

Master 1

Connections: Who Am I?

I was born on July 28, 1958.

I ran 5373 km across Canada in 143 days.

There are 14 schools and 15 roads in Canada named after me.

Marathons are held every year in my name in 52 countries.

I lost one of my legs to bone cancer when I was 18 years old.

Every year, people in close to 25 countries participate in
The National School Run Day.

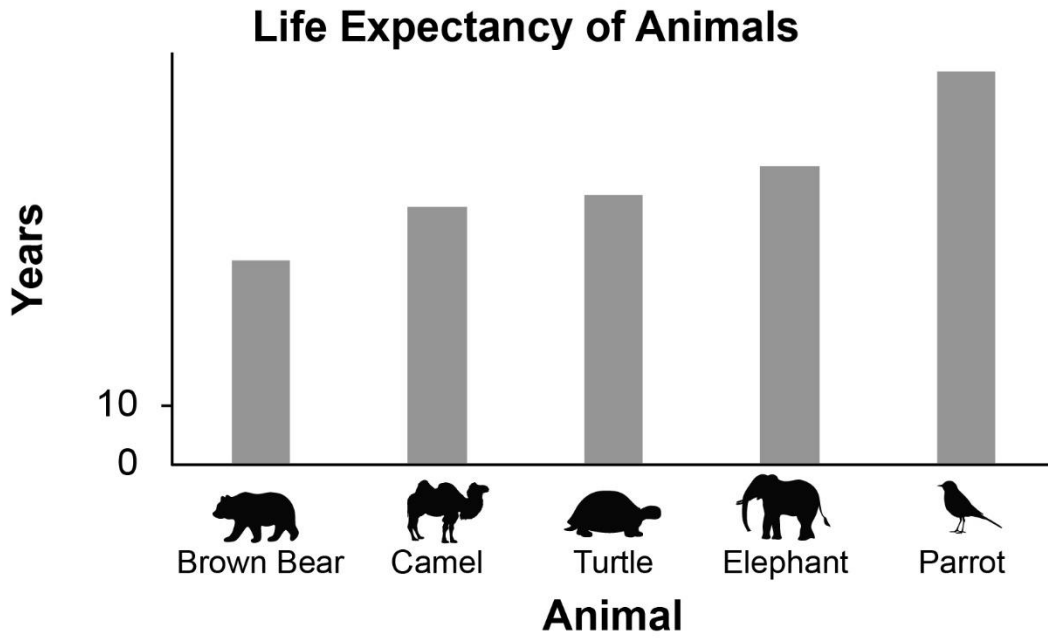
An 83-km section of the Trans-Canada Highway is named after
me to recognize my courage.

A 2639-m mountain in British Columbia is named in my honour.

Create your own *Who Am I?* poster.
Use as many numbers as you can.


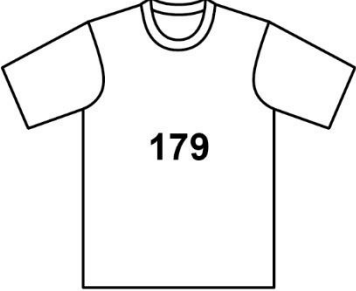
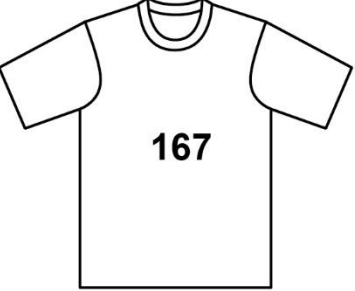






Master 2

Life Expectancy of Animals



Master 3a







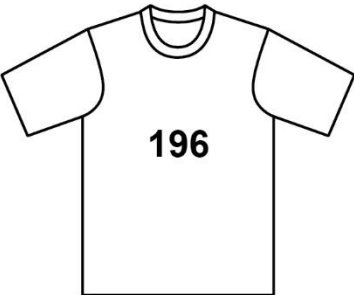


T-Shirt Cards

 <p>326</p>	 <p>179</p>	 <p>167</p>
 <p>234</p>	 <p>245</p>	 <p>267</p>
 <p>147</p>	 <p>314</p>	 <p>125</p>



Master 3b










T-Shirt Cards

 <p>379</p>	 <p>396</p>	 <p>411</p>
 <p>427</p>	 <p>479</p>	 <p>497</p>
 <p>196</p>	 <p>360</p>	 <p>407</p>



Master 3c









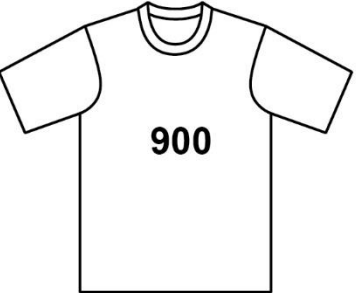
T-Shirt Cards

 <p>532</p>	 <p>523</p>	 <p>569</p>
 <p>598</p>	 <p>624</p>	 <p>656</p>
 <p>675</p>	 <p>699</p>	 <p>707</p>



Master 3d

T-Shirt Cards

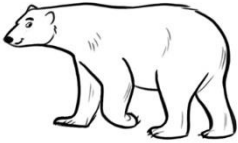
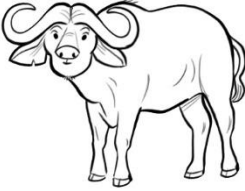
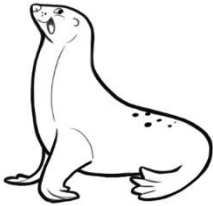

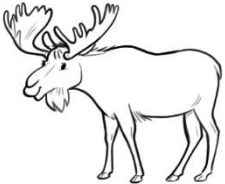

 <p>728</p>	 <p>758</p>	 <p>781</p>
 <p>811</p>	 <p>834</p>	 <p>849</p>
 <p>883</p>	 <p>501</p>	 <p>900</p>



Master 4

Connections: Animal Fun Facts

Order the animals from least to greatest mass.

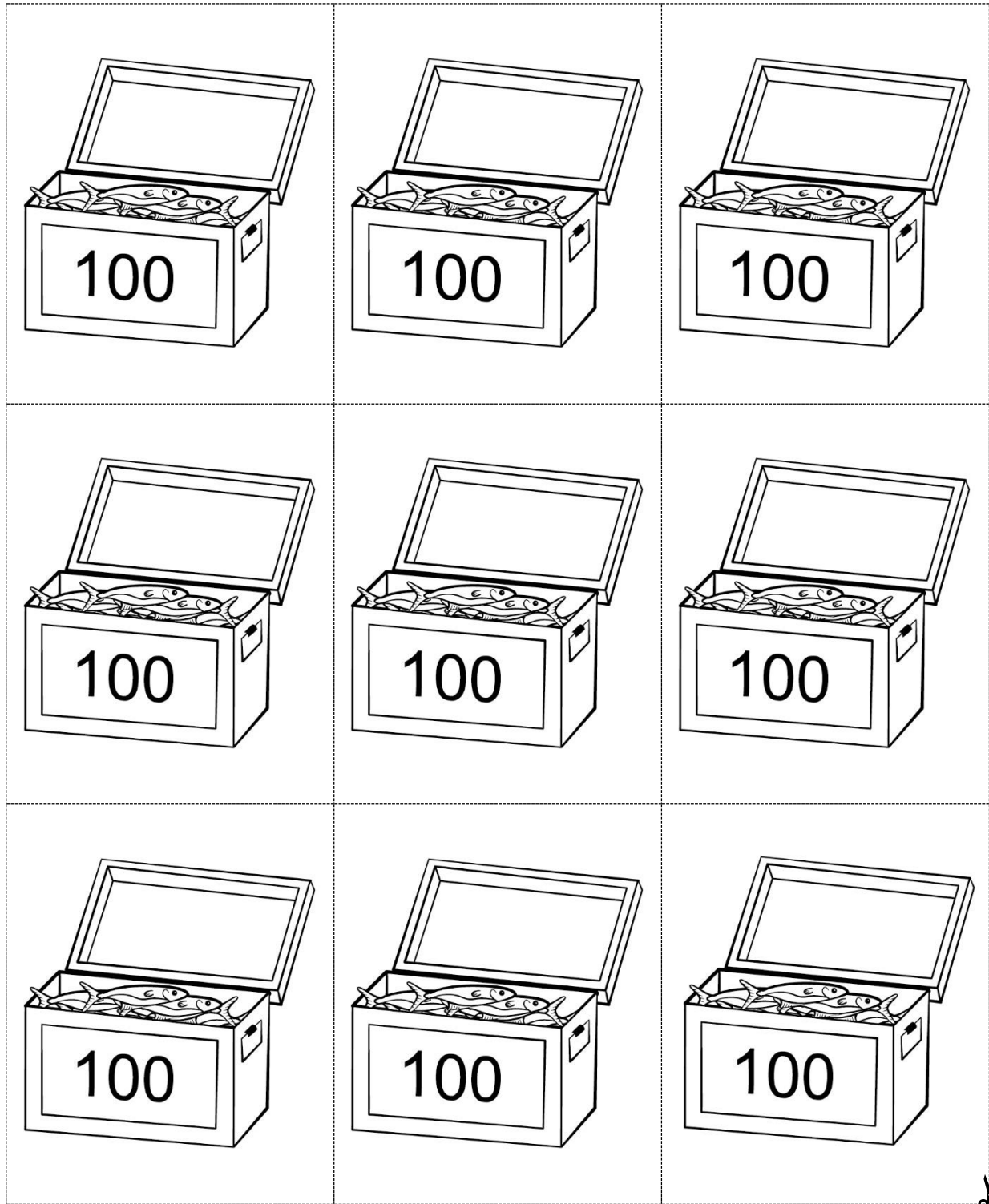
<p style="text-align: center;">Polar bear</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; border-radius: 10px; padding: 5px; font-size: 24px; font-weight: bold;">475 kg</div> </div> <p>Polar bears feed mostly on seals. They have a good sense of smell and can smell seals almost 2 km away.</p>	<p style="text-align: center;">Water buffalo</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; border-radius: 10px; padding: 5px; font-size: 24px; font-weight: bold;">725 kg</div> </div> <p>Water buffalo are sensitive to heat. They are known to roll in mud to help cool themselves down.</p>
<p style="text-align: center;">Seal</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; border-radius: 10px; padding: 5px; font-size: 24px; font-weight: bold;">425 kg</div> </div> <p>Seals have thick fur and blubber to protect them against freezing temperatures.</p>	<p style="text-align: center;">Brown bear</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; border-radius: 10px; padding: 5px; font-size: 24px; font-weight: bold;">278 kg</div> </div> <p>Brown bears dig caves with their long claws. They sleep in the caves for most of the winter.</p>
<p style="text-align: center;">Moose</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; border-radius: 10px; padding: 5px; font-size: 24px; font-weight: bold;">386 kg</div> </div> <p>Moose are excellent swimmers. They can swim 10 km per hour without a break for 2 hours.</p>	<p style="text-align: center;">Yak</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="border: 1px solid black; border-radius: 10px; padding: 5px; font-size: 24px; font-weight: bold;">667 kg</div> </div> <p>Yaks have very strong horns. They are used to break through snow to get plants that are buried below.</p>

Name _____

Date _____

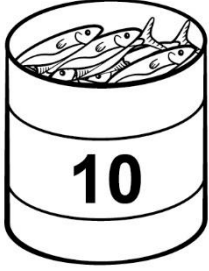
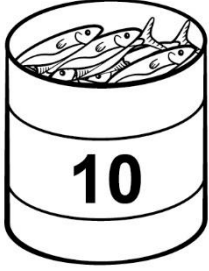
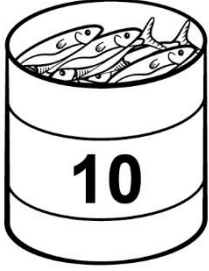
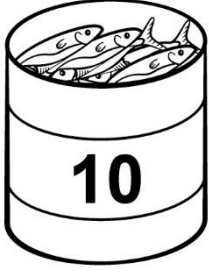
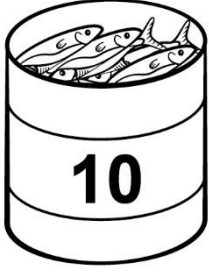
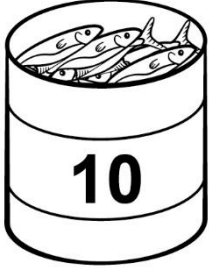
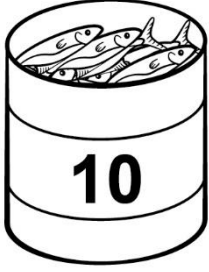
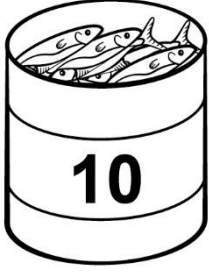
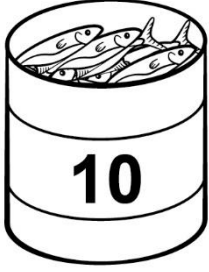
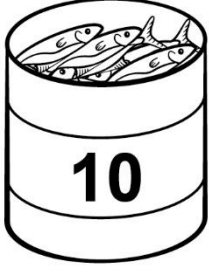
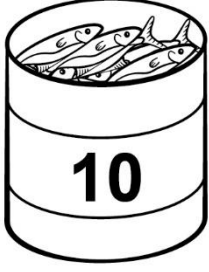
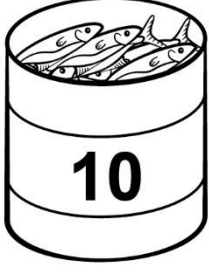
Master 5a

Base Ten Fish Cards



Master 5b

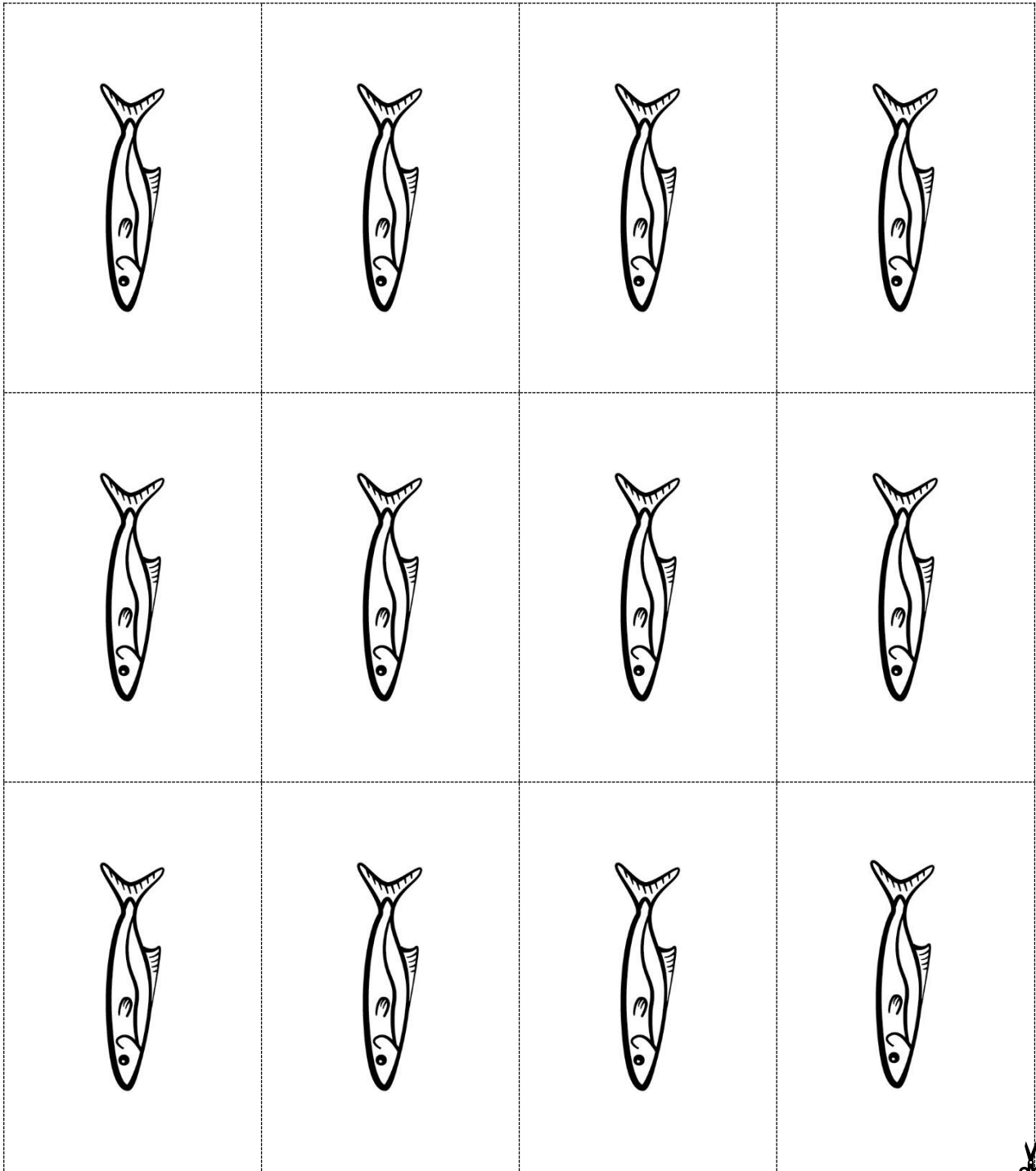
Base Ten Fish Cards

 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>
 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>
 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>
 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>	 <p>A cylindrical card with a fish illustration at the top and the number 10 in the center.</p>



Master 5c

Base Ten Fish Cards



Master 5d

Place-Value Riddles

<p>I have 3 hundreds, 25 tens, and 15 ones. What number am I?</p>	<p>I have 1 hundred, 84 tens, and 23 ones. What number am I?</p>
<p>I have 5 hundreds, 0 tens, and 38 ones. What number am I?</p>	<p>I have 6 hundreds, 18 tens, and 41 ones. What number am I?</p>
<p>I have 2 hundreds, 7 tens, and 32 ones. What number am I?</p>	<p>I have 4 hundreds, 30 tens, and 10 ones. What number am I?</p>








Master 6

Connections: Crack the Code!

Computers talk using only two numbers: 0 and 1.
This is called **Binary Code**.



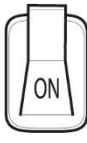

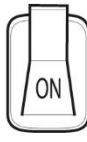
Think of a bunch of light switches being turned on and off.
We use 1 to show “On.”
We use 0 to show “Off.”

Number 6

	16	8	4	2	1
					
	0	0	1	1	0

The switches for 4 and 2 are “On.”
So, 00110 represents the number 4 + 2, or 6.

Number 15

	16	8	4	2	1
					
	0	1	1	1	1

The switches for 8, 4, 2, and 1 are “On.”
So, 01111 represents the number 8 + 4 + 2 + 1, or 15.

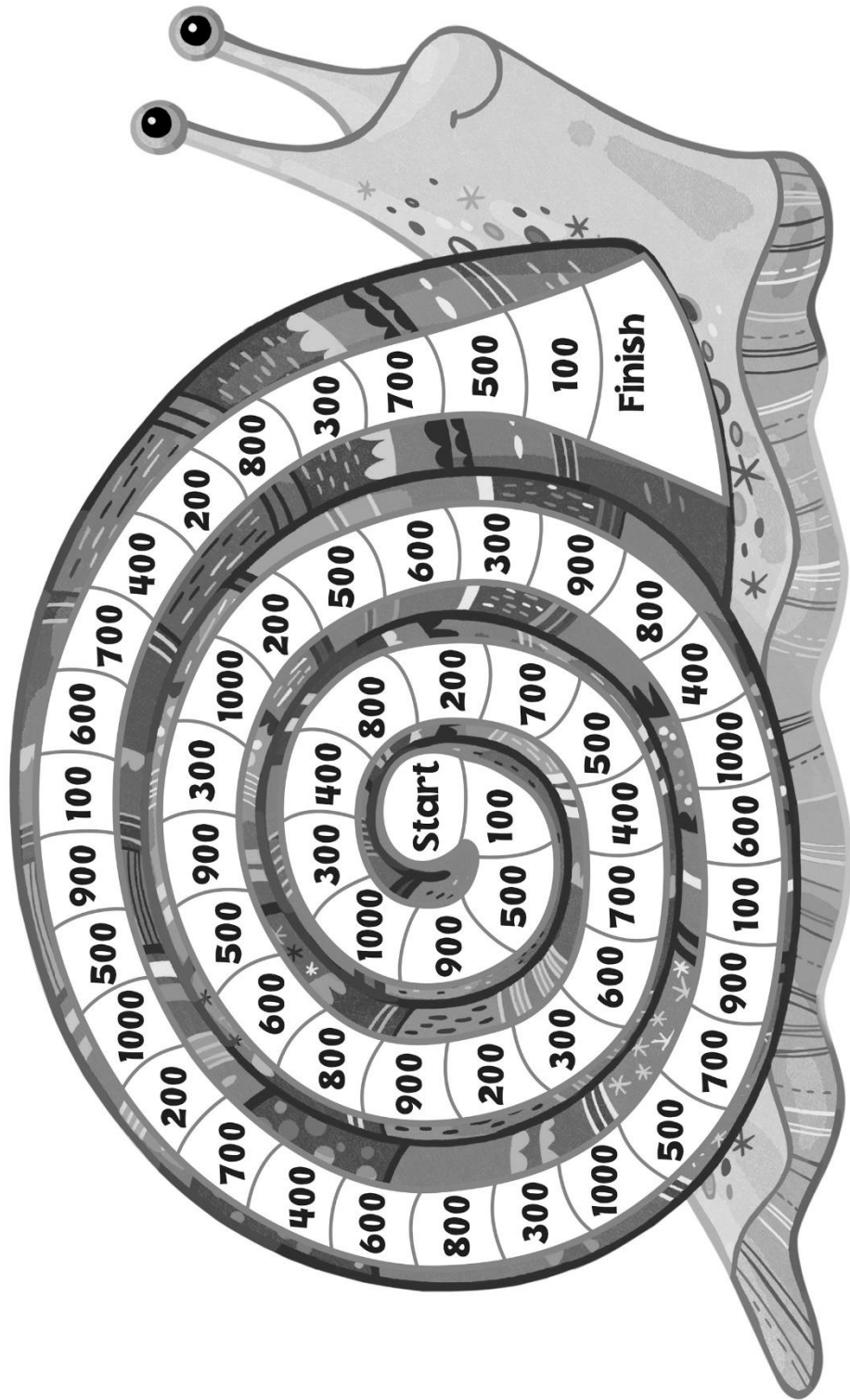
Crack the Code to find these numbers:

- a) 1 1 1 1 1 b) 1 0 0 0 1 c) 0 1 1 1 0

Use Binary Code to show 8, 9, and 10.

Master 7

Round We Go!



Name _____ Date _____

Master 8a

Paper Shapes

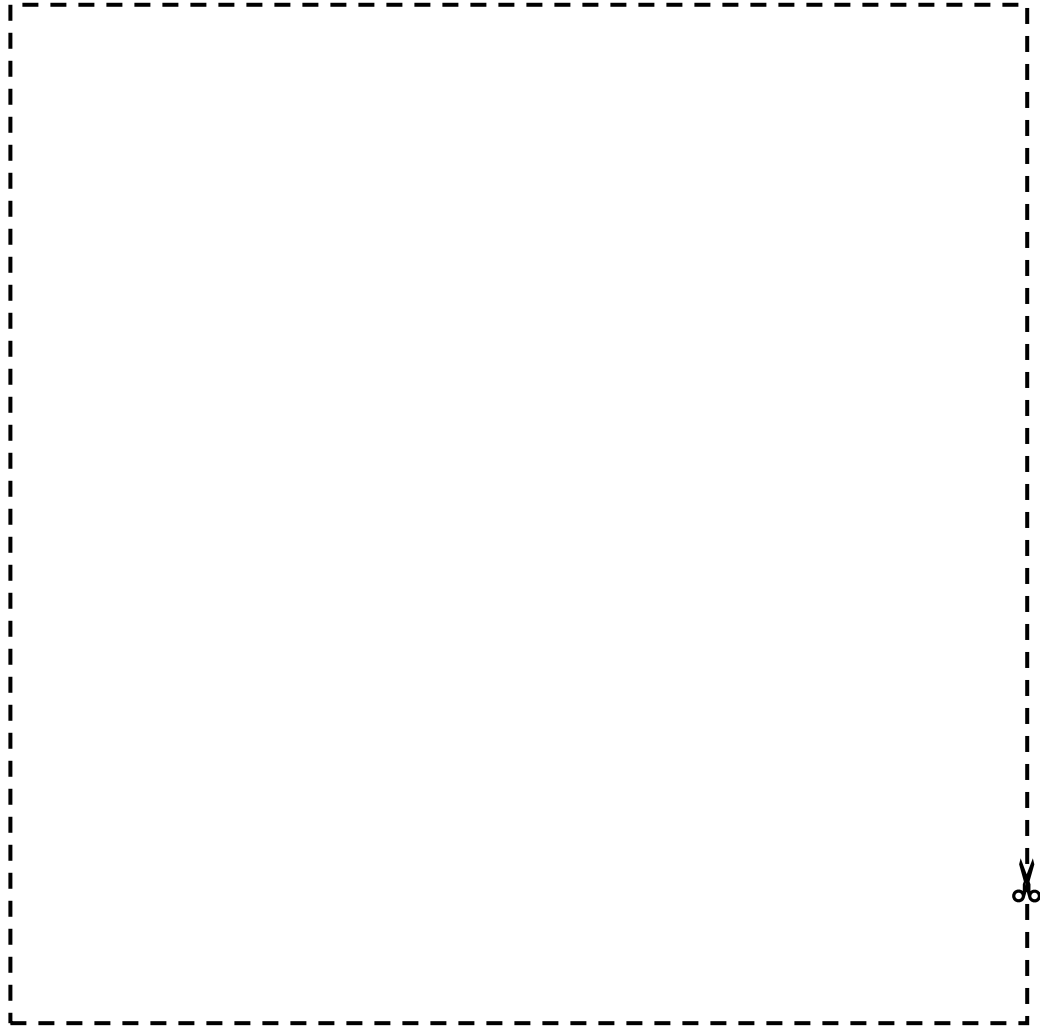
Paper Rectangles



Master 8b

Paper Shapes (cont'd)

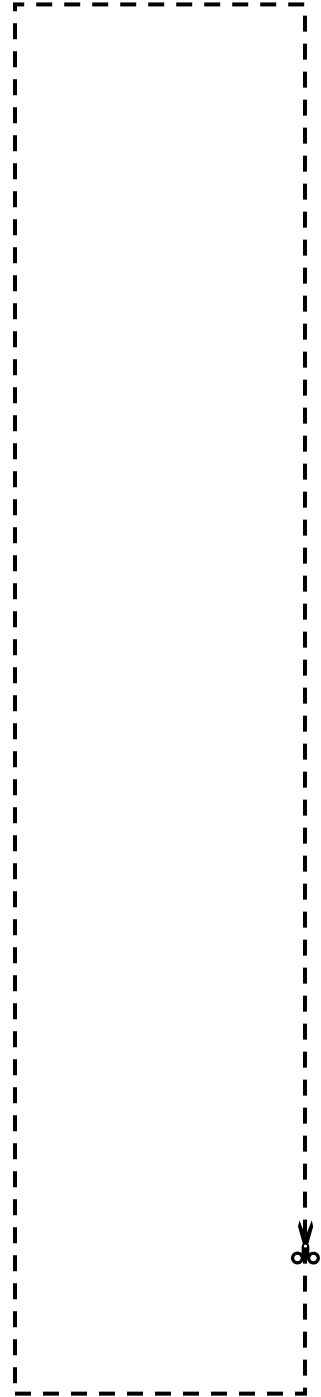
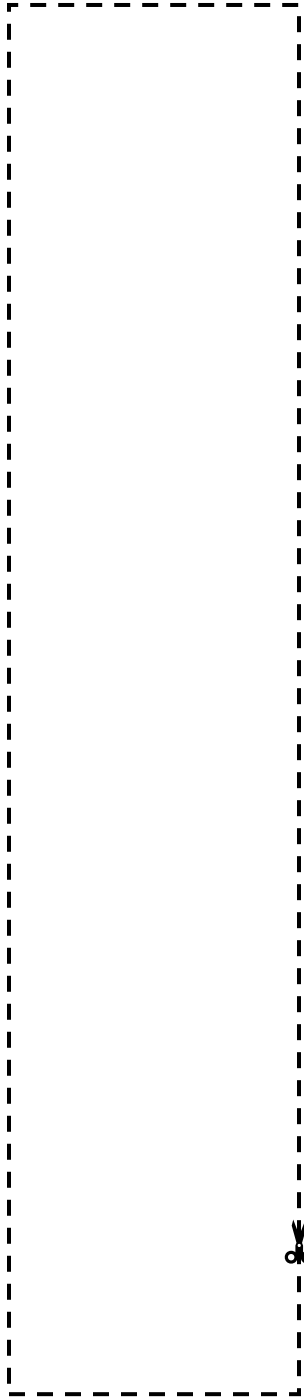
Paper Square



Master 8c

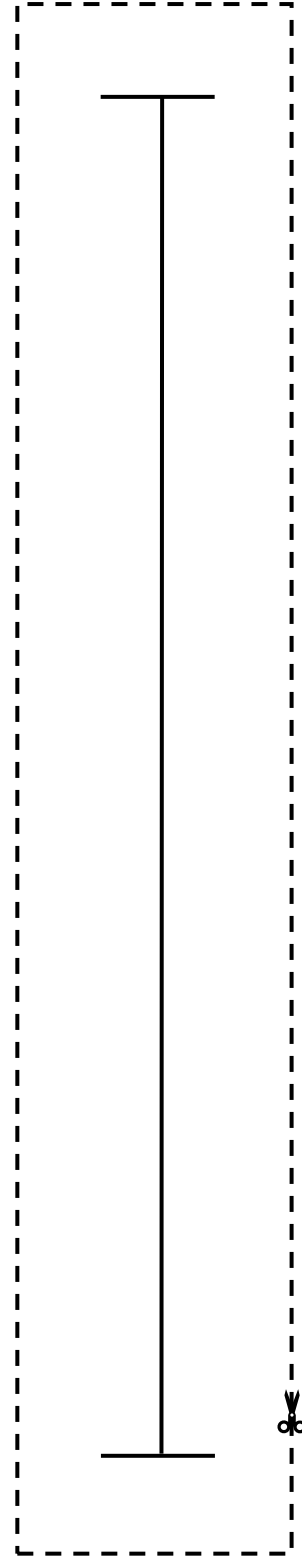
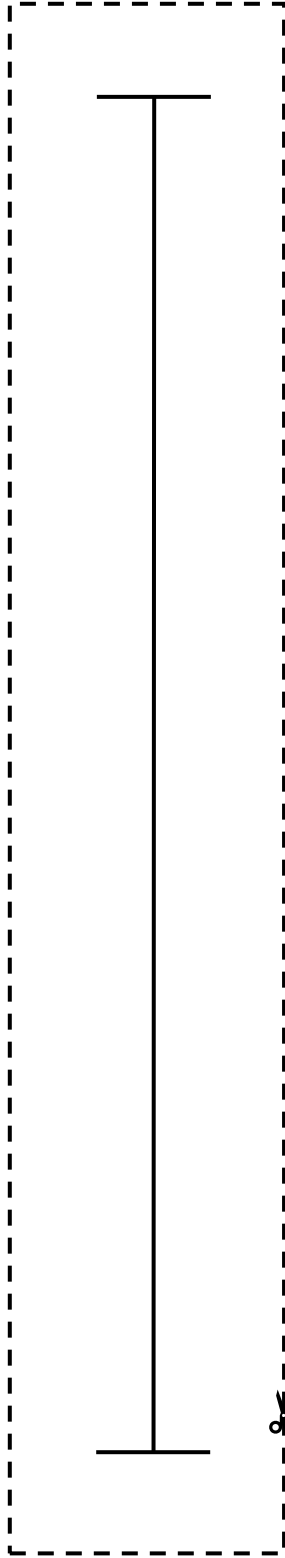
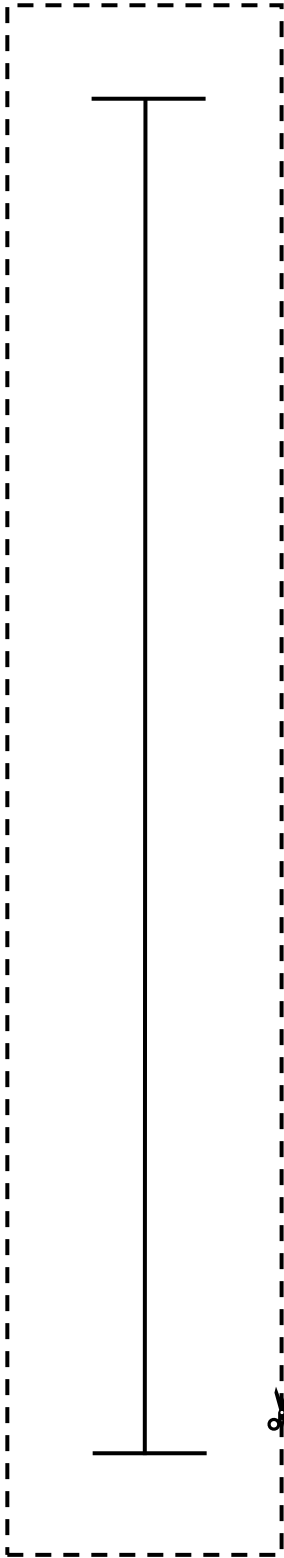
Paper Shapes (cont'd)

Paper Strips



Master 9

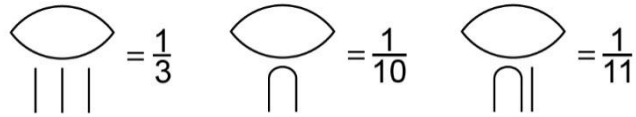
Number Lines



Master 10

Connections: Fraction Frenzy

Many, many years ago, Egyptian mathematicians wrote fractions like this:



How do you think Egyptians would have written $\frac{1}{7}$? $\frac{1}{14}$?

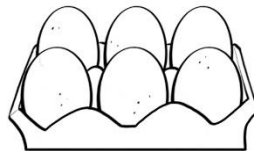
Have you ever wondered why we call 25¢ a quarter? The word *quarter* comes from a Latin word that means “four.” In French, the word for four is *quatre*! So, *quarter* means one-fourth of something. Since 25 cents is one-fourth of a dollar, we call this coin “a quarter.”



How many times do you hear fraction words in one day?



“It’s half past one!”



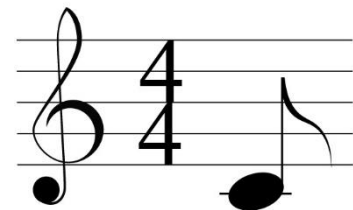
“I bought half a dozen eggs!”



“Please pass me the five-eighths wrench.”



“The store is having a half-price sale!”



“This is an eighth note C.”

Listen carefully for the rest of the day. What fraction words do you hear?

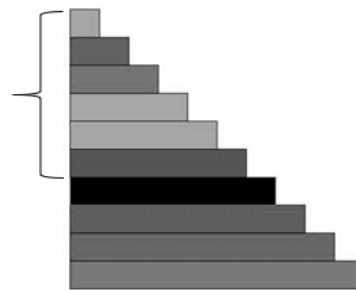
Filling Fractions! Instructions

Group size: 2

Materials:

- Student Card 10: Filling Fractions! (2 per pair)
- Paper bags of Relational Rods (1 of each of the first 6 rods per bag, 2 bags per pair)
- Dry-erase markers (2 per pair)

1 of each of the
first 6 rods per bag



Goal: To be the first to colour all your fraction parts

Instructions:

Player A: Without looking, take one rod from each bag.

Put the shorter rod on top of the longer rod, aligned at one end.

The longer rod is the whole.

What fraction have you modelled?

Colour parts of strips on your game board to show that fraction.

For example, for $\frac{3}{5}$, colour three parts of a strip showing fifths.

Player B: Take a turn.

Continue to take turns until one of you colours all your fraction parts.

Story Problems

12 students are on the school bus.
13 students get on at the next stop.
How many students are now on the bus?



Join, result unknown: $12 + 13 = ?$

A farmer is selling 78 cobs at her corn stand.
By lunch time, she has 23 cobs left.
How many cobs did she sell?



Separate, change unknown: $78 - ? = 23$

Freddy the fox has some eggs for winter in his den.
He collects 17 more eggs.
Now he has 45 eggs.
How many eggs did Freddy have to begin with?



Join, start unknown: $? + 17 = 45$

Anna lives 78 m from the school.
Brooklyn lives 14 m farther away than Anna.
How far does Brooklyn live from the school?



Compare, larger section unknown: $78 + 14 = ?$

Master 13a

Game Cards: Mental Math

<p>M</p> <p style="text-align: center;">$48 + 51$</p> <p>Points Roll 1 number cube.</p>	<p>M</p> <p style="text-align: center;">$65 + 17$</p> <p>Points Roll 2 number cubes. Make a 2-digit number.</p>	<p>M</p> <p style="text-align: center;">$63 + 321$</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>
<p>M</p> <p style="text-align: center;">$55 + 45$</p> <p>Points Roll 3 number cubes. Make the smallest 3-digit number.</p>	<p>M</p> <p style="text-align: center;">$374 - 139$</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>	<p>M</p> <p style="text-align: center;">$519 + 21$</p> <p>Points Roll 2 number cubes. Make the bigger 2-digit number.</p>
<p>M</p> <p style="text-align: center;">$272 + 17$</p> <p>Points Roll 1 number cube.</p>	<p>M</p> <p style="text-align: center;">$469 - 24$</p> <p>Points Roll 2 number cubes. Make a 2-digit number.</p>	<p>M</p> <p style="text-align: center;">$691 - 345$</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>
<p>M</p> <p style="text-align: center;">$834 + 156$</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>	<p>M</p> <p style="text-align: center;">$778 - 369$</p> <p>Points Roll 2 number cubes. Make the bigger 2-digit number.</p>	<p>M</p> <p style="text-align: center;">$435 + 519$</p> <p>Points Roll 3 number cubes. Make the smallest 3-digit number.</p>

Master 13b

Game Cards: Story Problems

<p>P</p> <p>Blue Team scored 48 points in Round 1 of the bean bag toss. They scored 91 points in Round 2. How many points do they have now?</p> <p>Points Roll 1 number cube.</p>	<p>P</p> <p>Red Team has 74 points. They are disqualified in Round 2 and have to take away 39 points. How many points do they have left?</p> <p>Points Roll 2 number cubes. Make a 2-digit number.</p>	<p>P</p> <p>Billy burst 12 balloons at the Balloon Pop. Billy burst 5 fewer balloons than Betty. How many balloons did Betty burst?</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>
<p>P</p> <p>Team Orange had 56 points after Round 1. They had 94 points after Round 2. How many points did they get in Round 2?</p> <p>Points Roll 3 number cubes. Make the smallest 3-digit number.</p>	<p>P</p> <p>Team Blue has 121 more points than Team Red. Team Blue has 257 points. How many points does Team Red have?</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>	<p>P</p> <p>There were 42 students in line for Tug-of-War. Some students left the line. Now there are 27 students in line. How many students left the line?</p> <p>Points Roll 2 number cubes. Make the bigger 2-digit number.</p>



Master 13c

Game Cards: Story Problems

<p>P</p> <p>The Balloon Pop game used 571 balloons. There were 850 balloons to start. How many balloons are left?</p> <p>Points Roll 1 number cube.</p>	<p>P</p> <p>Tilly scored 86 points at the three-legged race. That gave her a total of 197 points. How many points did she have before the three-legged race?</p> <p>Points Roll 2 number cubes. Make a 2-digit number.</p>	<p>P</p> <p>276 students and 19 teachers participated in Fun Day. How many people participated altogether?</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>
<p>P</p> <p>Becky took 33 jumps in the sack race before she fell. That is 9 more jumps than Oliver took. How many jumps did Oliver take?</p> <p>Points Roll 2 number cubes. Make the smaller 2-digit number.</p>	<p>P</p> <p>This year, 295 people participated in Fun Day. Last year, 332 people participated. How many more people participated last year?</p> <p>Points Roll 1 number cube.</p>	<p>P</p> <p>276 ribbons were given out. There were 118 ribbons left. How many ribbons were there to start with?</p> <p>Points Roll 1 number cube.</p>



Master 14

Connections: How Many Minutes? Seconds?



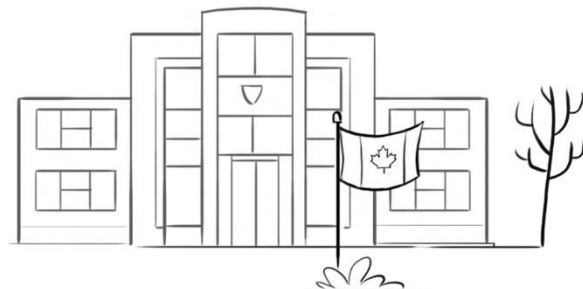
Grace brushes her teeth for 2 minutes every morning. That is 120 seconds.



She takes 3 minutes to get dressed. That is 180 seconds.



She takes 5 minutes to eat her breakfast. That is 300 seconds.



She takes 6 minutes to walk from her house to school. That is 360 seconds.

How many minutes does Grace spend getting ready for school altogether? How many seconds?

How many minutes and seconds do you take?

Pawty Planning

It's time to plan a Birthday Pawty for **10** adorable dogs.



To play party games, divide dogs into equal teams.

Games

Tug of War: Teams of 2

Go Fetch: Teams of 3

Obstacle Course: Teams of 5

Hide-and-Seek: Teams of 4

It's time to plan a Birthday Pawty for **4** playful cats.



To make loot bags, share treats among 4 bags.

Treats

8 Toy Mice

20 Cat Treats

15 Toy Feathers

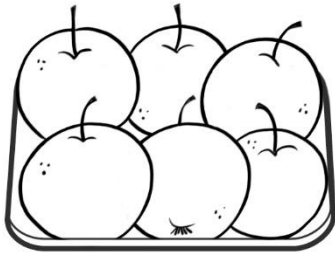
12 Dental Treats

5 Play Balls

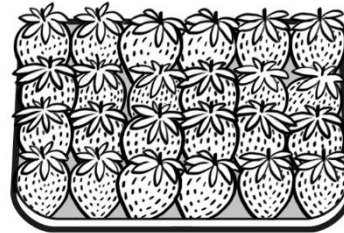
Master 16

Connections: Arrays at the Store

An array is a way of organizing items in equal rows and columns. If you look around the grocery store, you will find many arrays. Why do you think items are packaged in arrays?

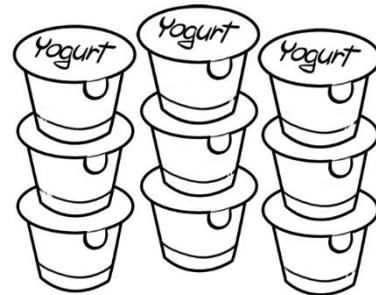
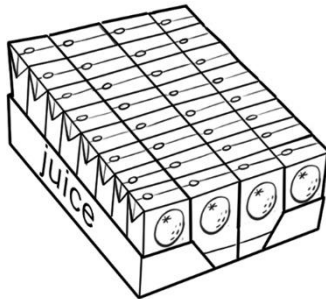


Apples

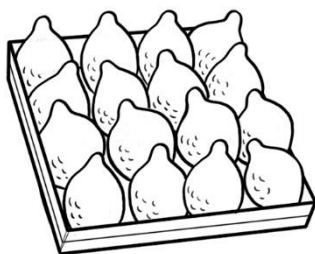


Strawberries

Arrays are a very efficient way to store and package goods. They save space and help us know how many without counting by ones.



Find how many are in each picture. How did you find out?



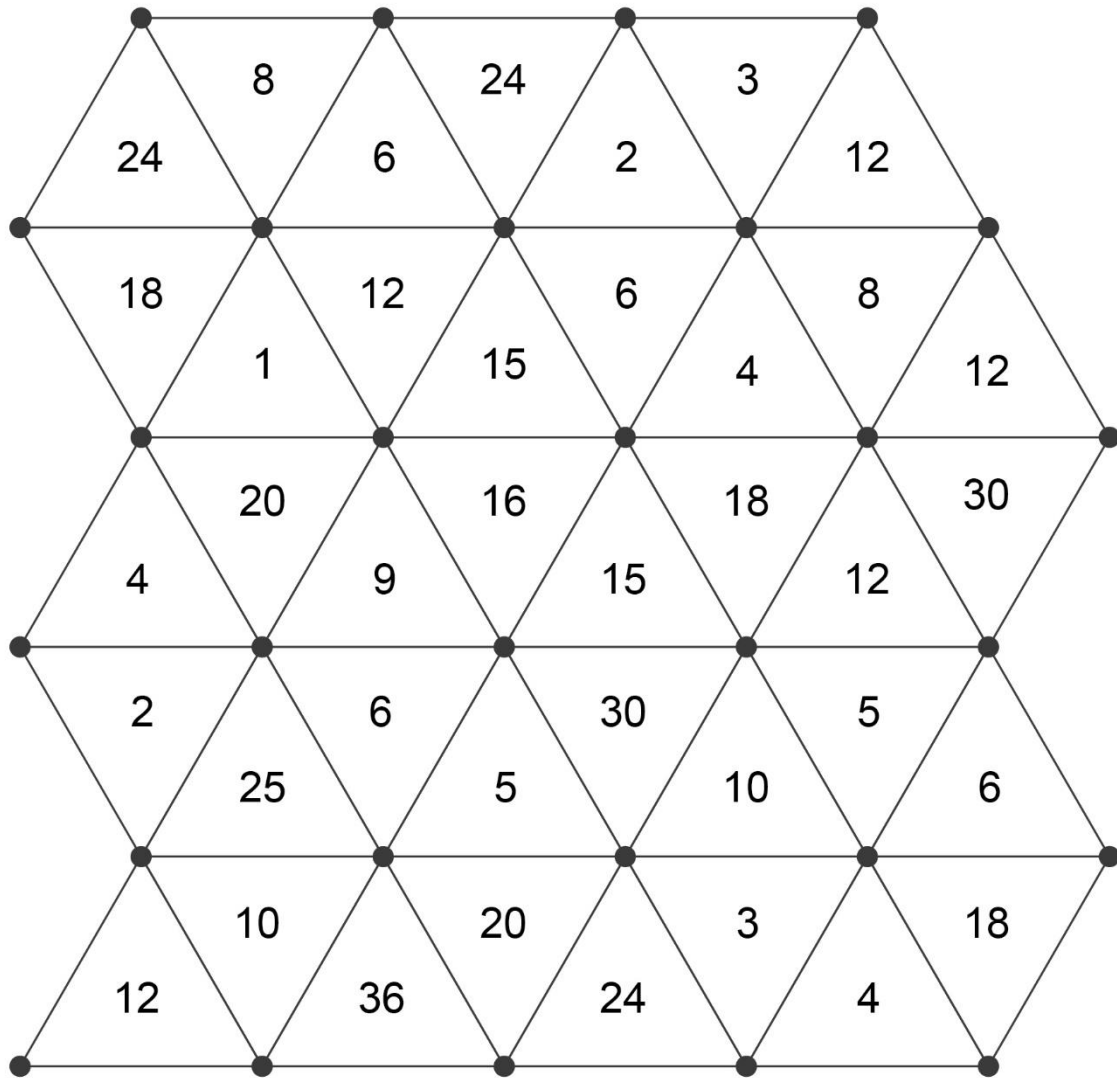
Lemons



The next time you are in a grocery store, take pictures of some arrays you see and share them with the class.

Master 17

Multiplication Triangles Game Board



Master 18a

Divide Me! Game Cards

2	3	4
5	6	8
9	10	12
15	16	18



Name _____ Date _____

Master 18b

Divide Me! Game Cards

20	24	25
30	36	12
18	20	30
6	24	15



Master 18c

Divide Me! Game Cards

7	21	27
35	42	48
54	60	63
64	72	81



Master 19

Multiplication Squares Instructions

Group size: 2

Materials:

- Student Card 17A: Multiplication Squares (or Math Mat 24: Square Dot Paper)
- Math Mat 37: Spinner
- Pencil and paper clip for pointer
- 2 dry-erase markers (different colours)

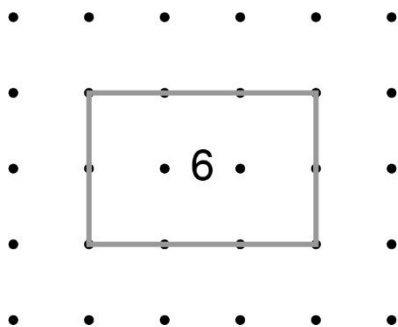
Instructions:

Write a 1 before the 0 on Math Mat 37: Spinner to make the number 10.

Take turns spinning the spinner twice and drawing a matching array on the grid.

Write the product inside the array.

For example, if you spin a 2 and a 3, you can draw an array of 2 rows of 3 squares, or 3 rows of 2 squares.



Continue to take turns until one of you runs out of room and cannot draw an array.

The other player wins.

Note: Arrays cannot overlap.

***Divide Me!* Instructions**

Group size: 2

Materials:

- Master 18: *Divide Me!* Game Cards
- Math Mat 37: Spinner
- Pencil and paper clip for pointer

Goal: To be the first to have no cards left in your hand

Instructions:

Write a 1 before the 0 on the spinner to make the number 10.

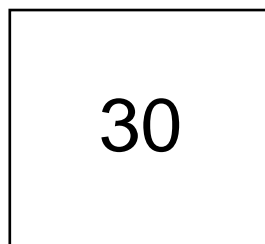
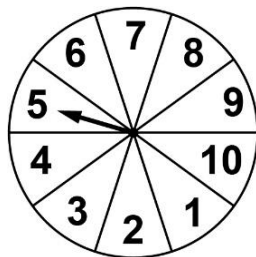
Deal 6 cards each.

Place the remaining cards, face down, in a pile.

Player A: Spin the spinner.

Find a number in your hand that can be divided into groups of that size (with no leftovers).

If you find a card, say the division sentence, then place the card on the table.



$$30 \div 5 = 6$$

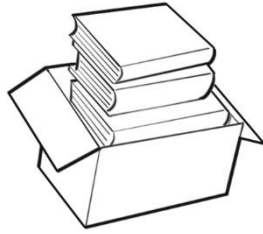
If you can't find a card, take a card from the pile.

Player B: Take a turn.

Continue to take turns until one of you has no cards left in your hand.

Master 22a

Thrift Store Items (Cents)



Books: 10¢



Toy truck: 30¢



Stuffed animal: 15¢



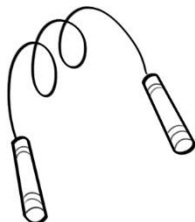
Bracelet: 20¢



Soccer ball: 40¢



Puzzle: 50¢



Skipping rope: 25¢



Bicycle bell: 45¢

Master 22b

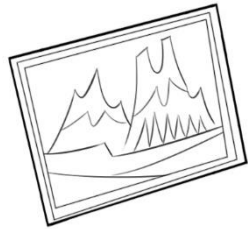
Thrift Store Items (Dollars)



Lamp: \$14



Computer monitor: \$10



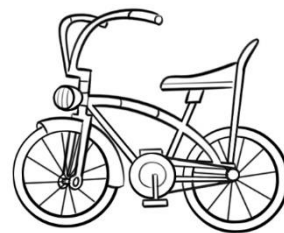
Picture: \$12



Sofa: \$55



Golf clubs: \$38



Bicycle: \$27




Suitcase: \$9



Radio: \$18

Master 23

Connections: Canadian Coins—Did You Know?


<p style="text-align: center;">Toonie (2 dollars)</p>  <ul style="list-style-type: none"> - replaced paper \$2 bill in 1996 - a two-colour coin - picture of polar bear - issued special toonie in 2008 to recognize the 400th anniversary of Quebec City 	<p style="text-align: center;">Loonie (1 dollar)</p>  <ul style="list-style-type: none"> - replaced paper \$1 bill in 1987 - picture of a loon, the national bird of Canada - issued special loonie in 2005 to honour Terry Fox 	<p style="text-align: center;">Quarter (25 cents)</p>  <ul style="list-style-type: none"> - worth one quarter of a dollar - picture of a caribou, one of Canada's most recognizable animals - issued poppy quarter in 2004 in honour of Remembrance Day
<p style="text-align: center;">Dime (10 cents)</p>  <ul style="list-style-type: none"> - smallest coin by size - has picture of a famous Canadian sailboat, the Bluenose - issued special dime in 2001 to honour the millions of Canadians who volunteer to help others 	<p style="text-align: center;">Nickel (5 cents)</p>  <ul style="list-style-type: none"> - was originally made from nickel - has picture of a beaver, an official symbol of Canada - issued Victory nickel in 2005 to remember 60 years since end of World War II 	<p style="text-align: center;">Penny (1 cent)</p>  <ul style="list-style-type: none"> - stopped being used in 2013 - cost more than 1 cent to make - picture of maple leaves - until 1996, the penny had 12 sides so it was easier for people with vision problems to identify it

Look for examples of some of these coins in your piggy bank.
 Did you find any of the special coins?
 Design a coin of your choice to honour or celebrate a special event.
 Explain why you chose the design you did.


Master 24

What's My Pattern?

Representation Cards

Use a number line.	Use a hundred chart.
Draw a picture.	Use linking cubes or Base Ten Blocks. 

Number Pattern Cards

44, 40, 36, ...	100, 95, 90, ...
1, 4, 7,	20, 26, 32, ...
12, 10, 8, ...	17, 20, 24, 29, ... 

Master 25a

Number String Cards

Extend the number string.

457 = 4 hundreds + 2 tens + 37 ones
457 = 4 hundreds + 1 ten + 47 ones
457 = 4 hundreds + 0 tens + 57 ones
457 = 3 hundreds + 10 tens + 7 ones
457 = 3 hundreds + 9 tens + 17 ones

Extend the number string.

$357 - 3 = 354$
 $357 - 6 = 351$
 $357 - 9 = 348$
 $357 - 12 = 345$
 $357 - 15 = 342$

Create a number string that involves subtraction.

$562 - \underline{\quad\quad} = \underline{\quad\quad}$

Create a number string using multiplication facts for 9.



Number String Cards (cont'd)**Find** the missing numbers.

$$80 \div 8 = 10$$

$$72 \div 8 = 9$$

$$\underline{\quad} \div 8 = 8$$

$$56 \div 8 = \underline{\quad}$$

$$48 \div \underline{\quad} = 6$$

$$\underline{\quad} \div 8 = 5$$

Find the missing numbers.

$$495 + 6 = 501$$

$$497 + 8 = 505$$

$$\underline{\quad} + 10 = 509$$

$$501 + \underline{\quad} = 513$$

$$503 + 14 = \underline{\quad}$$

$$505 + 16 = \underline{\quad}$$

Extension

Create your own number string that involves addition or subtraction.

Extension

Create your own number string that involves multiplication or division.



Master 25c

Number String Cards (Accommodations)

Extend the string.

$$20 + 2 = 22$$

$$24 + 2 = 26$$

$$28 + 2 = 30$$

$$32 + 2 = 34$$

$$36 + 2 = 38$$

Extend the string.

$$65 - 5 = 60$$

$$65 - 10 = 55$$

$$65 - 15 = 50$$

$$65 - 20 = 45$$

$$65 - 25 = 40$$

Create a number string that involves addition.

$$16 + \underline{\quad} = \underline{\quad}$$

Find the missing numbers.

$$59 = 5 \text{ tens} + 9 \text{ ones}$$

$$59 = 4 \text{ tens} + 19 \text{ ones}$$

$$59 = \underline{\quad} \text{ tens} + 29 \text{ ones}$$

$$\underline{\quad} = 2 \text{ tens} + \underline{\quad} \text{ ones}$$

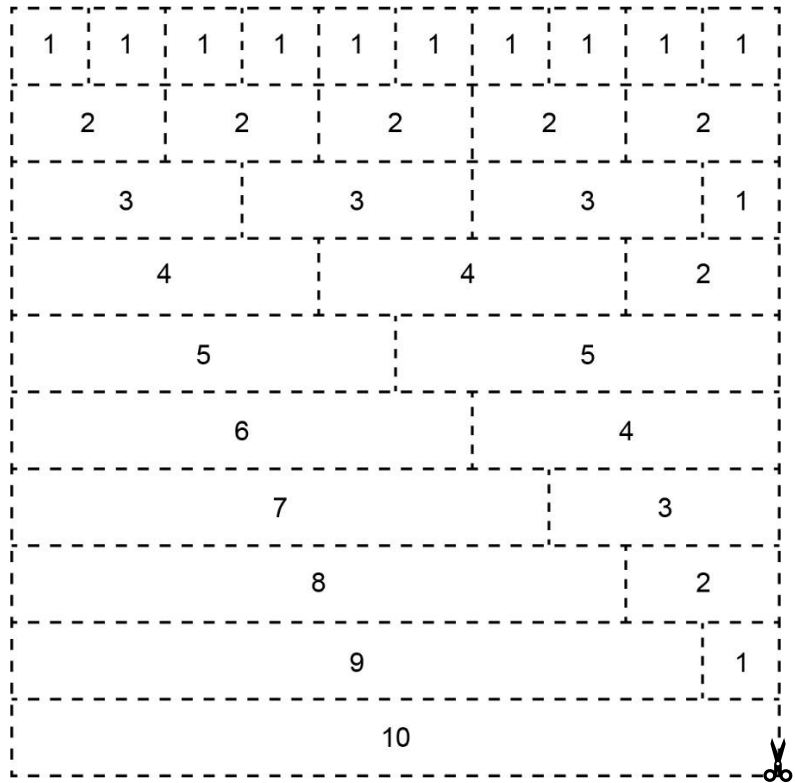
$$59 = 1 \text{ ten} + 49 \text{ ones}$$

$$59 = \underline{\quad} \text{ tens} + 59 \text{ ones}$$



Master 26

Relational Rods



Master 27a

Expression Cards

$37 + 12 \square 60 - 11$

$49 + 25 \square 47 + 27$

$7 \times 8 \square 29 + 26$

$62 - 18 \square 58 - 15$

$81 \div 9 \square 66 - 57$

$5 \times 8 \square 7 \times 6$

$20 \div 5 \square 12 \div 4$

$4 \times 9 \square 6 \times 6$



Master 27b

Expression Cards (Accommodations)

$7 + 12 \square 20 - 1$

$5 + 6 \square 8 + 3$

$2 \times 5 \square 2 + 9$

$15 - 5 \square 13 - 2$

$20 \div 5 \square 10 - 6$

$3 \times 4 \square 5 \times 3$

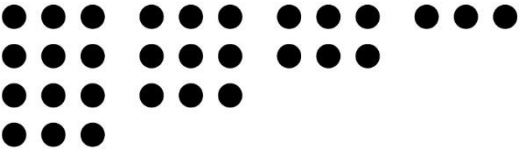
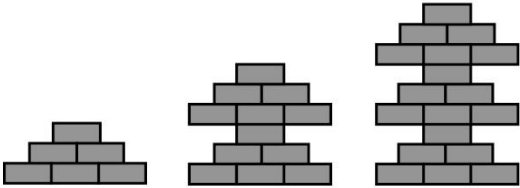
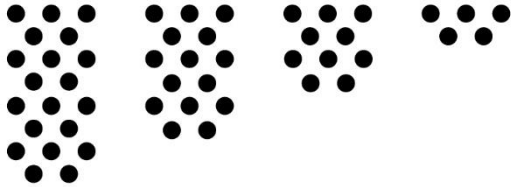

$10 \div 5 \square 6 \div 2$

$1 \times 8 \square 2 \times 4$




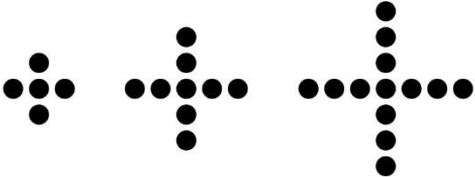

Master 28a

Fun Day! Patterning Cards (M)

<p>M</p> <p>What is the pattern rule?</p> 	<p>M</p> <p>What is the pattern rule?</p> 
<p>M</p> <p>What is the pattern rule?</p> 	<p>M</p> <p>What is the pattern rule?</p> <p>100, 98, 96, 94, ...</p>
<p>M</p> <p>Use this rule to create a pattern.</p> <p>Start at 27 and add 5 each time.</p>	<p>M</p> <p>Use this rule to create a pattern.</p> <p>Start at 31 and take away 3 each time.</p> 

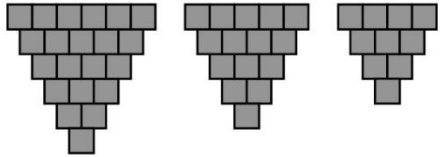
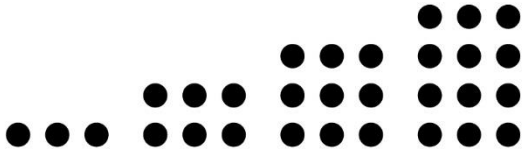
Master 28b

Fun Day! Patterning Cards (M)

<p>M</p> <p>Use this rule to create a pattern.</p> <p>Start at 1 and add 6 each time.</p>	<p>M</p> <p>Use this rule to create a pattern.</p> <p>Start at 335 and take away 9 each time.</p>
<p>M</p> <p>Show this pattern another way.</p> 	<p>M</p> <p>Show this pattern another way.</p> 
<p>M</p> <p>Show this pattern another way.</p> <p>545, 547, 549, 551, ...</p>	<p>M</p> <p>Show this pattern another way.</p> <p>87, 83, 79, 75, ...</p> 

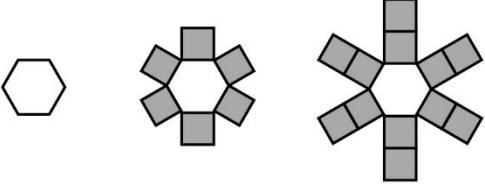
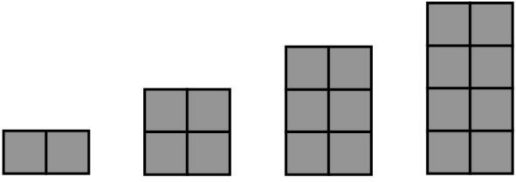
Master 28c

Fun Day! Patterning Cards (P)

<p>P</p> <p>Extend the pattern by 2 more terms.</p> <p>200, 196, 192, 188, ...</p>	<p>P</p> <p>Extend the pattern by 2 more terms.</p> <p>113, 116, 119, 122, ...</p>
<p>P</p> <p>Extend the pattern by 2 more terms.</p> <p>35, 29, 23, 17, ...</p>	<p>P</p> <p>Extend the pattern by 2 more terms.</p> <p>5, 10, 15, 20, ...</p>
<p>P</p> <p>Extend the pattern. Draw one term before and after these terms.</p> 	<p>P</p> <p>Extend the pattern by 2 more terms.</p> 

Master 28d

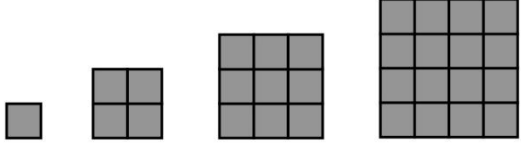
Fun Day! Patterning Cards (P)

<p>P</p> <p>Extend the pattern by 2 more terms.</p> 	<p>P</p> <p>Extend the pattern by 2 more terms.</p> 
<p>P</p> <p>Find the term ♥ represents.</p> <p>6, 11, 16, 21, ♥, 31, 36, ...</p>	<p>P</p> <p>Find the term ★ represents.</p> <p>303, 300, 297, ★, 291, 288, ...</p>
<p>P</p> <p>Find and correct the error.</p> <p>120, 129, 138, 146, 156, ...</p>	<p>P</p> <p>Find and correct the error.</p> <p>48, 40, 32, 25, 16, 8, ...</p>



Master 28e

Fun Day! Patterning Cards (P)

<p>P</p> <p>Find the terms B and A represent in the pattern.</p> <p>B, 6, 12, 18, 24, A, ...</p>	<p>P</p> <p>Extend the pattern by 2 more terms.</p> 
<p>P</p> <p>Are these expressions equivalent?</p> <p>$52 + 48$ $35 + 65$</p>	<p>P</p> <p>Are these expressions equivalent?</p> <p>$31 + 56$ $42 + 47$</p>
<p>P</p> <p>Are these expressions equivalent?</p> <p>$73 - 46$ $81 - 57$</p>	<p>P</p> <p>Are these expressions equivalent?</p> <p>$64 - 29$ $89 - 54$</p>
<p>P</p> <p>Are these expressions equivalent?</p> <p>$23 + 26$ $89 - 40$</p>	<p>P</p> <p>Are these expressions equivalent?</p> <p>$51 - 38$ $9 + 4$</p>



Master 29

Connections: Vyshyvanka

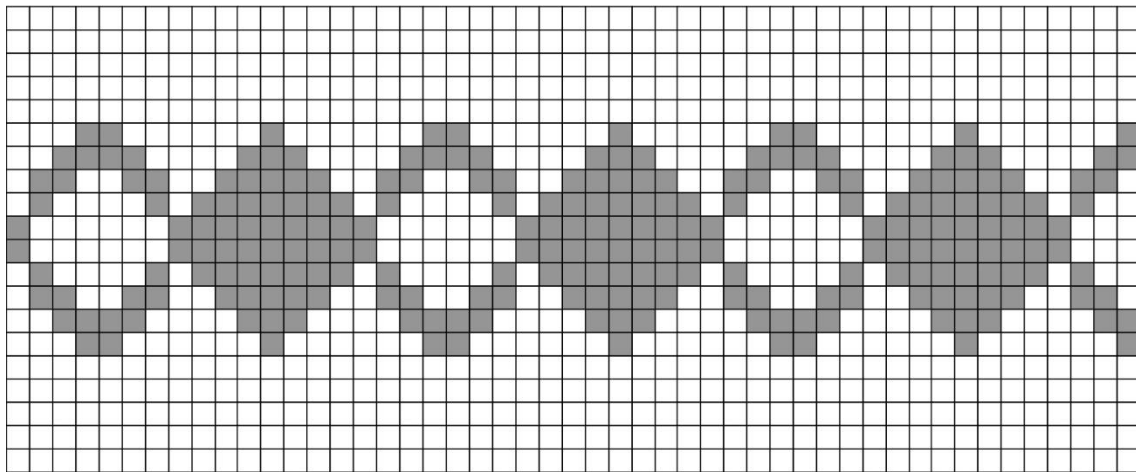
Vyshyvanka is the Ukrainian name for embroidered shirt.



Ukrainian embroidery often contains hidden meanings.

When people embroider shirts or blouses for others, they include symbols that are meant to protect them or bring good luck.

What increasing or decreasing pattern do you see in the stitches?



Copy the pattern on a grid.
What is the pattern rule?

Do some research to learn about the meaning of different symbols in this type of embroidery.

Master 30

Connections: Patterns in Nature

We often think of a pattern as something that repeats again and again in the same way.



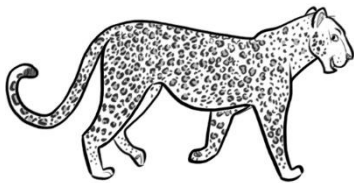
In nature, patterns can be found everywhere, including on animals, plants, and in the sky.

A zebra's stripes form a pattern, although no two stripes are exactly the same.

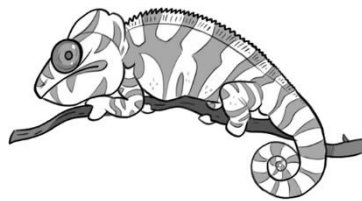


Zebra

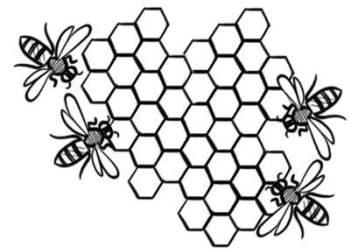
What patterns do you see?



Leopard



Chameleon



Honeycomb

Look around you. What patterns do you see?

Name _____ Date _____

Master 31a

Our Pattern Recording Sheet

Circle two attributes to change.

Shape Size Colour Thickness Orientation

Pattern for first attribute: _____

Pattern for second attribute: _____

Pattern core: _____

Core with letters: _____

Our pattern:

The numeric translation of our pattern: _____

Name _____ Date _____

Master 31b

Our Pattern Recording Sheet

Our growing or shrinking pattern:

The pattern rule is: _____

The numeric translation of our pattern: _____

The table of values of our pattern:

Section	Number of Tiles
1	
2	
3	
4	
5	
6	

The repeated operation of our pattern: _____

Master 32

Estimating Length

Measure	Personal Referent
1 mm	
1 cm	
10 cm	
1 m	
1 km	

Use your personal referents.
Estimate each measure.

Object	Referent Used	Estimate
Height of a water bottle		
Height of a desk		
Width of an eraser		
Width of a pencil tip		
Width of the whiteboard		
Width of a paper clip		
Length of a paper clip		
Height of classroom door		
Length of a square Pattern Block		
Width of a sheet of paper		
Width of classroom		
Length of 12 city blocks		
Distance from your home to school		
Distance from your home to a friend's home		
Your choice _____		

Master 33

How Long Is It?

Part A: How Long Is the String?

Rod or Cube Used	Length of Rod or Cube (cm)	Length of String (cm)

Is the string 1 m long? 1000 mm long? _____

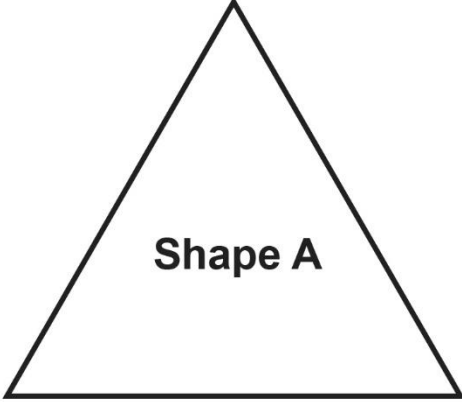

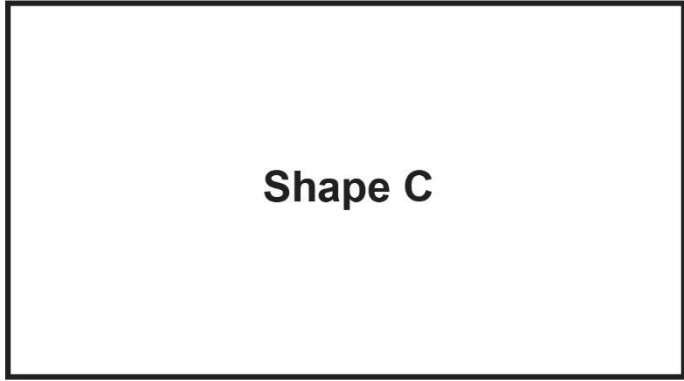
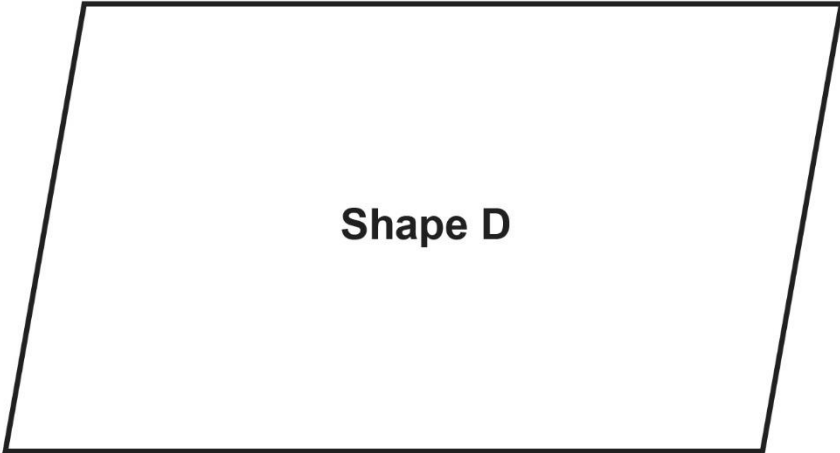
How do you know? _____

Part B: How Long Is It?

Object	Estimate	Measure
Width of the door		
Height of the window		
Width of the classroom		
Thickness of a counter		
Thickness of a paper clip		
Length of the carpet		
Your choice _____		

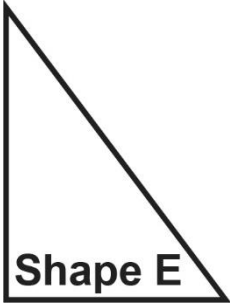
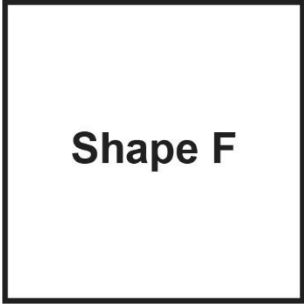
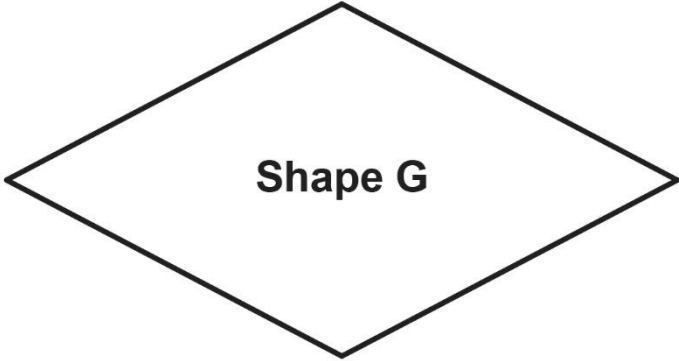
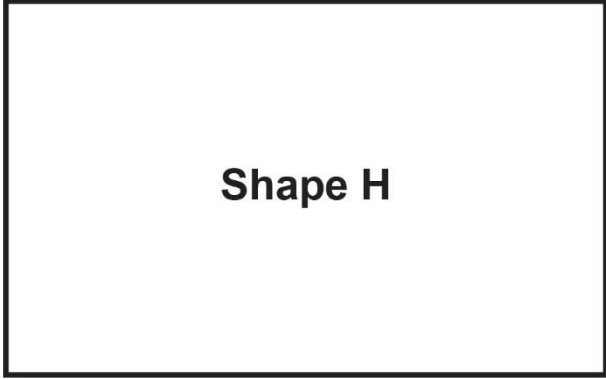
Master 34a

2-D Shapes

 <p>Shape A</p>	 <p>Shape B</p>
 <p>Shape C</p>	
 <p>Shape D</p>	

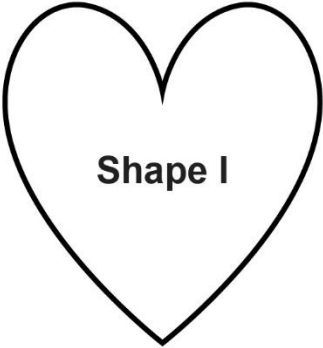
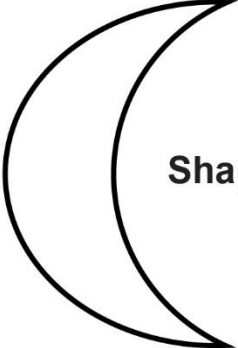
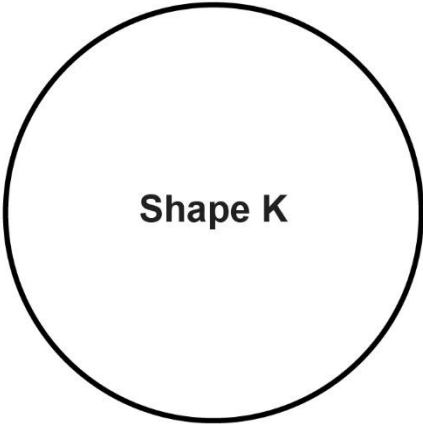
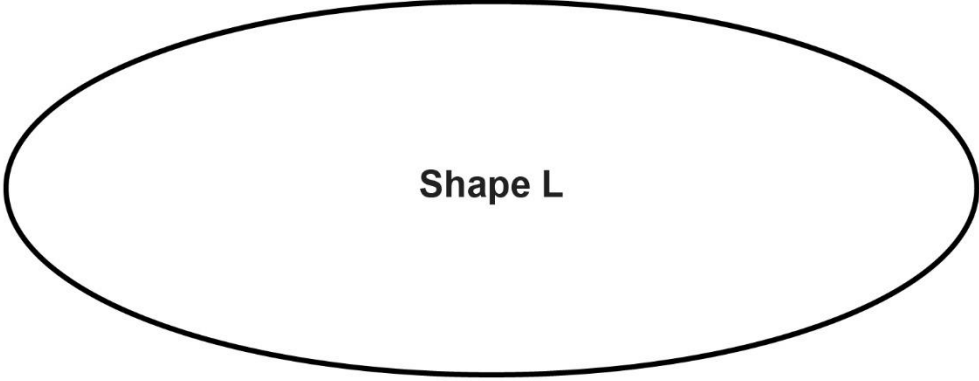
Master 34b

2-D Shapes

 <p>Shape E</p>	 <p>Shape F</p>
 <p>Shape G</p>	
 <p>Shape H</p>	

Master 34c

2-D Shapes

 <p>Shape I</p>	 <p>Shape J</p>
 <p>Shape K</p>	
 <p>Shape L</p>	

Name _____ Date _____

Master 35

3-D Objects Recording Sheet

Height			
Width			
Length			
Object			

Name _____ Date _____

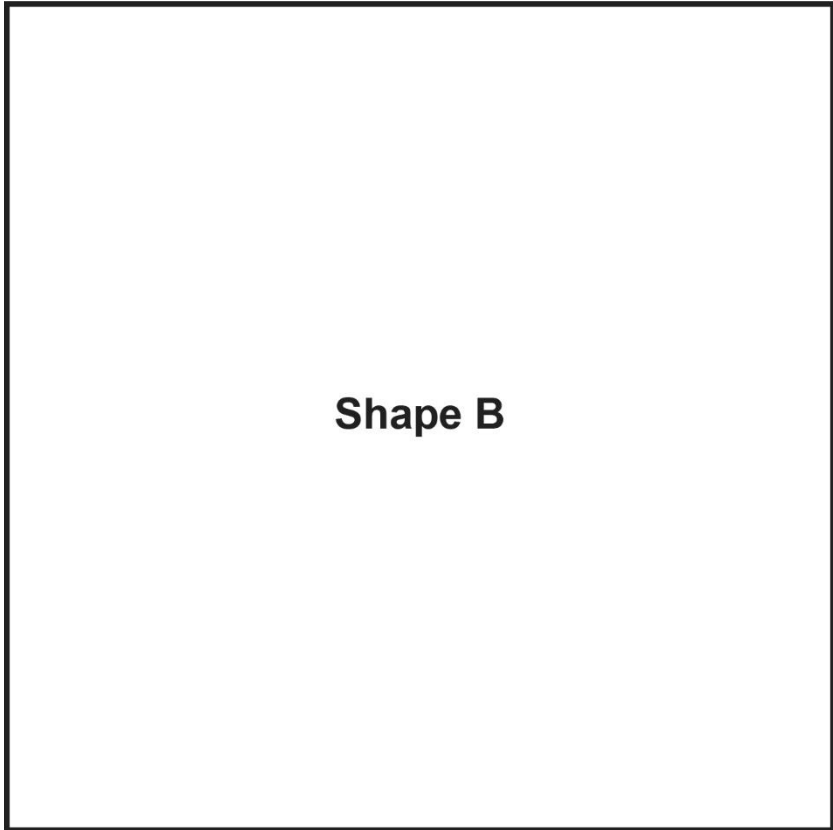
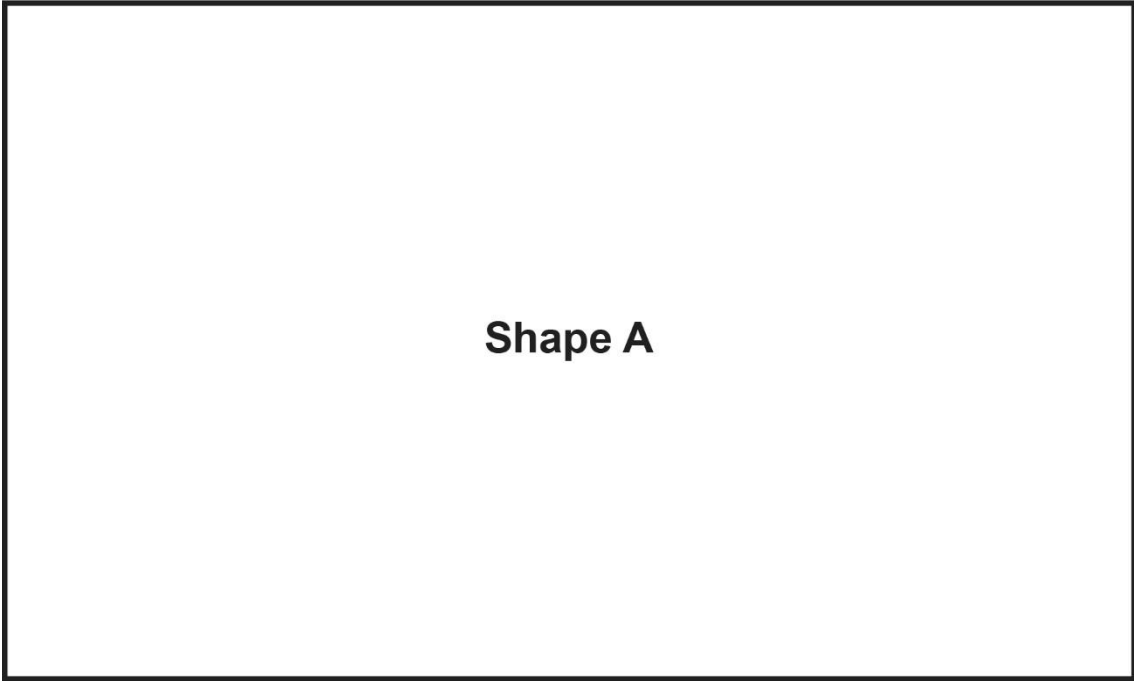
Master 36

Distance Around

Measure				
Estimate				
Measuring Unit				
Item				

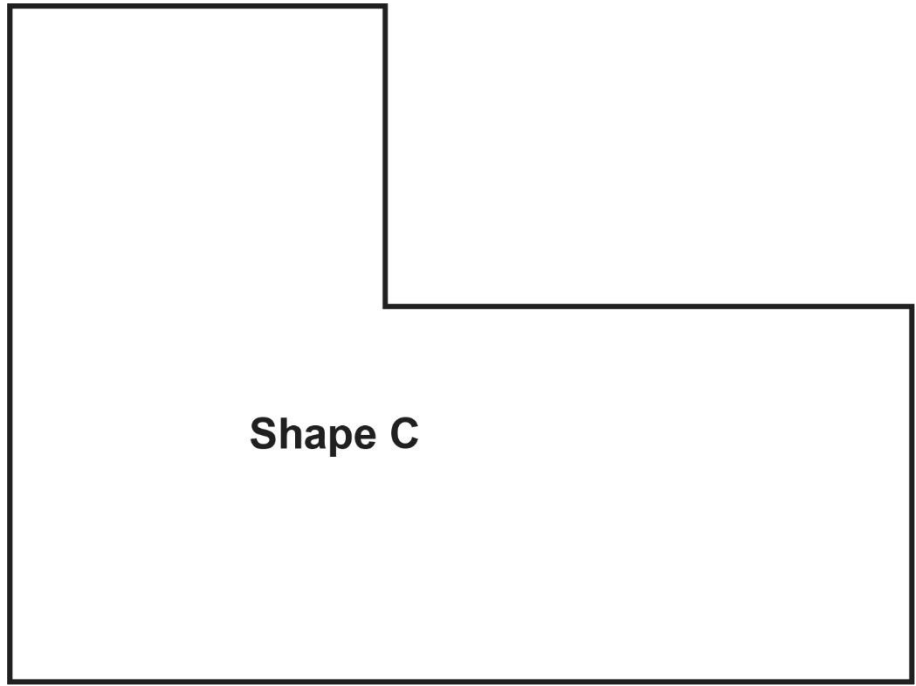
Master 37a

Perimeter Shapes



Master 37b

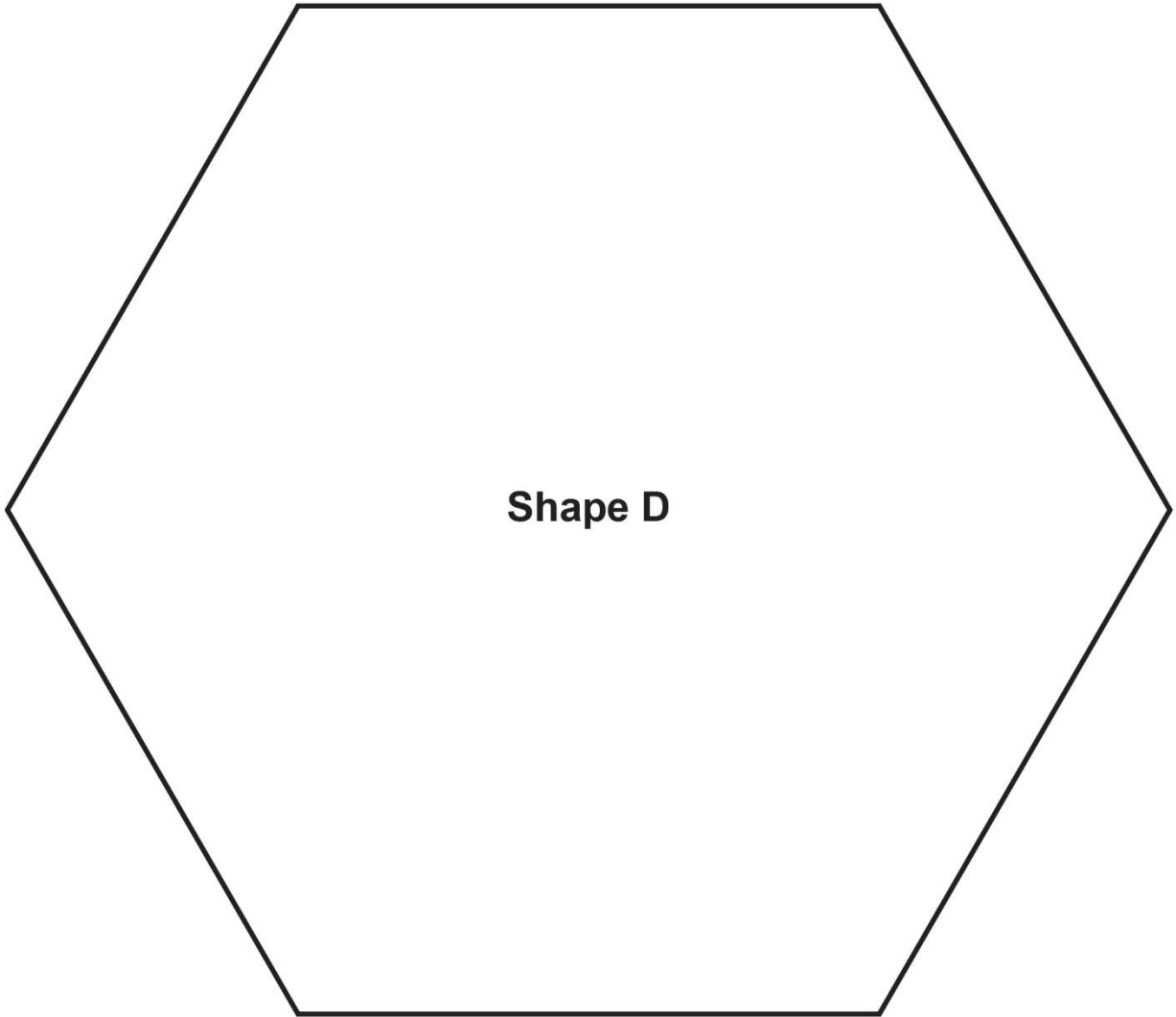
Perimeter Shapes



Name _____ Date _____

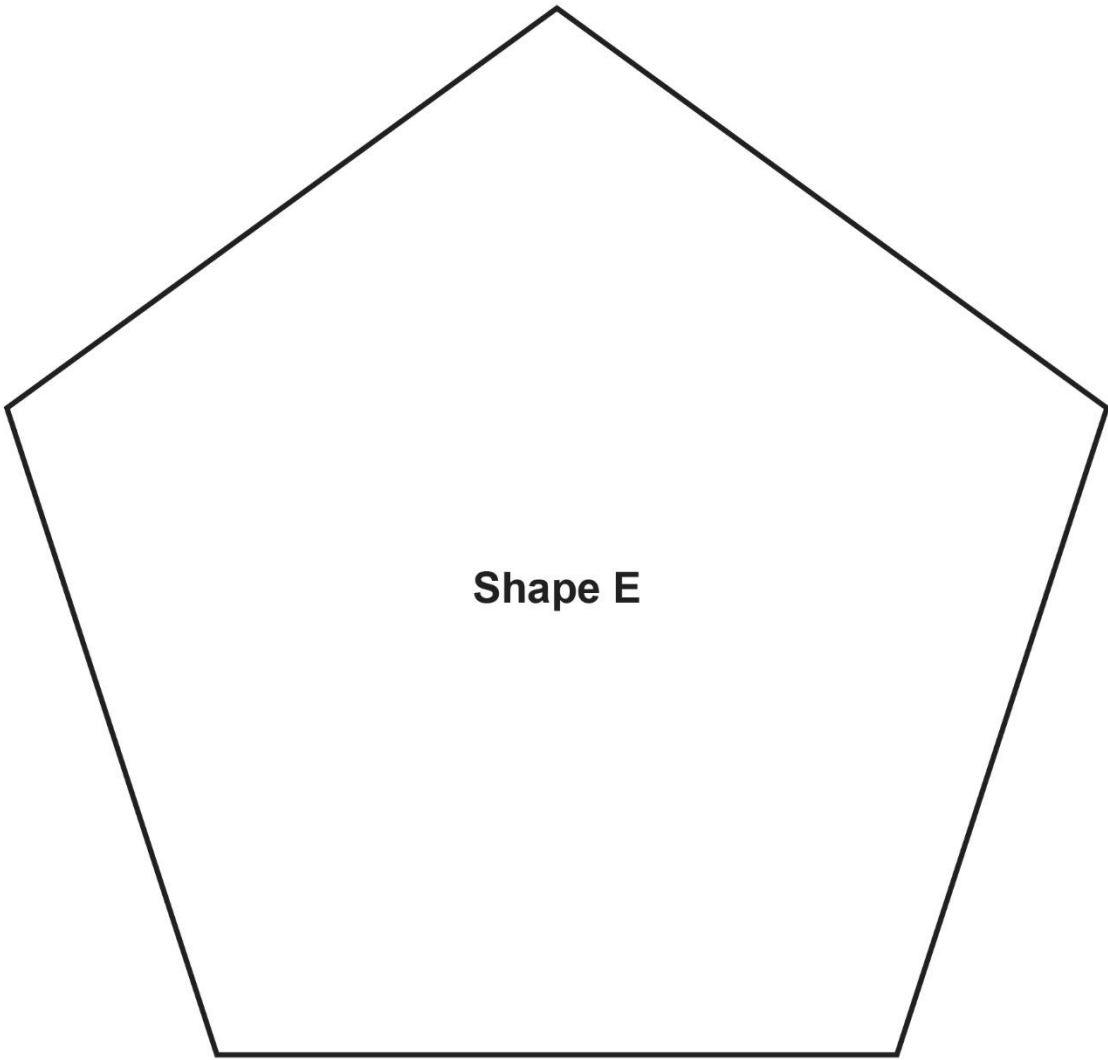
Master 37c

Perimeter Shapes



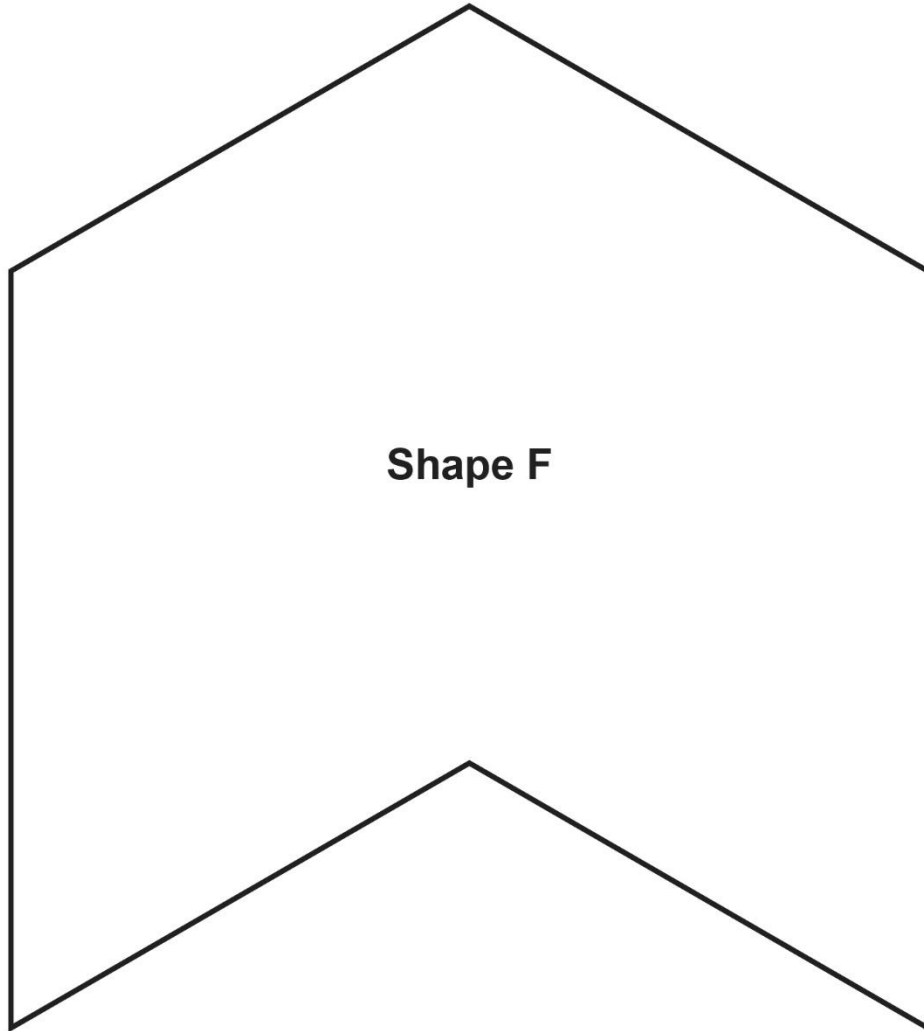
Master 37d

Perimeter Shapes



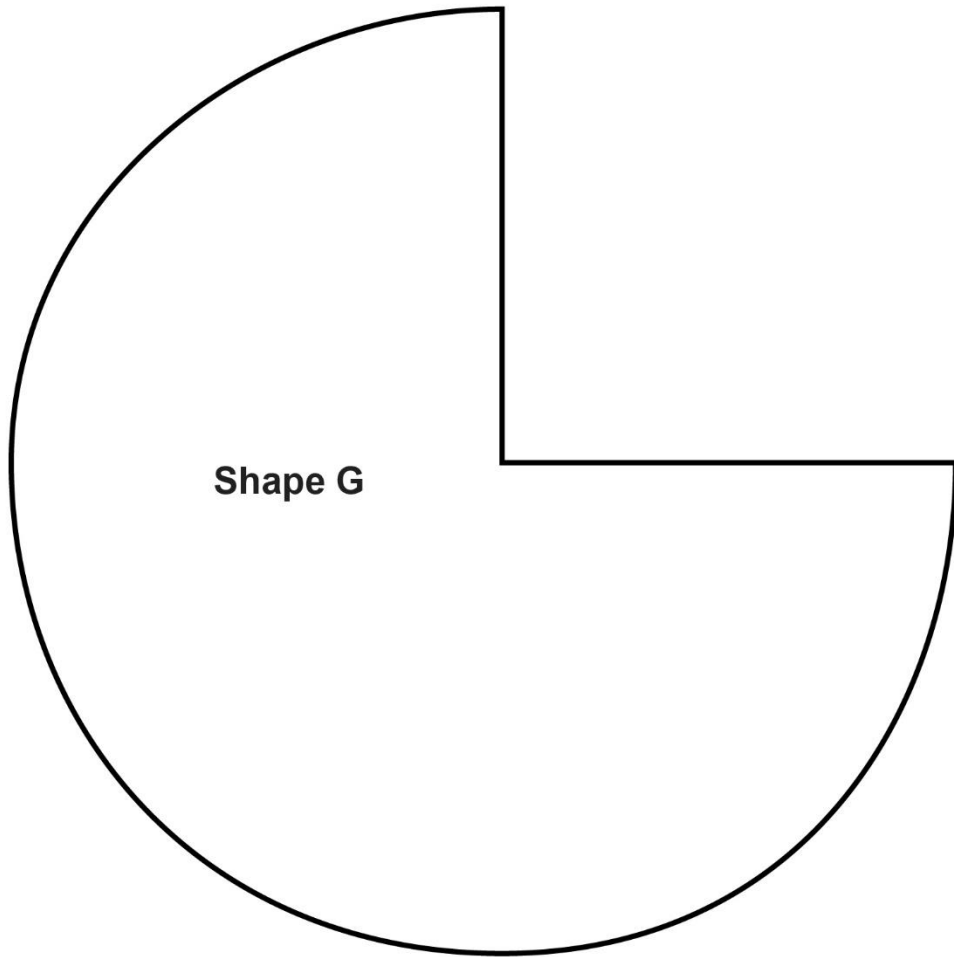
Master 37e

Perimeter Shapes



Master 37f

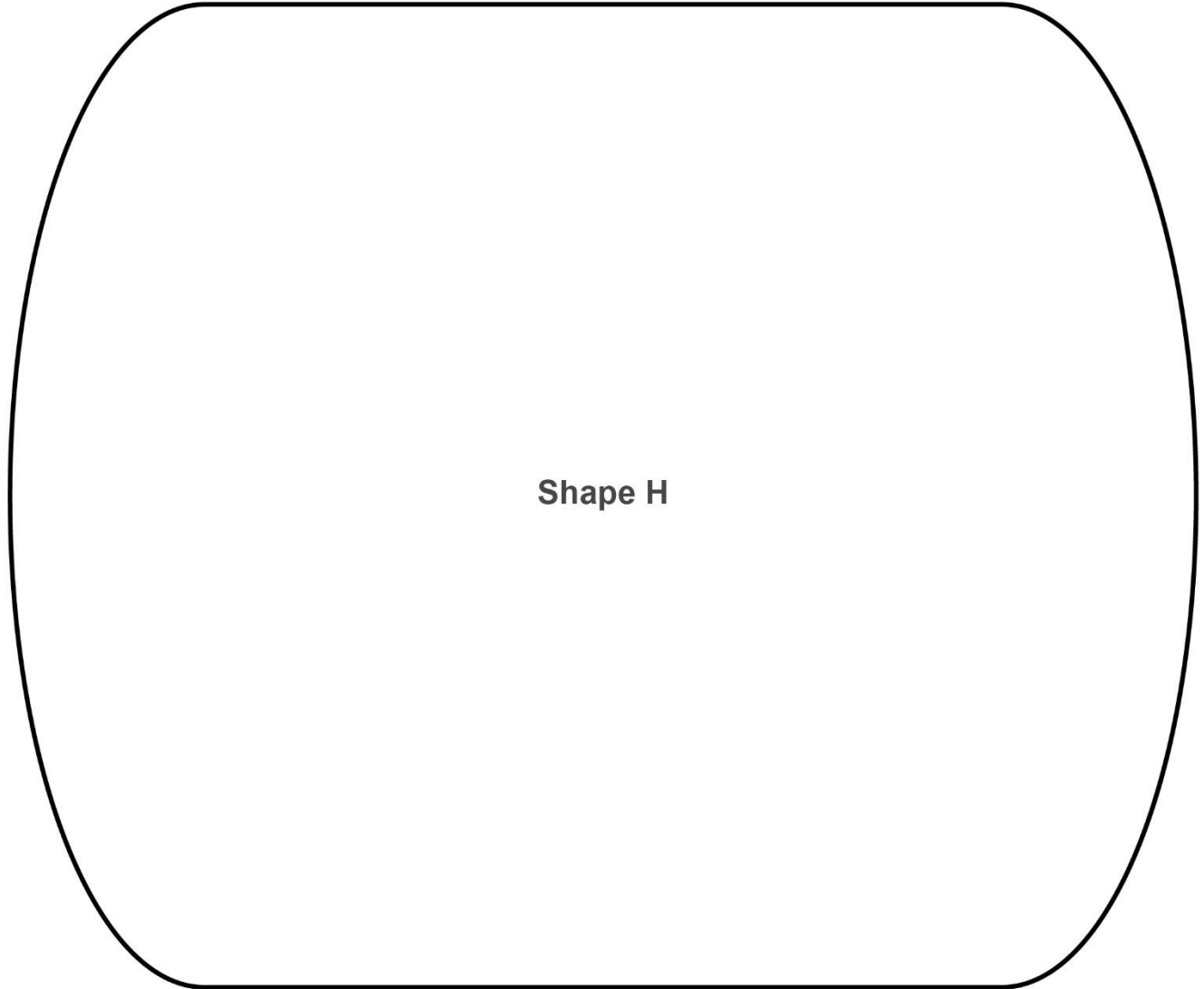
Perimeter Shapes



Name _____ Date _____

Master 37g

Perimeter Shapes



Instructions for Centres

Length Centre

Task A: Estimating and Measuring Length

- Find an object whose length you would measure in millimetres.
Find an object whose length you would measure in centimetres.
Find another object whose length you would measure in metres.
- Estimate the length of each, then measure to check.
- How close were your estimates? Is either object more than 100 cm long? Explain.

Task B: Drawing Line Segments

- Roll the number cubes, then add the numbers rolled.
- Without using a ruler, each of you draw a line segment that you think is that many centimetres long.
- Measure each other's line segment to check. How close were your estimates?
- Use a ruler to draw a line segment of that length.

Instructions for Centres

Perimeter Centre

Task A: Estimating and Measuring Perimeter

- Roll the number cubes. Use the numbers rolled to make a 2-digit number. Record the number.
- Find something in the classroom that has a perimeter of about that many centimetres.
- Find another thing with curved and straight edges that has a perimeter of about that many centimetres.
- Measure to check using rulers and string.
- How close were your estimates to the actual measures?

Task B: Drawing Shapes with the Same Perimeter

- Roll the number cubes. Use one number for length and the other for width.
- Draw a rectangle on 1-cm grid paper with that length and width. Find its perimeter.
- Draw 3 more shapes with the same perimeter.

Instructions for Centres

Time Centre

Task A: Building Clocks

In pairs, use a paper plate, twist ties, and a pin to build your clock.

- Write the numbers 1 to 12 on your clock face.
- What hands does your clock need to tell time to the second?
- Draw any other parts you need to tell time to the second.

- **Student A:** Pick a time to the second. Show it on your clock face.
- **Student B:** Represent the time digitally.
- Trade places and repeat.

Task B: Telling Time

Use Math Mat 40.

- **Student A:** Show 2 times to the second on the analog clocks.
- **Student B:** Write 2 times to the second on the digital clocks.
- Trade mats. Read the time on each other's clocks.
- How could you say each time another way? Record at least 2 ways in your math journal.
- Write each time on the other type of clocks on the mat.
- Switch roles and repeat the activity.

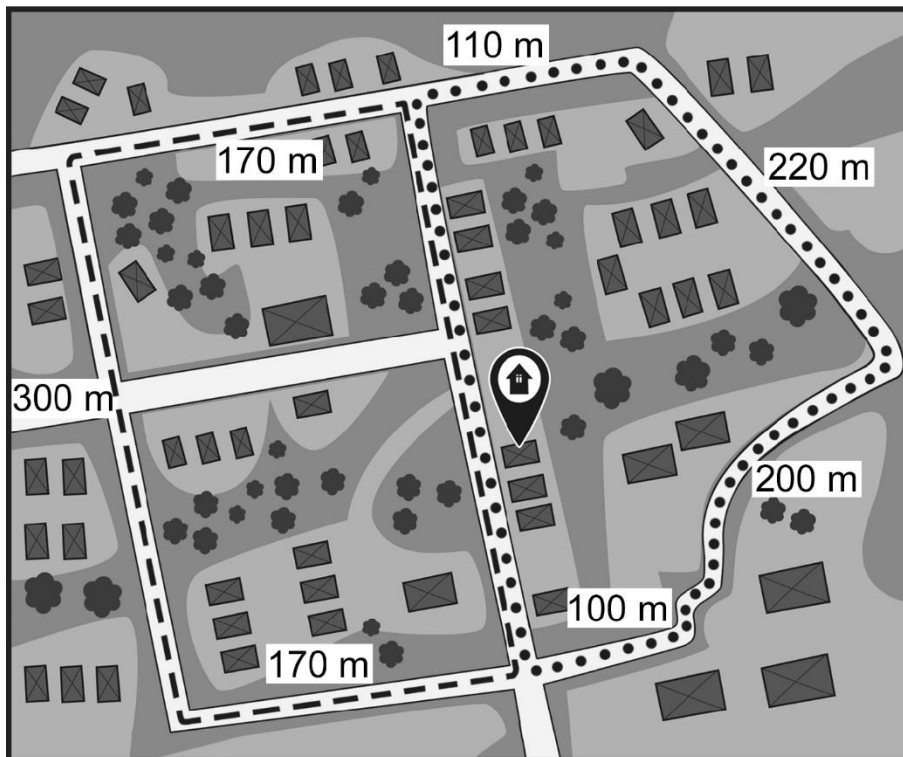
Master 40

Connections: Neighbourhood Walk

When you walk around the outside of a park, a building, or a neighbourhood, you are walking around its perimeter.

Tristan and his mom walk around their neighbourhood every night after dinner. Sometimes they walk to the end of the street and turn left. Sometimes they turn right.

The two paths are shown on this map. How far do they walk along each path? Which path is longer? How much longer is it?



Go for a walk with a friend around the perimeter of your neighbourhood or school yard. Use a big step as a personal referent for 1 m. Count your steps.

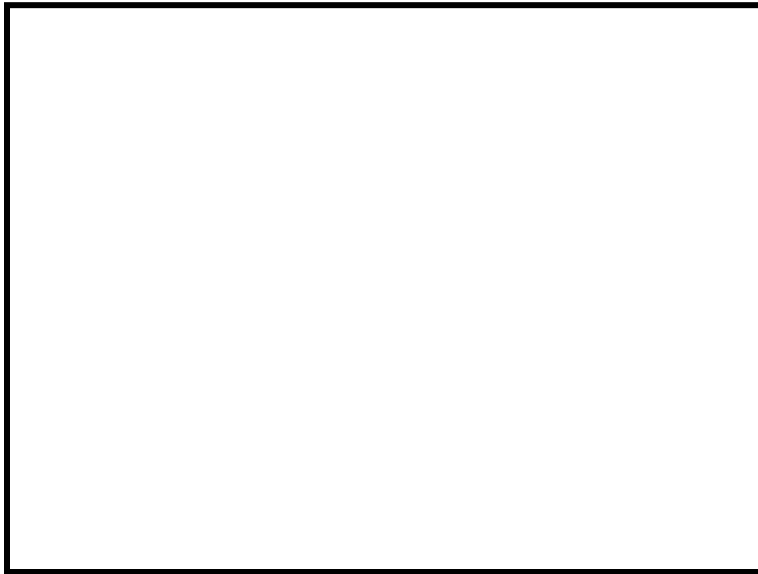
About how long was the path you took in metres?

Is that longer or shorter than 1 kilometre? How do you know?

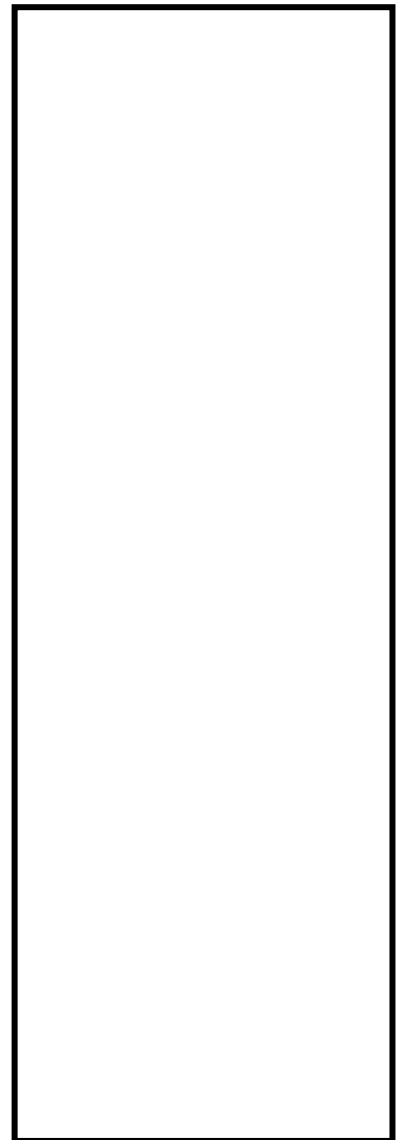
Master 41

Paper Rectangles

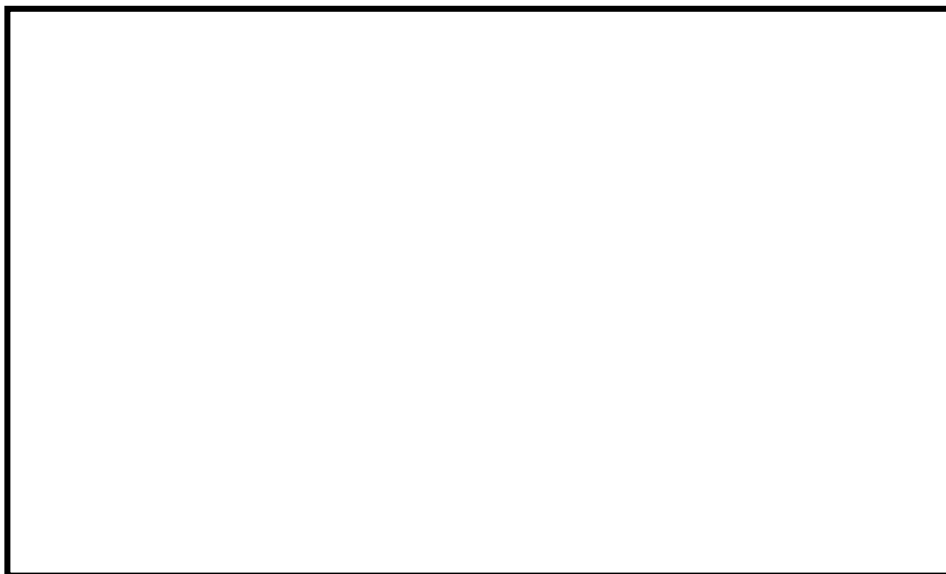
A



B



C



Master 42

Measuring Mass Recording Sheet

Use estimates to order objects from lightest to heaviest:

_____, _____, _____

	Linking cubes	Centicubes
Object measured as a class:	Estimate: _____ Measure: _____	Estimate: _____ Measure: _____
Object:	Estimate: _____ Measure: _____	Estimate: _____ Measure: _____
Object:	Estimate: _____ Measure: _____	Estimate: _____ Measure: _____

Use measures to order objects from lightest to heaviest:

_____, _____, _____

Name _____ Date _____

Master 43

How Many Cups? Recording Sheet

Container 1: _____ Container 2: _____

Container 3: _____

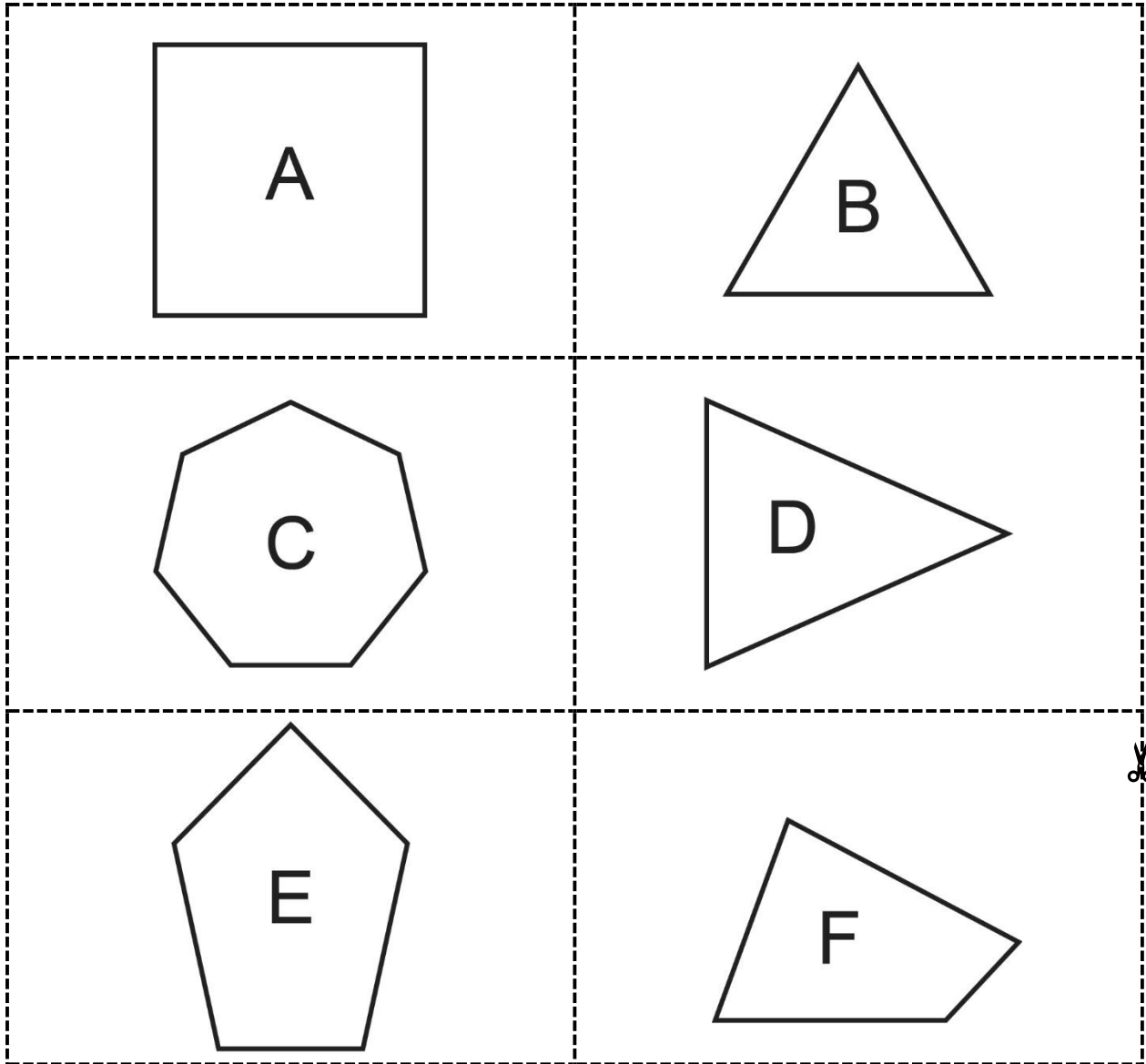
Look at the containers. Order them from least to greatest capacity.

Container	Estimate	Measure
1		
2		
3		

Look at your measures.
Order them from least to greatest capacity.

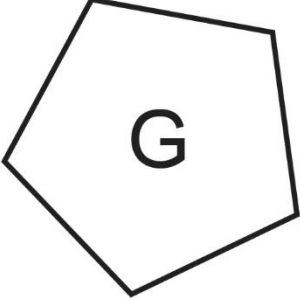
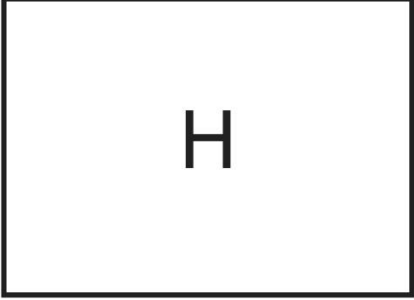
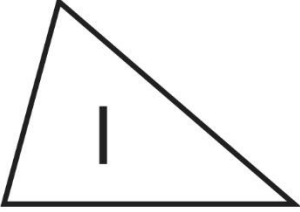
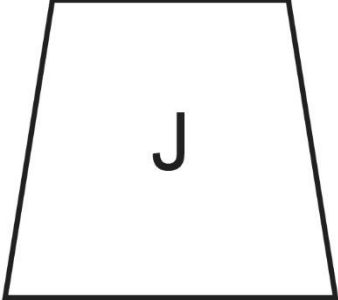
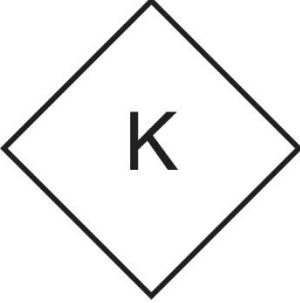
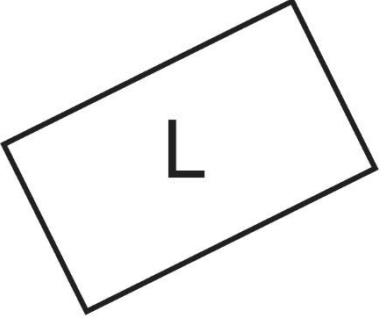
Master 44a

Polygons



Master 44b


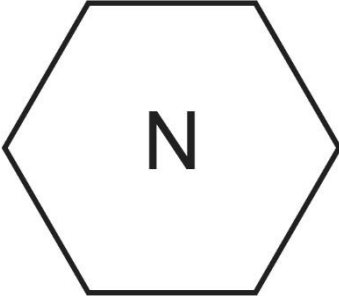
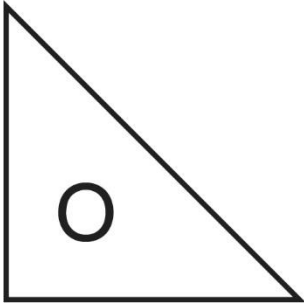
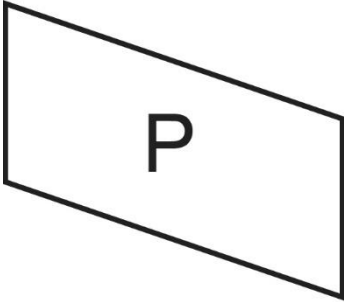


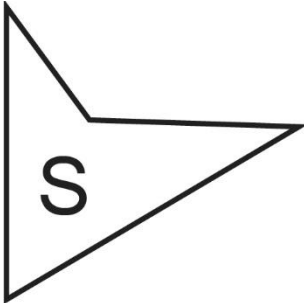
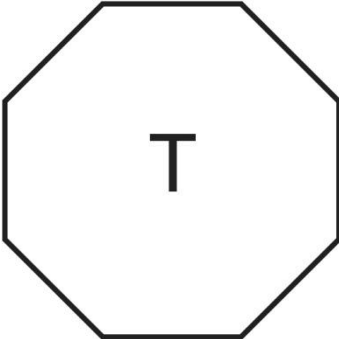
Polygons

 <p>G</p>	 <p>H</p>
 <p>I</p>	 <p>J</p>
 <p>K</p>	 <p>L</p>

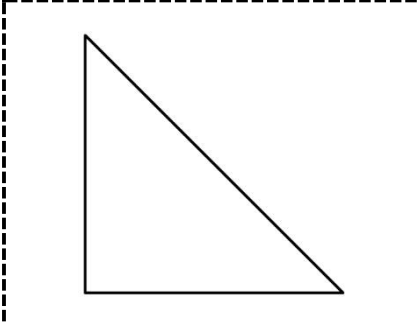
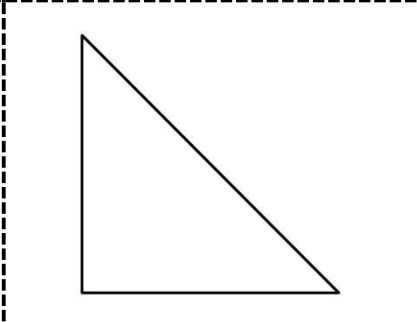
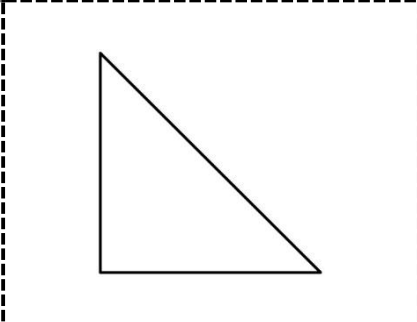
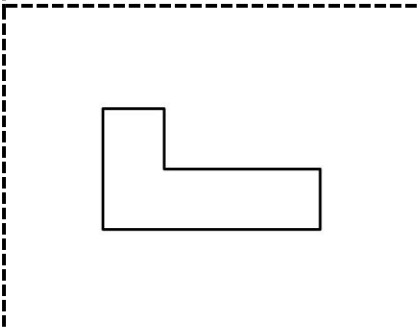
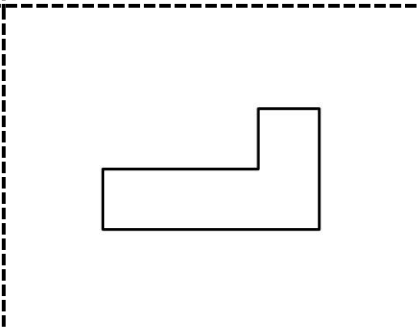
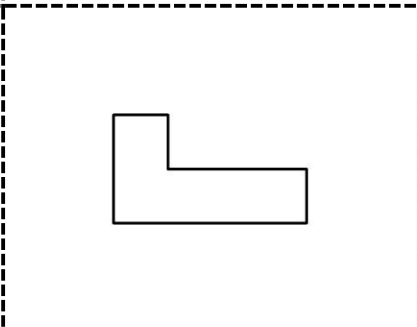
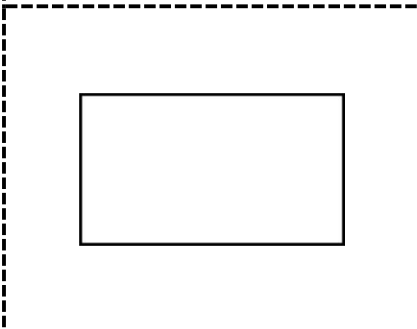
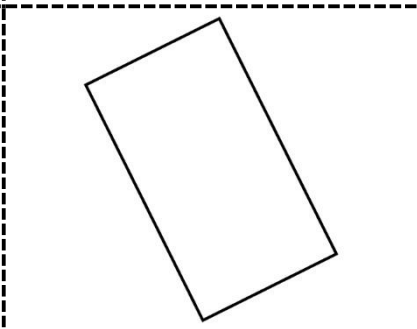
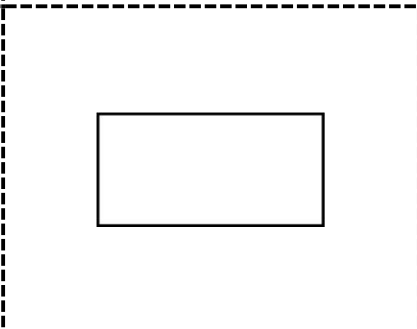
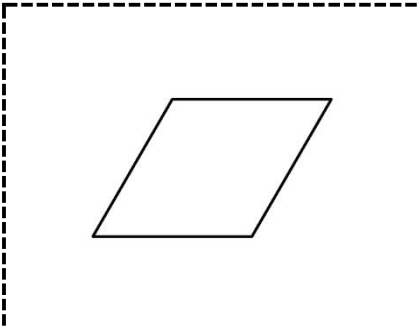
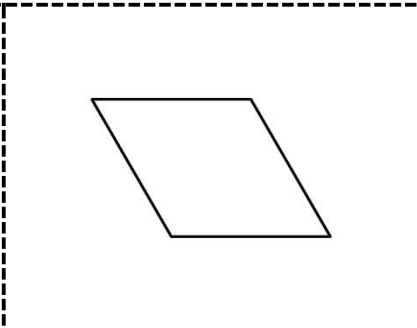
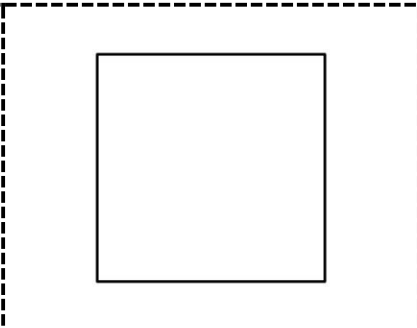
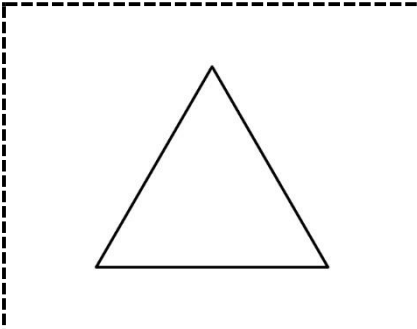
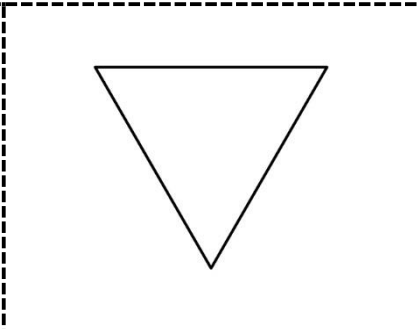
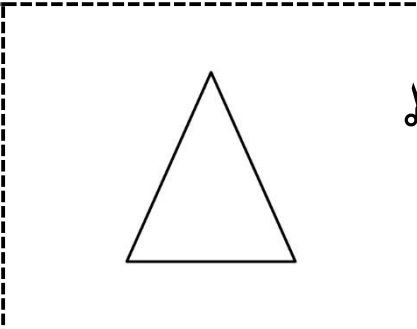


Master 44c

Polygons

 <p>M</p>	 <p>N</p>
 <p>O</p>	 <p>P</p>
 <p>Q</p>	 <p>R</p>
 <p>S</p>	 <p>T</p>

Congruent Shapes

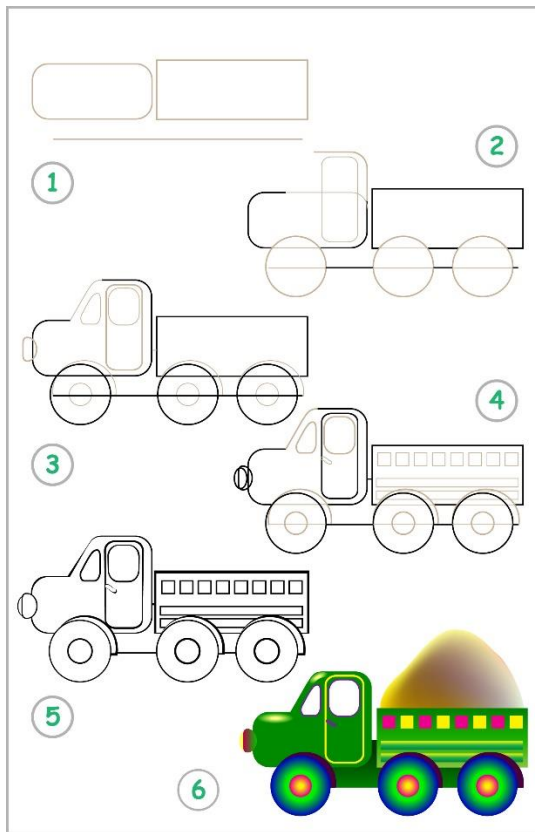
		
		
		
		
		



Master 46

Connections: Drawing from Shapes

Many artists start their drawings with simple shapes like circles, rectangles, and triangles.

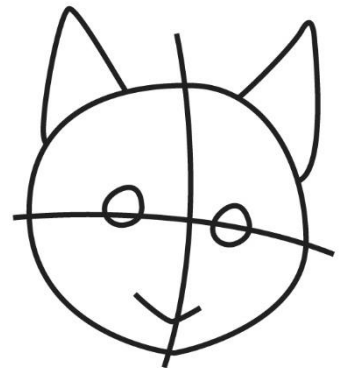


To draw this truck, the artist started with a line, a rectangle, and a rectangle with rounded corners.

What other shapes were used to finish the drawing?
What do they represent?

When first learning to draw, it is often easiest to start with simple shapes as guides.

For example, to draw a cat, we might start with a circle for the head and triangles for the ears.



Try using shapes to draw a picture of your favourite animal.

Attributes of Shapes Instructions

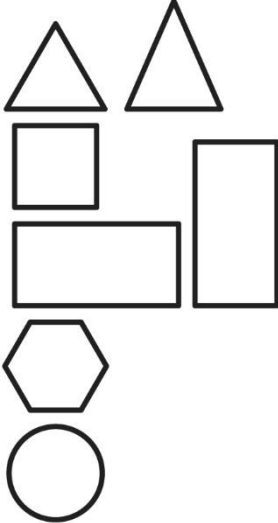
Number rolled	Team who rolled	Other team
1	Point to a shape.	Name the shape in two ways.
2	Point to two shapes.	Explain how the shapes are alike and how they are different.
3	Name an attribute to sort by.	Point to all shapes with that attribute.
4	Point to a shape that would be in the overlap of a Venn diagram.	Name two attributes that could have been used to sort. If possible, find a shape that belongs in each loop.
5	Name an attribute.	Point to a shape with that attribute. Draw or describe a new shape that has the same attribute.
6	Choose a shape. Create a riddle to describe your shape.	Solve the riddle. Point to the shape.

Name _____ Date _____

Master 48

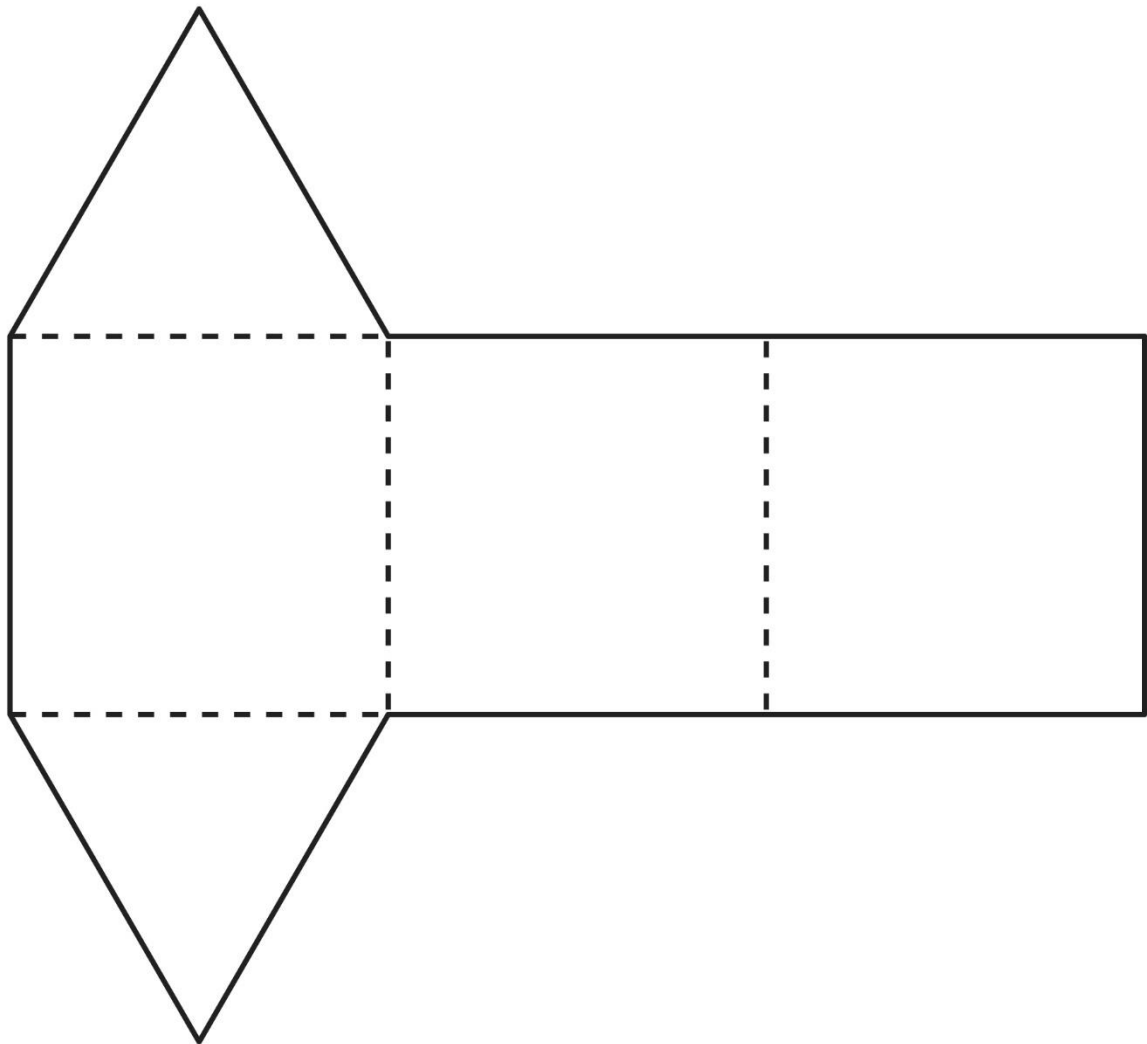
Our Solid Recording Sheet

Our Solid: _____

Attributes	Number of...
<p data-bbox="203 556 324 598">Faces</p>  <p data-bbox="609 1140 901 1182">Shape of Base:</p> <p data-bbox="609 1224 1412 1234">_____</p>	
<p data-bbox="203 1291 324 1333">Edges</p>	
<p data-bbox="203 1402 357 1444">Vertices</p>	
<p data-bbox="203 1497 519 1539">Curved Surfaces</p>	

Master 49a

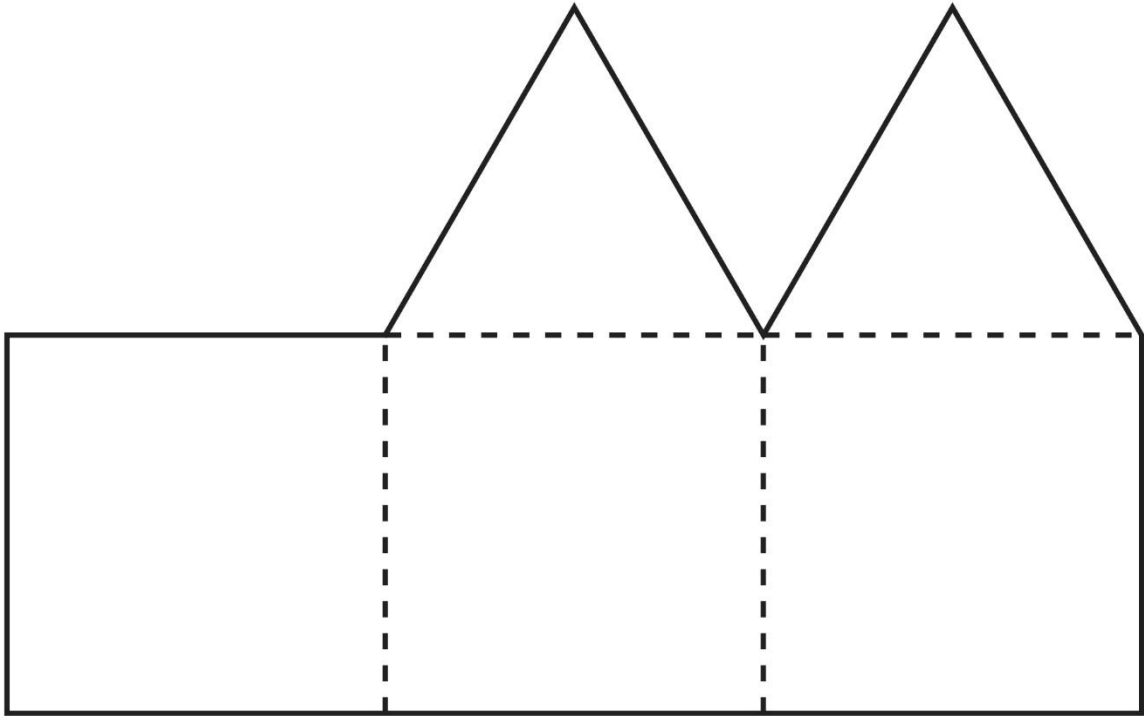
Is It a Net?



Name _____ Date _____

Master 49b

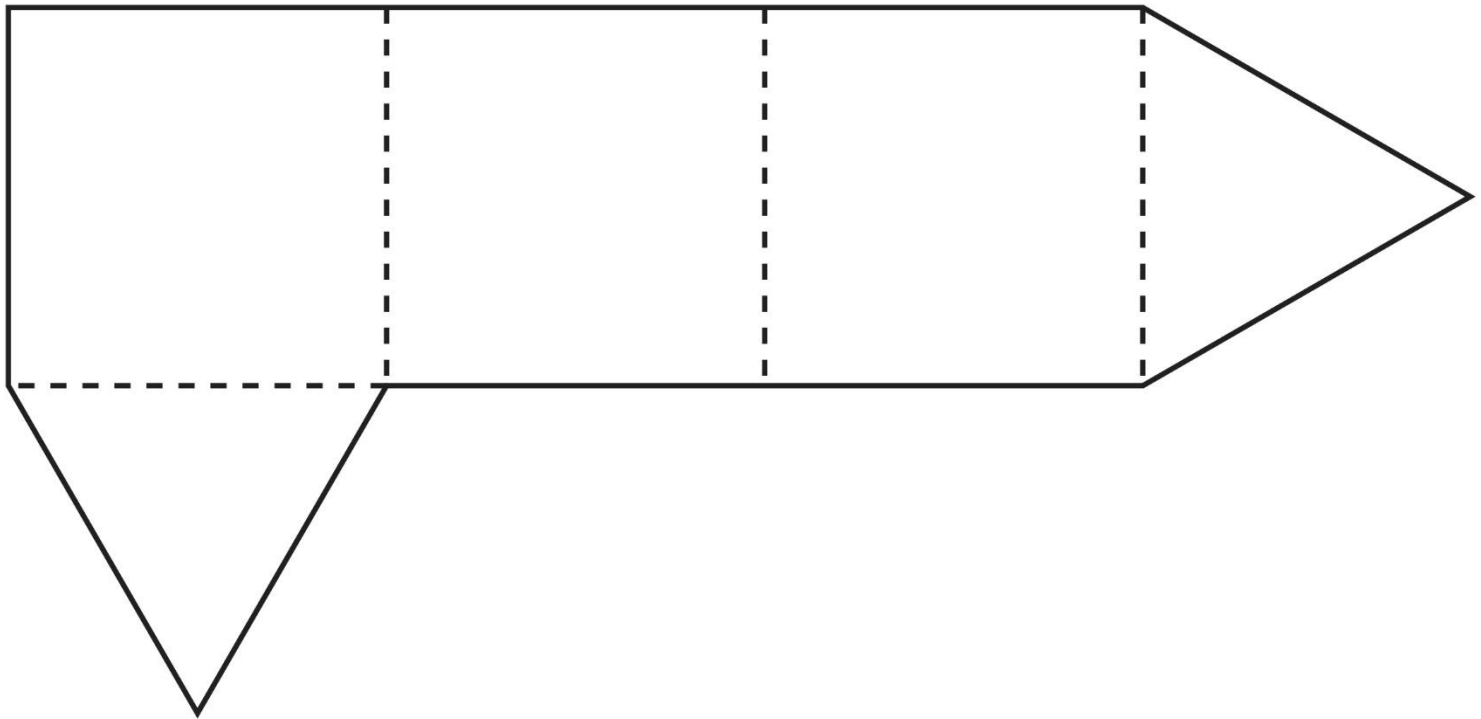
Is It a Net?



Name _____ Date _____

Master 49c

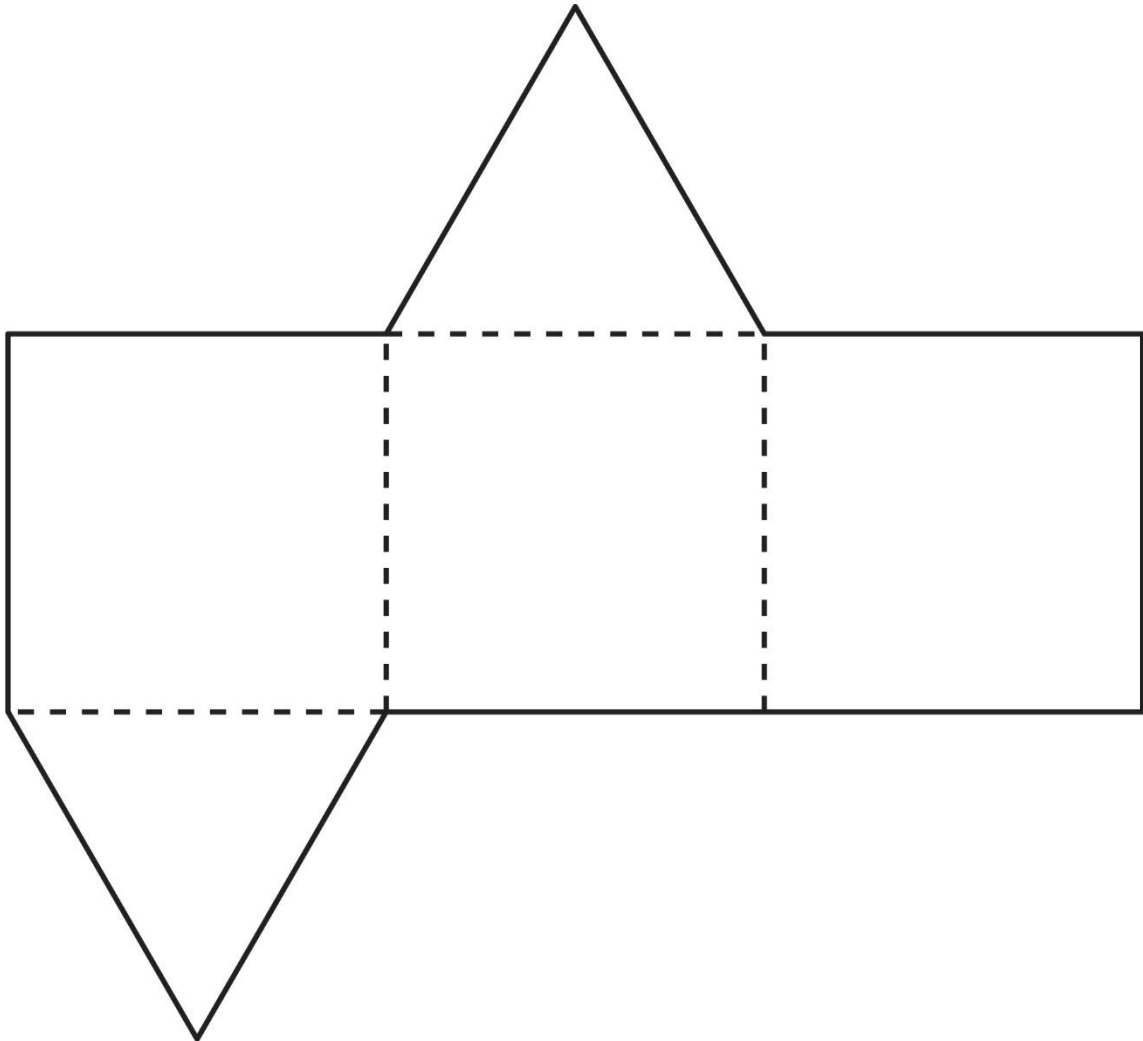
Is It a Net?



Name _____ Date _____

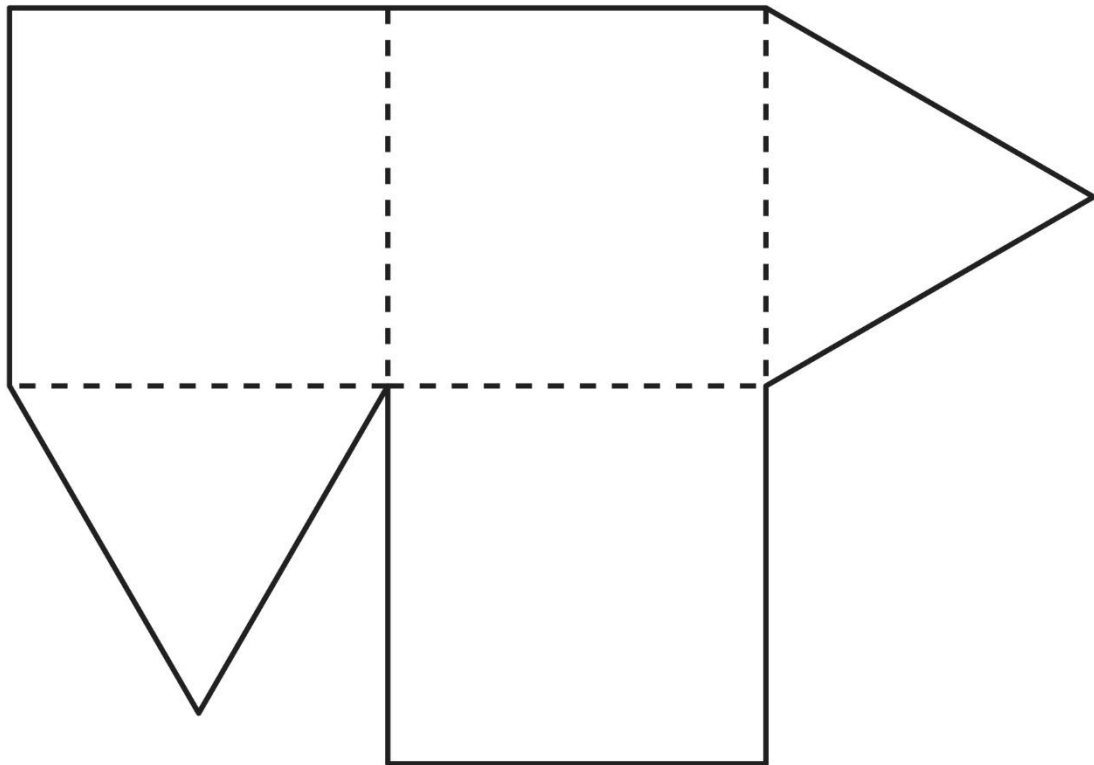
Master 49d

Is It a Net?



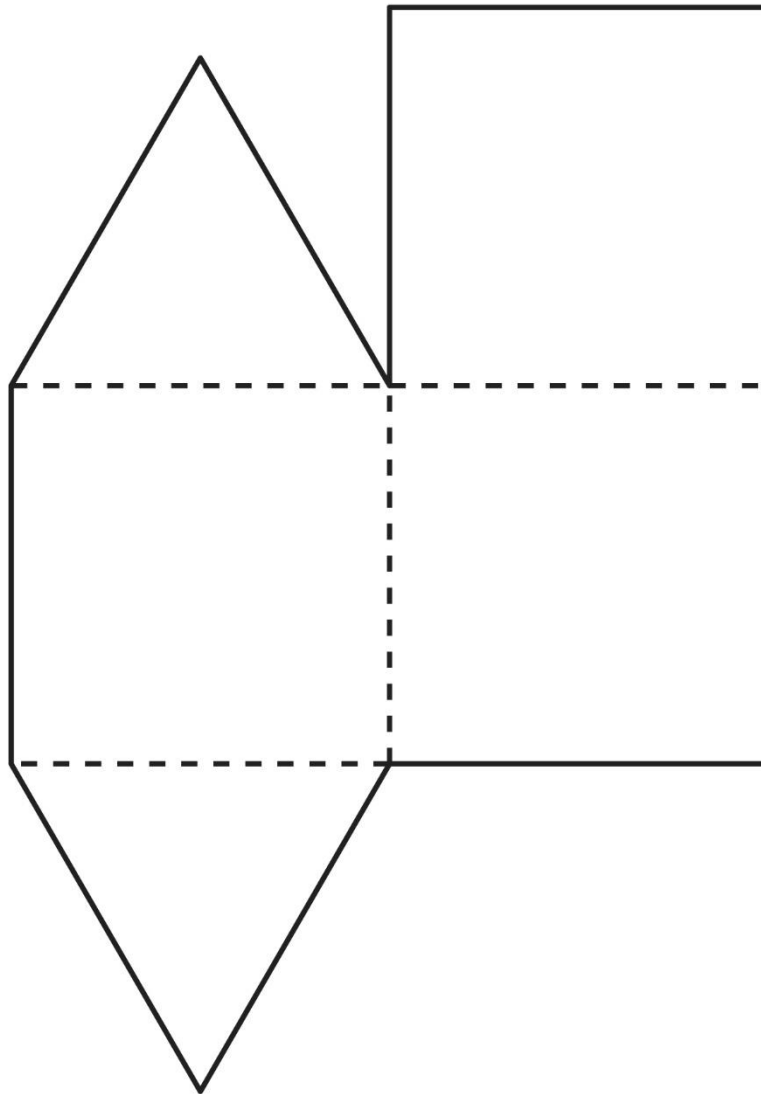
Master 49e

Is It a Net?



Master 49f

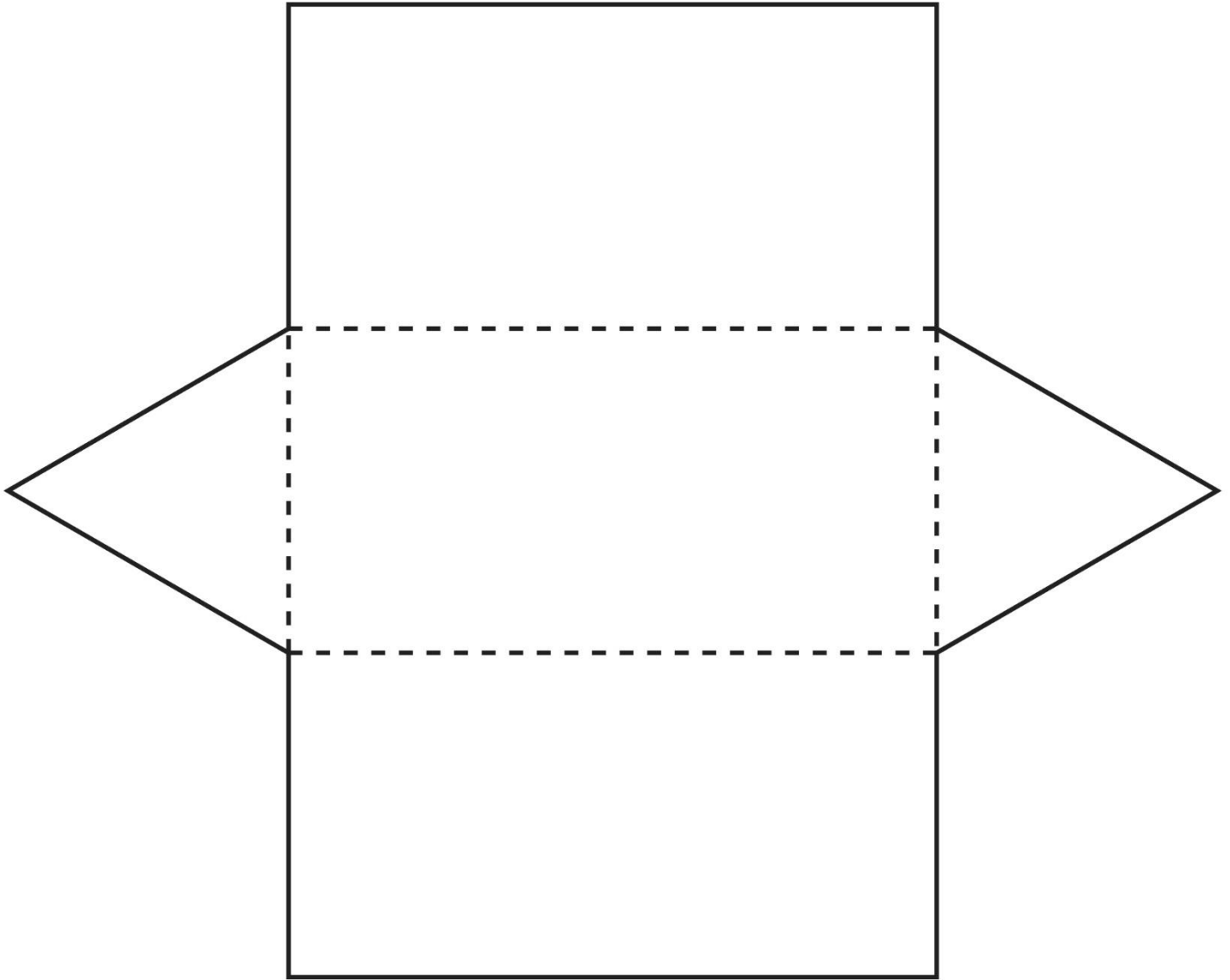
Is It a Net?



Name _____ Date _____

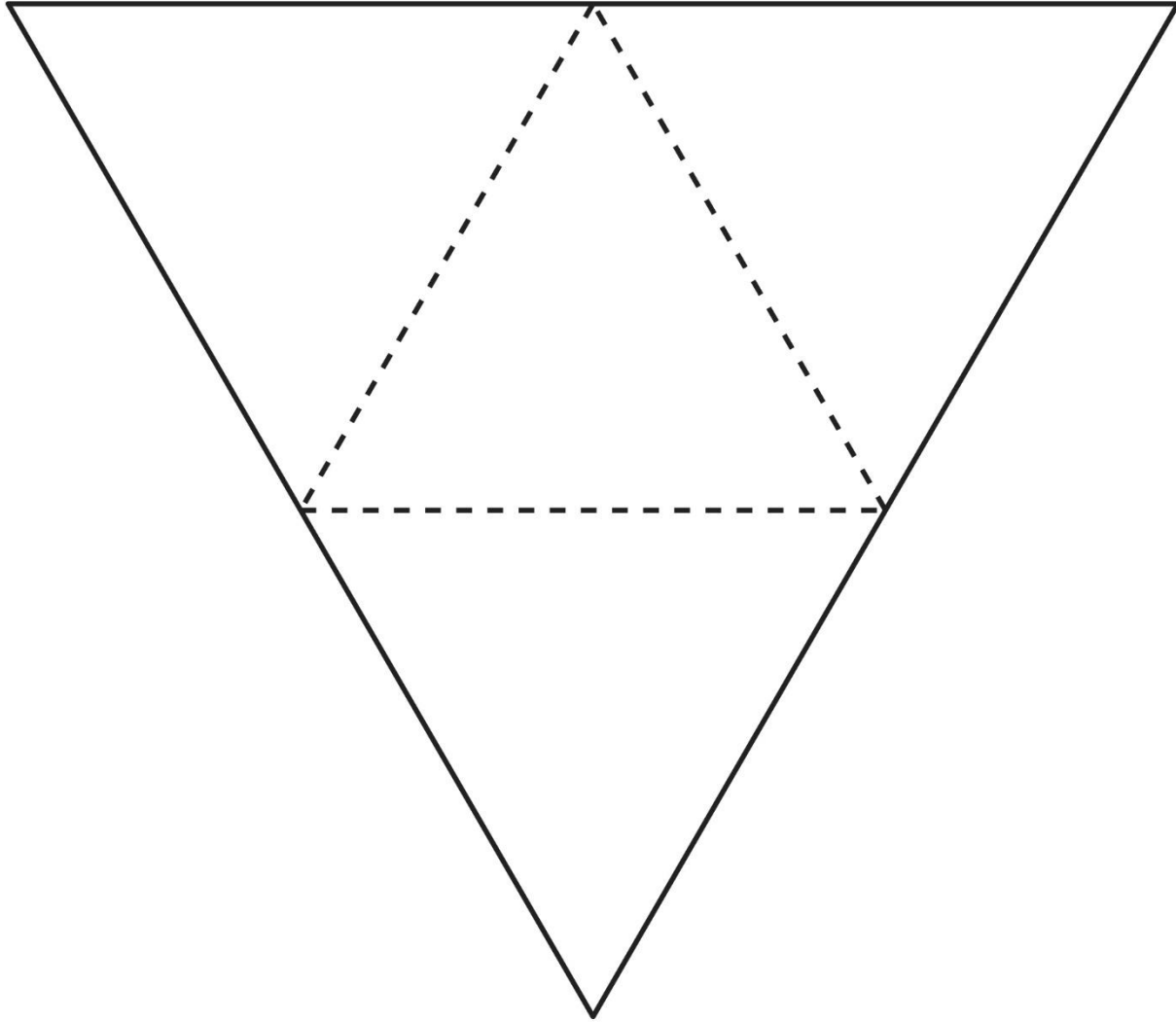
Master 50a

Nets of Solids



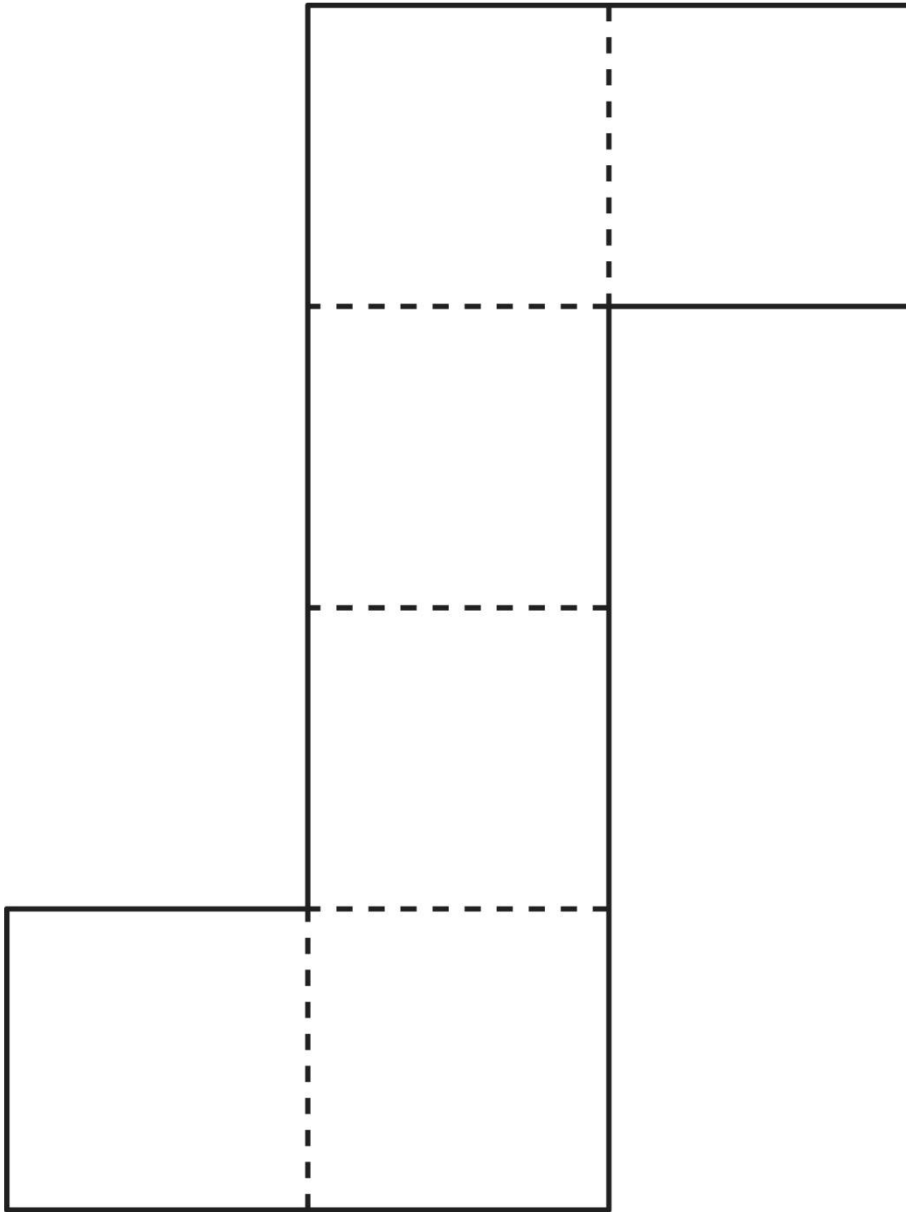
Master 50b

Nets of Solids



Master 50c

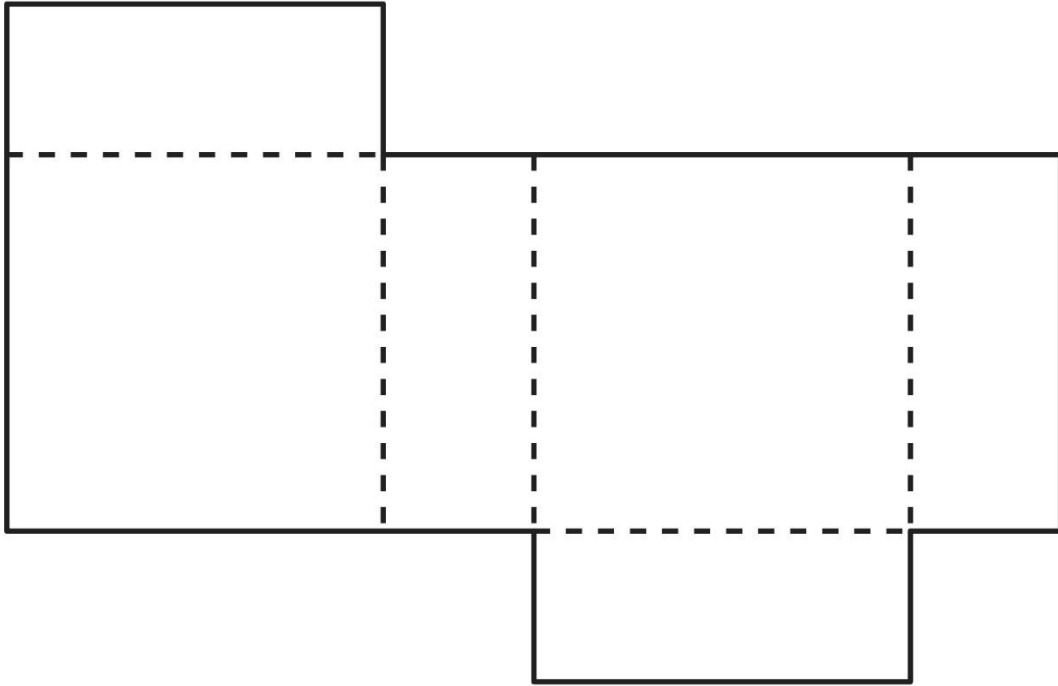
Nets of Solids



Name _____ Date _____

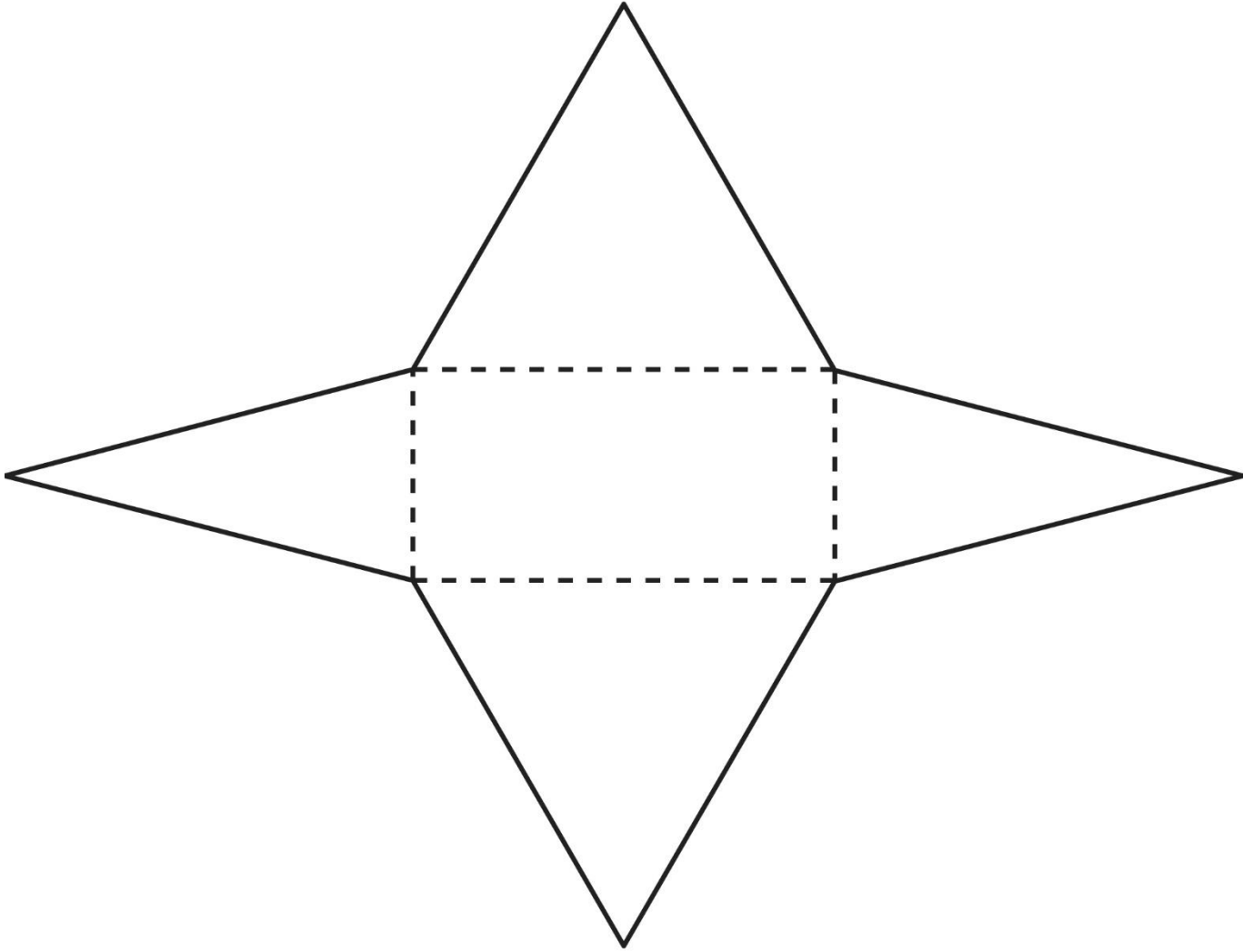
Master 50d

Nets of Solids



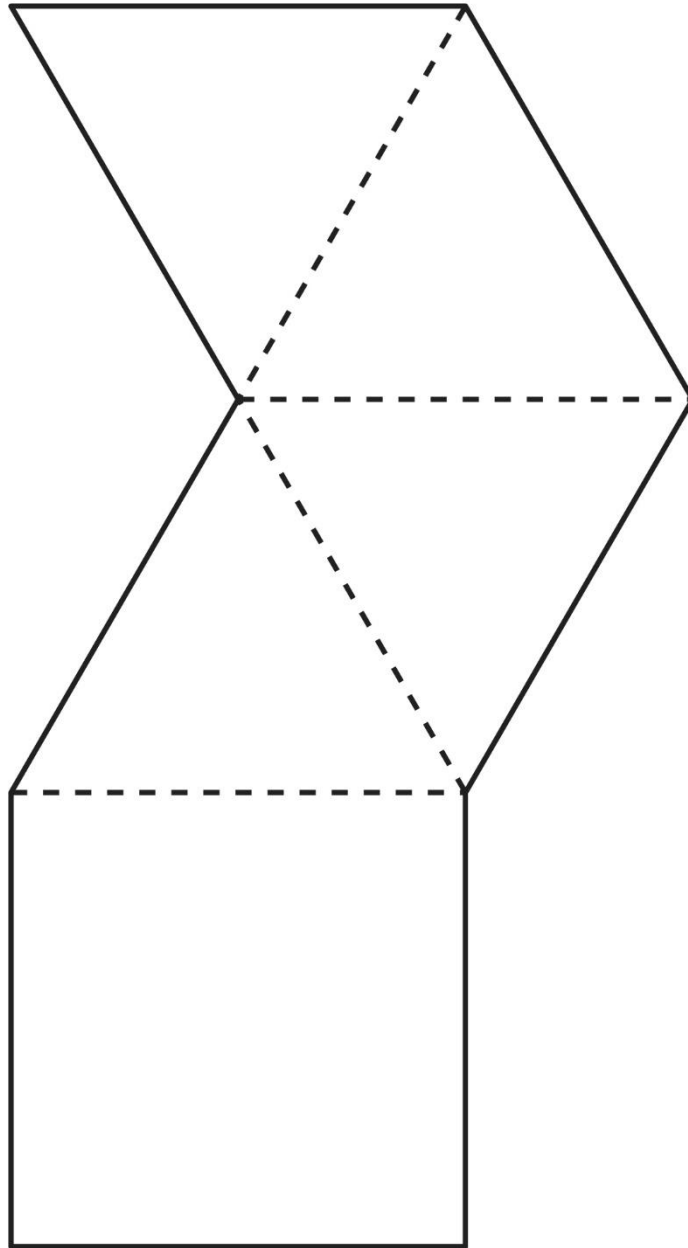
Master 50e

Nets of Solids



Master 50f

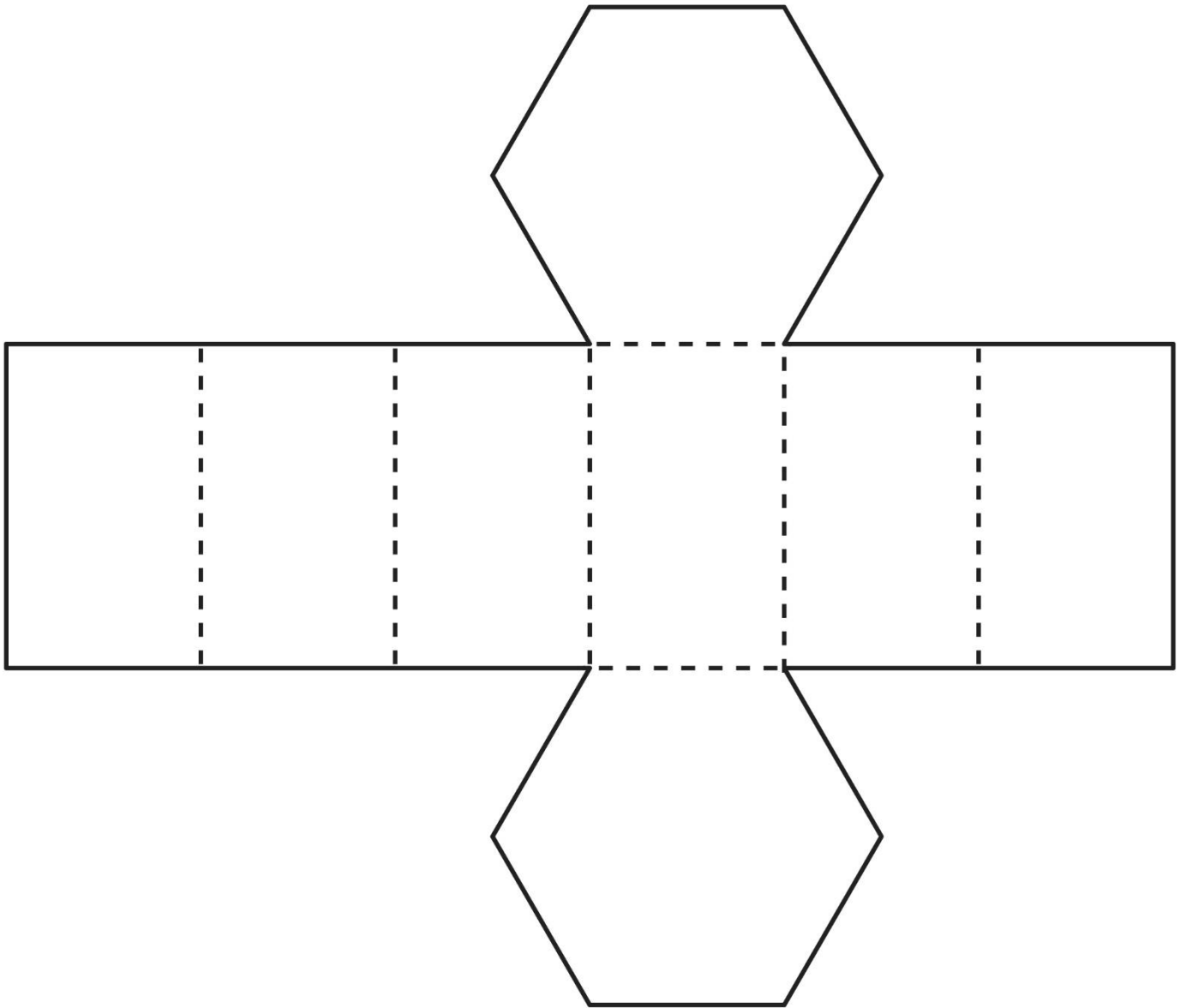
Nets of Solids



Name _____ Date _____

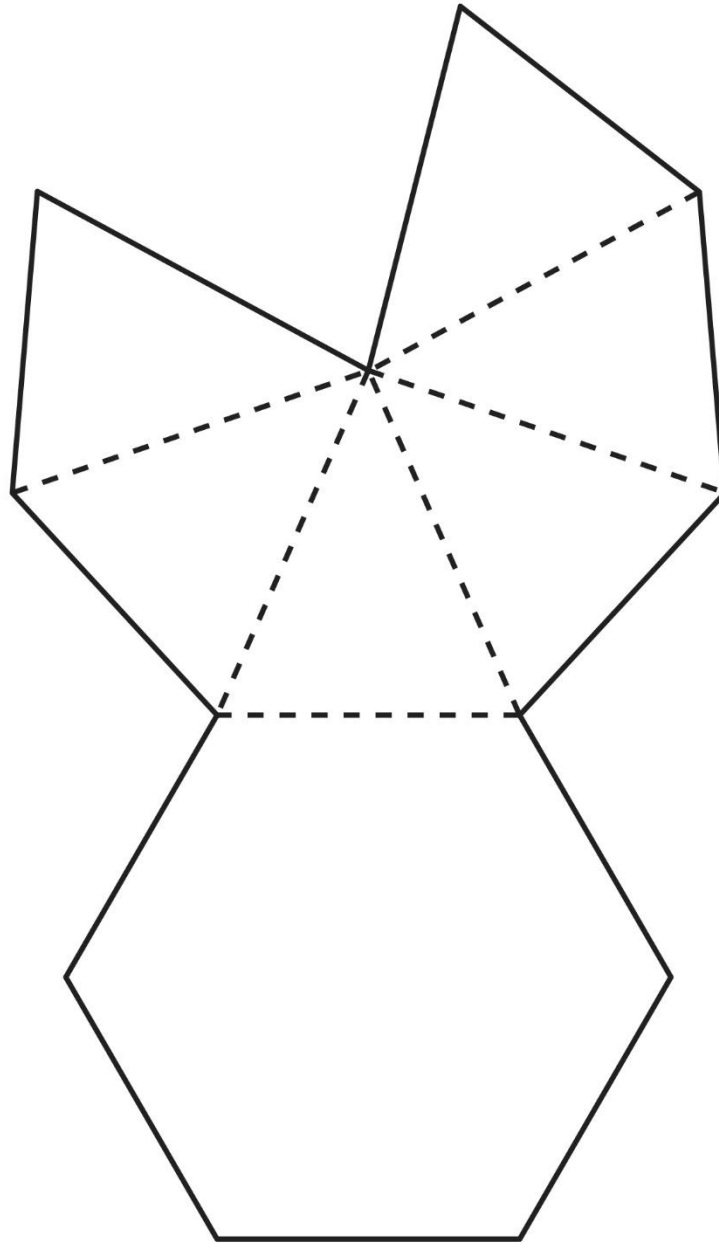
Master 50g

Nets of Solids



Master 50h

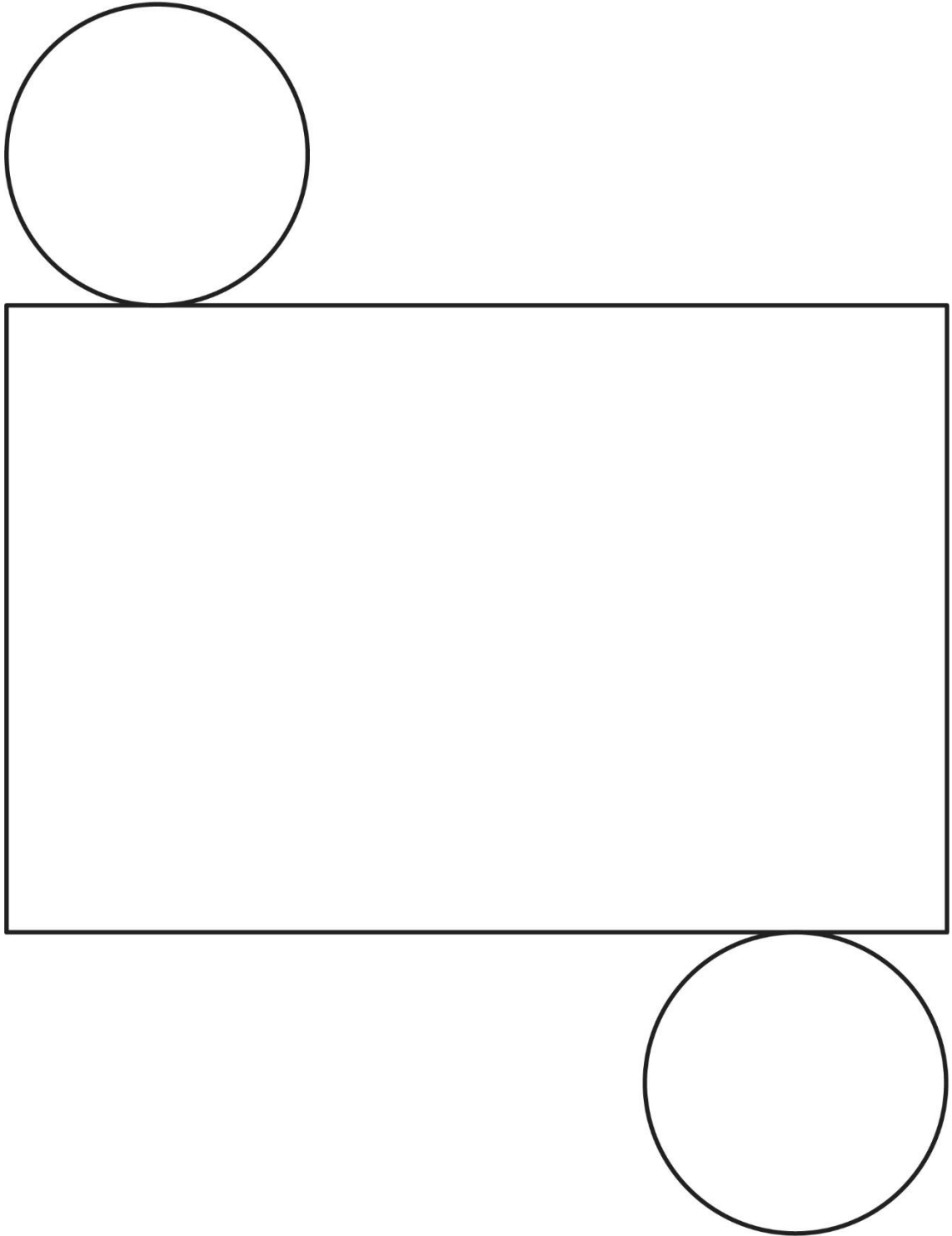
Nets of Solids



Name _____ Date _____

Master 50i

Nets of Solids



Connections: Teatime

Tea comes in many interesting flavours.
Have you ever heard of Gummy Bear Tea or Vanilla Berry Cupcake Tea?

Tea leaves can be packaged in tea bags.
Hot water goes through the tiny holes in the bags,
causing the tea leaves to expand and release their flavour.

The bags may look like triangular pyramids or be circular or square.



Tea leaves can also be used loose.
For example, they can be put in a glass teapot
with a tea infuser shaped like a cylinder.

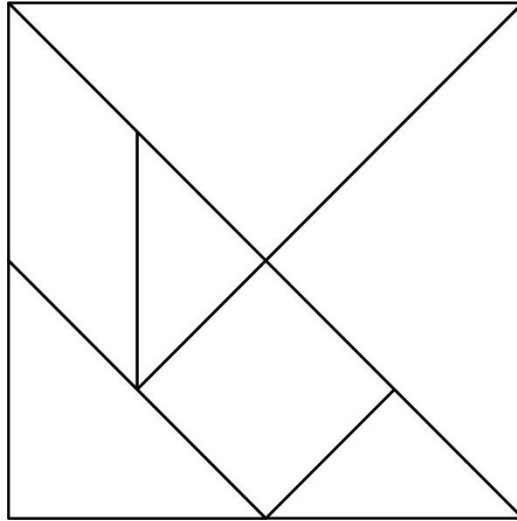
Create your own flavour of tea.
How would you package it?
Describe the 2-D shape or 3-D solid you would use.
What are the advantages and disadvantages of the “package shape”
you chose?

Checklist

- environmentally friendly
- room for tea leaves to expand
- material allows water to enter easily
- fits in a cup or mug

Master 52

Tangram Cutouts



Name _____ Date _____

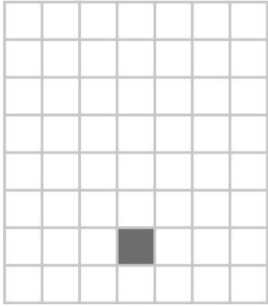
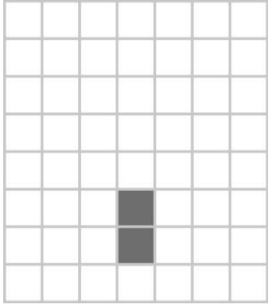
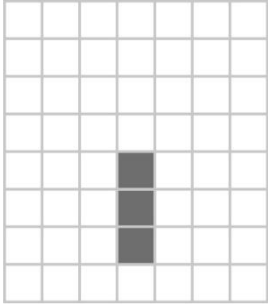
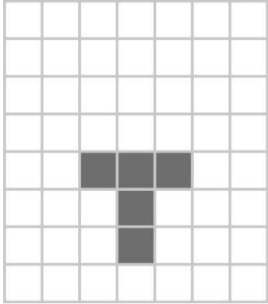
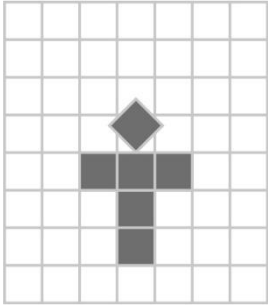
Master 53

Tangram Grid



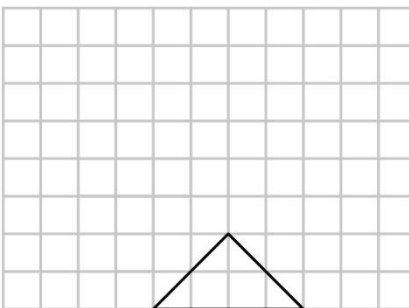
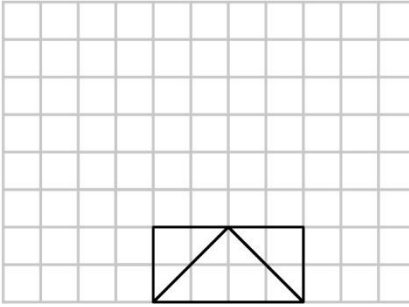
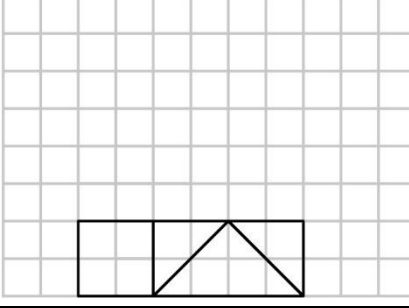
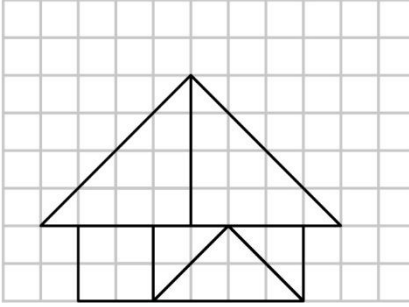
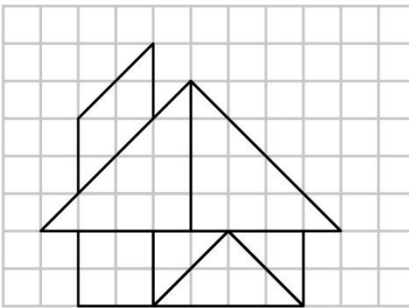
Master 54a

Picture Instructions: Tiles

<p>Place a tile in the second row from the bottom, in the middle square.</p>	
<p>Place a tile in the square directly above the first tile so sides are touching.</p>	
<p>Place a tile in the square directly above the second tile so sides are touching.</p>	
<p>Place one square to the right and left of the top tile so sides are touching.</p>	
<p>Turn a tile so it is sitting on a vertex. Place it in the square above the middle tile in the row of three tiles. Its vertex should touch the middle of the other tile's side.</p>	

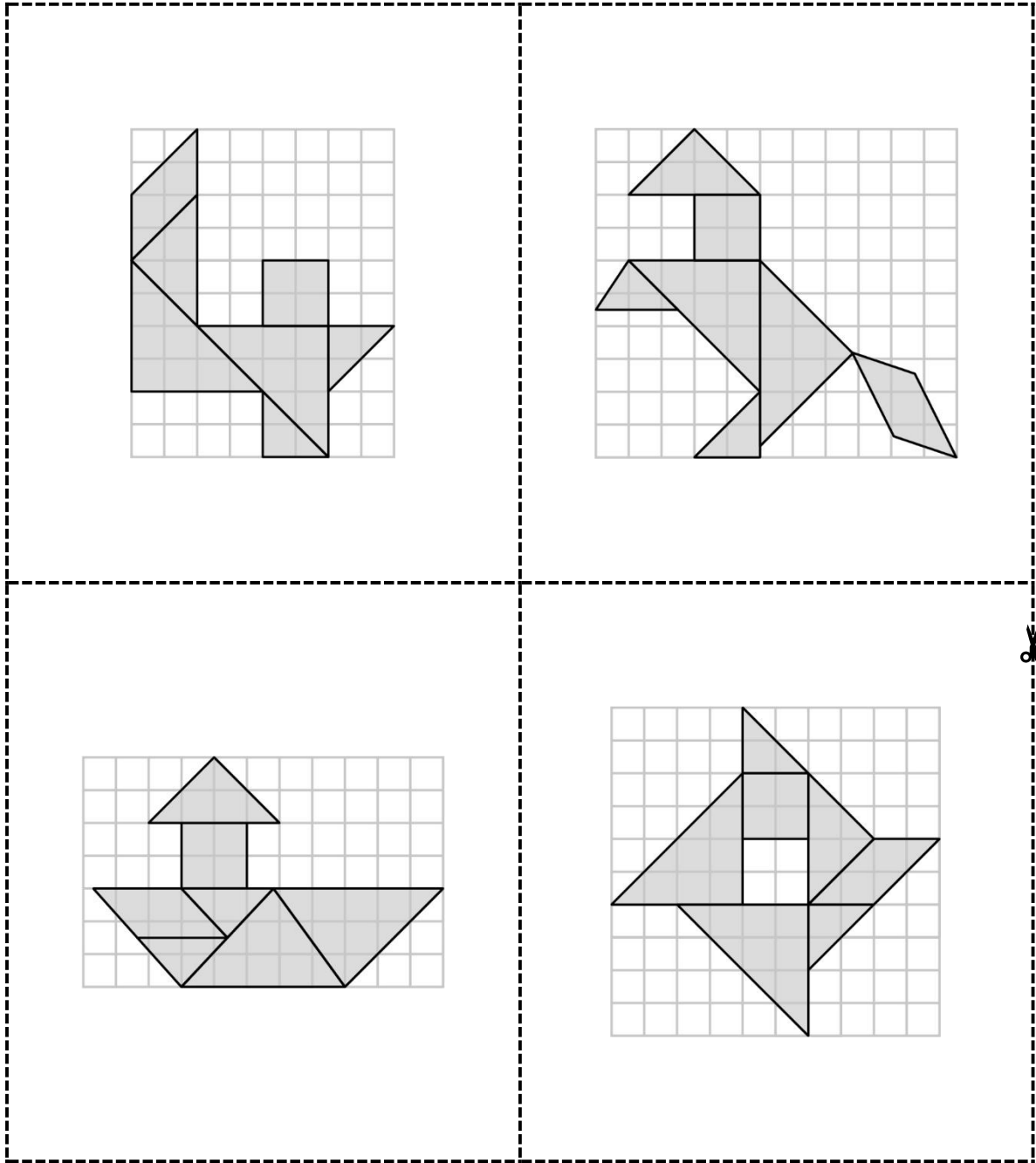
Master 54b

Picture Instructions: Tangram

<p>Place the medium triangle so its long side lines up with the bottom of the grid.</p> <p>Its left vertex touches the 4th vertical grid line from the left.</p>	
<p>Place a small triangle on each side of the medium triangle.</p> <p>The long side of each matches a side of the medium triangle to make a rectangle.</p>	
<p>Place the square on the left side of the rectangle to make a longer rectangle.</p>	
<p>Place the two large triangles together with square corners touching at the bottom to make a larger triangle.</p> <p>Place this triangle on top of the long rectangle to make a house.</p>	
<p>Place the parallelogram to the left of the large triangle to make a chimney.</p> <p>The short sides of the parallelogram should lie along the 2nd and 4th vertical grid lines from the left.</p>	

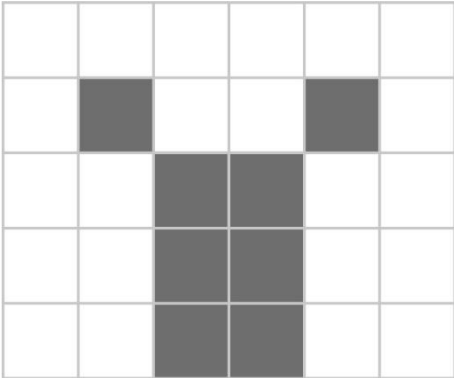
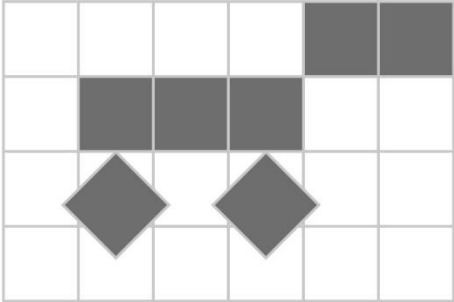
Master 55a

Tangram Pictures



Master 55b

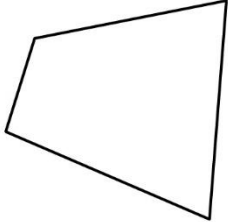
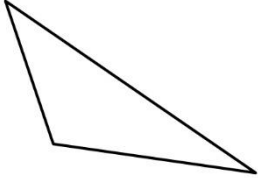
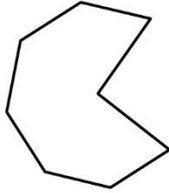
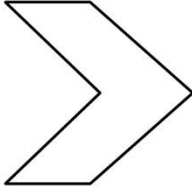
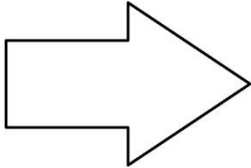
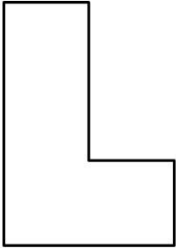
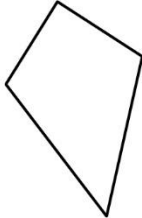
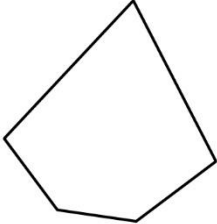
Colour Tile Pictures

	
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✂

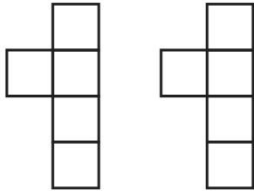
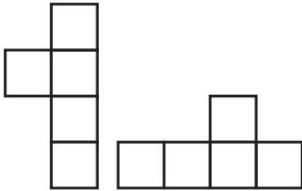
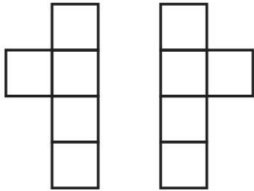
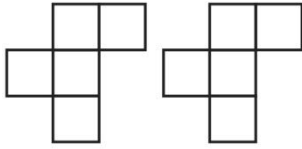
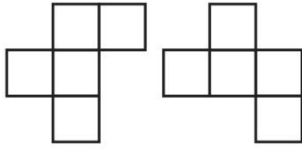
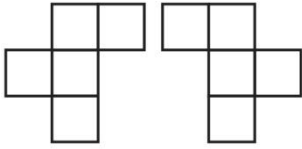
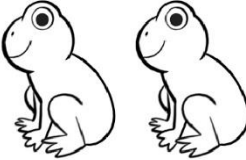

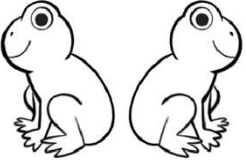


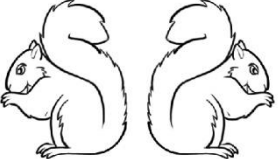
Master 56

Amusement Park Shapes

Master 57

Movement Matching Cards

<p>Slide (Translation)</p>	<p>Turn (Rotation)</p>	<p>Flip (Reflection)</p>
		
		
		
		

Master 58a

Dance Move Cards

Hop on 2 Feet	Step Touch Left
Step Touch Right	Slide Left
Slide Right	Grapevine Left
Grapevine Right	Clap Hands



Master 58b

Dance Move Cards

Spin Around	Touch Right Knee to Elbow
Touch Left Knee to Elbow	Dig Left Heel
Dig Right Heel	Cross Over Left
Cross Over Right	Snap Fingers



Master 58c

Dance Move Cards

Turn Right	Turn Left














Name _____ Date _____

Master 59a

Steer Clear! Game Board

Level 1

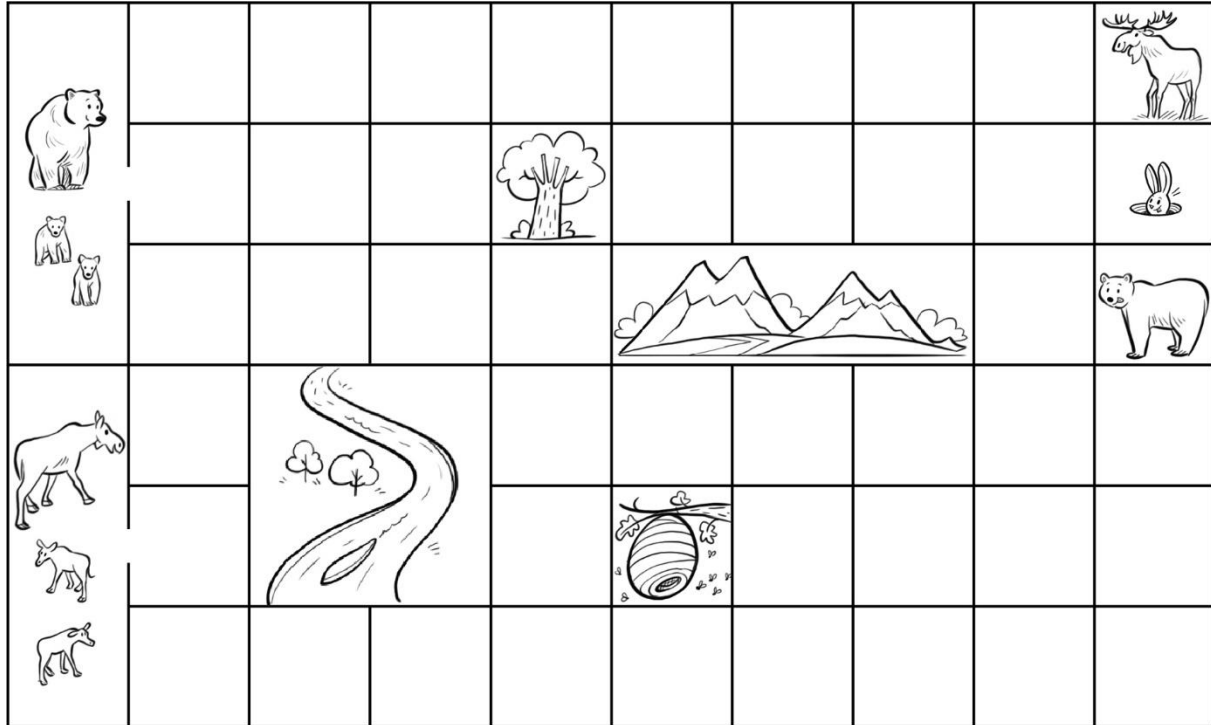
									
									
									
									
									
									

Name _____ Date _____

Master 59b

Steer Clear! Game Board

Level 2



Master 60

Game Codes

Raccoon's Codes	Porcupine's Codes
<p>Start facing right. Make $\frac{1}{4}$ turn counterclockwise. Move 1 square forward. Make $\frac{1}{4}$ turn clockwise. Move 2 squares forward.</p> <p style="text-align: right;">Repeat 4 times.</p>	<p>Start facing right. Make $\frac{1}{4}$ turn counterclockwise. Move 2 squares forward. Make $\frac{1}{4}$ turn clockwise. Move 2 squares forward. Make $\frac{1}{4}$ turn clockwise. Move 1 square forward. Make $\frac{1}{4}$ turn counterclockwise. Move 2 squares forward.</p> <p style="text-align: right;">Repeat 3 times.</p>
<p>Start facing right. Move 2 squares forward. Make $\frac{1}{4}$ turn counterclockwise. Move 1 square forward. Make $\frac{1}{4}$ turn clockwise.</p> <p style="text-align: right;">Repeat 4 times.</p>	<p>Start facing right. Make $\frac{1}{4}$ turn clockwise. Move 2 squares forward. Make $\frac{1}{4}$ turn counterclockwise. Move 2 squares forward. Make $\frac{1}{4}$ turn counterclockwise. Move 1 square forward. Make $\frac{1}{4}$ turn clockwise. Move 2 squares forward.</p> <p style="text-align: right;">Repeat 3 times.</p>
Moose's Code	Bear's Code
<p>Start facing down. Make $\frac{1}{4}$ turn clockwise. Move 5 squares forward. Make $\frac{1}{4}$ turn counterclockwise. Move 2 squares forward.</p> <p style="text-align: right;">Repeat 2 times.</p>	<p>Start facing up. Make $\frac{1}{4}$ turn counterclockwise. Move 4 squares forward. Make $\frac{1}{4}$ turn clockwise. Move 1 square forward.</p> <p style="text-align: right;">Repeat 2 times.</p>

Master 61

Connections: Code the Vacuum

Coding is what makes lots of things work, like computers, phones, video games, and even a robot vacuum cleaner.

A robot vacuum is coded so that when it senses an obstacle, such as the leg of a table, it gently touches it, then turns.

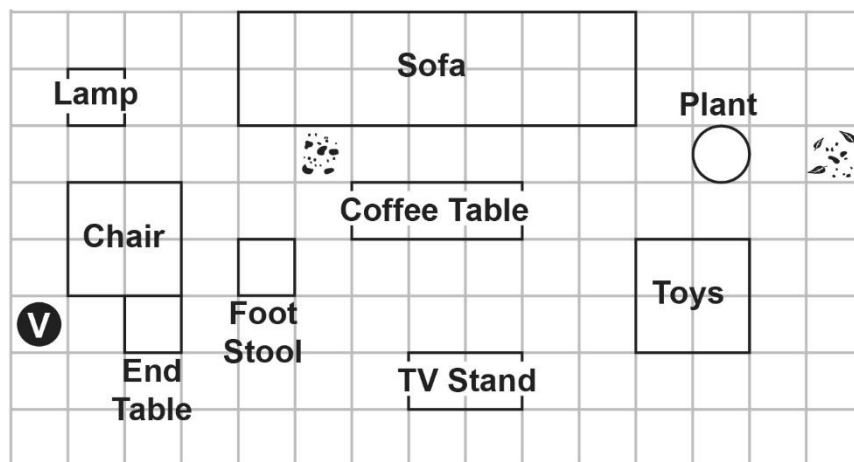
Some vacuums have cameras so they can take pictures of the walls, ceiling, doorways, and furniture to build a map of a room.

This way, they can plan an efficient route.



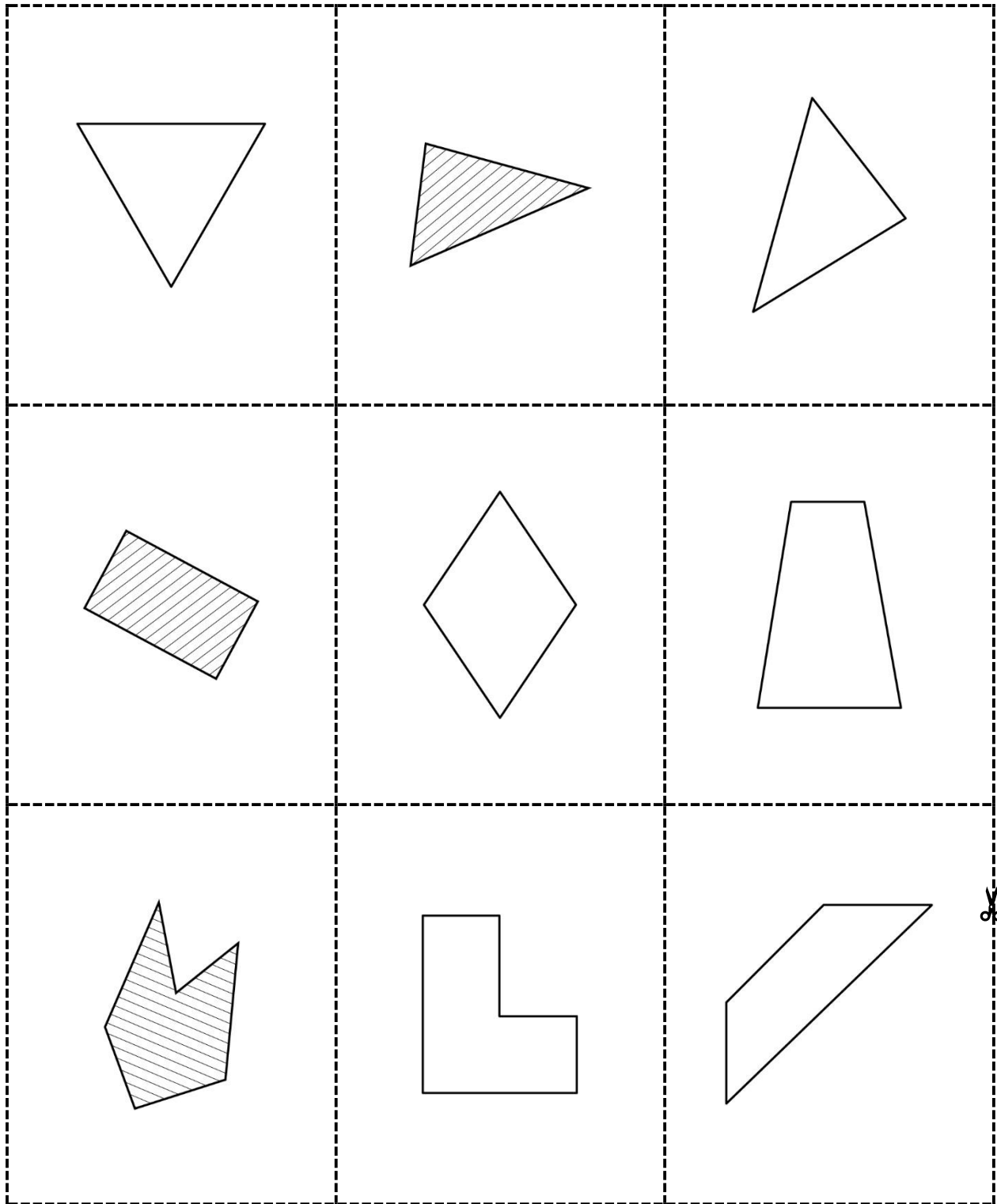
Look at the living room!
Someone spilled cookie crumbs and the dog knocked over the plant.

Code the vacuum to clean up the two messes, avoiding all obstacles.



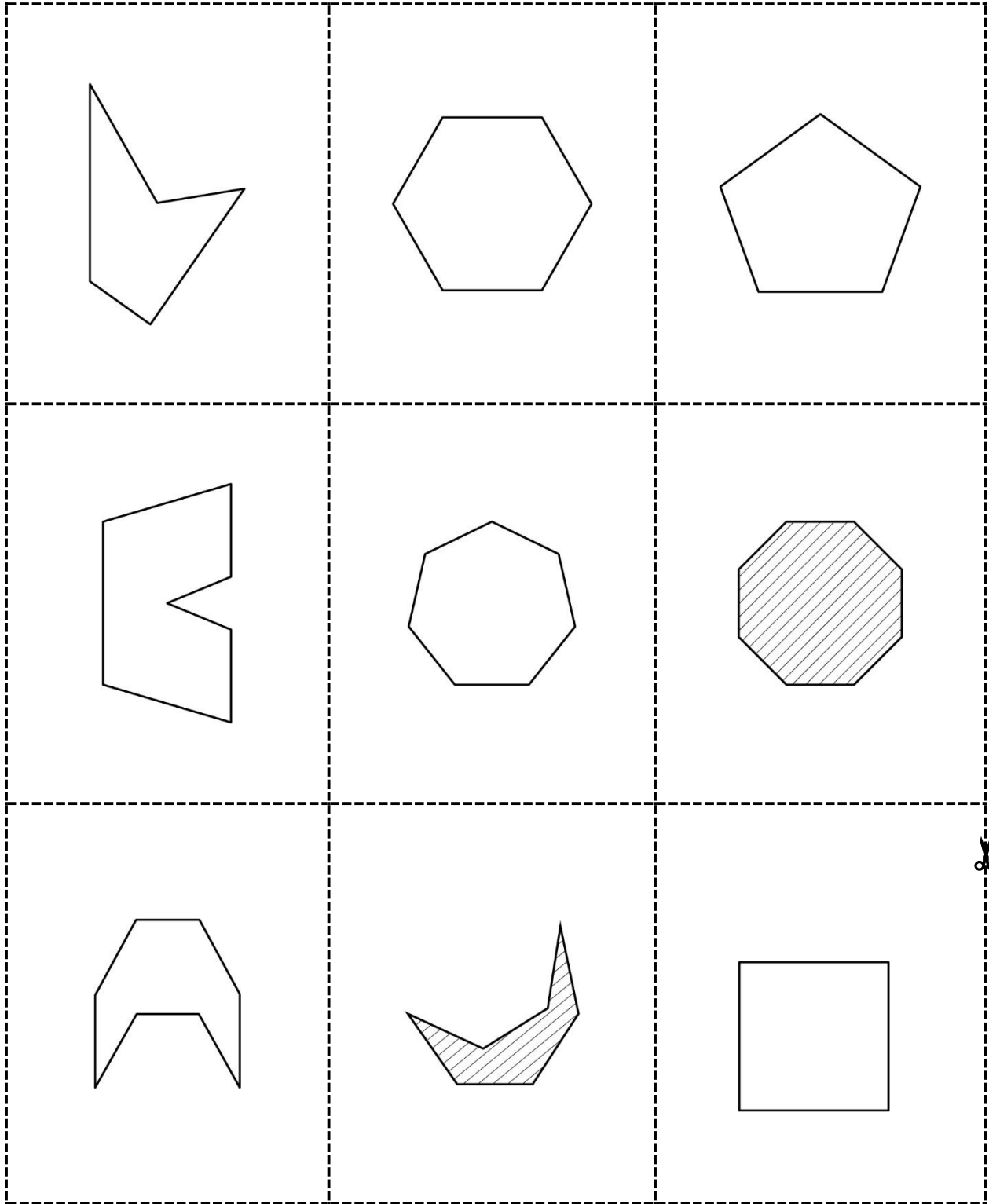
Master 62a

2-D Shapes



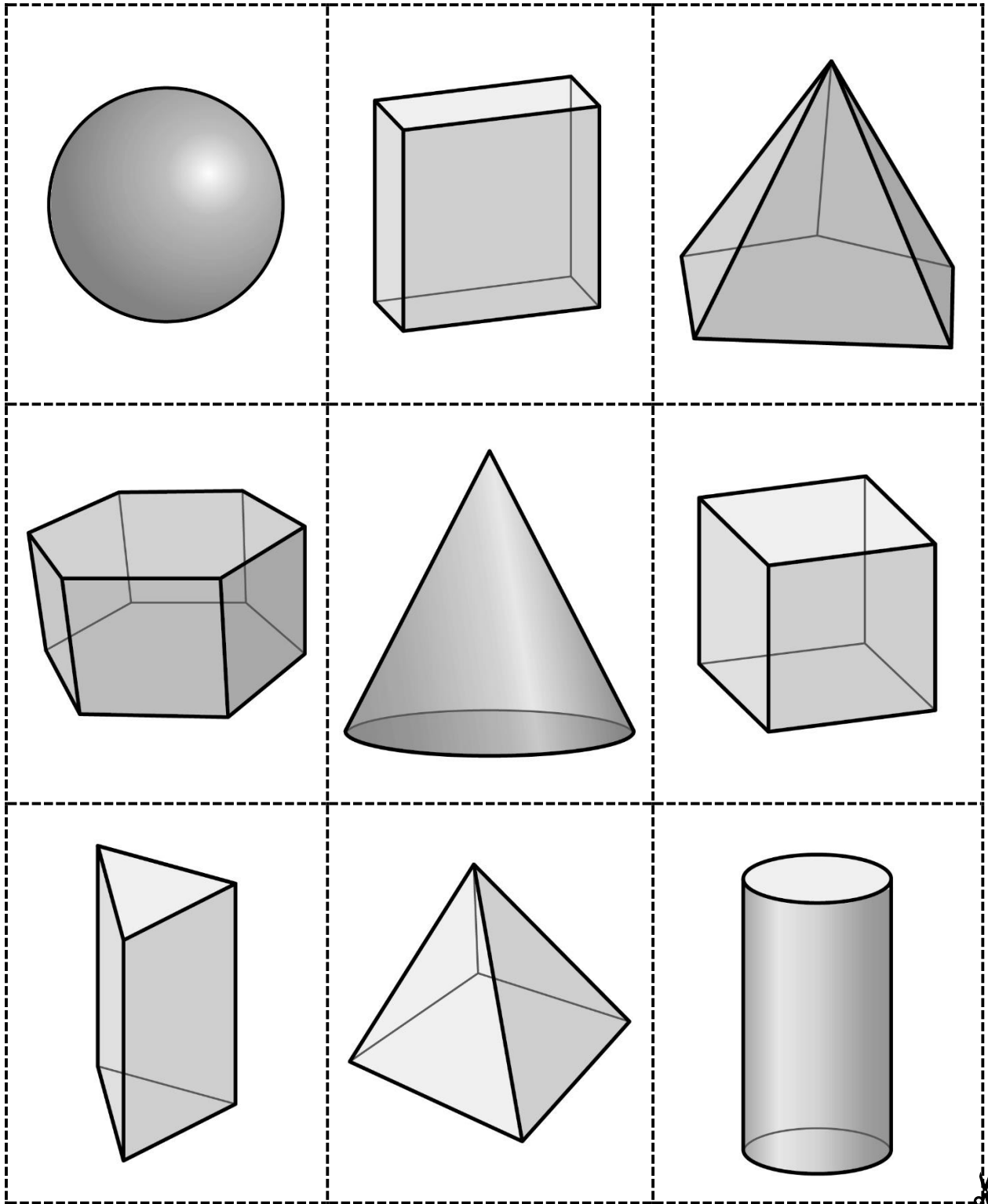
Master 62b

2-D Shapes



Master 63

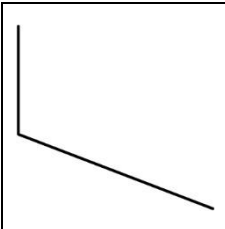
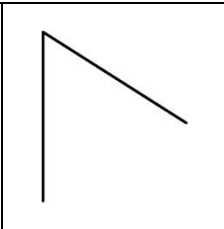
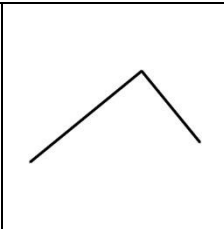
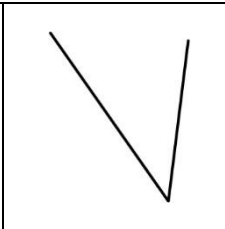
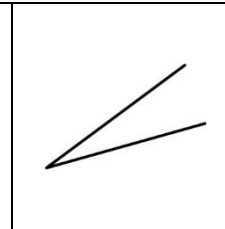
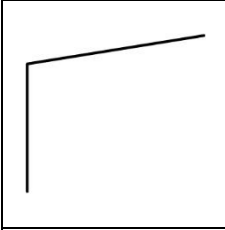
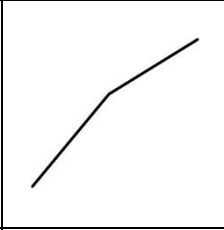
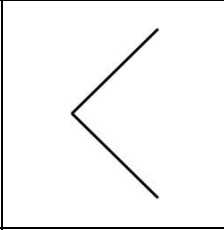
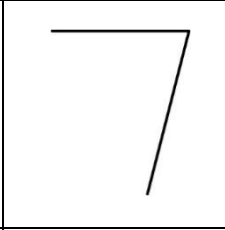
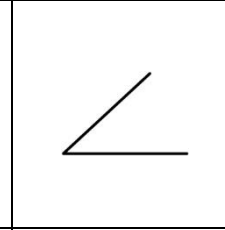
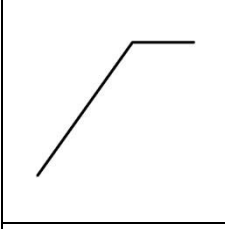
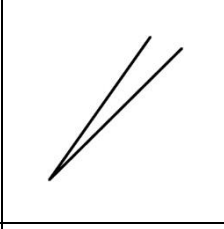
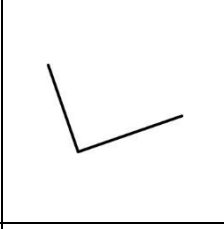
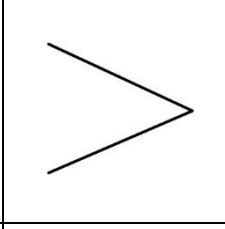
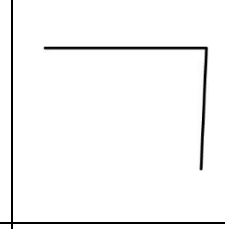
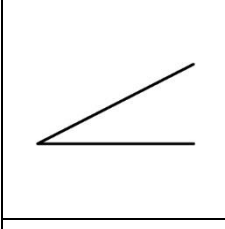
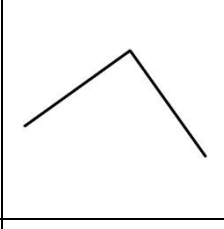
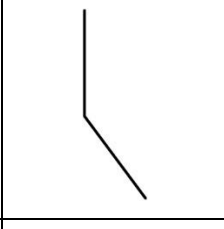
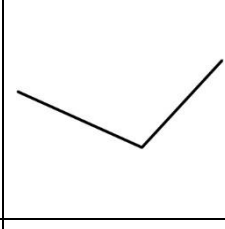
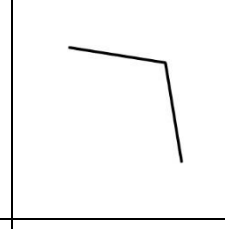
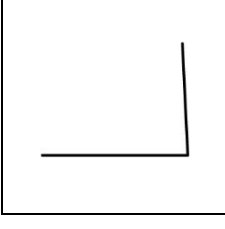
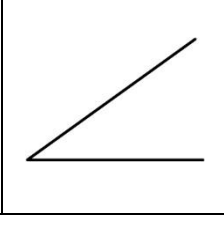
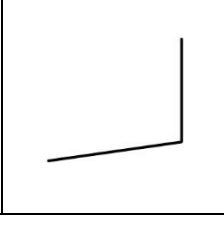
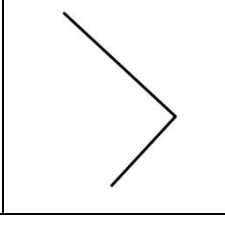
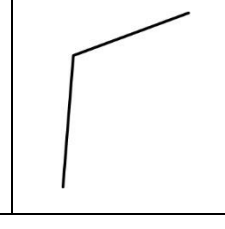
3-D Solids



Master 64a

Angle Search

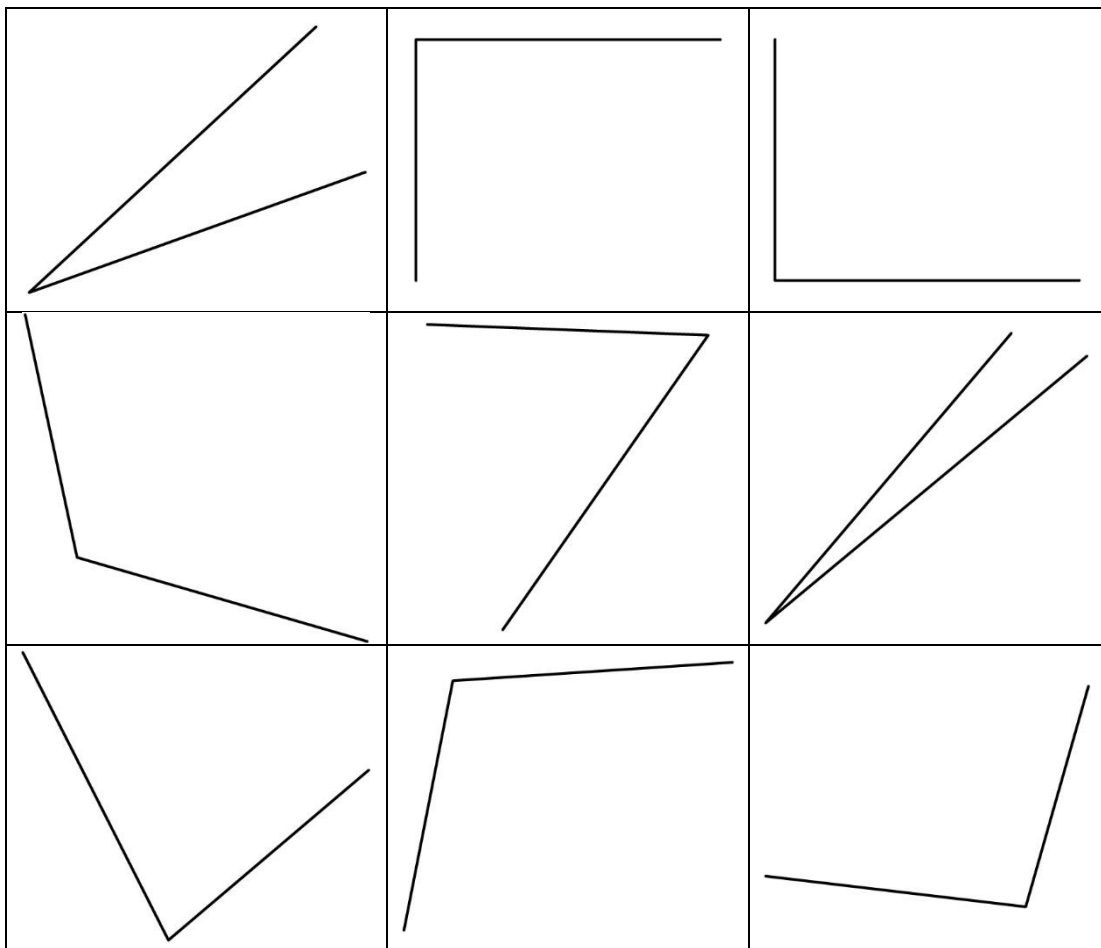
- Angle is less than a right angle.
- Angle is a right angle.
- Angle is greater than a right angle.

Master 64b

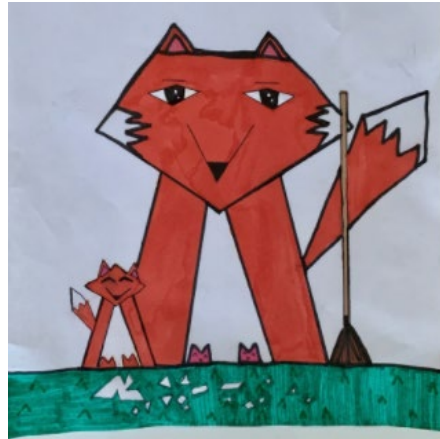
Angle Search (Accommodation)

- Angle is less than a right angle.
- Angle is a right angle.
- Angle is greater than a right angle.



Connections: Art with Geometry

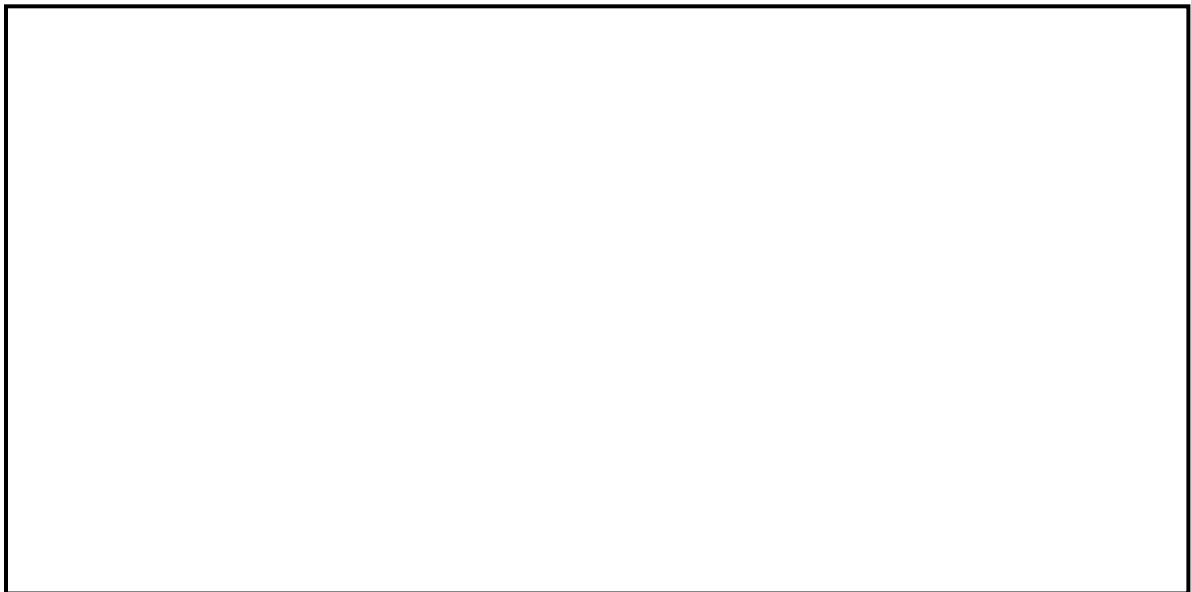
This art of a fox was created by Isla, a young student artist. She used lots of lines, angles, and shapes to create the drawing. How would you describe this art to a friend?



Create your own piece of art that meets these criteria.

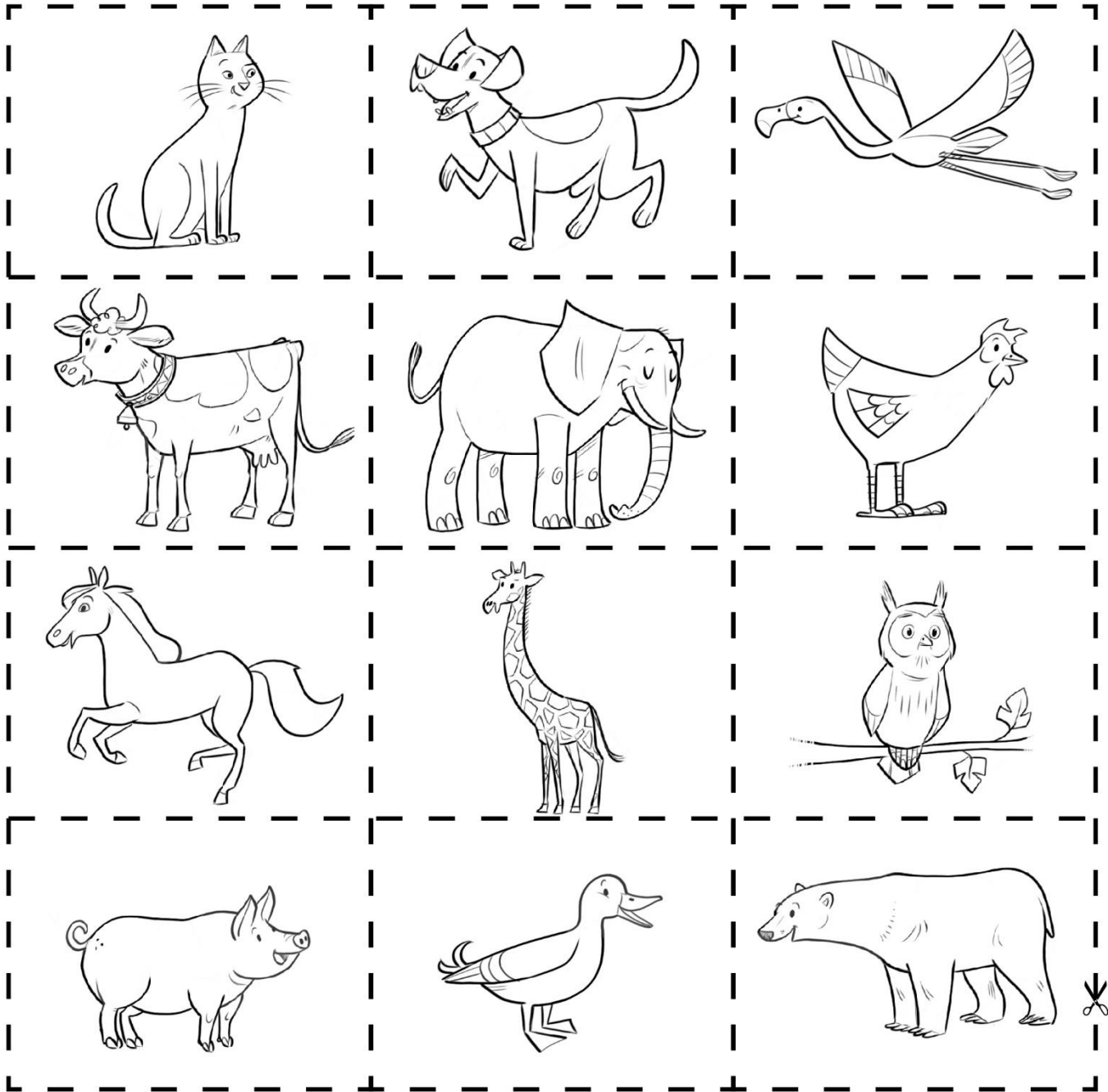
- has at least 3 different shapes
- has at least 4 of each type of angle (right angle, angle greater than a right angle, and angle less than a right angle)

You might choose to use Pattern Blocks create your art.



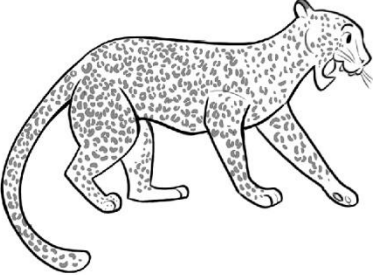


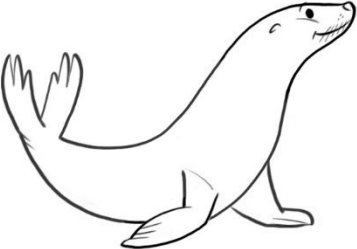

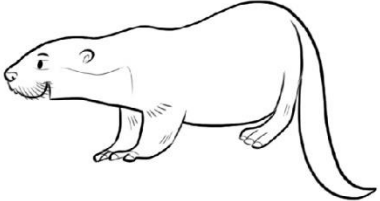
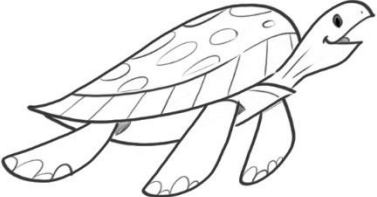
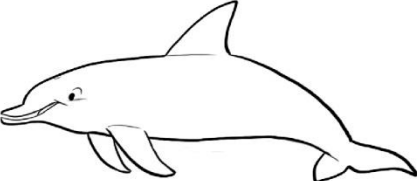
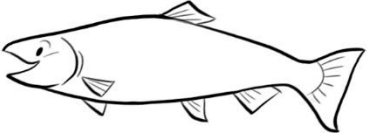
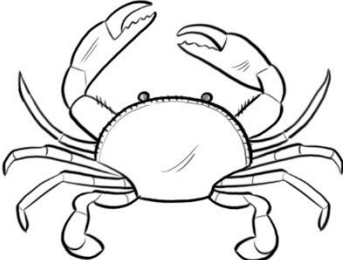
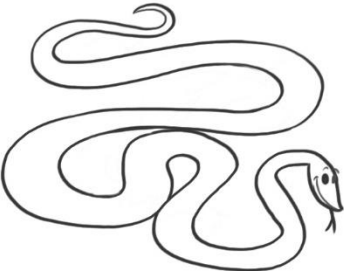
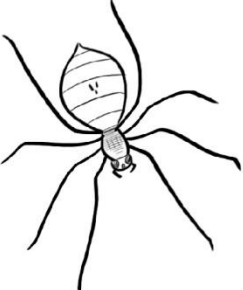
Master 66a

Animal Sort



Master 66b

Animal Sort (cont'd)



Master 67

Items in a Store's Return Bin

Toaster	Frying pan	Building blocks
Stuffed animal bear	Mugs	Scooter
Running shoes	Light bulbs	Sweater
Car snow brush	Jigsaw puzzle	Jeans
Rain boots	Board game	Socks
T-shirt	Snowsuit	Soccer ball



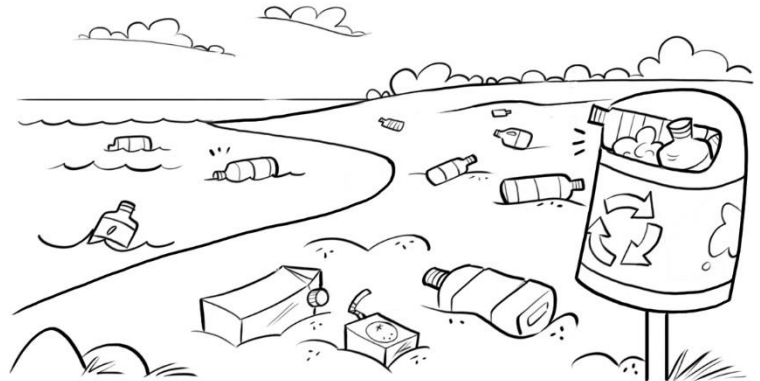
Connections: Protecting Our Environment

Did You Know?

20 000 plastic bottles are bought around the world every second.

It takes a lot more water to make a plastic bottle than it does to fill it.

It can take up to 1000 years for plastic to decompose.
That's 10 times as long as a person might live!



What Can We Do to Help Protect Our Environment?

- Drink water from reusable bottles.
- Place lunch and snacks in reusable containers.
- Use reusable cloth bags.
- Use paper straws.

Do you do any of these things?

How much plastic do you save?

Plastic Footprint Challenge

Over one week, collect data on the number of single-use plastics you use each day.

Record how many of each type you use (for example, bottles, bags, straws, and cutlery).

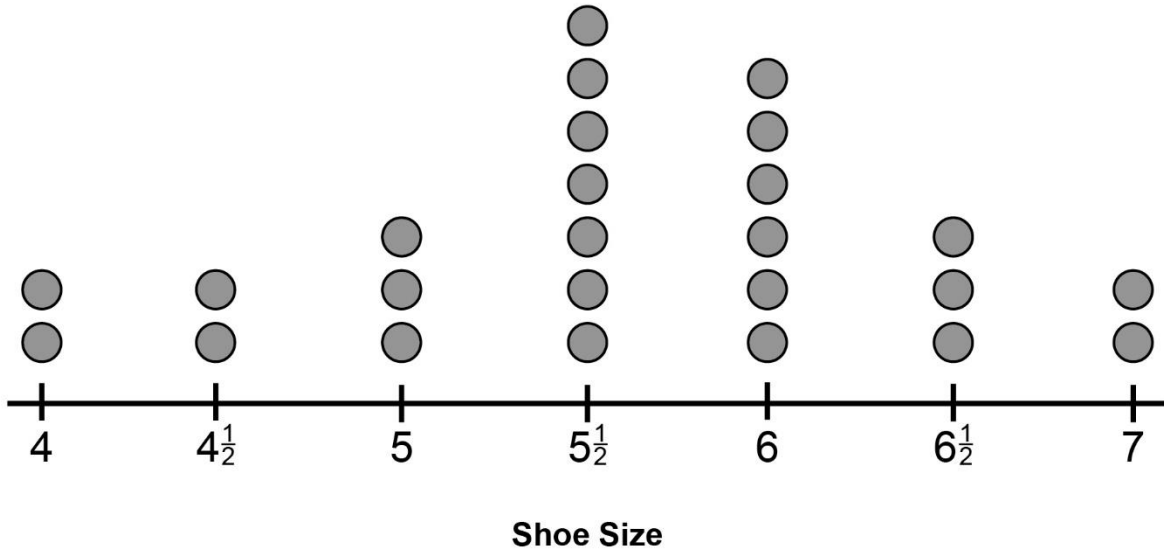
Display the data and present them to the class.

You may choose to use more than one graph.

Master 69

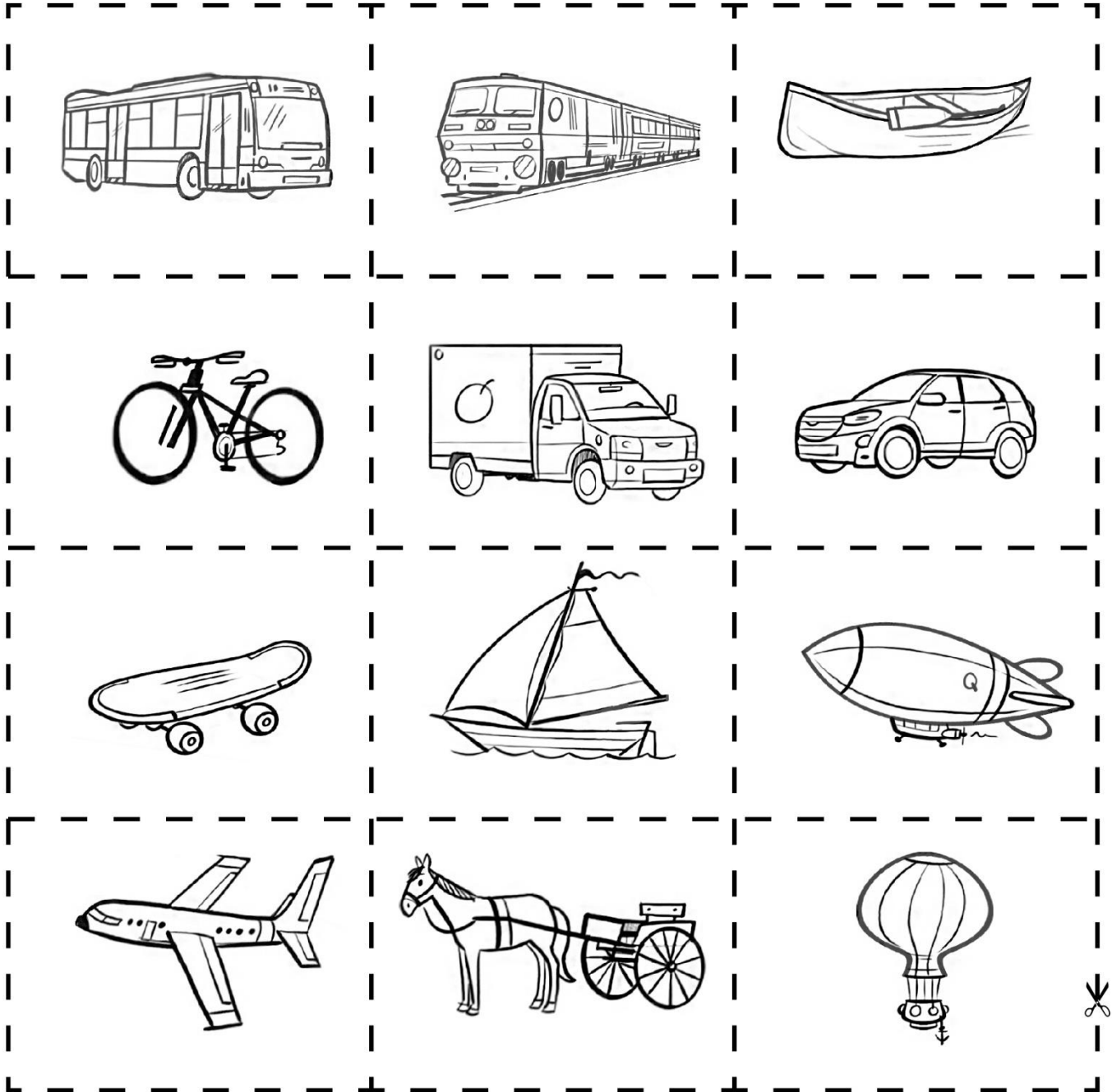
Shoe-Size Line Plot

Shoe Size of Students



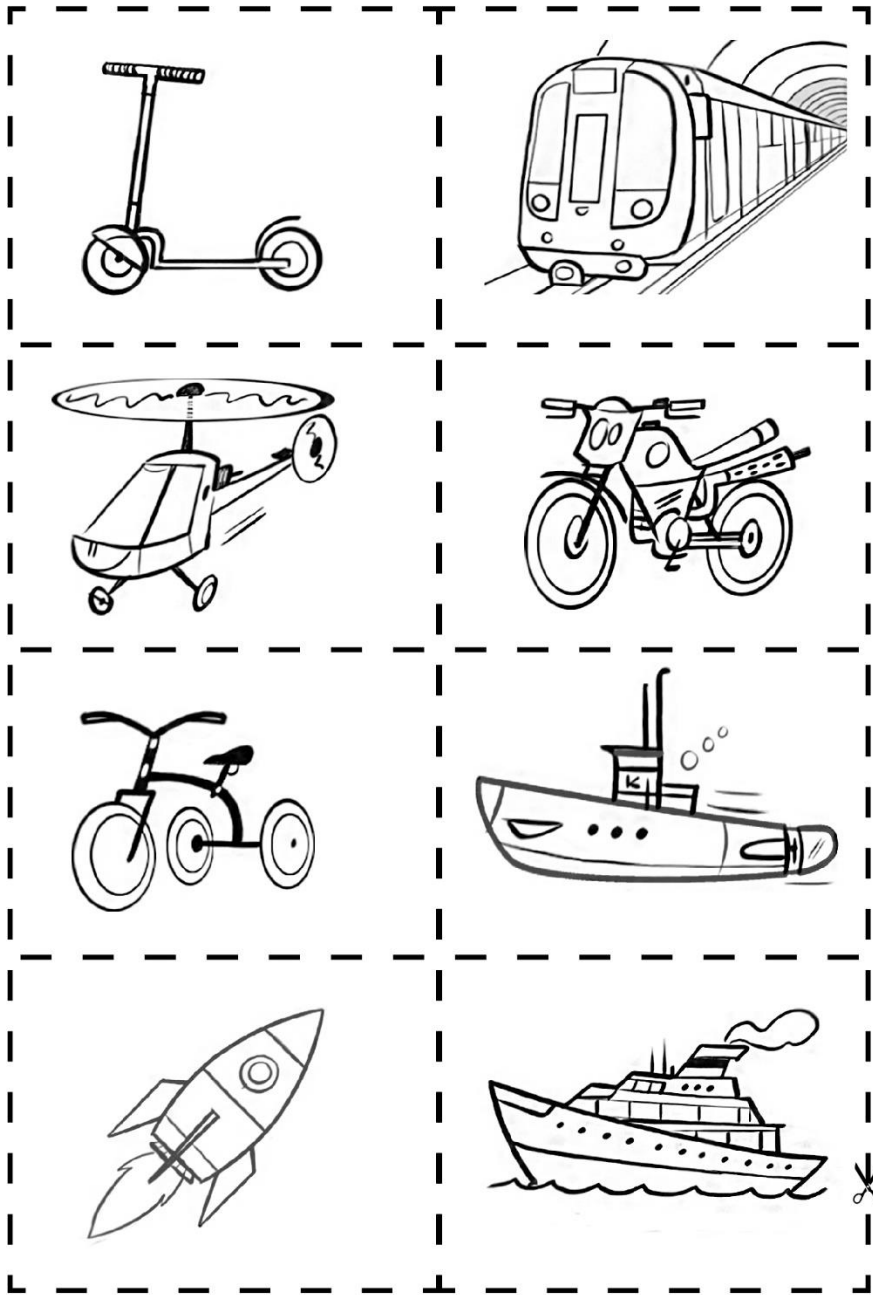
Master 70a

Types of Transportation



Master 70b

Types of Transportation



Master 71

Connections: What's the Chance?

Chance is the likelihood that something will happen.
Chance is all around us.

We hear chance when we listen to the weather forecast.
"It is very likely to rain tomorrow."



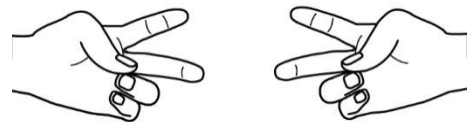
We see chance when watching a football game.
A coin is tossed to see who gets the ball first.



Have you ever spun to win a prize?
What is the chance of winning a good prize?
Why do you think this is?



Think about games you play.
What is the chance of both players showing scissors when playing Rock, Paper, Scissors?



What is the chance of finding a four-leaf clover?









What is the chance of getting an egg with two yolks?



Activity 1 Assessment

Numbers All Around Us

Recognizing and Writing Numerals							
<p>Reads and writes numbers to 100</p> <p>“25, twenty-five”</p>	<p>Matches numerals to 100 to quantities</p> <div style="text-align: center;"> <table border="1"> <tr> <td style="text-align: center;">Tens</td> <td style="text-align: center;">Ones</td> </tr> <tr> <td style="text-align: center;">  </td> <td style="text-align: center;">  </td> </tr> </table> </div> <p>“25 is 2 tens and 5 ones.”</p>	Tens	Ones			<p>Reads and writes numbers to 1000</p> <p>“250; two hundred fifty”</p>	<p>Matches numerals to 1000 to quantities</p> <p>“It says this box contains 250 envelopes.”</p>
Tens	Ones						
							
Observations/Documentation							

Activity 2 Assessment

Counting to 1000

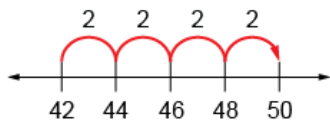
Counting to 1000 (by 1s)			
Counts on to 20 "13, 14, 15, 16, 17, 18, 19"	Counts on and back within 100, bridging tens "48, 49, 50, 51, 52"	Counts on and back within 1000, bridging hundreds "498, 499, 500, 501, 502"	Flexibly counts on and back within 1000, bridging tens and hundreds "603, 602, 601, 600, 599"
Observations/Documentation			

Activity 3 Assessment

Skip-Counting Forward and Backward

Counting to 1000 (Skip-Counting)

Skip-counts forward and backward by factors of 10



By 2s: "42, 44, 46, 48, 50, ..."
 By 5s: "95, 100, 105, 110, 115, ..."
 By 10s: "120, 130, 140, 150, 160, ..."

Flexibly skip-counts forward and backward by factors of 10

By 2s: "43, 45, 47, 49, 51, ..."
 By 5s: "96, 101, 106, 111, 116, ..."
 By 10s: "121, 131, 141, 151, 161, ..."

Skip-counts forward and backward by factors of 1000

By 20s: "100, 120, 140, 160, ..."
 By 25s: "325, 350, 375, 400, ..."
 By 50s: "150, 200, 250, 300, ..."
 By 100s: "400, 500, 600, 700, ..."
 By 200s: "200, 400, 600, 800, ..."

Flexibly skip-counts forward and backward.

By 20s: "105, 125, 145, 165, ..."
 By 25s: "326, 351, 376, 401, ..."
 By 50s: "155, 205, 255, 305, ..."
 By 100s: "407, 507, 607, 707, ..."
 By 200s: "999, 799, 599, 399, ..."

Observations/Documentation

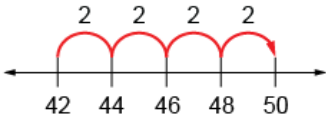
Number

Activity 3 Assessment

Skip-Counting Forward and Backward

Activity 4 Assessment Consolidation

Counting to 1000 (by 1s)			
Counts on to 20 "13, 14, 15, 16, 17, 18, 19"	Counts on and back within 100, bridging tens "48, 49, 50, 51, 52"	Counts on and back within 1000, bridging hundreds "498, 499, 500, 501, 502"	Flexibly counts on and back within 1000, bridging tens and hundreds "603, 602, 601, 600, 599"
Observations/Documentation			

Counting to 1000 (Skip-Counting)			
Skip-counts forward and backward by factors of 10  By 2s: "42, 44, 46, 48, 50, ..." By 5s: "95, 100, 105, 110, 115, ..." By 10s: "120, 130, 140, 150, 160, ..."	Flexibly skip-counts forward and backward by factors of 10 By 2s: "43, 45, 47, 49, 51, ..." By 5s: "96, 101, 106, 111, 116, ..." By 10s: "121, 131, 141, 151, 161, ..."	Skip-counts forward and backward by factors of 1000 By 20s: "100, 120, 140, 160, ..." By 25s: "325, 350, 375, 400, ..." By 50s: "150, 200, 250, 300, ..." By 100s: "400, 500, 600, 700, ..." By 200s: "200, 400, 600, 800, ..."	Flexibly skip-counts forward and backward. By 20s: "105, 125, 145, 165, ..." By 25s: "326, 351, 376, 401, ..." By 50s: "155, 205, 255, 305, ..." By 100s: "407, 507, 607, 707, ..." By 200s: "999, 799, 599, 399, ..."
Observations/Documentation			

Activity 5 Assessment

Estimating Quantities

Estimating Quantities

Guesses or counts



"About 500!"

Creates a referent of 10



"There are lots of groups of 10."

Creates a referent of 100



"I counted out 100."

Observations/Documentation

Activity 5 Assessment

Estimating Quantities

Estimating Quantities (con't)

Compares to a referent (more or less)



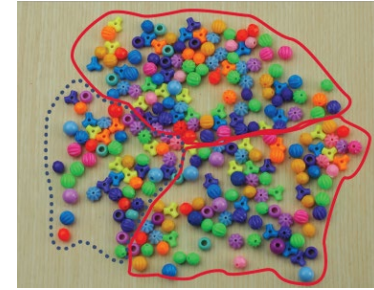
"More than 200."

Gives estimate as a range (physically groups)



"Between 200 and 300."

Estimates using visual strategies



"About 250: 2 groups of 100 and half of another 100."

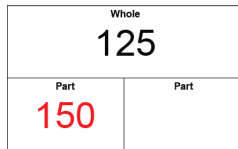
Observations/Documentation

Activity 6 Assessment

Composing and Decomposing Quantities

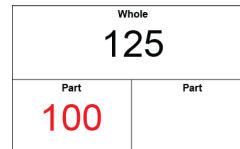
Decomposing and Composing Quantities

Randomly chooses a number as a part



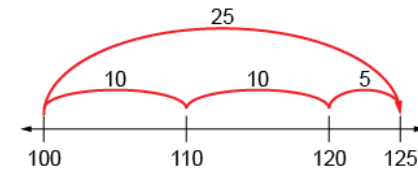
"I like the number 150."

Finds one part of a whole



"I thought of a number less than 125: 100."

Counts on or back to find the other part



"I counted on: 100, 110, 120, 125; the other part is 25."

Observations/Documentation

Composes the whole in different ways using known pairs

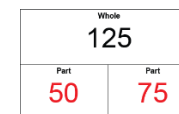
100 and 25
50 and 75

Uses patterns systematically to compose the whole, considering 0

Part	Part
125	0
124	1
123	2
122	3

"I kept taking 1 from a part and giving it to the other."

Uses number relationships and mental strategies to compose the whole


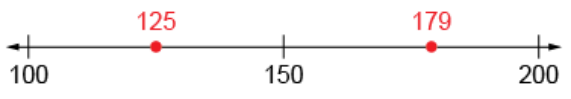
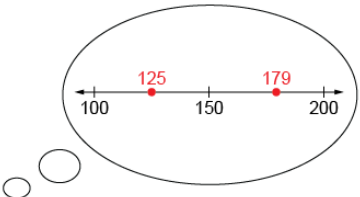



"75: I know 50 and 50 make 100, and 25 more makes 125."

Observations/Documentation

Activity 7 Assessment

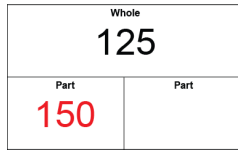
Comparing and Ordering Quantities

Comparing and Ordering Quantities		
<p>Orders numbers randomly</p> <p>125 245 179</p> <p>"I just put down any card."</p>	<p>Models with manipulatives</p>  <p>125 245</p>	<p>Uses benchmark on hundred chart or number line</p>  <p>"I compared the numbers to 150."</p>
Observations/Documentation		
<p>Visualizes hundred chart or number line</p>  <p>"I picture 179 farther to the right than 125."</p>	<p>Compares numbers, digit by digit (with the same place value)</p>  <p>"Both start with 1, 2 is less than 7, and 5 is less than 9. So, 125 is less than 179."</p>	<p>Orders three or more quantities (e.g., using early place-value, mental strategies)</p> <p>179 245 326</p> <p>"326 is greatest because 3 hundreds is more than both 2 hundreds and 1 hundred."</p>
Observations/Documentation		

Activity 8 Assessment Consolidation

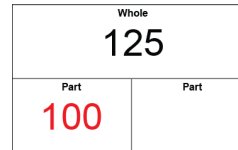
Decomposing and Composing Quantities

Randomly chooses a number as a part



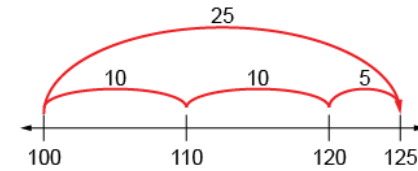
"I like the number 150."

Finds one part of a whole



"I thought of a number less than 125: 100."

Counts on or back to find the other part



"I counted on: 100, 110, 120, 125; the other part is 25."

Observations/Documentation

Composes the whole in different ways using known pairs

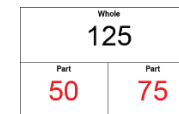
100 and 25
50 and 75

Uses patterns systematically to compose the whole, considering 0

Part	Part
125	0
124	1
123	2
122	3

"I kept taking 1 from a part and giving it to the other."

Uses number relationships and mental strategies to compose the whole



"75: I know 50 and 50 make 100, and 25 more makes 125."

Observations/Documentation

Activity 8 Assessment Consolidation

Comparing and Ordering Quantities

Orders numbers randomly

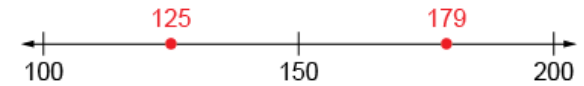
125 245 179

"I just put down any card."

Models with manipulatives



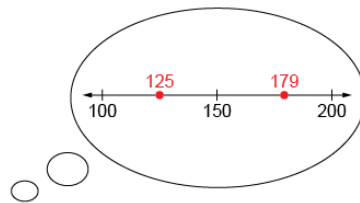
Uses benchmark on hundred chart or number line



"I compared the numbers to 150."

Observations/Documentation

Visualizes hundred chart or number line



"I picture 179 farther to the right than 125."

Compares numbers, digit by digit (with the same place value)



"Both start with 1, 2 is less than 7, and 5 is less than 9. So, 125 is less than 179."

Orders three or more quantities (e.g., using early place-value, mental strategies)

179 245 326

"326 is greatest because 3 hundreds is more than both 2 hundreds and 1 hundred."

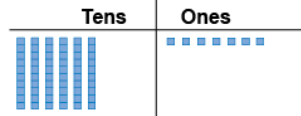
Observations/Documentation

Activity 9 Assessment

Building Numbers

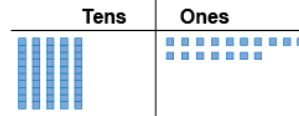
Composing and Decomposing 3-Digit Numbers

Composes and decomposes using tens and ones (one way)



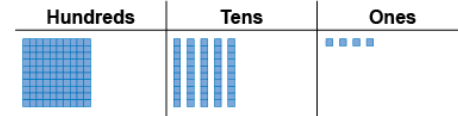
"I modelled 67."

Composes and decomposes using tens and ones (more than one way)



"I traded a ten for 10 ones."

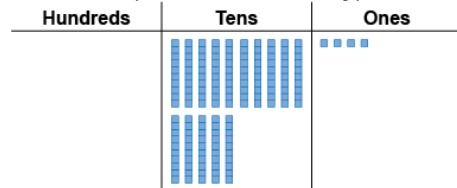
Composes and decomposes using hundreds, tens, and ones (one way)



"I modelled 154."

Observations/Documentation

Composes and decomposes using hundreds, tens, and ones (more than one way)



"I traded the hundred for 10 tens."

Uses place value to write a number in different ways

"One hundred fifty-four
 $154 = 100 + 50 + 4$;
 1 hundred, 5 tens, 4 ones;
 1 hundred, 4 tens, 14 ones
 □|||||♦♦♦♦"

Understands relationships among digits

"The digit 4 in 429 represents
 4 hundreds, 40 tens, or 400 ones."

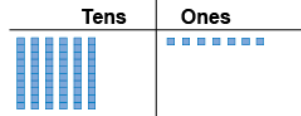
Observations/Documentation

Activity 10 Assessment

Representing Numbers in Different Ways

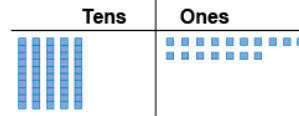
Composing and Decomposing 3-Digit Numbers

Composes and decomposes using tens and ones (one way)



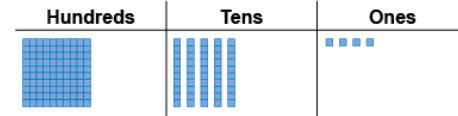
"I modelled 67."

Composes and decomposes using tens and ones (more than one way)



"I traded a ten for 10 ones."

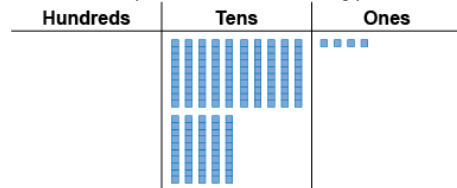
Composes and decomposes using hundreds, tens, and ones (one way)



"I modelled 154."

Observations/Documentation

Composes and decomposes using hundreds, tens, and ones (more than one way)



"I traded the hundred for 10 tens."

Uses place value to write a number in different ways

"One hundred fifty-four
 $154 = 100 + 50 + 4$;
 1 hundred, 5 tens, 4 ones;
 1 hundred, 4 tens, 14 ones
 □|||||♦♦♦♦"

Understands relationships among digits

"The digit 4 in 429 represents
 4 hundreds, 40 tens, or 400 ones."

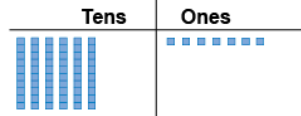
Observations/Documentation

Activity 11 Assessment

What's the Number?

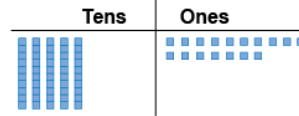
Composing and Decomposing 3-Digit Numbers

Composes and decomposes using tens and ones (one way)



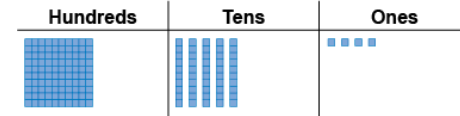
"I modelled 67."

Composes and decomposes using tens and ones (more than one way)



"I traded a ten for 10 ones."

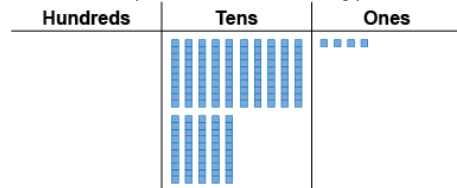
Composes and decomposes using hundreds, tens, and ones (one way)



"I modelled 154."

Observations/Documentation

Composes and decomposes using hundreds, tens, and ones (more than one way)



"I traded the hundred for 10 tens."

Uses place value to write a number in different ways

"One hundred fifty-four
 $154 = 100 + 50 + 4$;
 1 hundred, 5 tens, 4 ones;
 1 hundred, 4 tens, 14 ones
 □|||||♦♦♦♦"

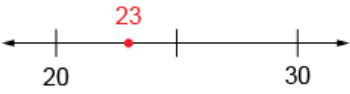
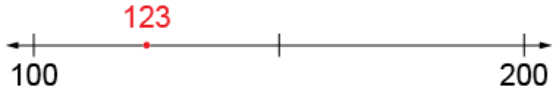
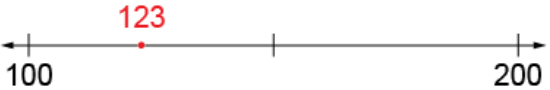
Understands relationships among digits

"The digit 4 in 429 represents
 4 hundreds, 40 tens, or 400 ones."

Observations/Documentation

Activity 12 Assessment

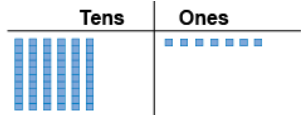
Rounding Numbers

Estimating Numbers		
<p>Identifies benchmark numbers (multiples of 10)</p> <p>“23 lies between 20 and 30.”</p>	<p>Compares to benchmark numbers (multiples of 10)</p>  <p>“23 is closer to 20 than to 30.”</p>	<p>Identifies benchmark numbers (multiples of 100)</p> <p>“123 lies between 100 and 200.”</p>
Observations/Documentation		
<p>Compares to benchmark numbers (multiples of 100)</p>  <p>“123 is closer to 100 than to 200.”</p>	<p>Uses benchmark numbers to round 3-digit numbers to the nearest 10</p> <p>“123 is between 120 and 130, but closer to 120.”</p>	<p>Uses benchmark numbers flexibly to round to the nearest 10 and 100</p>  <p>“123 is between 100 and 200, but closer to 100. To be more closer, it's between 120 and 130, and rounds to 120.”</p>
Observations/Documentation		

Activity 13 Assessment Consolidation

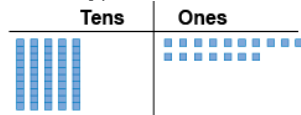
Composing and Decomposing 3-Digit Numbers

Composes and decomposes using tens and ones (one way)



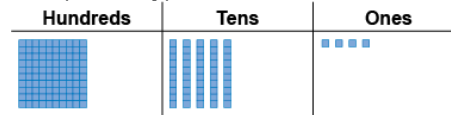
"I modelled 67."

Composes and decomposes using tens and ones (more than one way)



"I traded a ten for 10 ones."

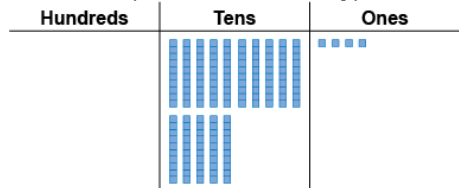
Composes and decomposes using hundreds, tens, and ones (one way)



"I modelled 154."

Observations/Documentation

Composes and decomposes using hundreds, tens, and ones (more than one way)



"I traded the hundred for 10 tens."

Uses place value to write a number in different ways

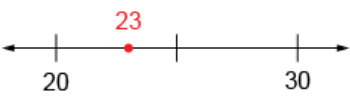
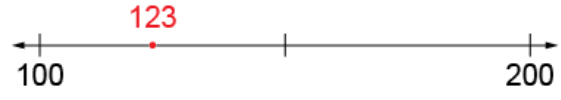

"One hundred fifty-four
 $154 = 100 + 50 + 4$;
 1 hundred, 5 tens, 4 ones;
 1 hundred, 4 tens, 14 ones
 □|||||♦♦♦♦"

Understands relationships among digits

"The digit 4 in 429 represents
 4 hundreds, 40 tens, or 400 ones."

Observations/Documentation

Activity 13 Assessment Consolidation

Estimating Numbers		
<p>Identifies benchmark numbers (multiples of 10)</p> <p>“23 lies between 20 and 30.”</p>	<p>Compares to benchmark numbers (multiples of 10)</p>  <p>“23 is closer to 20 than to 30.”</p>	<p>Identifies benchmark numbers (multiples of 100)</p> <p>“123 lies between 100 and 200.”</p>
Observations/Documentation		
<p>Compares to benchmark numbers (multiples of 100)</p>  <p>“123 is closer to 100 than to 200.”</p>	<p>Uses benchmark numbers to round 3-digit numbers to the nearest 10</p> <p>“123 is between 120 and 130, but closer to 120.”</p>	<p>Uses benchmark numbers flexibly to round to the nearest 10 and 100</p>  <p>“123 is between 100 and 200, but closer to 100. To be more closer, it's between 120 and 130, and rounds to 120.”</p>
Observations/Documentation		

Activity 14 Assessment

Exploring Equal Parts

Exploring Fractions			
<p>Partitions whole (area or length) into equal parts</p>  <p>“I folded the line into 4 equal parts.”</p>	<p>Counts parts using unit fractions</p>  <p>“1 one-fourth, 2 one-fourths, 3 one-fourths, 4 one-fourths”</p>	<p>Understands the meaning of the numerator and denominator</p>  <p>“I counted 4 one-fifths, which tells me I have $\frac{4}{5}$ altogether. 4 is the number of parts shaded and 5 is the total number of equal parts.”</p>	<p>Compares unit fractions</p>  <p>“One-half is bigger than one-third of the same whole.”</p>
Observations/Documentation			

Activity 14 Assessment

Exploring Equal Parts

Partitioning Quantities to Form Fractions (con't)

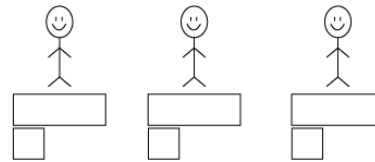
Understands relationship between number of parts and size of parts

“When I divide the whole into more parts, the parts get smaller.”

Understands that, for the same whole, equivalent fractions represent the same quantity

“ $\frac{2}{3}$ and $\frac{4}{6}$ represent the same amount, but $\frac{4}{6}$ has twice as many parts as $\frac{2}{3}$.”

Solves equal-grouping problems that result in fractional amounts



“I cut the leftover bar into 3 equal parts. Each person got $1\frac{1}{3}$ bars.”

Flexibly solves equal-grouping problems that result in fractional amounts

“When the leftover bar is cut into 6 equal parts, each person gets $1\frac{2}{6}$ bars. $1\frac{1}{3}$ and $1\frac{2}{6}$ are equivalent.”

Observations/Documentation

Activity 15 Assessment

Comparing Fractions 1

Exploring Fractions			
<p>Partitions whole (area or length) into equal parts</p>  <p>"I folded the line into 4 equal parts."</p>	<p>Counts parts using unit fractions</p>  <p>"1 one-fourth, 2 one-fourths, 3 one-fourths, 4 one-fourths"</p>	<p>Understands the meaning of the numerator and denominator</p>  <p>"I counted 4 one-fifths, which tells me I have $\frac{4}{5}$ altogether. 4 is the number of parts shaded and 5 is the total number of equal parts."</p>	<p>Compares unit fractions</p>  <p>"One-half is bigger than one-third of the same whole."</p>
Observations/Documentation			

Activity 15 Assessment

Comparing Fractions 1

Partitioning Quantities to Form Fractions (con't)

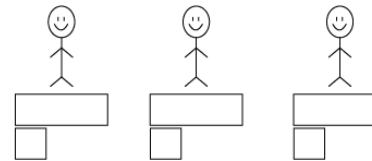
Understands relationship between number of parts and size of parts

“When I divide the whole into more parts, the parts get smaller.”

Understands that, for the same whole, equivalent fractions represent the same quantity

“ $\frac{2}{3}$ and $\frac{4}{6}$ represent the same amount, but $\frac{4}{6}$ has twice as many parts as $\frac{2}{3}$.”

Solves equal-grouping problems that result in fractional amounts



“I cut the leftover bar into 3 equal parts. Each person got $1\frac{1}{3}$ bars.”


Flexibly solves equal-grouping problems that result in fractional amounts

“When the leftover bar is cut into 6 equal parts, each person gets $1\frac{2}{6}$ bars. $1\frac{1}{3}$ and $1\frac{2}{6}$ are equivalent.”

Observations/Documentation

Activity 16 Assessment

Comparing Fractions 2

Exploring Fractions			
<p>Partitions whole (area or length) into equal parts</p>  <p>“I folded the line into 4 equal parts.”</p>	<p>Counts parts using unit fractions</p>  <p>“1 one-fourth, 2 one-fourths, 3 one-fourths, 4 one-fourths”</p>	<p>Understands the meaning of the numerator and denominator</p>  <p>“I counted 4 one-fifths, which tells me I have $\frac{4}{5}$ altogether. 4 is the number of parts shaded and 5 is the total number of equal parts.”</p>	<p>Compares unit fractions</p>  <p>“One-half is bigger than one-third of the same whole.”</p>
Observations/Documentation			

Activity 16 Assessment

Comparing Fractions 2

Partitioning Quantities to Form Fractions (con't)

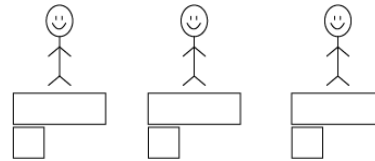
Understands relationship between number of parts and size of parts

“When I divide the whole into more parts, the parts get smaller.”

Understands that, for the same whole, equivalent fractions represent the same quantity

“ $\frac{2}{3}$ and $\frac{4}{6}$ represent the same amount, but $\frac{4}{6}$ has twice as many parts as $\frac{2}{3}$.”

Solves equal-grouping problems that result in fractional amounts



“I cut the leftover bar into 3 equal parts. Each person got $1\frac{1}{3}$ bars.”

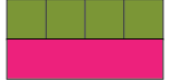

Flexibly solves equal-grouping problems that result in fractional amounts

“When the leftover bar is cut into 6 equal parts, each person gets $1\frac{2}{6}$ bars. $1\frac{1}{3}$ and $1\frac{2}{6}$ are equivalent.”

Observations/Documentation

Activity 17 Assessment

Partitioning Sets

Exploring Fractions			
<p>Partitions whole (area or length) into equal parts</p>  <p>“I folded the line into 4 equal parts.”</p>	<p>Counts parts using unit fractions</p>  <p>“1 one-fourth, 2 one-fourths, 3 one-fourths, 4 one-fourths”</p>	<p>Understands the meaning of the numerator and denominator</p>  <p>“I counted 4 one-fifths, which tells me I have $\frac{4}{5}$ altogether. 4 is the number of parts shaded and 5 is the total number of equal parts.”</p>	<p>Compares unit fractions</p>  <p>“One-half is bigger than one-third of the same whole.”</p>
Observations/Documentation			

Activity 17 Assessment

Partitioning Sets

Partitioning Quantities to Form Fractions (con't)

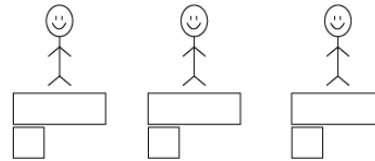
Understands relationship between number of parts and size of parts

“When I divide the whole into more parts, the parts get smaller.”

Understands that, for the same whole, equivalent fractions represent the same quantity

“ $\frac{2}{3}$ and $\frac{4}{6}$ represent the same amount, but $\frac{4}{6}$ has twice as many parts as $\frac{2}{3}$.”

Solves equal-grouping problems that result in fractional amounts



“I cut the leftover bar into 3 equal parts. Each person got $1\frac{1}{3}$ bars.”

Flexibly solves equal-grouping problems that result in fractional amounts

“When the leftover bar is cut into 6 equal parts, each person gets $1\frac{2}{6}$ bars. $1\frac{1}{3}$ and $1\frac{2}{6}$ are equivalent.”

Observations/Documentation

Activity 18 Assessment Consolidation

Exploring Fractions			
<p>Partitions whole (area or length) into equal parts</p>  <p>“I folded the line into 4 equal parts.”</p>	<p>Counts parts using unit fractions</p>  <p>“1 one-fourth, 2 one-fourths, 3 one-fourths, 4 one-fourths”</p>	<p>Understands the meaning of the numerator and denominator</p>  <p>“I counted 4 one-fifths, which tells me I have $\frac{4}{5}$ altogether. 4 is the number of parts shaded and 5 is the total number of equal parts.”</p>	<p>Compares unit fractions</p>  <p>“One-half is bigger than one-third of the same whole.”</p>
Observations/Documentation			

Activity 18 Assessment Consolidation

Partitioning Quantities to Form Fractions (con't)

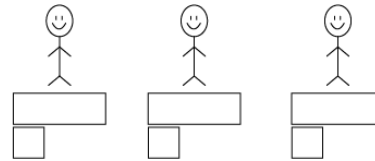
Understands relationship between number of parts and size of parts

“When I divide the whole into more parts, the parts get smaller.”

Understands that, for the same whole, equivalent fractions represent the same quantity

“ $\frac{2}{3}$ and $\frac{4}{6}$ represent the same amount, but $\frac{4}{6}$ has twice as many parts as $\frac{2}{3}$.”

Solves equal-grouping problems that result in fractional amounts



“I cut the leftover bar into 3 equal parts. Each person got $1\frac{1}{3}$ bars.”

Flexibly solves equal-grouping problems that result in fractional amounts

“When the leftover bar is cut into 6 equal parts, each person gets $1\frac{2}{6}$ bars. $1\frac{1}{3}$ and $1\frac{2}{6}$ are equivalent.”

Observations/Documentation

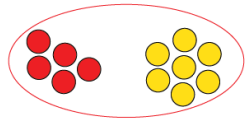
Activity 19 Assessment

Modelling Addition and Subtraction

Developing Meaning of Addition and Subtraction

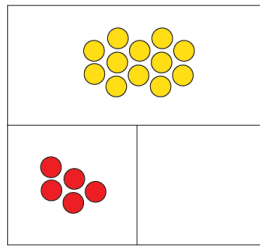
Recognizes addition and subtraction situations

Join



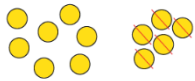
$$5 + 7 = \underline{\quad}$$

Part-part-whole



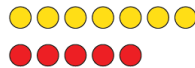
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

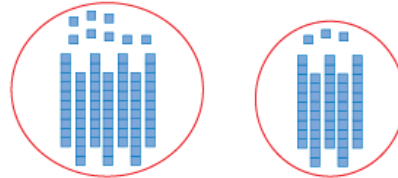
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

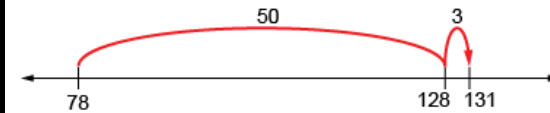
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 19 Assessment

Modelling Addition and Subtraction

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

Activity 19 Assessment

Modelling Addition and Subtraction

Developing Fluency for Addition and Subtraction

Fluently adds and subtracts within 5

“I know $4 + 1 = 5$ and $5 - 1 = 4$.”

Fluently adds and subtracts to 10

“I know $8 + 2 = 10$ and $10 - 2 = 8$.”
(complements to 10)

Fluently adds and subtracts to 20

“I can use doubles.
I know $9 + 9 = 18$ and $18 - 9 = 9$.”

Observations/Documentation

Uses known sums and differences to solve addition and subtraction equations

“ $25 + 37 = \square$
I know $25 + 30 = 55$, and 55 plus 5 is 60,
and 2 more makes 62.”
(decomposing, known facts)

Develops mental strategies and algorithms

$129 + 232 = \square$
I take 1 from 32 and give it to 129
to get $130 + 231$.
 $130 + 230 = 360$, and 1 more is 361.”
(compensation)

Estimates sums and differences

$149 + 138 = \square$
“149 is close to 150.
138 is close to 140.
 $150 + 140 = 290$ ”
(using benchmarks)

Observations/Documentation

Activity 20 Assessment

Estimating Sums and Differences

Developing Fluency for Addition and Subtraction		
Fluently adds and subtracts within 5 “I know $4 + 1 = 5$ and $5 - 1 = 4$.”	Fluently adds and subtracts to 10 “I know $8 + 2 = 10$ and $10 - 2 = 8$.” (complements to 10)	Fluently adds and subtracts to 20 “I can use doubles. I know $9 + 9 = 18$ and $18 - 9 = 9$.”
Observations/Documentation		
Uses known sums and differences to solve addition and subtraction equations “ $25 + 37 = \square$ I know $25 + 30 = 55$, and 55 plus 5 is 60, and 2 more makes 62.” (decomposing, known facts)	Develops mental strategies and algorithms $129 + 232 = \square$ I take 1 from 32 and give it to 129 to get $130 + 231$. $130 + 230 = 360$, and 1 more is 361.” (compensation)	Estimates sums and differences $149 + 138 = \square$ “149 is close to 150. 138 is close to 140. $150 + 140 = 290$ ” (using benchmarks)
Observations/Documentation		

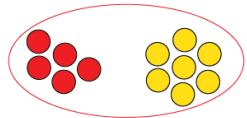
Activity 20 Assessment

Estimating Sums and Differences

Developing Meaning of Addition and Subtraction

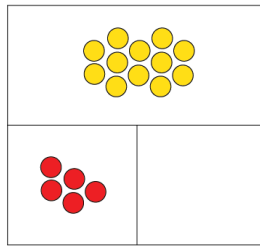
Recognizes addition and subtraction situations

Join



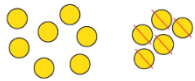
$$5 + 7 = \underline{\quad}$$

Part-part-whole



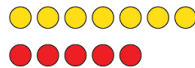
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

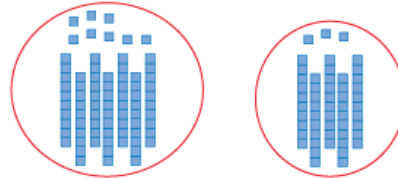
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

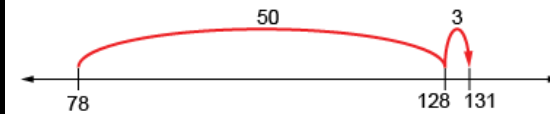
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 20 Assessment

Estimating Sums and Differences

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

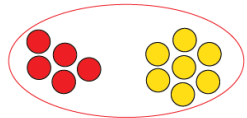
Activity 21 Assessment

Adding and Subtracting Money Amounts

Developing Meaning of Addition and Subtraction

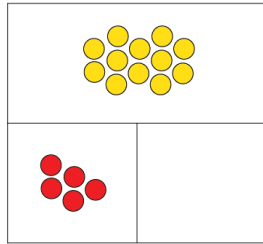
Recognizes addition and subtraction situations

Join



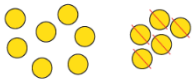
$$5 + 7 = \underline{\quad}$$

Part-part-whole



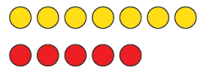
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

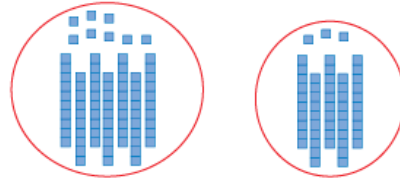
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

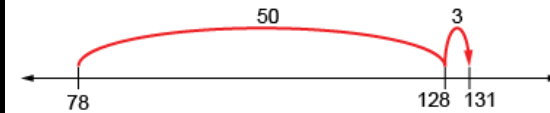
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 21 Assessment

Adding and Subtracting Money Amounts

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

Activity 21 Assessment

Adding and Subtracting Money Amounts

Developing Fluency for Addition and Subtraction		
Fluently adds and subtracts within 5 “I know $4 + 1 = 5$ and $5 - 1 = 4$.”	Fluently adds and subtracts to 10 “I know $8 + 2 = 10$ and $10 - 2 = 8$.” (complements to 10)	Fluently adds and subtracts to 20 “I can use doubles. I know $9 + 9 = 18$ and $18 - 9 = 9$.”
Observations/Documentation		
Uses known sums and differences to solve addition and subtraction equations “ $25 + 37 = \square$ I know $25 + 30 = 55$, and 55 plus 5 is 60, and 2 more makes 62.” (decomposing, known facts)	Develops mental strategies and algorithms $129 + 232 = \square$ I take 1 from 32 and give it to 129 to get $130 + 231$. $130 + 230 = 360$, and 1 more is 361.” (compensation)	Estimates sums and differences $149 + 138 = \square$ “149 is close to 150. 138 is close to 140. $150 + 140 = 290$ ” (using benchmarks)
Observations/Documentation		

Activity 22 Assessment

Using Mental Math to Add and Subtract

Developing Fluency for Addition and Subtraction

Fluently adds and subtracts within 5

“I know $4 + 1 = 5$ and $5 - 1 = 4$.”

Fluently adds and subtracts to 10

“I know $8 + 2 = 10$ and $10 - 2 = 8$.”
(complements to 10)

Fluently adds and subtracts to 20

“I can use doubles.
I know $9 + 9 = 18$ and $18 - 9 = 9$.”

Observations/Documentation

Uses known sums and differences to solve addition and subtraction equations

“ $25 + 37 = \square$
I know $25 + 30 = 55$, and 55 plus 5 is 60,
and 2 more makes 62.”
(decomposing, known facts)

Develops mental strategies and algorithms

$129 + 232 = \square$
I take 1 from 32 and give it to 129
to get $130 + 231$.
 $130 + 230 = 360$, and 1 more is 361.”
(compensation)

Estimates sums and differences

$149 + 138 = \square$
“149 is close to 150.
138 is close to 140.
 $150 + 140 = 290$ ”
(using benchmarks)

Observations/Documentation

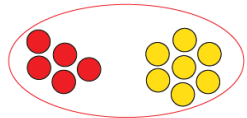
Activity 22 Assessment

Using Mental Math to Add and Subtract

Developing Meaning of Addition and Subtraction

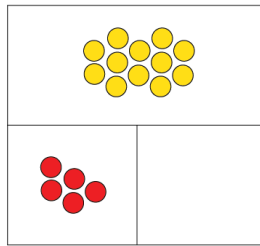
Recognizes addition and subtraction situations

Join



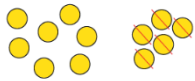
$$5 + 7 = \underline{\quad}$$

Part-part-whole



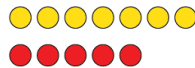
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

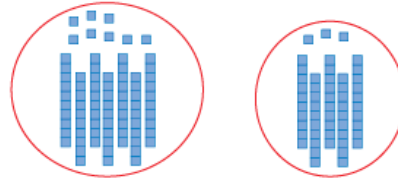
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

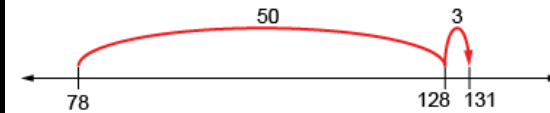
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 22 Assessment

Using Mental Math to Add and Subtract

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

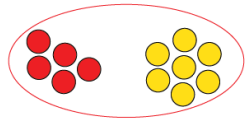
Activity 23 Assessment

Creating and Solving Problems

Developing Meaning of Addition and Subtraction

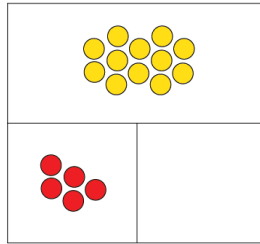
Recognizes addition and subtraction situations

Join



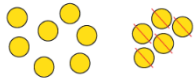
$$5 + 7 = \underline{\quad}$$

Part-part-whole



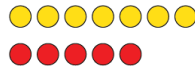
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

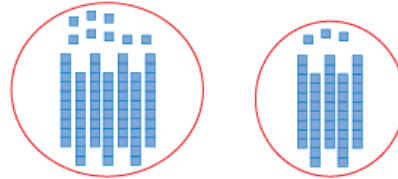
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

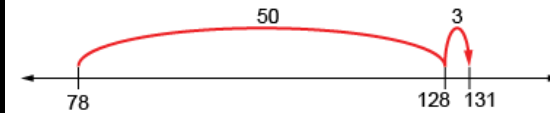
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 23 Assessment

Creating and Solving Problems

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

Activity 23 Assessment

Creating and Solving Problems

Developing Fluency for Addition and Subtraction		
Fluently adds and subtracts within 5 “I know $4 + 1 = 5$ and $5 - 1 = 4$.”	Fluently adds and subtracts to 10 “I know $8 + 2 = 10$ and $10 - 2 = 8$.” (complements to 10)	Fluently adds and subtracts to 20 “I can use doubles. I know $9 + 9 = 18$ and $18 - 9 = 9$.”
Observations/Documentation		
Uses known sums and differences to solve addition and subtraction equations “ $25 + 37 = \square$ I know $25 + 30 = 55$, and 55 plus 5 is 60, and 2 more makes 62.” (decomposing, known facts)	Develops mental strategies and algorithms $129 + 232 = \square$ I take 1 from 32 and give it to 129 to get $130 + 231$. $130 + 230 = 360$, and 1 more is 361.” (compensation)	Estimates sums and differences $149 + 138 = \square$ “149 is close to 150. 138 is close to 140. $150 + 140 = 290$ ” (using benchmarks)
Observations/Documentation		

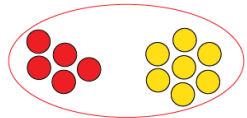
Activity 24 Assessment

Creating and Solving Problems with Larger Numbers

Developing Meaning of Addition and Subtraction

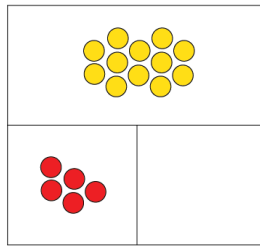
Recognizes addition and subtraction situations

Join



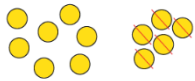
$$5 + 7 = \underline{\quad}$$

Part-part-whole



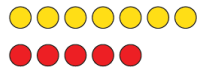
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

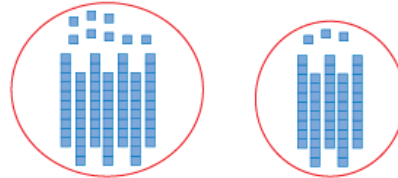
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

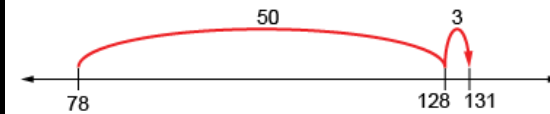
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 24 Assessment

Creating and Solving Problems with Larger Numbers

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

Activity 24 Assessment

Creating and Solving Problems with Larger Numbers

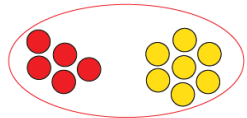
Developing Fluency for Addition and Subtraction		
Fluently adds and subtracts within 5 “I know $4 + 1 = 5$ and $5 - 1 = 4$.”	Fluently adds and subtracts to 10 “I know $8 + 2 = 10$ and $10 - 2 = 8$.” (complements to 10)	Fluently adds and subtracts to 20 “I can use doubles. I know $9 + 9 = 18$ and $18 - 9 = 9$.”
Observations/Documentation		
Uses known sums and differences to solve addition and subtraction equations “ $25 + 37 = \square$ I know $25 + 30 = 55$, and 55 plus 5 is 60, and 2 more makes 62.” (decomposing, known facts)	Develops mental strategies and algorithms $129 + 232 = \square$ I take 1 from 32 and give it to 129 to get $130 + 231$. $130 + 230 = 360$, and 1 more is 361.” (compensation)	Estimates sums and differences $149 + 138 = \square$ “149 is close to 150. 138 is close to 140. $150 + 140 = 290$ ” (using benchmarks)
Observations/Documentation		

Activity 25 Assessment Consolidation

Developing Meaning of Addition and Subtraction

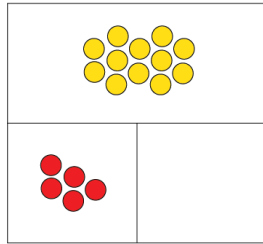
Recognizes addition and subtraction situations

Join



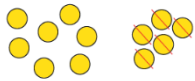
$$5 + 7 = \underline{\quad}$$

Part-part-whole



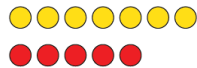
$$5 + \underline{\quad} = 12$$

Separate



$$12 - 5 = \underline{\quad}$$

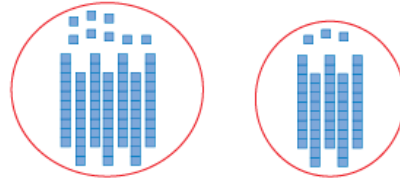
Compare



$$7 = 5 + \underline{\quad}$$

Models concretely to add and subtract

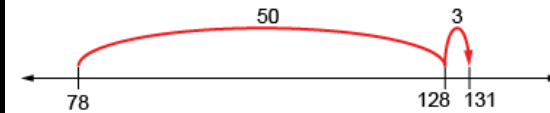
$$78 + 53 = \underline{\quad}$$



"78" "88, 98, 108, 118, 128, 129, 130, 131"

Models and symbolizes addition and subtraction

$$78 + 53 = \underline{\quad}$$



"I add 5 tens and 3 ones.
 $78 + 53 = 78 + 50 + 3$, or 131"

Observations/Documentation

Activity 25 Assessment

Consolidation

Developing Meaning of Addition and Subtraction (con't)

Estimates sums and differences to check reasonableness

$231 - 142 = 89$
 “ $230 - 140 = 90$, which is close to 89 so my answer is reasonable.”

Creates and solves problems

“There are 231 birds in the tree.
 Some birds flew away.
 Now there are 142 birds in the tree.
 How many birds flew away?”

$231 - \square = 142$
 89 birds flew away.

Uses properties and inverse operations of addition and subtraction to solve problems

$231 - \square = 142$
 “I can think addition to help me solve the problem:
 $142 + \square = 231$ ”

Observations/Documentation

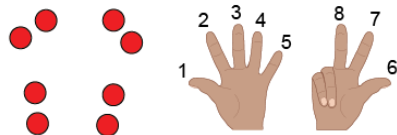
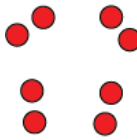
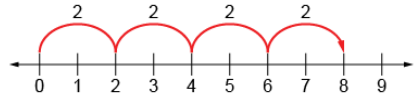
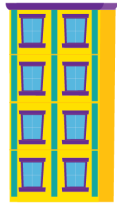
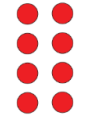
Activity 25 Assessment

Consolidation

Developing Fluency for Addition and Subtraction		
Fluently adds and subtracts within 5 “I know $4 + 1 = 5$ and $5 - 1 = 4$.”	Fluently adds and subtracts to 10 “I know $8 + 2 = 10$ and $10 - 2 = 8$.” (complements to 10)	Fluently adds and subtracts to 20 “I can use doubles. I know $9 + 9 = 18$ and $18 - 9 = 9$.”
Observations/Documentation		
Uses known sums and differences to solve addition and subtraction equations “ $25 + 37 = \square$ I know $25 + 30 = 55$, and 55 plus 5 is 60, and 2 more makes 62.” (decomposing, known facts)	Develops mental strategies and algorithms $129 + 232 = \square$ I take 1 from 32 and give it to 129 to get $130 + 231$. $130 + 230 = 360$, and 1 more is 361.” (compensation)	Estimates sums and differences $149 + 138 = \square$ “149 is close to 150. 138 is close to 140. $150 + 140 = 290$ ” (using benchmarks)
Observations/Documentation		

Activity 26 Assessment

Exploring Multiplication

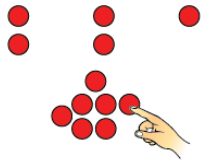
Multiplying 1-Digit Numbers			
<p>Groups objects and counts by 1s</p> 	<p>Groups objects and skip-counts</p>  <p>"2, 4, 6, 8"</p>	<p>Uses repeated addition</p>  <p>"2 + 2 + 2 + 2 = 8."</p>	<p>Models using multiplicative thinking</p>  <p>"4 rows of 2 is 8."</p>
Observations/Documentation			
<p>Understands relationship between operations</p> <p>"I can think of $2 + 2 + 2 + 2 = 8$ as 4 groups of 2."</p> 	<p>Uses multiplication symbol</p> <p>"$4 \times 2 = 8$"</p>	<p>Multiplies fluently (e.g., uses properties of multiplication)</p> <p>"$4 \times 2 = 8$ $2 \times 4 = 8$"</p>	<p>Creates and solves problems involving equal groups</p> <p>$4 \times 2 = 8$</p> <p>"There are 4 bicycles in the shed. How many wheels are there altogether?"</p>
Observations/Documentation			

Activity 27 Assessment

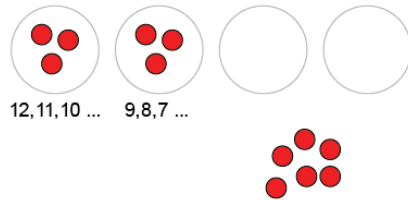
Exploring Division

Dividing 1-Digit Numbers

Models using equal sharing

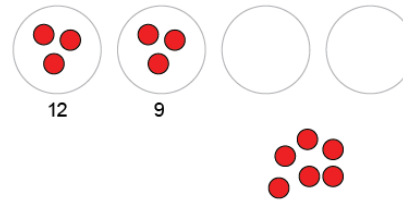


Models using equal grouping, counting by 1s

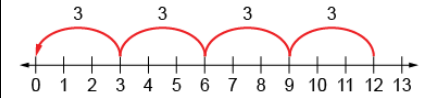


"I know 3 go in each group."

Models using equal grouping, skip-counting backward



Uses repeated subtraction

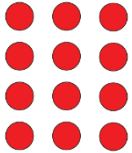
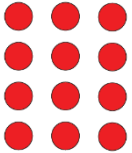


"4 jumps of 3 backward is the same as $12 - 3 - 3 - 3 - 3 = 0$."

Observations/Documentation

Activity 27 Assessment

Exploring Division

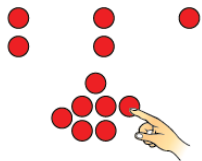
Dividing 1-Digit Numbers (con't)			
<p>Models using multiplicative thinking, and uses division symbol</p>  <p>“12 divided into groups of 3 is 4 groups $12 \div 3 = 4$.”</p>	<p>Divides fluently</p> <p>“I know $12 \div 4 = 3$, so $12 \div 3 = 4$.”</p>	<p>Creates and solves problems involving equal sharing and grouping</p>  <p>“There are 12 wheels on tricycles in the shed. How many tricycles are there?”</p>	<p>Understands relationships among operations</p> <p>“I know $12 - 3 - 3 - 3 - 3 = 0$, so I also know that $12 \div 3 = 4$. I also know that $4 \times 3 = 12$”</p>
Observations/Documentation			

Activity 28 Assessment

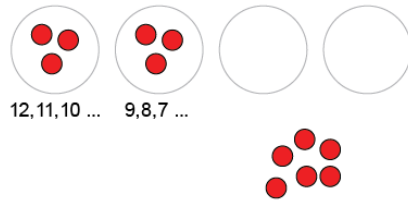
Relating Multiplication and Division

Dividing 1-Digit Numbers

Models using equal sharing

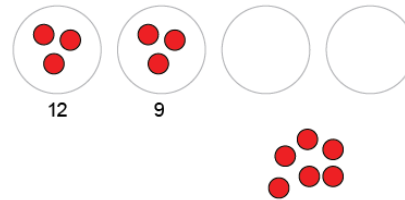


Models using equal grouping, counting by 1s

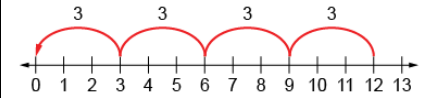


"I know 3 go in each group."

Models using equal grouping, skip-counting backward



Uses repeated subtraction

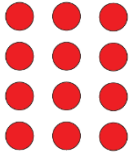
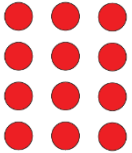


"4 jumps of 3 backward is the same as $12 - 3 - 3 - 3 - 3 = 0$."

Observations/Documentation

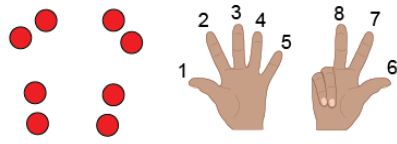
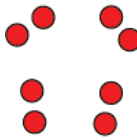
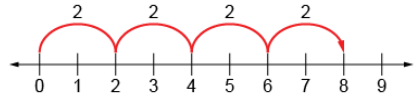
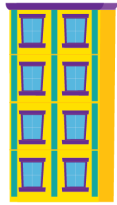
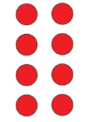
Activity 28 Assessment

Relating Multiplication and Division

Dividing 1-Digit Numbers (con't)			
<p>Models using multiplicative thinking, and uses division symbol</p>  <p>“12 divided into groups of 3 is 4 groups $12 \div 3 = 4$.”</p>	<p>Divides fluently</p> <p>“I know $12 \div 4 = 3$, so $12 \div 3 = 4$.”</p>	<p>Creates and solves problems involving equal sharing and grouping</p>  <p>“There are 12 wheels on tricycles in the shed. How many tricycles are there?”</p>	<p>Understands relationships among operations</p> <p>“I know $12 - 3 - 3 - 3 - 3 = 0$, so I also know that $12 \div 3 = 4$. I also know that $4 \times 3 = 12$”</p>
Observations/Documentation			

Activity 29 Assessment

Properties of Multiplication

Multiplying 1-Digit Numbers			
<p>Groups objects and counts by 1s</p> 	<p>Groups objects and skip-counts</p>  <p>"2, 4, 6, 8"</p>	<p>Uses repeated addition</p>  <p>"2 + 2 + 2 + 2 = 8."</p>	<p>Models using multiplicative thinking</p>  <p>"4 rows of 2 is 8."</p>
Observations/Documentation			
<p>Understands relationship between operations</p> <p>"I can think of $2 + 2 + 2 + 2 = 8$ as 4 groups of 2."</p> 	<p>Uses multiplication symbol</p> <p>"$4 \times 2 = 8$"</p>	<p>Multiplies fluently (e.g., uses properties of multiplication)</p> <p>"$4 \times 2 = 8$ $2 \times 4 = 8$"</p>	<p>Creates and solves problems involving equal groups</p> <p>$4 \times 2 = 8$</p> <p>"There are 4 bicycles in the shed. How many wheels are there altogether?"</p>
Observations/Documentation			

Activity 30 Assessment

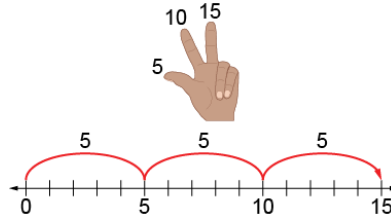
Multiplying and Dividing Larger Numbers

Developing Fluency with Multiplication and Division

Models with concrete materials and counts by 1s



Uses skip-counting forward and backward



Works flexibly with numbers (e.g., uses repeated addition or subtraction, familiar facts, commutative property)

$$5 + 5 + 5 = 15$$

I know $2 \times 5 = 10$ and one more group of 5 is 15, so $3 \times 5 = 15$.

I know $5 \times 3 = 15$, so 3×5 also equals 15."

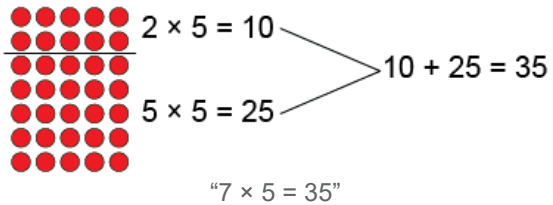
Observations/Documentation

Activity 30 Assessment

Multiplying and Dividing Larger Numbers

Developing Fluency with Multiplication and Division (con't)

Uses distributive property to help with unfamiliar facts



Applies multiplicative thinking to compare quantities (solve ratio problems)

1	2	3	4	5
$\times 5$	$\times 5$	$\times 5$	$\times 5$	$\times 5$
5	10	15	20	25

"For each hand there are 5 fingers. The ratio of hands to fingers is 1:5. That means I multiply by 5. So, on 2 hands there are 2×5 , or 10 fingers."

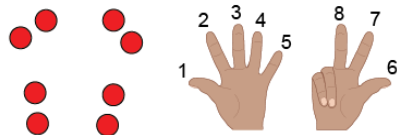
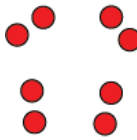
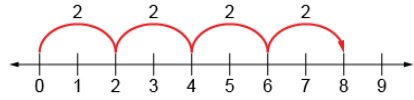
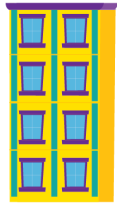
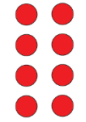
Fluently multiplies and divides

"I just know that $7 \times 5 = 35$."

Observations/Documentation

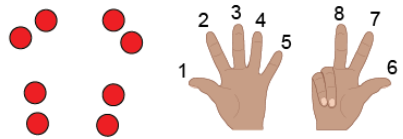
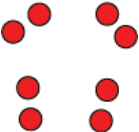
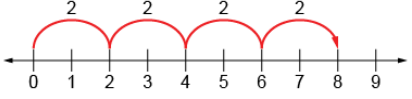

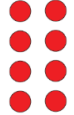
Activity 30 Assessment

Multiplying and Dividing Larger Numbers

Multiplying 1-Digit Numbers			
<p>Groups objects and counts by 1s</p> 	<p>Groups objects and skip-counts</p>  <p>"2, 4, 6, 8"</p>	<p>Uses repeated addition</p>  <p>"2 + 2 + 2 + 2 = 8."</p>	<p>Models using multiplicative thinking</p>  <p>"4 rows of 2 is 8."</p>
Observations/Documentation			
<p>Understands relationship between operations</p> <p>"I can think of $2 + 2 + 2 + 2 = 8$ as 4 groups of 2."</p> 	<p>Uses multiplication symbol</p> <p>"$4 \times 2 = 8$"</p>	<p>Multiplies fluently (e.g., uses properties of multiplication)</p> <p>"$4 \times 2 = 8$ $2 \times 4 = 8$"</p>	<p>Creates and solves problems involving equal groups</p> <p>$4 \times 2 = 8$</p> <p>"There are 4 bicycles in the shed. How many wheels are there altogether?"</p>
Observations/Documentation			

Activity 31 Assessment

Creating and Solving Problems

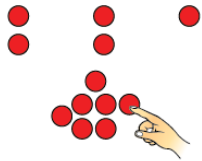
Multiplying 1-Digit Numbers			
<p>Groups objects and counts by 1s</p> 	<p>Groups objects and skip-counts</p>  <p>"2, 4, 6, 8"</p>	<p>Uses repeated addition</p>  <p>"2 + 2 + 2 + 2 = 8."</p>	<p>Models using multiplicative thinking</p>  <p>"4 rows of 2 is 8."</p>
Observations/Documentation			
<p>Understands relationship between operations</p> <p>"I can think of $2 + 2 + 2 + 2 = 8$ as 4 groups of 2."</p> 	<p>Uses multiplication symbol</p> <p>"$4 \times 2 = 8$"</p>	<p>Multiplies fluently (e.g., uses properties of multiplication)</p> <p>"$4 \times 2 = 8$ $2 \times 4 = 8$"</p>	<p>Creates and solves problems involving equal groups</p> <p>$4 \times 2 = 8$</p> <p>"There are 4 bicycles in the shed. How many wheels are there altogether?"</p>
Observations/Documentation			

Activity 31 Assessment

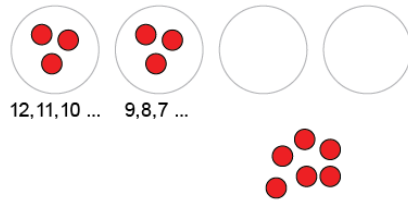
Creating and Solving Problems

Dividing 1-Digit Numbers

Models using equal sharing

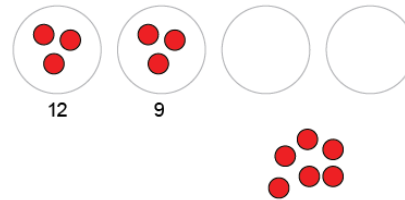


Models using equal grouping, counting by 1s

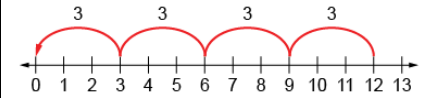


"I know 3 go in each group."

Models using equal grouping, skip-counting backward



Uses repeated subtraction

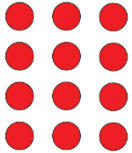
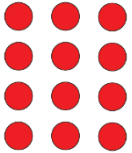


"4 jumps of 3 backward is the same as $12 - 3 - 3 - 3 - 3 = 0$."

Observations/Documentation

Activity 31 Assessment

Creating and Solving Problems

Dividing 1-Digit Numbers (con't)			
<p>Models using multiplicative thinking, and uses division symbol</p>  <p>“12 divided into groups of 3 is 4 groups $12 \div 3 = 4$.”</p>	<p>Divides fluently</p> <p>“I know $12 \div 4 = 3$, so $12 \div 3 = 4$.”</p>	<p>Creates and solves problems involving equal sharing and grouping</p>  <p>“There are 12 wheels on tricycles in the shed. How many tricycles are there?”</p>	<p>Understands relationships among operations</p> <p>“I know $12 - 3 - 3 - 3 - 3 = 0$, so I also know that $12 \div 3 = 4$. I also know that $4 \times 3 = 12$”</p>
Observations/Documentation			

Activity 32 Assessment

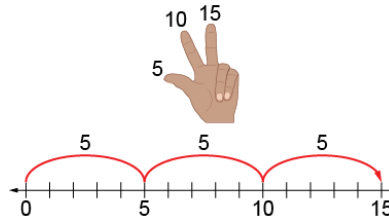
Building Fluency: The Games Room

Developing Fluency with Multiplication and Division

Models with concrete materials and counts by 1s



Uses skip-counting forward and backward



Works flexibly with numbers (e.g., uses repeated addition or subtraction, familiar facts, commutative property)

$$5 + 5 + 5 = 15$$

I know $2 \times 5 = 10$ and one more group of 5 is 15, so $3 \times 5 = 15$.

I know $5 \times 3 = 15$, so 3×5 also equals 15."

Observations/Documentation

Activity 32 Assessment

Building Fluency: The Games Room

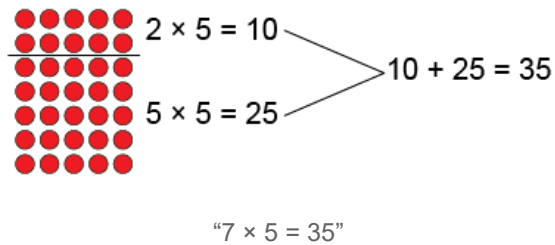
Developing Fluency with Multiplication and Division (con't)

Uses familiar facts to solve ratios

1	2	3	4	5
$\times 5$	$\times 5$	$\times 5$	$\times 5$	$\times 5$
5	10	15	20	25

"The ratio is 1:5. That means I multiply by 5. $2 \times 5 = 10$, so 2:10. $3 \times 5 = 15$, so 3:15."

Uses distributive property to help with unfamiliar facts



Fluently multiplies and divides

"I just know that $7 \times 5 = 35$."

Observations/Documentation

Activity 30 Assessment

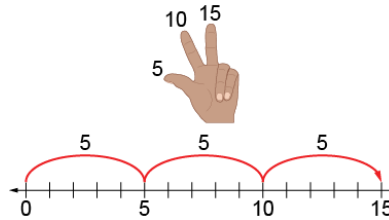
Multiplying and Dividing Larger Numbers

Developing Fluency with Multiplication and Division

Models with concrete materials and counts by 1s



Uses skip-counting forward and backward



Works flexibly with numbers (e.g., uses repeated addition or subtraction, familiar facts, commutative property)

$$5 + 5 + 5 = 15$$

I know $2 \times 5 = 10$ and one more group of 5 is 15, so $3 \times 5 = 15$.

I know $5 \times 3 = 15$, so 3×5 also equals 15."

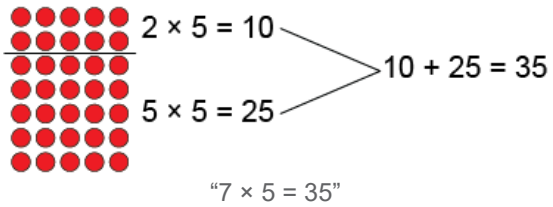
Observations/Documentation

Activity 30 Assessment

Multiplying and Dividing Larger Numbers

Developing Fluency with Multiplication and Division (con't)

Uses distributive property to help with unfamiliar facts



Applies multiplicative thinking to compare quantities (solve ratio problems)

Hands	1	2	3	4	5
Ratio	$\times 5$	$\times 5$	$\times 5$	$\times 5$	$\times 5$
Fingers	5	10	15	20	25

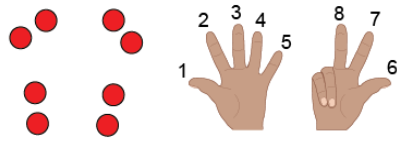
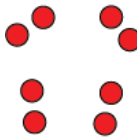
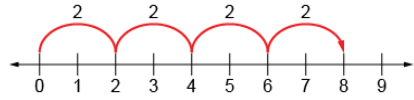
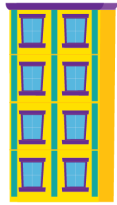
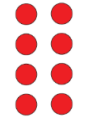
"For each hand there are 5 fingers. The ratio of hands to fingers is 1:5. That means I multiply by 5. So, on 2 hands there are 2×5 , or 10 fingers."

Fluently multiplies and divides

"I just know that $7 \times 5 = 35$."

Observations/Documentation

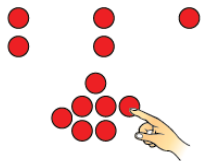
Activity 34 Assessment Consolidation

Multiplying 1-Digit Numbers			
<p>Groups objects and counts by 1s</p> 	<p>Groups objects and skip-counts</p>  <p>"2, 4, 6, 8"</p>	<p>Uses repeated addition</p>  <p>"2 + 2 + 2 + 2 = 8."</p>	<p>Models using multiplicative thinking</p>  <p>"4 rows of 2 is 8."</p>
Observations/Documentation			
<p>Understands relationship between operations</p> <p>"I can think of $2 + 2 + 2 + 2 = 8$ as 4 groups of 2."</p> 	<p>Uses multiplication symbol</p> <p>"$4 \times 2 = 8$"</p>	<p>Multiplies fluently (e.g., uses properties of multiplication)</p> <p>"$4 \times 2 = 8$ $2 \times 4 = 8$"</p>	<p>Creates and solves problems involving equal groups</p> <p>$4 \times 2 = 8$</p> <p>"There are 4 bicycles in the shed. How many wheels are there altogether?"</p>
Observations/Documentation			

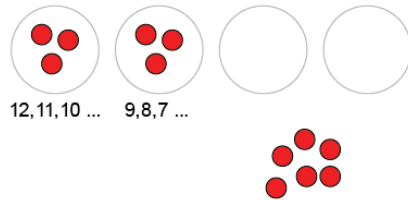
Activity 34 Assessment Consolidation

Dividing 1-Digit Numbers

Models using equal sharing

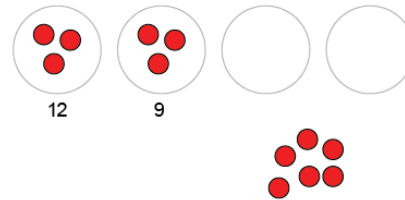


Models using equal grouping, counting by 1s

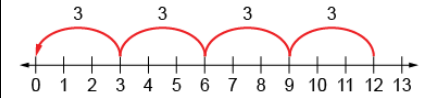


"I know 3 go in each group."

Models using equal grouping, skip-counting backward



Uses repeated subtraction



"4 jumps of 3 backward is the same as $12 - 3 - 3 - 3 - 3 = 0$."

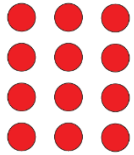
Observations/Documentation

Activity 34 Assessment

Consolidation

Dividing 1-Digit Numbers (con't)

Models using multiplicative thinking, and uses division symbol



“12 divided into groups of 3 is
4 groups
 $12 \div 3 = 4$.”

Divides fluently

“I know $12 \div 4 = 3$,
so $12 \div 3 = 4$.”

Creates and solves problems involving equal sharing and grouping



“There are 12 wheels
on tricycles in the shed.
How many tricycles are there?”

Understands relationships among operations

“I know $12 - 3 - 3 - 3 - 3 = 0$,
so I also know that $12 \div 3 = 4$.
I also know that $4 \times 3 = 12$ ”

Observations/Documentation

Activity 34 Assessment

Estimating and Counting Money

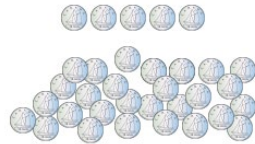
Estimating Money Amounts

Scans quantity of coins (disregards value of the coins)



"There's a lot of coins. I think it's about \$100."

Uses a referent to estimate the value of a collection of one denomination



"There's about 5 groups of 5 dimes, so about \$2.50."

Estimates the value of a mixed collection of coins to the nearest dollar



"I see about 10 loonies and 10 quarters, which is about \$12."

Makes reasonable estimates of mixed collections in dollars and cents



"There's \$55 dollars in bills and about \$4 in loonies and quarters. I don't think the rest of the coins make a dollar. So, my estimate is about \$59 and 50¢."

Observations/Documentation

Activity 36 Assessment

Purchasing and Making Change

Comparing Money Amounts and Making Change

Compares money amounts using part-part-whole relationship



"The total cost is the whole. That's \$10. The cost of each item is a part. The items cost \$6 and \$4."

Uses part-part-whole relationship to find a missing part

\$10	
\$8	?

"Part + Part = whole so, $8 + ? = 10$ or $10 - 8 = ?$ I model \$10 with coins, then take away \$8. I am left with \$2, the missing part."

Makes change using skip-counting

I had a \$5 bill.
I bought:



Change:



"I skip-counted on from \$3 and 50¢ by 25s, adding a quarter each time. 6 quarters is the same as \$1 and 50¢."

Uses different strategies to make change efficiently (e.g., counting on, counting back)

I had a \$10 bill.
I bought:



\$8 and 85¢

Change:



"I counted on from \$8 and 85¢ and needed only 3 coins to get to \$10."

Observations/Documentation

Activity 36 Assessment

Purchasing and Making Change

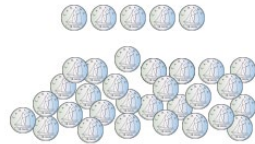
Estimating Money Amounts

Scans quantity of coins (disregards value of the coins)



"There's a lot of coins. I think it's about \$100."

Uses a referent to estimate the value of a collection of one denomination



"There's about 5 groups of 5 dimes, so about \$2.50."

Estimates the value of a mixed collection of coins to the nearest dollar



"I see about 10 loonies and 10 quarters, which is about \$12."

Makes reasonable estimates of mixed collections in dollars and cents



"There's \$55 dollars in bills and about \$4 in loonies and quarters. I don't think the rest of the coins make a dollar. So, my estimate is about \$59 and 50¢."

Observations/Documentation

Activity 38 Assessment Consolidation

Comparing Money Amounts and Making Change

Compares money amounts using part-part-whole relationship



“The total cost is the whole. That’s \$10. The cost of each item is a part. The items cost \$6 and \$4.”

Uses part-part-whole relationship to find a missing part

\$10	
\$8	?

“Part + Part = whole so, $8 + ? = 10$ or $10 - 8 = ?$ I model \$10 with coins, then take away \$8. I am left with \$2, the missing part.”

Makes change using skip-counting

I had a \$5 bill.
I bought:



Change:



“I skip-counted on from \$3 and 50¢ by 25s, adding a quarter each time. 6 quarters is the same as \$1 and 50¢.”

Uses different strategies to make change efficiently (e.g., counting on, counting back)

I had a \$10 bill.
I bought:



\$8 and 85¢

Change:



“I counted on from \$8 and 85¢ and needed only 3 coins to get to \$10.”

Observations/Documentation

Activity 38 Assessment Consolidation

Understanding Equality with Money

Uses like coins to show equivalent amounts



"I know 5 nickels make 1 quarter and 4 quarters make \$1."

Uses different denominations of coins to show equivalent amounts



"I can show 25 cents with 5 nickels, then trade 2 nickels for a dime."

Determines total cost of purchase and shows equivalent amounts in different ways



\$1.25 \$3.70

$$\$3.70 + \$1.25 = \$4.95$$



"I can pay \$4.95 using lots of different coins, but I could also pay with a \$5 bill, and get 5 cents change."

Determines total value of purchase and shows equivalent amount in most efficient way



$$\$6.25 + \$5.45 + \$4.50 = \$16.20$$



"I know that I can start with \$15 in bills, then add 1 dollar and twenty cents."

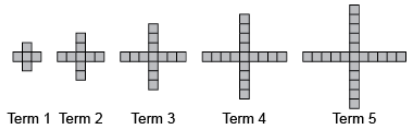
Observations/Documentation

Activity 1 Assessment

Describing and Extending Patterns

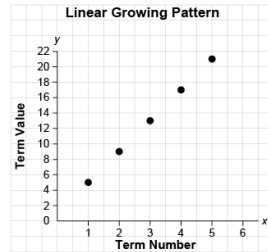
Generalizing and Representing Patterns

Identifies how a pattern repeats, increases, or decreases and describes the pattern rule.



“This is an increasing pattern. The pattern rule is: Start with 5 red tiles and add 4 tiles each time.”

Represents patterns using tables, charts, or graphs and describes the pattern rule.



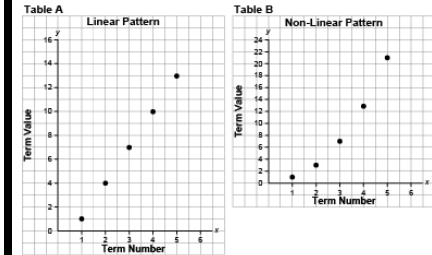
“The graph represents a growing pattern. The pattern rule is: Multiply the term number by 4 and add 1.”

Represents patterns symbolically, using algebraic expressions and equations.

Term Number	1	2	3	4	5
Term Value	5	9	13	17	21

“An algebraic expression for the pattern rule: $4n + 1$, where n is the term number. An equation for the pattern: $v = 4n + 1$, where v is the term value.”

Identifies and describes different representations of patterns as linear or non-linear.



“The first graph represents a linear pattern because the points lie on a straight line. The second graph represents a non-linear pattern because the points do not lie on a straight line.”

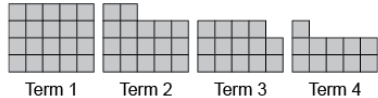
Observations/Documentation

Activity 1 Assessment

Describing and Extending Patterns

Generalizing and Representing Patterns (con't)

Extends patterns using repeated addition and subtraction, multiplication, and division.



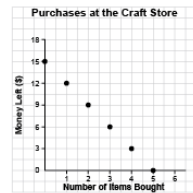
Term Number	1	2	3	4	5	6	7
Term Value	20	17	14	11	8	5	2

“This is a linear decreasing pattern because the same number (3) is subtracted each time. To extend the pattern, I subtract 3 from the previous term: $11 - 3 = 8$, $8 - 3 = 5$, $5 - 3 = 2$. The term values can be represented with the expression $23 - 3n$, where n is the term number.”

Creates and translates linear patterns using various representations.

Kiera has \$15 to spend on items that cost \$3 each.

Number of Items Bought	Money Left (\$)
1	12
2	9
3	6
4	3
5	0



“The table shows that for each additional item bought, the money left decreases by \$3. The graph shows the same linear pattern, where the money left decreases by \$3 as you move from point to point.”

Uses patterns to represent and solve problems.

How far had the bus travelled after 3 h 30 min?

Time (h)	Distance Travelled (km)
1	70
2	140
3	210
4	280

“The bus travels 70 km in 1 h (60 min). So, in 30 min, the bus travels $70 \text{ km} \div 2 = 35 \text{ km}$. In 3 h, the bus travels 210 km. So, in 3 h 30 min, the bus travels $210 \text{ km} + 35 \text{ km} = 245 \text{ km}$.”

Fluently identifies, creates, and extends patterns to solve real-life problems.

How much would a 6-km ride cost?

Distance Driven (km)	Money Earned (\$)
1	3.50
2	4.00
3	4.50
4	5.00

“I added $2 \times \$0.50 = \1.00 to the cost of a 4-km ride which is \$5.00. So, a 6-km ride costs: $\$5.00 + \$1.00 = \$6.00$. Or, I could multiply the number of kilometres by \$0.50, then add \$3: $6 \times \$0.50 + \$3 = \$3 + \3 , or \$6.”

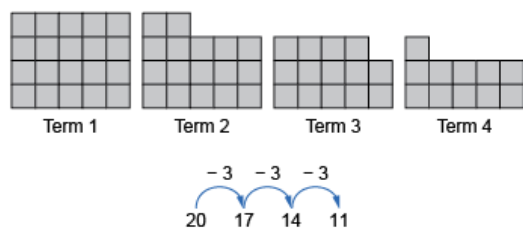
Observations/Documentation

Activity 1 Assessment

Describing and Extending Patterns

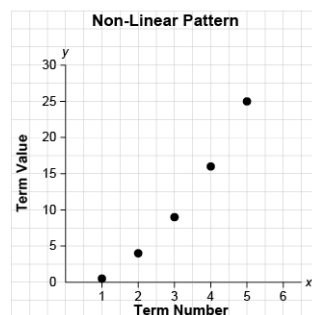
Number Pattern Relationships

Recognizes pattern relationships in repeating, increasing, and decreasing patterns.



“I see a relationship that shows skip-counting backward by 3. The rule is: Start with 20 tiles and take away 3 tiles each time.”

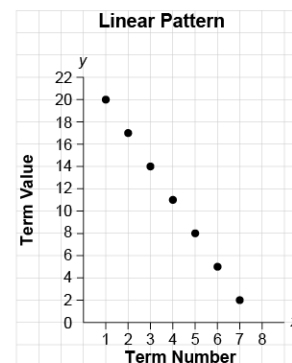
Identifies and describes linear and non-linear patterns in tables, charts, and graphs.



“The graph shows a non-linear increasing pattern. The points do not lie on a straight line, and a different number is added to the term value each time.”

Creates and translates repeating, increasing, and decreasing patterns using various representations.

Term Number	1	2	3	4
Term Value	20	17	14	11



“Each of these representations shows a linear pattern that follows the pattern rule: Start at 20 and subtract 3 each time.”

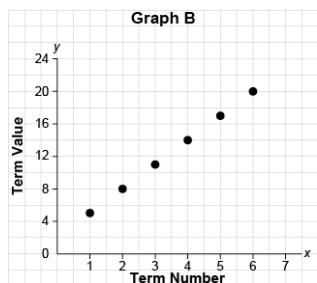
Observations/Documentation

Activity 1 Assessment

Describing and Extending Patterns

Number Pattern Relationships (con't)

Creates and translates repeating, increasing, and decreasing patterns and describes them using algebraic expressions and equations.



“I created this increasing pattern. An expression for the term values is: $3n + 2$, when n is the term number. An equation for this pattern is: $v = 3n + 2$, where v is the term value.”

Describes patterns to show relationships among whole numbers and decimals with tenths, hundredths, and thousandths.

$$3.004 - 0.004 = 3.000$$

$$3.004 - 0.003 = 3.001$$

$$3.004 - 0.002 = 3.002$$

$$3.004 - 0.001 = 3.003$$

$$3.004 - 0.000 = 3.004$$

“As the number that is subtracted decreases by 0.001, the difference increases by 0.001.”

Fluently identifies and describes linear and non-linear patterns and justifies choice of representation to show pattern relationships.

Students raised \$180 to buy 8 games that cost \$26 each. Do they have enough money?

Number of Classes	Total Cost of Games (\$)
1	26
2	52
3	78
4	104
5	130
6	156
7	182
8	208

“This is a linear pattern where \$26 dollars is added each time. I used the equation $c = 26n$ to determine the cost of n games in dollars, where $n = 8$: $c = 26 \times 8$, which is \$208. There is not enough money to buy games for 8 classes. Only 6 classes can have a game.”

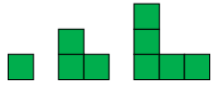
Observations/Documentation

Activity 2 Assessment

Representing Patterns

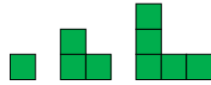
Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
“Start at 1 and add 2 each time.”
17, 14, 11, ...
“Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

$$357 - 12 = 345$$

$$357 - 15 = 342$$

$$357 - 18 = 339$$

“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
“Start at 3 and add 5 each time.
 $18 + 5 = 23$, so 22 should be 23.”

32, 28, ★, 20, 16, 12, 8,
“Start at 32 and subtract 4 each time.
 $28 - 4 = \star$, so ★ is 24.”

Creates patterns and explains pattern rules

“85, 75, 65, 55,
I started with my house number and took away 10 each time.”

Uses patterns to solve problems

“If I save 2 quarters a day, when will I have 10 quarters?
2, 4, 6, 8, 10
I will have 10 quarters after 5 days.”

Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
Output	2	4	6	8	10

“Each input number is multiplied by 2.”

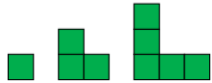
Observations/Documentation

Activity 3 Assessment

Creating Patterns

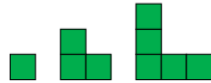
Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
 “Start at 1 and add 2 each time.”
 17, 14, 11, ...
 “Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

$$357 - 12 = 345$$

$$357 - 15 = 342$$

$$357 - 18 = 339$$

“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
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32, 28, ★, 20, 16, 12, 8,
 “Start at 32 and subtract 4 each time.
 $28 - 4 = \star$, so ★ is 24.”

Creates patterns and explains pattern rules

“85, 75, 65, 55,
 I started with my house number and took away 10 each time.”

Uses patterns to solve problems

“If I save 2 quarters a day, when will I have 10 quarters?
 2, 4, 6, 8, 10
 I will have 10 quarters after 5 days.”

Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
Output	2	4	6	8	10

“Each input number is multiplied by 2.”

Observations/Documentation

Activity 4 Assessment

Identifying Errors and Missing Terms

Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
“Start at 1 and add 2 each time.”
17, 14, 11, ...
“Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

$$357 - 12 = 345$$

$$357 - 15 = 342$$

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“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
“Start at 3 and add 5 each time.
 $18 + 5 = 23$, so 22 should be 23.”

32, 28, ★, 20, 16, 12, 8,
“Start at 32 and subtract 4 each time.
 $28 - 4 = \star$, so ★ is 24.”

Creates patterns and explains pattern rules

“85, 75, 65, 55,
I started with my house number and took away 10 each time.”

Uses patterns to solve problems

“If I save 2 quarters a day, when will I have 10 quarters?
2, 4, 6, 8, 10
I will have 10 quarters after 5 days.”

Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
Output	2	4	6	8	10

“Each input number is multiplied by 2.”

Observations/Documentation

Activity 5 Assessment

Solving Problems

Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
“Start at 1 and add 2 each time.”
17, 14, 11, ...
“Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

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$$357 - 15 = 342$$

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“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
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32, 28, ★, 20, 16, 12, 8,
“Start at 32 and subtract 4 each time.
 $28 - 4 = \star$, so ★ is 24.”

Creates patterns and explains pattern rules

“85, 75, 65, 55,
I started with my house number and took away 10 each time.”

Uses patterns to solve problems

“If I save 2 quarters a day, when will I have 10 quarters?
2, 4, 6, 8, 10
I will have 10 quarters after 5 days.”

Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
Output	2	4	6	8	10

“Each input number is multiplied by 2.”

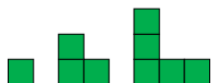
Observations/Documentation

Activity 6 Assessment

Exploring Multiplicative Patterns

Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
“Start at 1 and add 2 each time.”
17, 14, 11, ...
“Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

$$357 - 12 = 345$$

$$357 - 15 = 342$$

$$357 - 18 = 339$$

“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
“Start at 3 and add 5 each time.
 $18 + 5 = 23$, so 22 should be 23.”

32, 28, ★, 20, 16, 12, 8,
“Start at 32 and subtract 4 each time.
 $28 - 4 = \star$, so ★ is 24.”

Creates patterns and explains pattern rules

“85, 75, 65, 55,
I started with my house number and took away 10 each time.”

Uses patterns to solve problems

“If I save 2 quarters a day, when will I have 10 quarters?
2, 4, 6, 8, 10
I will have 10 quarters after 5 days.”

Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
Output	2	4	6	8	10

“Each input number is multiplied by 2.”

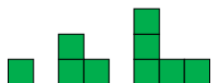
Observations/Documentation

Activity 7 Assessment

Patterns in Whole Numbers

Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
“Start at 1 and add 2 each time.”
17, 14, 11, ...
“Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

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“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
“Start at 3 and add 5 each time.
 $18 + 5 = 23$, so 22 should be 23.”

32, 28, ★, 20, 16, 12, 8,
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“If I save 2 quarters a day, when will I have 10 quarters?
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Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
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“Each input number is multiplied by 2.”

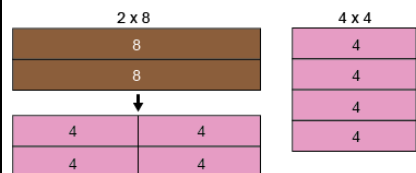
Observations/Documentation

Activity 8 Assessment

Equivalent Expressions

Identifying Equivalent Expressions

Models expressions concretely to determine equivalence



"I could trade rods for other rods to make both models look the same. So, 2×8 and 4×4 are equivalent."

Use number relationships or mental math strategies to determine equivalence

$$9 + 7 \text{ and } 42 - 27$$

" $9 + 7$: take 1 from 9 and give it to 7 to make $8 + 8$, or 16.

$42 - 27$: add 3 to each number to make $45 - 30$, or 15.

Since 15 doesn't equal 16, the expressions are not equivalent."

Uses equal sign as balance (left side equals right side) and not equal sign as imbalance

$$2 \times 8 = 4 \times 4$$

$$9 + 7 \neq 42 - 27$$

"The equal sign means that the expressions on both sides are worth the same amount."

Records an equation with an unknown to match a given situation

"I started with 12 stickers. My friend gave me some more. Now I have 21 stickers.

$$12 + \blacksquare = 21$$

I used a box to represent the unknown, but I could have used a different shape."

Observations/Documentation

Activity 9 Assessment Consolidation

Generalizing and Representing Increasing and Decreasing Patterns

Recognizes that a pattern increases or decreases



“The terms are getting bigger.”

Identifies how a pattern changes (describes rule)



“It grows by 2 tiles each time.”

Represents patterns symbolically and writes rules using addition or subtraction

1, 3, 5, ...
“Start at 1 and add 2 each time.”
17, 14, 11, ...
“Start at 17 and take away 3 each time.”

Extends patterns using repeated addition and subtraction

$$357 - 9 = 348$$

$$357 - 12 = 345$$

$$357 - 15 = 342$$

$$357 - 18 = 339$$

“I added 3 to the number taken away and subtracted 3 from the difference.”

Observations/Documentation

Finds missing terms or errors in patterns

3, 8, 13, 18, 22, 28,
“Start at 3 and add 5 each time.
 $18 + 5 = 23$, so 22 should be 23.”

32, 28, ★, 20, 16, 12, 8,
“Start at 32 and subtract 4 each time.
 $28 - 4 = \star$, so ★ is 24.”

Creates patterns and explains pattern rules

“85, 75, 65, 55,
I started with my house number and took away 10 each time.”

Uses patterns to solve problems

“If I save 2 quarters a day, when will I have 10 quarters?
2, 4, 6, 8, 10
I will have 10 quarters after 5 days.”

Identifies and extends patterns involving multiplication

Input	1	2	3	4	5
Output	2	4	6	8	10

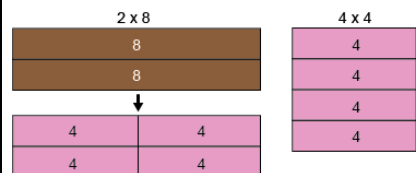
“Each input number is multiplied by 2.”

Observations/Documentation

Activity 9 Assessment Consolidation

Identifying Equivalent Expressions

Models expressions concretely to determine equivalence



"I could trade rods for other rods to make both models look the same. So, 2×8 and 4×4 are equivalent."

Use number relationships or mental math strategies to determine equivalence

$$9 + 7 \text{ and } 42 - 27$$

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Since 15 doesn't equal 16, the expressions are not equivalent."

Uses equal sign as balance (left side equals right side) and not equal sign as imbalance

$$2 \times 8 = 4 \times 4$$

$$9 + 7 \neq 42 - 27$$

"The equal sign means that the expressions on both sides are worth the same amount."

Records an equation with an unknown to match a given situation

"I started with 12 stickers. My friend gave me some more. Now I have 21 stickers.

$$12 + \blacksquare = 21$$

I used a box to represent the unknown, but I could have used a different shape."

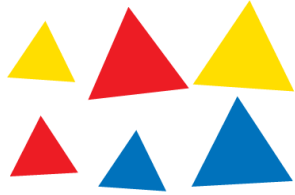
Observations/Documentation

Activity 10 Assessment

Sorting with Attributes

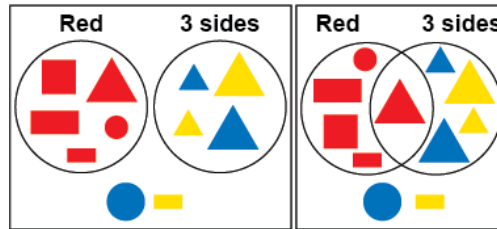
Identifying and Sorting Attributes

Uses one attribute to sort (size, colour, shape)

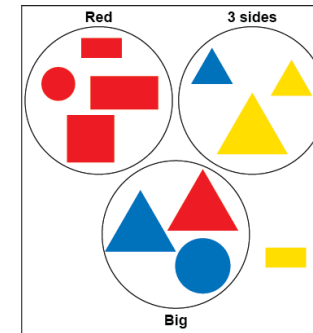


"I sorted the blocks by number of sides: 3."

Identifies 2 attributes and uses them to sort (with and without overlap)



Identifies 3 attributes and uses them to sort (without overlap)



"I used the attributes red, 3 sides, and big."

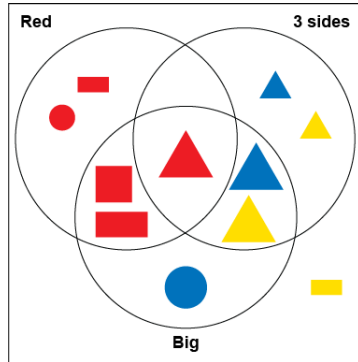
Observations/Documentation

Activity 10 Assessment

Sorting with Attributes

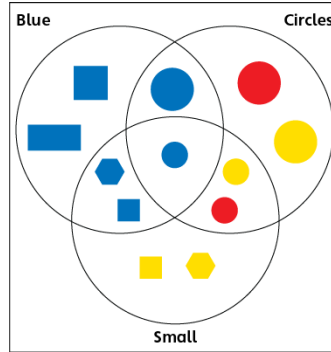
Identifying and Sorting Attributes

Identifies 3 attributes and uses them to sort (with overlap)



“One block has all three attributes: red, 3 sides, and big.”

Identifies the sorting rule



“The centre overlap has a small, blue circle. So, this category must be blue, this must be small, and this must be circles.”





Uses attributes flexibly to sort (concretely and mentally)

Attributes: small, blue, 6-sides
Centre overlap: small blue hexagon
Overlaps:
Small, blue blocks
Small hexagons
Blue hexagons

Observations/Documentation

Activity 11 Assessment

Identifying and Extending Patterns

Identifying and Extending Repeating Patterns			
<p>Identifies repeating pattern (one of the changing attributes)</p>  <p>“Shape is changing. The pattern is: star, triangle, triangle.”</p>	<p>Identifies repeating pattern (two changing attributes)</p>  <p>“Colour and shape are changing.”</p>	<p>Identifies core of a repeating pattern</p>  <p>“The core is: blue star, blue triangle, red triangle.”</p>	<p>Uses core to extend the repeating pattern</p>  <p>“I drew the core on a piece of paper and moved it along the pattern to help me extend it.”</p>
Observations/Documentation			

Activity 12 Assessment

Creating Patterns

Creating Repeating Patterns

Builds core with one attribute (e.g., always colour)



"red, blue, blue, yellow"

Builds core with one attribute (shape, size, colour)



"I changed shape."

Creates patterns with one attribute in many ways (shape, size, colour)



"I copied the core two more times."

Builds core with two attributes



"I changed shape and colour."

Observations/Documentation

Creates patterns with two attributes



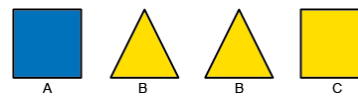
"I copied the core two more times."

Represents the same pattern in many ways (e.g., letters, numbers, sounds)



"I represented the pattern core with letters: ABBC."

Translates the same pattern into many forms (e.g., numbers, movements, table of values)



"I translated the pattern into numbers: 122312231223."

Creates and translates a pattern with a repeating operation (e.g., addition, subtraction)



Section	Number of Tiles
1	2
2	4
3	6

"I created a pattern, adding 2 tiles each time. I translated the pattern into a table of values."

Observations/Documentation

Activity 13 Assessment Consolidation

Identifying and Extending Repeating Patterns

Identifies repeating pattern (one of the changing attributes)



“Shape is changing. The pattern is: star, triangle, triangle.”

Identifies repeating pattern (two changing attributes)



“Colour and shape are changing.”

Identifies core of a repeating pattern



“The core is: blue star, blue triangle, red triangle.”

Uses core to extend the repeating pattern



“I drew the core on a piece of paper and moved it along the pattern to help me extend it.”

Observations/Documentation

Creating Repeating Patterns

Builds core with one attribute (e.g., always colour)



“red, blue, blue, yellow”

Builds core with one attribute (shape, size, colour)



“I changed shape.”

Creates patterns with one attribute in many ways (shape, size, colour)



“I copied the core two more times.”

Builds core with two attributes



“I changed shape and colour.”

Observations/Documentation

Creates patterns with two attributes



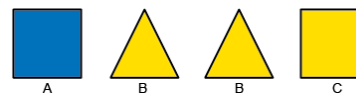
“I copied the core two more times.”

Represents the same pattern in many ways (e.g., letters, numbers, sounds)



“I represented the pattern core with letters: ABBC.”

Translates the same pattern into many forms (e.g., numbers, movements, table of values)



“I translated the pattern into numbers: 122312231223.”

Creates and translates a pattern with a repeating operation (e.g., addition, subtraction)





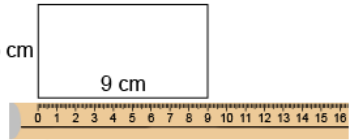
Section	Number of Tiles
1	2
2	4
3	6

“I created a pattern, adding 2 tiles each time. I translated the pattern into a table of values.”

Observations/Documentation

Activity 1 Assessment

Estimating Length

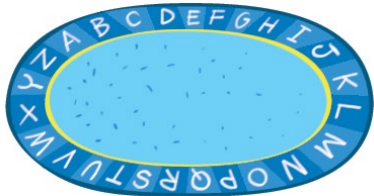
Measuring Length and Perimeter			
<p>Uses non-standard units to measure</p>  <p>“The rectangle is 5 paper clips long. Its perimeter is 16 paper clips.”</p>	<p>Uses standard-sized items to measure</p>  <p>“The rectangle is 17 centicubes long. Its perimeter is 54 centicubes.”</p>	<p>Uses benchmarks to estimate in standard units (m, cm)</p> <p>“I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m.”</p>	<p>Measures using standard units (m, cm)</p>  <p>“The perimeter is 28 cm.”</p>
Observations/Documentation			

Activity 1 Assessment

Estimating Length

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

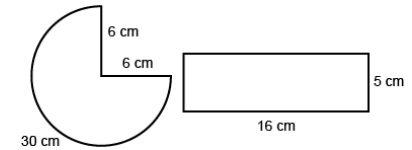


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

Compares using standard units



"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 2 Assessment

Relating Millimetres, Centimetres, Metres, and Kilometres

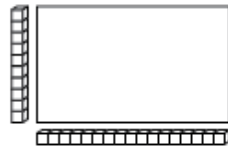
Measuring Length and Perimeter

Uses non-standard units to measure



"The rectangle is 5 paper clips long.
Its perimeter is 16 paper clips."

Uses standard-sized items to measure

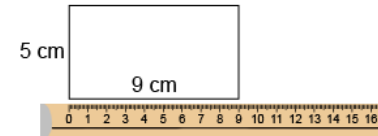


"The rectangle is 17 centicubes long.
Its perimeter is 54 centicubes."

Uses benchmarks to estimate in standard units (m, cm)

"I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m."

Measures using standard units (m, cm)



"The perimeter is 28 cm."

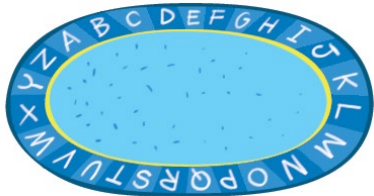
Observations/Documentation

Activity 2 Assessment

Relating Millimetres, Centimetres, Metres, and Kilometres

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

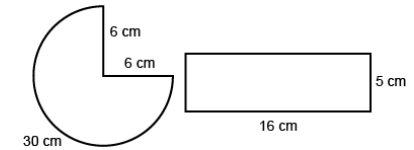


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

Compares using standard units



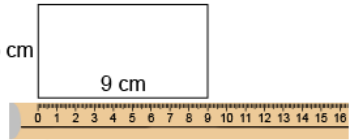


"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 3 Assessment

Measuring Length

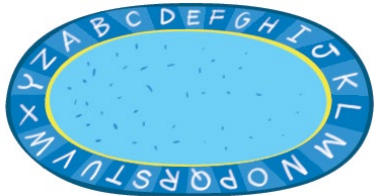
Measuring Length and Perimeter			
<p>Uses non-standard units to measure</p>  <p>“The rectangle is 5 paper clips long. Its perimeter is 16 paper clips.”</p>	<p>Uses standard-sized items to measure</p>  <p>“The rectangle is 17 centicubes long. Its perimeter is 54 centicubes.”</p>	<p>Uses benchmarks to estimate in standard units (m, cm)</p> <p>“I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m.”</p>	<p>Measures using standard units (m, cm)</p>  <p>“The perimeter is 28 cm.”</p>
Observations/Documentation			

Activity 3 Assessment

Measuring Length

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

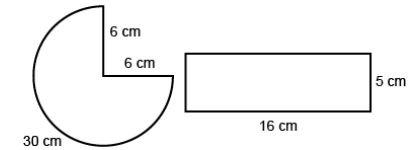


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

Compares using standard units



"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 4 Assessment

Introducing Perimeter

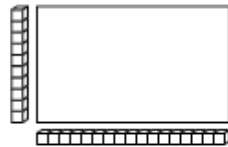
Measuring Length and Perimeter

Uses non-standard units to measure



"The rectangle is 5 paper clips long.
Its perimeter is 16 paper clips."

Uses standard-sized items to measure

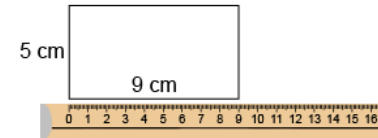


"The rectangle is 17 centicubes long.
Its perimeter is 54 centicubes."

Uses benchmarks to estimate in standard units (m, cm)

"I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m."

Measures using standard units (m, cm)



"The perimeter is 28 cm."

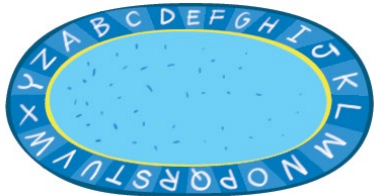
Observations/Documentation

Activity 4 Assessment

Introducing Perimeter

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

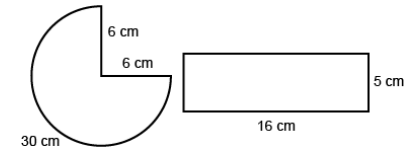


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

Compares using standard units



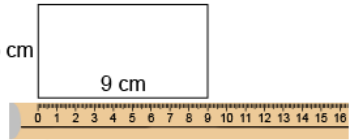


"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 5 Assessment

Measuring Perimeter

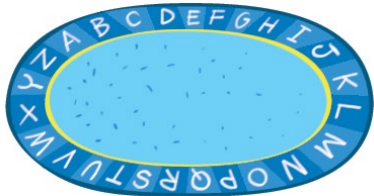
Measuring Length and Perimeter			
<p>Uses non-standard units to measure</p>  <p>“The rectangle is 5 paper clips long. Its perimeter is 16 paper clips.”</p>	<p>Uses standard-sized items to measure</p>  <p>“The rectangle is 17 centicubes long. Its perimeter is 54 centicubes.”</p>	<p>Uses benchmarks to estimate in standard units (m, cm)</p> <p>“I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m.”</p>	<p>Measures using standard units (m, cm)</p>  <p>“The perimeter is 28 cm.”</p>
Observations/Documentation			

Activity 5 Assessment

Measuring Perimeter

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

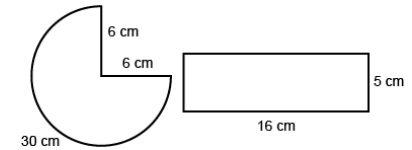


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

Compares using standard units



"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 6 Assessment

How Many Can You Make?

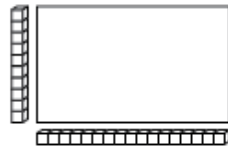
Measuring Length and Perimeter

Uses non-standard units to measure



“The rectangle is 5 paper clips long.
Its perimeter is 16 paper clips.”

Uses standard-sized items to measure

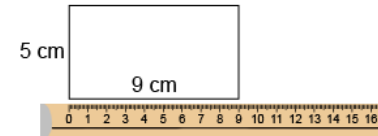


“The rectangle is 17 centicubes long.
Its perimeter is 54 centicubes.”

Uses benchmarks to estimate in standard units (m, cm)

“I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m.”

Measures using standard units (m, cm)



“The perimeter is 28 cm.”

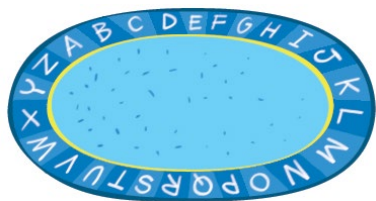
Observations/Documentation

Activity 6 Assessment

How Many Can You Make?

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

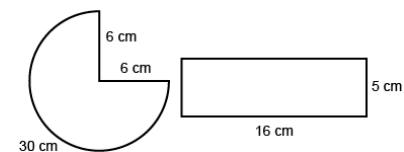


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

Compares using standard units

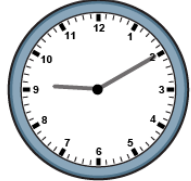


"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 7 Assessment

Telling Time

Time and Measurement Relationships			
<p>Uses standard units to measure passage of time</p> <p>“I used a stopwatch. Recess lasts 20 minutes. I used a watch. Kayla ran 50 m in 7 seconds.”</p>	<p>Selects and uses appropriate unit to measure time</p> <p>“I would measure a school day in hours, the time to walk to the library in minutes, and the blink of an eye in seconds.”</p>	<p>Reads time on an analogue and digital clock</p>  <p>“It is 10 minutes after 9.”</p>	<p>Understands relationships among time units</p> <p>“1 hour is 60 minutes. So, 2 hours is 120 minutes. 1 minute is 60 seconds. So, 2 minutes is 120 seconds.”</p>
Observations/Documentation			

Activity 8 Assessment Consolidation

Measuring Length and Perimeter

Uses non-standard units to measure



"The rectangle is 5 paper clips long.
Its perimeter is 16 paper clips."

Uses standard-sized items to measure

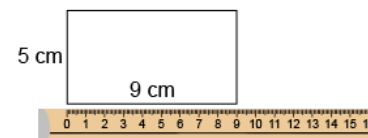


"The rectangle is 17 centicubes long.
Its perimeter is 54 centicubes."

Uses benchmarks to estimate in standard units (m, cm)

"I used a big step as a referent for one metre. The classroom is about 7 big steps, or 7 m wide. Its perimeter is about 30 big steps, or 30 m."

Measures using standard units (m, cm)



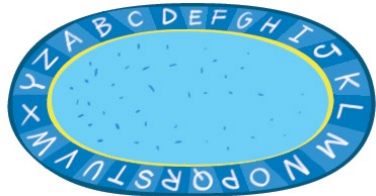
"The perimeter is 28 cm."

Observations/Documentation

Activity 8 Assessment Consolidation

Measuring Length and Perimeter (con't)

Selects and uses appropriate standard units



"I would use m because mm and cm are too small. The length of string I wound around the edge is 10 m. So, the perimeter is 10 m."

Relates standard units of length (1 m = 100 cm)

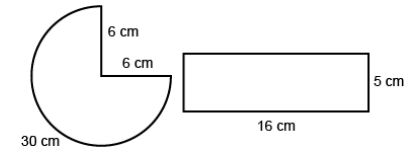


"The door has a perimeter of 8 m. Since 1 m = 100 cm, 8 m = 800 cm."

Uses smaller units to give more accurate measures

"The pen is between 13 cm and 14 cm long. If I use mm, I can be more accurate: 137 mm."

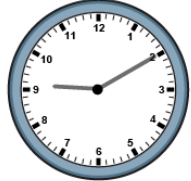
Compares using standard units



"Rectangle:
 $5 + 16 + 5 + 16 = 42$ cm
 Three-quarter circle:
 $6 + 6 + 30 = 42$ cm
 The perimeters are the same."

Observations/Documentation

Activity 8 Assessment Consolidation

Time and Measurement Relationships			
<p>Uses standard units to measure passage of time</p> <p>“I used a stopwatch. Recess lasts 20 minutes. I used a watch. Kayla ran 50 m in 7 seconds.”</p>	<p>Selects and uses appropriate unit to measure time</p> <p>“I would measure a school day in hours, the time to walk to the library in minutes, and the blink of an eye in seconds.”</p>	<p>Reads time on an analogue and digital clock</p>  <p>“It is 10 minutes after 9.”</p>	<p>Understands relationships among time units</p> <p>“1 hour is 60 minutes. So, 2 hours is 120 minutes. 1 minute is 60 seconds. So, 2 minutes is 120 seconds.”</p>
Observations/Documentation			

Activity 9 Assessment

Measuring Area Using Non-Standard Units

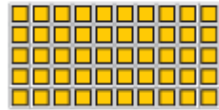
Using Standard Units to Estimate, Measure, and Compare Area

Uses non-standard units to measure



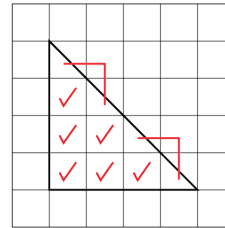
"Its area is 8 Colour Tiles."

Uses standard-sized items to measure



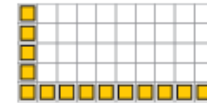
"Its area is 50 square centimetres."

Uses partial units to get more precise measure



"6 whole squares and
4 half squares.
Area is 8 square centimetres."

Measures using multiple copies of a unit



"I skip-counted by 10 five times:
10, 20, 30, 40, 50.
Area is 50 square centimetres."

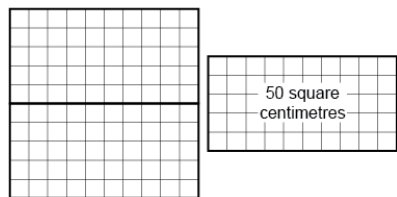
Observations/Documentation

Activity 9 Assessment

Measuring Area Using Non-Standard Units

Using Standard Units to Estimate, Measure, and Compare Area (con't)

Measures using intermediary shape (e.g., shape whose area is known)



"Each rectangle has area 50 square centimetres, so the area of the square is 100 square centimetres."

Uses benchmarks to estimate in standard units

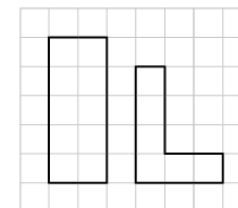


"Area of hand: about 100 square centimetres. The card is a bit bigger, so I estimate 125 square centimetres."

Selects and uses appropriate standard units

"I would use square metres to measure the area of the floor because it is much bigger than a square made from metre sticks."

Compares using standard units



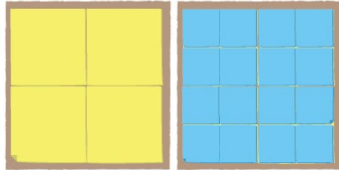
"The rectangle: 10 square centimetres is bigger than 6 square centimetres."

Activity 9 Assessment

Measuring Area Using Non-Standard Units

Relationships in Area, Mass, and Capacity

Measures using different non-standard units for area, mass, and capacity



"I covered the shape with big squares, then with small squares."

Uses the relationship between non-standard units to explain measures

"The bigger the cube, the fewer I needed to fill the milk carton.

The smaller the square, the more I needed to cover the shape."

Uses conservation of area and mass to predict measures



"I reshaped the modelling clay and its mass didn't change. It was 375 g both times."

Flexibly uses the relationships among measurement units

"375 g is less than 1 kg because 1 kg is 1000 g."

Observations/Documentation

Activity 10 Assessment

Measuring Area Using Standard Units

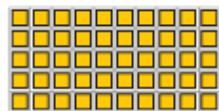
Using Standard Units to Estimate, Measure, and Compare Area

Uses non-standard units to measure



"Its area is 8 Colour Tiles."

Uses standard-sized items to measure



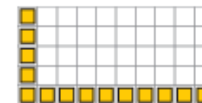
"Its area is 50 square centimetres."

Uses partial units to get more precise measure



"6 whole squares and
4 half squares.
Area is 8 square centimetres."

Measures using multiple copies of a unit



"I skip-counted by 10 five times:
10, 20, 30, 40, 50.
Area is 50 square centimetres."

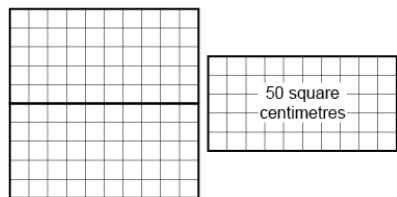
Observations/Documentation

Activity 10 Assessment

Measuring Area Using Standard Units

Using Standard Units to Estimate, Measure, and Compare Area (con't)

Measures using intermediary shape (e.g., shape whose area is known)



"Each rectangle has area 50 square centimetres, so the area of the square is 100 square centimetres."

Uses benchmarks to estimate in standard units

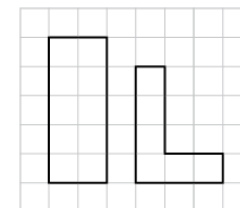


"Area of hand: about 100 square centimetres. The card is a bit bigger, so I estimate 125 square centimetres."

Selects and uses appropriate standard units

"I would use square metres to measure the area of the floor because it is much bigger than a square made from metre sticks."

Compares using standard units



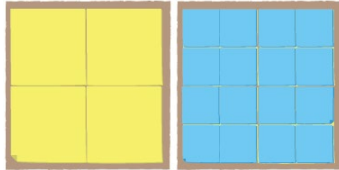
"The rectangle: 10 square centimetres is bigger than 6 square centimetres."

Activity 10 Assessment

Measuring Area Using Standard Units

Relationships in Area, Mass, and Capacity

Measures using different non-standard units for area, mass, and capacity



"I covered the shape with big squares, then with small squares."

Uses the relationship between non-standard units to explain measures

"The bigger the cube, the fewer I needed to fill the milk carton.

The smaller the square, the more I needed to cover the shape."

Uses conservation of area and mass to predict measures



"I reshaped the modelling clay and its mass didn't change. It was 375 g both times."

Flexibly uses the relationships among measurement units

"375 g is less than 1 kg because 1 kg is 1000 g."

Observations/Documentation

Activity 11 Assessment

Measuring Mass Using Non-Standard Units

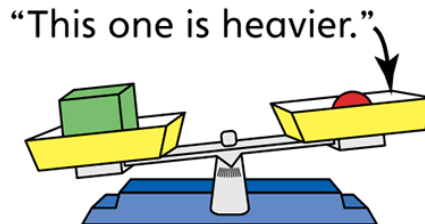
Using Non-Standard Units to Estimate and Measure Mass and Capacity

Compares objects by mass with non-standard units but thinks a larger object has a greater mass



“The blue block is heavier because it’s bigger.”

Measures and compares objects by mass with non-standard units, but thinks the heavier object is in the higher pan of the pan balance



Measures and compares objects by mass with non-standard units, but thinks the arrangement of objects in the pans will impact the mass

“I rearranged the objects in this pan. I'd better compare the masses again.”

Observations/Documentation

Activity 11 Assessment

Measuring Mass Using Non-Standard Units

Using Non-Standard Units to Estimate and Measure Mass and Capacity (con't)

Estimates and measures objects by mass with non-standard units

"I measured the mass of each unit using linking cubes."

Estimates, measures, compares, and orders objects by mass with non-standard units

"The mass of the object differs depending on which unit I use to measure."


Estimates, measures, compares, and orders objects by mass with non-standard units, and sees a relationship between the units

"The mass of a linking cube is greater than the mass of a centicube, so it takes more centicubes to balance the object."

Observations/Documentation

Activity 12 Assessment

Measuring Capacity Using Non-Standard Units

Using Non-Standard Units to Compare, Estimate, and Measure Capacity		
<p>Uses non-standard units to estimate objects by capacity but estimates are extreme/unreasonable</p> <p>“About 100 cups!”</p>	<p>Uses non-standard units to measure objects by capacity, but randomly fills containers, paying no attention to the count</p>	<p>Uses non-standard units to measure objects by capacity, but does not fill the containers</p> 
Observations/Documentation		
<p>Uses non-standard units to measure objects by capacity but is unsure how to deal with a partial cup</p> <p>“There is still room for more cubes, but a whole cup won’t fit.”</p>	<p>Uses non-standard units to measure objects by capacity but has difficulty ordering the containers from least to greatest capacity</p> <p>“How do I order the containers?”</p>	<p>Uses non-standard units to estimate measure, compare, and order objects by capacity</p> <p>“The container that holds the fewest cubes has the least capacity. The container that holds the most cubes has the greatest capacity.”</p>
Observations/Documentation		

Activity 13 Assessment Consolidation

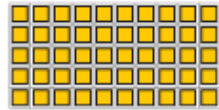
Using Standard Units to Estimate, Measure, and Compare Area

Uses non-standard units to measure



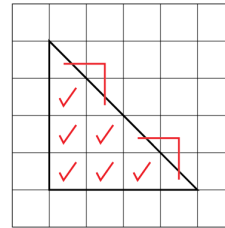
"Its area is 8 Colour Tiles."

Uses standard-sized items to measure



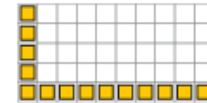
"Its area is 50 square centimetres."

Uses partial units to get more precise measure



"6 whole squares and
4 half squares.
Area is 8 square centimetres."

Measures using multiple copies of a unit



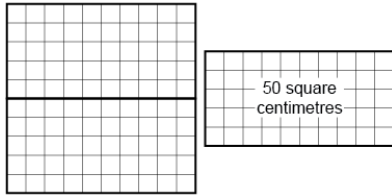
"I skip-counted by 10 five times:
10, 20, 30, 40, 50.
Area is 50 square centimetres."

Observations/Documentation

Activity 13 Assessment Consolidation

Using Standard Units to Estimate, Measure, and Compare Area (con't)

Measures using intermediary shape (e.g., shape whose area is known)



"Each rectangle has area 50 square centimetres, so the area of the square is 100 square centimetres."

Uses benchmarks to estimate in standard units

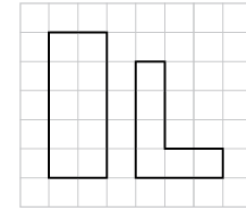


"Area of hand: about 100 square centimetres. The card is a bit bigger, so I estimate 125 square centimetres."

Selects and uses appropriate standard units

"I would use square metres to measure the area of the floor because it is much bigger than a square made from metre sticks."

Compares using standard units

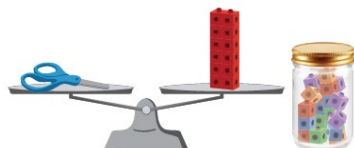


"The rectangle: 10 square centimetres is bigger than 6 square centimetres."

Activity 13 Assessment Consolidation

Using Standard Units to Estimate and Measure Mass and Capacity

Uses non-standard units to measure



“The scissors have a mass of about 12 linking cubes. The jar has a capacity of about 20 linking cubes.”

Uses multiple copies of standard-sized items to measure

“I added 1-g masses to the pan until the pans balanced. The eraser has a mass of 20 g.

I filled the 100-mL cylinder and poured it into the jug. I did this 6 times. The capacity of the jug is 600 mL.”

Measures using intermediary object (e.g., object whose mass/capacity is known)

“I know the soup can has a mass of about 300 g, so I started with that and added other masses.

I used the water bottle to fill the bowl. It didn't quite fill it, so I then used the 100-mL cylinder.”

Observations/Documentation

Activity 13 Assessment Consolidation

Using Standard Units to Estimate and Measure Mass and Capacity (con't)

Uses benchmarks to estimate in standard units

“My pencil case is a bit heavier than a can of tuna, so I estimate 225 g.

The bottle is a bit smaller than a carton of milk, so I estimate 900 mL.”

Selects and uses appropriate standard units

“It’s lighter than a box of salt, so I will use grams.

It’s bigger than a milk carton, so I will use litres.”

Compares using standard units

“1 L is more than 750 mL, so the milk carton holds more than the yogurt tub.”

Observations/Documentation

Activity 1 Assessment

Sorting Polygons

Investigating Geometric Attributes of 2-D Shapes

Recognizes and names familiar 2-D shapes

“The top of my desk has the shape of a rectangle.”

Groups shapes that share the same geometric attributes



“The first four shapes all have 5 sides, so they are pentagons. The last shape doesn’t belong. It has 6 sides.”

Compares attributes to identify congruent shapes



“The size and shape of these two pentagons match exactly. They have matching sides and matching angles.”

Observations/Documentation

Activity 1 Assessment

Sorting Polygons

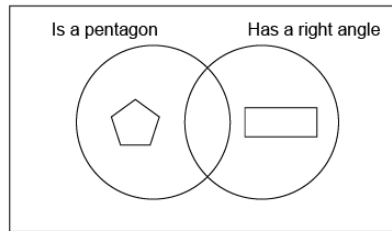
Investigating Geometric Attributes of 2-D Shapes (con't)

Analyzes geometric attributes of 2-D shapes (e.g., number and length of sides, number of vertices)



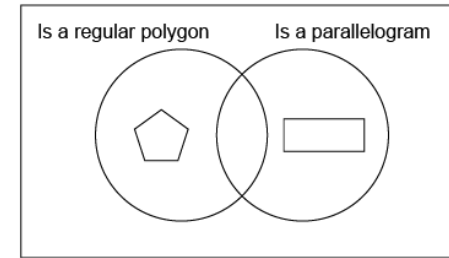
"The first two are irregular pentagons as not all sides are equal. The third one is regular because all sides are equal."

Uses attributes to compare and sort shapes



"I need a shape with 5 sides and at least one right angle to go in the overlap."

Sorts, classifies, and names shapes flexibly using geometric attributes







"The sorting rule could be 'Is a regular polygon and is a parallelogram.'"

Observations/Documentation

Activity 7 Assessment

Exploring Congruency

Identifying Congruent 2-D Shapes			
<p>Identifies congruent shapes with same orientation</p>  <p>“These shapes are congruent because they have the same shape and size and are facing the same way.”</p>	<p>Identifies congruent shapes with different orientations (uses physical movement)</p>  <p>“These shapes are congruent because when I turn one shape, it matches the other shape exactly.”</p>	<p>Identifies congruent shapes with different orientations (uses visualization)</p>  <p>“These shapes are congruent because I can picture turning one shape half a turn to match the other.”</p>	<p>Identifies congruent shapes with different orientations (using matching sides and angles)</p>  <p>“These shapes are congruent because they have matching sides and angles. If I flipped C onto D, the side lengths and angle sizes would match.”</p>
Observations/Documentation			

Activity 3 Assessment

What's the Sorting Rule?

Investigating Geometric Attributes of 2-D Shapes

Recognizes and names familiar 2-D shapes

"The top of my desk has the shape of a rectangle."

Groups shapes that share the same geometric attributes



"The first four shapes all have 5 sides, so they are pentagons. The last shape doesn't belong. It has 6 sides."

Compares attributes to identify congruent shapes



"The size and shape of these two pentagons match exactly. They have matching sides and matching angles."

Observations/Documentation

Activity 3 Assessment

What's the Sorting Rule?

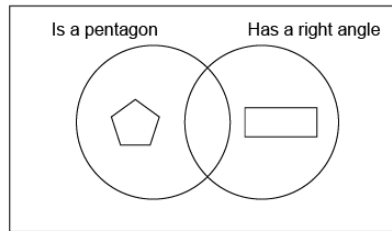
Investigating Geometric Attributes of 2-D Shapes (con't)

Analyzes geometric attributes of 2-D shapes (e.g., number and length of sides, number of vertices)



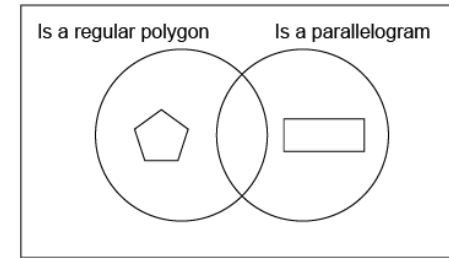
"The first two are irregular pentagons as not all sides are equal. The third one is regular because all sides are equal."

Uses attributes to compare and sort shapes



"I need a shape with 5 sides and at least one right angle to go in the overlap."

Sorts, classifies, and names shapes flexibly using geometric attributes



"The sorting rule could be 'Is a regular polygon and is a parallelogram.'"

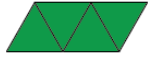
Observations/Documentation

Activity 4 Assessment

Composing Shapes

Composing and Decomposing 2-D Shapes

Constructs composite shape using copies of the same Pattern Block



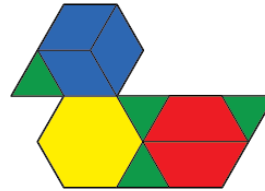
"I can use 4 triangles to make a parallelogram."

Constructs composite shape from Pattern Blocks in more than one way



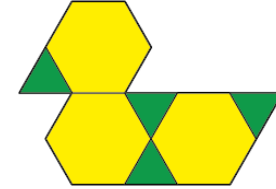
"I can also use 2 triangles and a rhombus to make a parallelogram."

Completes a picture outline with Pattern Blocks



"I used 10 blocks to cover the outline. I tried to use a variety of blocks."

Constructs composite shapes in many ways by decomposing shapes and rearranging parts



"I traded 3 blue blocks for a yellow block, and 2 red blocks for a yellow block. I was able to cover the outline using only 7 blocks. When I use only green blocks, it takes 22 blocks."

Observations/Documentation

Activity 5 Assessment Consolidation

Investigating Geometric Attributes of 2-D Shapes

Recognizes and names familiar 2-D shapes

“The top of my desk has the shape of a rectangle.”

Groups shapes that share the same geometric attributes



“The first four shapes all have 5 sides, so they are pentagons. The last shape doesn’t belong. It has 6 sides.”

Compares attributes to identify congruent shapes



“The size and shape of these two pentagons match exactly. They have matching sides and matching angles.”

Observations/Documentation

Activity 5 Assessment Consolidation

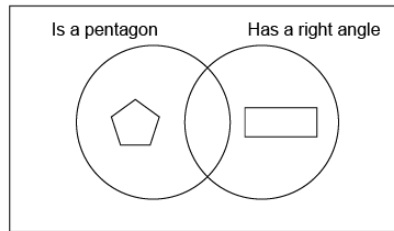
Investigating Geometric Attributes of 2-D Shapes (con't)

Analyzes geometric attributes of 2-D shapes (e.g., number and length of sides, number of vertices)



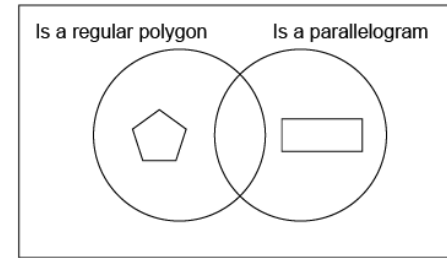
"The first two are irregular pentagons as not all sides are equal. The third one is regular because all sides are equal."

Uses attributes to compare and sort shapes



"I need a shape with 5 sides and at least one right angle to go in the overlap."

Sorts, classifies, and names shapes flexibly using geometric attributes



"The sorting rule could be 'Is a regular polygon and is a parallelogram.'"

Observations/Documentation

Activity 5 Assessment Consolidation

Composing and Decomposing 2-D Shapes

Constructs composite shape using copies of the same Pattern Block



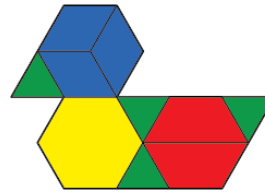
"I can use 4 triangles to make a parallelogram."

Constructs composite shape from Pattern Blocks in more than one way



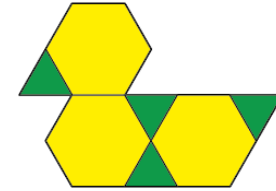
"I can also use 2 triangles and a rhombus to make a parallelogram."

Completes a picture outline with Pattern Blocks



"I used 10 blocks to cover the outline. I tried to use a variety of blocks."

Constructs composite shapes in many ways by decomposing shapes and rearranging parts

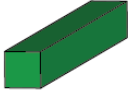





"I traded 3 blue blocks for a yellow block, and 2 red blocks for a yellow block. I was able to cover the outline using only 7 blocks. When I use only green blocks, it takes 22 blocks."

Observations/Documentation

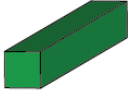



Activity 6 Assessment

Exploring Geometric Attributes of Solids

Investigating Geometric Attributes of 3-D Solids			
<p>Identifies and describes geometric attributes of individual solids</p>  <p>“This 3-D solid has 2 square bases, 4 rectangular faces, 12 edges, and 8 vertices.”</p> <p>Or “This 3-D solid has 2 rectangular bases, 2 square faces, 2 rectangular faces, 12 edges, and 8 vertices.”</p>	<p>Groups solids that share the same geometric attributes</p>  <p>“All these solids have the same geometric attributes, so they are all square-based prisms.”</p>	<p>Builds solids based on given geometric attributes</p>  <p>“I made a square pyramid. It has 4 triangle faces and 1 square base.”</p>	<p>Sorts, classifies and names solids using geometric attributes</p>  <p>“All pyramids have faces that are triangles.”</p>
Observations/Documentation			

Activity 7 Assessment

Building Solids

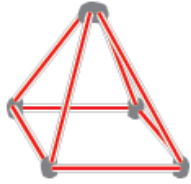
Investigating Geometric Attributes of 3-D Solids			
<p>Identifies and describes geometric attributes of individual solids</p>  <p>“This 3-D solid has 2 square bases, 4 rectangular faces, 12 edges, and 8 vertices.”</p> <p>Or “This 3-D solid has 2 rectangular bases, 2 square faces, 2 rectangular faces, 12 edges, and 8 vertices.”</p>	<p>Groups solids that share the same geometric attributes</p>  <p>“All these solids have the same geometric attributes, so they are all square-based prisms.”</p>	<p>Builds solids based on given geometric attributes</p>  <p>“I made a square pyramid. It has 4 triangle faces and 1 square base.”</p>	<p>Sorts, classifies and names solids using geometric attributes</p>  <p>“All pyramids have faces that are triangles.”</p>
Observations/Documentation			

Activity 8 Assessment

Constructing Skeletons

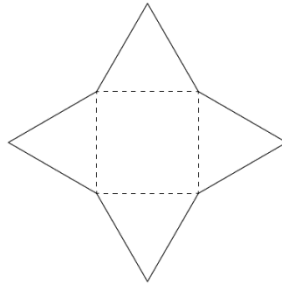
Composing and Decomposing 3-D Solids

Constructs skeletons of 3-D solids by decomposing solids into 2-D shapes and matching



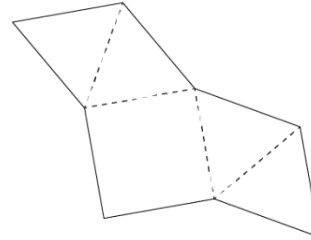
"I started by making a square as the base, then added the triangular faces."

Identifies nets of 3-D solids by folding



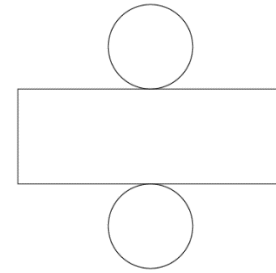
"I folded this net and made a square-based pyramid."

Recognizes nets of 3-D solids by decomposing and matching (visualization)



"When I imagine folding it in my mind, I see the triangles wrapping around the square to make a pyramid."

Constructs and deconstructs solids flexibly using skeletons and nets



"This net will make a cylinder, but I can't make a skeleton of a cylinder because it doesn't have vertices and edges."

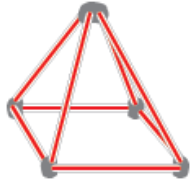
Observations/Documentation

Activity 9 Assessment

Working with Nets

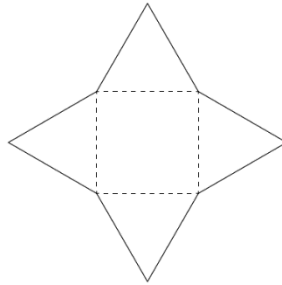
Composing and Decomposing 3-D Solids

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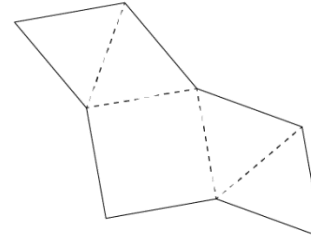
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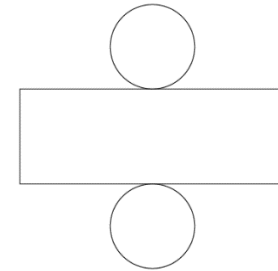
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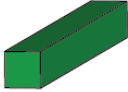
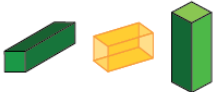


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"This net will make a cylinder, but I can't make a skeleton of a cylinder because it doesn't have vertices and edges."

Observations/Documentation

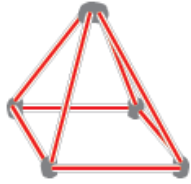
Activity 10 Assessment Consolidation

Investigating Geometric Attributes of 3-D Solids			
<p>Identifies and describes geometric attributes of individual solids</p>  <p>“This 3-D solid has 2 square bases, 4 rectangular faces, 12 edges, and 8 vertices.”</p> <p>Or “This 3-D solid has 2 rectangular bases, 2 square faces, 2 rectangular faces, 12 edges, and 8 vertices.”</p>	<p>Groups solids that share the same geometric attributes</p>  <p>“All these solids have the same geometric attributes, so they are all square-based prisms.”</p>	<p>Builds solids based on given geometric attributes</p>  <p>“I made a square pyramid. It has 4 triangle faces and 1 square base.”</p>	<p>Sorts, classifies and names solids using geometric attributes</p>  <p>“All pyramids have faces that are triangles.”</p>
Observations/Documentation			

Activity 10 Assessment Consolidation

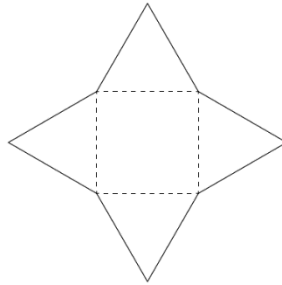
Composing and Decomposing 3-D Solids

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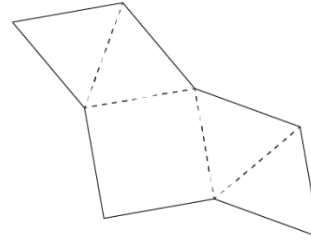
"I started by making a square as the base, then added the triangular faces."

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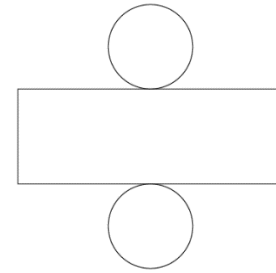
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"When I imagine folding it in my mind, I see the triangles wrapping around the square to make a pyramid."

Constructs and deconstructs solids flexibly using skeletons and nets



"This net will make a cylinder, but I can't make a skeleton of a cylinder because it doesn't have vertices and edges."

Observations/Documentation

Activity 11 Assessment

Describing Location

Locating and Mapping Objects

Uses positional language to describe location



“The green triangle is above the orange square.
The orange square is below the green triangle.”

Uses positional and directional language to locate objects on a grid map



“The Grocery Store is 1 square up from the Basketball Court. The Bank is 1 square to the left of the Grocery Store.”

Describes the movement of an object from one location to another on a grid map



“To get from the Hospital to the Bank, I walk forward 2 squares to the Vet, then turn left and walk forward 2 squares.”

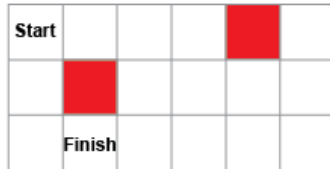
Observations/Documentation

Activity 11 Assessment

Describing Location

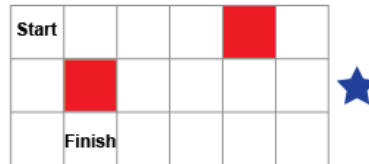
Locating and Mapping Objects (con't)

Writes code to move from Start to Finish on a grid



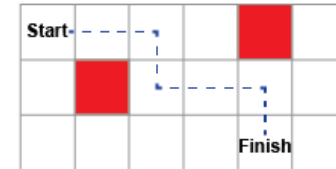
"From Start, move 2 squares right, 2 squares down, and 1 square left."

Considers perspective to give directions and code efficiently and flexibly



"My partner is looking at the grid from the right. So, from Start, move 2 squares down, 2 squares left, and 1 square up."

Uses loops to show repeated steps in a code



"Repeat 2 times: Move right 2 steps, then 1 step down."

Observations/Documentation

Activity 12 Assessment

Exploring Movements

Applying Movements to 2-D Shapes

Gives and follows instructions to move congruent shapes to matching orientations



"I can turn one shape half a turn to match the other."

Gives and follows instructions to slide (translate) shapes but struggles to differentiate between flips (reflections) and turns (rotations)



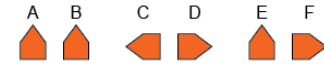
"I would slide A to the right to get to B. I'm not sure whether I would flip or turn C to get to D."

Gives and follows instructions to move shapes from one location to another (e.g., turn (rotation), flip (reflection), or slide (translation))



"I used a Mira and the two shapes matched exactly. So, I flipped Shape C onto D."

Uses orientation of shape to predict, describe, and move shapes from one location to another



"To move from A to B: same orientation, so slide A to the right; from C to D: opposite orientations, so a flip in vertical line between C and D; from E to F: different orientations, so a quarter-turn clockwise."

Observations/Documentation

Activity 13 Assessment

Describing Movement on a Map

Locating and Mapping Objects

Uses positional language to describe location



“The green triangle is above the orange square.
The orange square is below the green triangle.”

Uses positional and directional language to locate objects on a grid map



“The Grocery Store is 1 square up from the Basketball Court. The Bank is 1 square to the left of the Grocery Store.”

Describes the movement of an object from one location to another on a grid map



“To get from the Hospital to the Bank, I walk forward 2 squares to the Vet, then turn left and walk forward 2 squares.”

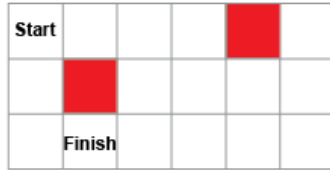
Observations/Documentation

Activity 13 Assessment

Describing Movement on a Map

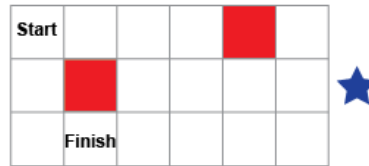
Locating and Mapping Objects (con't)

Writes code to move from Start to Finish on a grid



"From Start, move 2 squares right, 2 squares down, and 1 square left."

Considers perspective to give directions and code efficiently and flexibly



"My partner is looking at the grid from the right. So, from Start, move 2 squares down, 2 squares left, and 1 square up."

Uses loops to show repeated steps in a code



"Repeat 2 times: Move right 2 steps, then 1 step down."

Observations/Documentation

Activity 14 Assessment

Coding on a Grid

Locating and Mapping Objects

Uses positional language to describe location



“The green triangle is above the orange square.
The orange square is below the green triangle.”

Uses positional and directional language to locate objects on a grid map



“The Grocery Store is 1 square up from the Basketball Court. The Bank is 1 square to the left of the Grocery Store.”

Describes the movement of an object from one location to another on a grid map



“To get from the Hospital to the Bank, I walk forward 2 squares to the Vet, then turn left and walk forward 2 squares.”

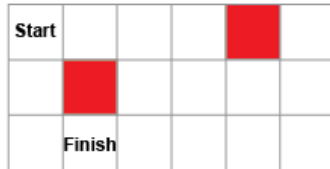
Observations/Documentation

Activity 14 Assessment

Coding on a Grid

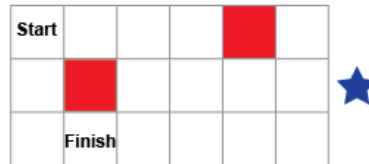
Locating and Mapping Objects (con't)

Writes code to move from Start to Finish on a grid



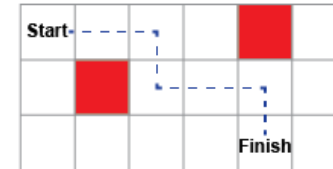
"From Start, move 2 squares right, 2 squares down, and 1 square left."

Considers perspective to give directions and code efficiently and flexibly



"My partner is looking at the grid from the right. So, from Start, move 2 squares down, 2 squares left, and 1 square up."

Uses loops to show repeated steps in a code



"Repeat 2 times: Move right 2 steps, then 1 step down."

Observations/Documentation

Activity 15 Assessment

Exploring Loops in Coding

Locating and Mapping Objects

Uses positional language to describe location



“The green triangle is above the orange square.
The orange square is below the green triangle.”

Uses positional and directional language to locate objects on a grid map



“The Grocery Store is 1 square up from the Basketball Court. The Bank is 1 square to the left of the Grocery Store.”

Describes the movement of an object from one location to another on a grid map



“To get from the Hospital to the Bank, I walk forward 2 squares to the Vet, then turn left and walk forward 2 squares.”

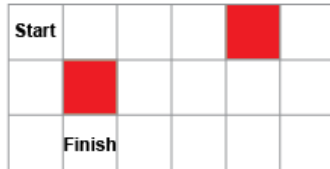
Observations/Documentation

Activity 15 Assessment

Exploring Loops in Coding

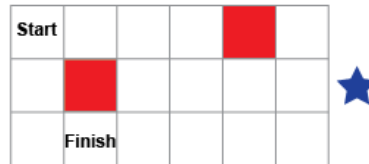
Locating and Mapping Objects (con't)

Writes code to move from Start to Finish on a grid



"From Start, move 2 squares right, 2 squares down, and 1 square left."

Considers perspective to give directions and code efficiently and flexibly



"My partner is looking at the grid from the right. So, from Start, move 2 squares down, 2 squares left, and 1 square up."

Uses loops to show repeated steps in a code



"Repeat 2 times: Move right 2 steps, then 1 step down."

Observations/Documentation

Activity 16 Assessment

Altering Code

Locating and Mapping Objects

Uses positional language to describe location



“The green triangle is above the orange square. The orange square is below the green triangle.”

Uses positional and directional language to locate objects on a grid map



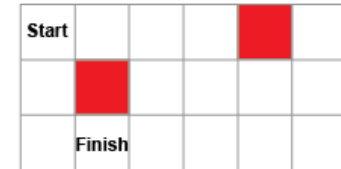
“The Grocery Store is 1 square up from the Basketball Court. The Bank is 1 square to the left of the Grocery Store.”

Describes the movement of an object from one location to another on a grid map



“To get from the Hospital to the Bank, I walk forward 2 squares to the Vet, then turn left and walk forward 2 squares.”

Writes code to move from Start to Finish on a grid



“From Start, move 2 squares right, 2 squares down, and 1 square left.”

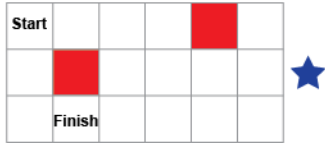
Observations/Documentation

Activity 16 Assessment

Altering Code

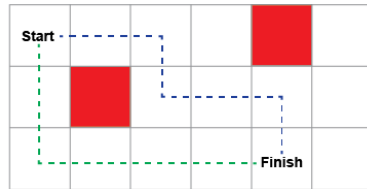
Locating and Mapping Objects (con't)

Considers perspective to give directions and code efficiently and flexibly



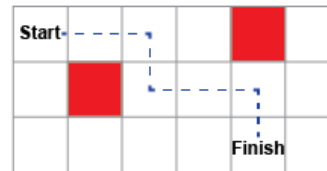
“My partner is looking at the grid from the right. So, from Start, move 2 squares down, 2 squares left, and 1 square up.”

Writes and executes code that involves concurrent events



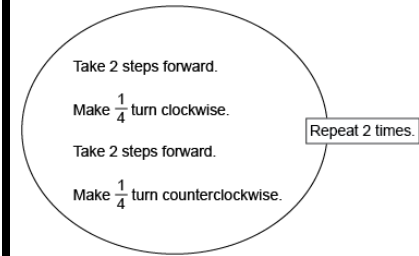
“I gave them different paths so they won't bump into each other.”

Uses loops to show repeated steps in a code



“Repeat 2 times: Move right 2 steps, then 1 step down.”

Flexibly reads and alters code to get desired outcome



“To make a square, all turns should be in the same direction.”

Observations/Documentation

Activity 17 Assessment Consolidation

Locating and Mapping Objects

Uses positional language to describe location



“The green triangle is above the orange square.
The orange square is below the green triangle.”

Uses positional and directional language to locate objects on a grid map



“The Grocery Store is 1 square up from the Basketball Court. The Bank is 1 square to the left of the Grocery Store.”

Describes the movement of an object from one location to another on a grid map



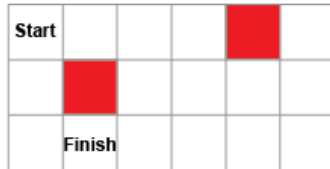
“To get from the Hospital to the Bank, I walk forward 2 squares to the Vet, then turn left and walk forward 2 squares.”

Observations/Documentation

Activity 17 Assessment Consolidation

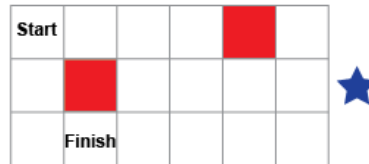
Locating and Mapping Objects (con't)

Writes code to move from Start to Finish on a grid



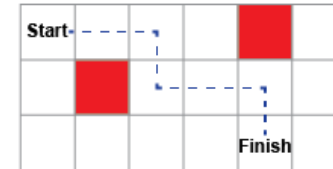
"From Start, move 2 squares right, 2 squares down, and 1 square left."

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"My partner is looking at the grid from the right. So, from Start, move 2 squares down, 2 squares left, and 1 square up."

Uses loops to show repeated steps in a code



"Repeat 2 times: Move right 2 steps, then 1 step down."

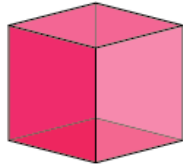
Observations/Documentation

Activity 18 Assessment

Investigating Angles

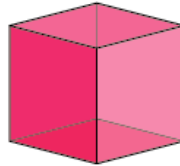
Comparing Angles

Identifies number of vertices as a geometric attribute of a shape



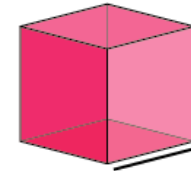
"A square has 4 vertices."

Relates vertices of shapes to angles



"A square has 4 vertices, so it has 4 angles."

Identifies right angles using manipulatives



"This is a right angle because it is the same as the corner of a square."

Observations/Documentation

Activity 18 Assessment

Investigating Angles

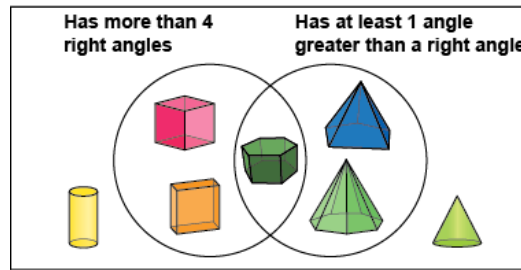
Comparing Angles (con't)

Uses right angle as benchmark for comparison



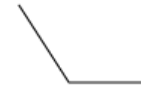
"This triangle has angles less than a right angle.
The angle is greater than a right angle."

Sorts shapes using attributes related to angles

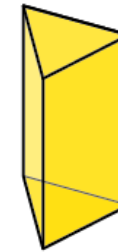


"The solid in the overlap has more than 4 right angles and at least one angle greater than a right angle."

Flexibly compares angles



"I pictured putting a square in the angle and there was space left over. It's bigger than a right angle."



"The triangular prism has two faces with angles less than a right angle and three faces with all right angles."

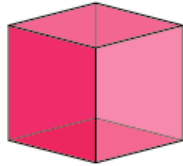
Observations/Documentation

Activity 19 Assessment

Comparing Angles

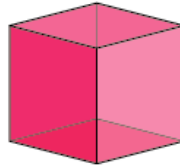
Comparing Angles

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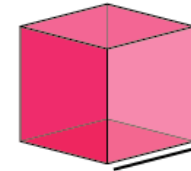
"A square has 4 vertices."

Relates vertices of shapes to angles



"A square has 4 vertices, so it has 4 angles."

Identifies right angles using manipulatives



"This is a right angle because it is the same as the corner of a square."

Observations/Documentation

Activity 19 Assessment

Comparing Angles

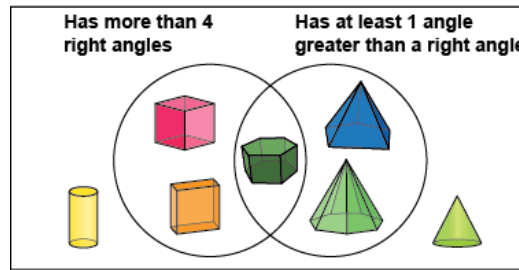
Comparing Angles (con't)

Uses right angle as benchmark for comparison



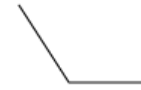
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Sorts shapes using attributes related to angles

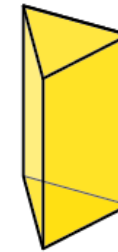


"The solid in the overlap has more than 4 right angles and at least one angle greater than a right angle."

Flexibly compares angles



"I pictured putting a square in the angle and there was space left over. It's bigger than a right angle."



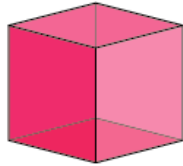
"The triangular prism has two faces with angles less than a right angle and three faces with all right angles."

Observations/Documentation

Activity 20 Assessment Consolidation

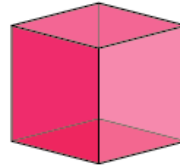
Comparing Angles

Identifies number of vertices as a geometric attribute of a shape



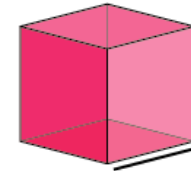
"A square has 4 vertices."

Relates vertices of shapes to angles



"A square has 4 vertices, so it has 4 angles."

Identifies right angles using manipulatives



"This is a right angle because it is the same as the corner of a square."

Observations/Documentation

Activity 20 Assessment Consolidation

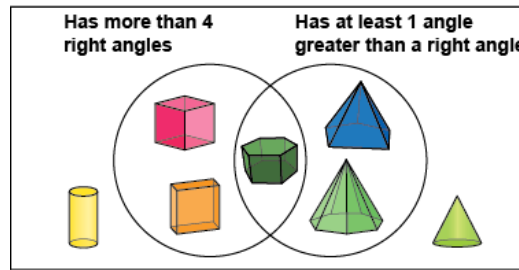
Comparing Angles (con't)

Uses right angle as benchmark for comparison



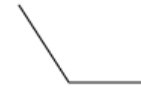
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The angle is greater than a right angle."

Sorts shapes using attributes related to angles

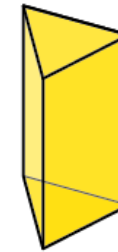


"The solid in the overlap has more than 4 right angles and at least one angle greater than a right angle."

Flexibly compares angles



"I pictured putting a square in the angle and there was space left over. It's bigger than a right angle."



"The triangular prism has two faces with angles less than a right angle and three faces with all right angles."

Observations/Documentation

Activity 6 Assessment Consolidation

Collecting and Organizing Data

No organization of data

Which category of animals do you like best?

fish, mammals,
mammals, other,
birds, mammals,
fish, mammals,
mammals, fish

Uses class list; no interpretation

- ✓ Juin Fish
Tommy
- ✓ Tai Fish
- ✓ Ioana Mammals
- ✓ Mark Mammals
- ✓ Alex Mammals
- ✓ Kim Other
Jon
- ✓ Sadia Fish
- ✓ Lise Mammals
- ✓ Dimitri Birds
Vicky
- ✓ Ali Mammals

“I’m not sure which answer
was chosen most often.”

Organizes data using one attribute (e.g., tally chart,
table, list, or line plot)

	Tally	Frequency
Fish		3
Birds		1
Mammals		5
Other		1

“I made a tally chart so I can easily see how many
chose each answer.
Most students like mammals best.”

Observations/Documentation

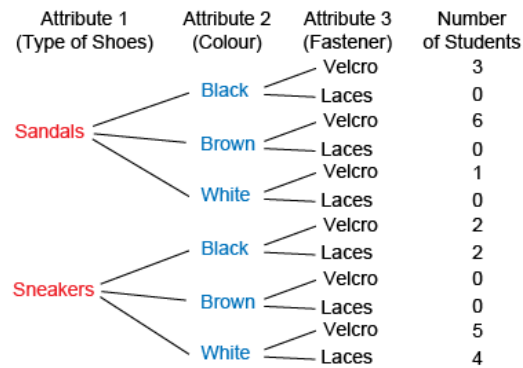
Activity 6 Assessment Consolidation

Collecting and Organizing Data (con't)

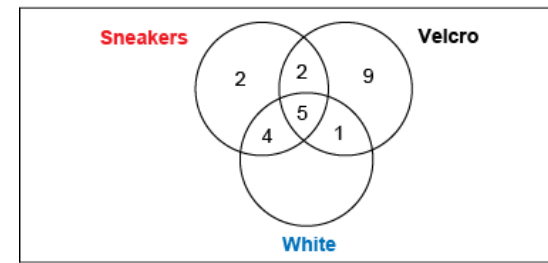
Organizes data using two attributes (e.g., two-way table, Venn diagram, Carroll diagram)

Students in a Grade 3 Class		Colour		
		Black	Brown	White
Type of Shoes	Sandals			
	Sneakers			

Organizes data using three attributes (e.g., Venn diagram, tree diagram)



Collects data and appropriately organizes them according to number of attributes



Observations/Documentation

Activity 2 Assessment

Interpreting Graphs

Reading and Interpreting Data Displays

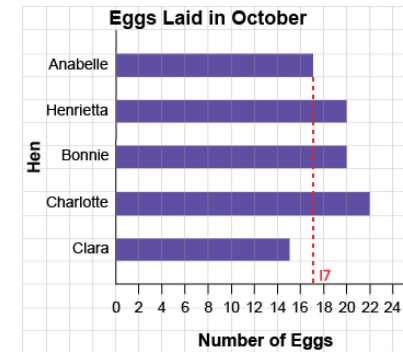
Notices basic shape of graph

"This bar is the longest. This bar is the shortest."

Skip-counts symbols or squares to read data

"2, 4, 6, ..., 16, 18, 20 squares are shaded.
Bonnie laid 20 eggs in October."

Uses scale to read data



"It is halfway between 16 and 18,
so the bar has length 17."

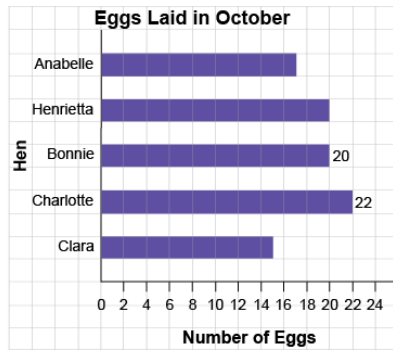
Observations/Documentation

Activity 2 Assessment

Interpreting Graphs

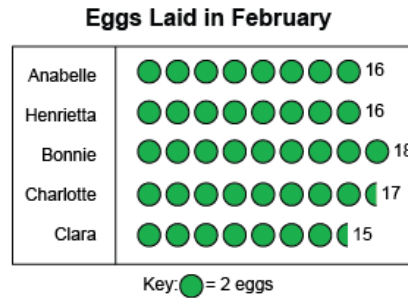
Reading and Interpreting Data Displays (con't)

Makes direct comparisons between data



"Charlotte laid 2 more eggs than Bonnie."

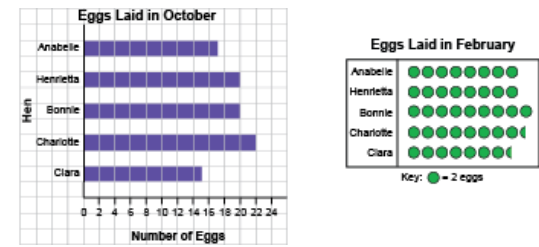
Describes shape of data (e.g., identifies mode)



"16 eggs were laid most often."
Or 13, 1, 1, 1, 2, 2, 2, 2, 3, 4

"The mode shoe size is 2."

Answers questions and draws conclusions from data



"More eggs were laid in October than in February."

Observations/Documentation

Activity 3 Assessment

Collecting & Organizing Data

Formulating Questions			
Makes statements that don't generate answers "I really like fish."	Formulates questions to learn about people (no response options) "What type of animal do you like best?"	Formulates questions to learn about people (incomplete response options) "What type of animal do you like best: fish, birds, mammals?"	Formulates clear questions with complete response options to collect relevant data "What type of animal do you like best: fish, birds, mammals, other?"
Observations/Documentation			

Activity 3 Assessment

Collecting & Organizing Data

Collecting and Organizing Data

No organization of data

fish, mammals,
mammals, other,
birds, mammals,
fish, mammals,
mammals, fish

Uses class list; no interpretation

✓ Juin Fish
Tommy
✓ Tai Fish
✓ Ioana Mammals
✓ Mark Mammals
✓ Alex Mammals
✓ Kim Other
Jon
✓ Sadia Fish
✓ Lise Mammals
✓ Dimitri Birds
Vicky
✓ Ali Mammals

"I'm not sure which answer was
chosen most often."

Uses tally chart, table, list, or line
plot

Fish	
Birds	
Mammals	
Other	

"I made a tally chart so I can easily
see how many chose each answer."

Uses collected data to answer
question

Fish	
Birds	
Mammals	
Other	

"Most students like mammals best."

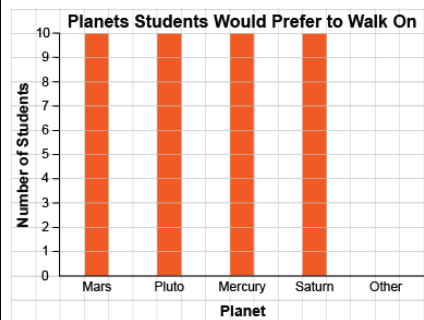
Observations/Documentation

Activity 4 Assessment

Creating Graphical Displays

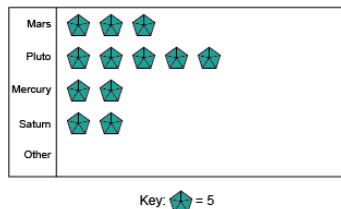
Creating Graphical Displays

Creates graph using on-to-one correspondence

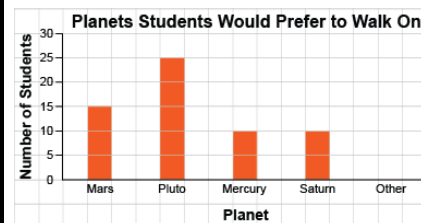


"I ran out of room for Mars and Pluto"

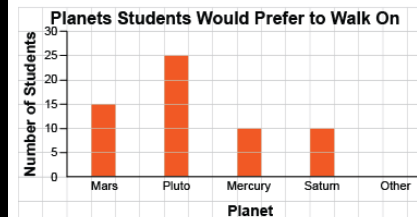
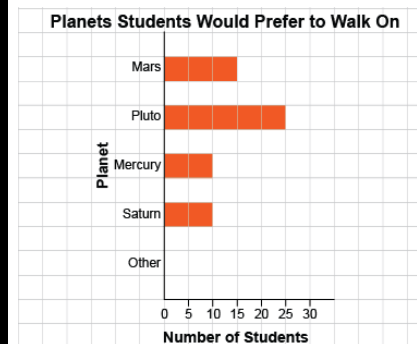
Creates graphs but omits labels, title, or scale/key



Successfully creates graphs (always of same type)



Creates graphs flexibly; shows same data on different graph types and using different scales



Observations/Documentation

Activity 5 Assessment

Identifying the Mode and the Mean

Reading and Interpreting Data Displays

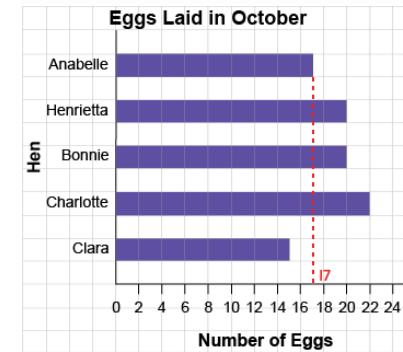
Notices basic shape of graph

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Skip-counts symbols or squares to read data

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Bonnie laid 20 eggs in October."

Uses scale to read data



"It is halfway between 16 and 18,
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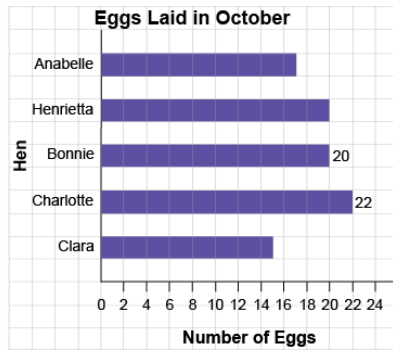
Observations/Documentation

Activity 5 Assessment

Identifying the Mode and the Mean

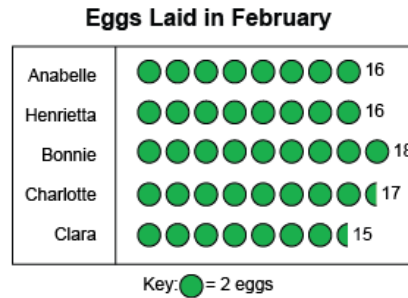
Reading and Interpreting Data Displays (con't)

Makes direct comparisons between data



"Charlotte laid 2 more eggs than Bonnie."

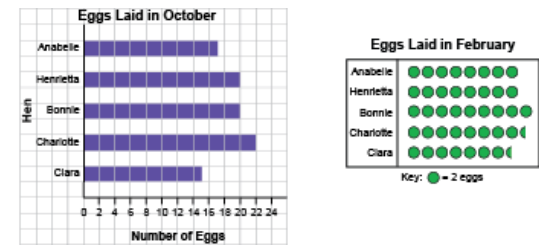
Describes shape of data (e.g., identifies mode)



"16 eggs were laid most often."
Or 13, 1, 1, 1, 2, 2, 2, 2, 3, 4

"The mode shoe size is 2."

Answers questions and draws conclusions from data

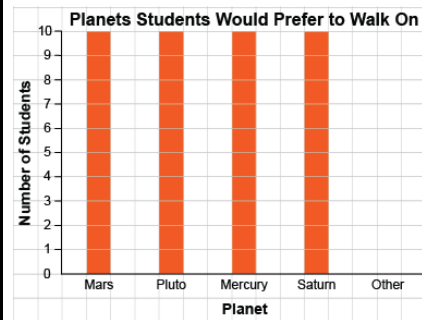


"More eggs were laid in October than in February."

Observations/Documentation

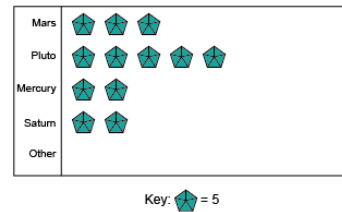
Creating Graphical Displays

Creates graph using on-to-one correspondence

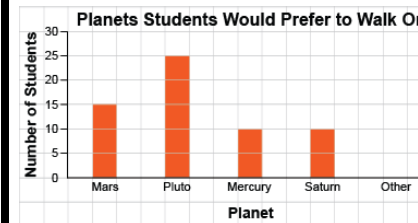


"I ran out of room for Mars and Pluto"

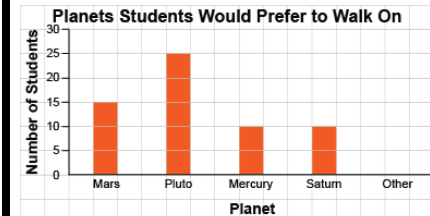
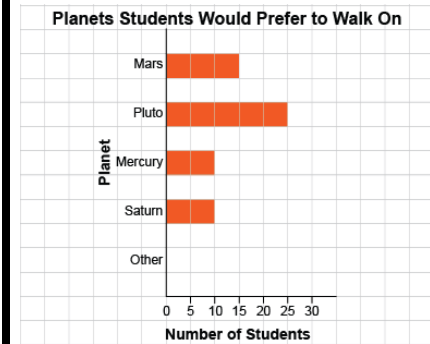
Creates graphs but omits labels, title, or scale/key



Successfully creates graphs (always of same type)



Creates graphs flexibly; shows same data on different graph types and using different scales



Observations/Documentation

Reading and Interpreting Data Displays

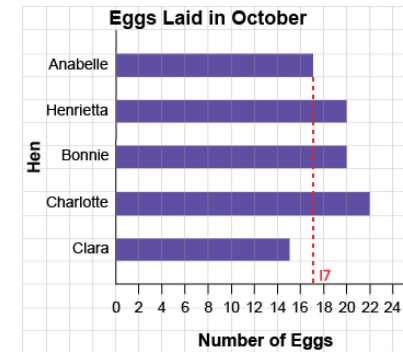
Notices basic shape of graph

“This bar is the longest. This bar is the shortest.”

Skip-counts symbols or squares to read data

“2, 4, 6, ..., 16, 18, 20 squares are shaded.
Bonnie laid 20 eggs in October.”

Uses scale to read data

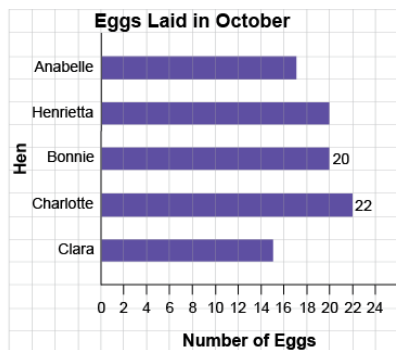


“It is halfway between 16 and 18,
so the bar has length 17.”

Observations/Documentation

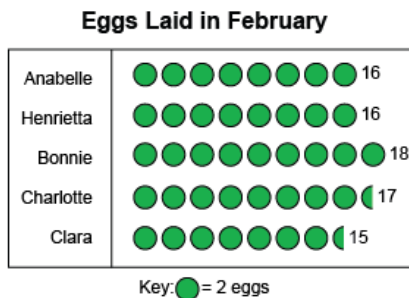
Reading and Interpreting Data Displays (con't)

Makes direct comparisons between data



"Charlotte laid 2 more eggs than Bonnie."

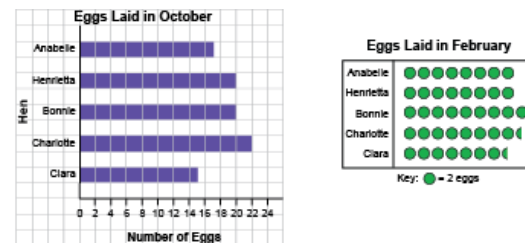
Describes shape of data (e.g., identifies mode)



"16 eggs were laid most often."
Or 13, 1, 1, 1, 2, 2, 2, 2, 3, 4

"The mode shoe size is 2."

Answers questions and draws conclusions from data



"More eggs were laid in October than in February."

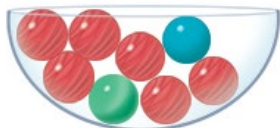
Observations/Documentation

Activity 7 Assessment

Making Predictions

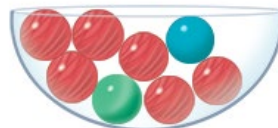
Describing Events Using the Language of Chance

Thinks outcomes of an experiment are always equally likely to happen



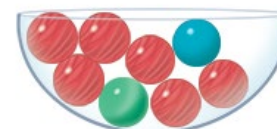
"I choose green. The chance of getting any colour is always the same."

Describes the likelihood of an event or outcome (e.g., impossible, likely, certain)



"It is **likely** that I will get red."

Makes predictions based on likelihoods



"If I draw a marble 8 times and put it back each time, I predict I will get red 6 times."

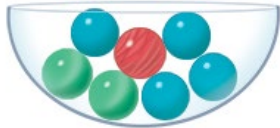
Observations/Documentation

Activity 7 Assessment

Making Predictions

Describing Events Using the Language of Chance (con't)

Lists all possible outcomes for an experiment



"I could get green, blue, or red,
but not yellow or purple."

Compares the likelihoods of two outcomes



"It is **more likely** that I will get blue than green."

Identifies flexibly the likelihoods of outcomes in a simple probability experiment



"Blue is most likely, red is least likely, green is unlikely, and yellow is impossible."

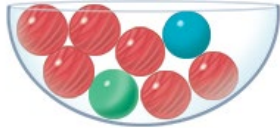
Observations/Documentation

Activity 8 Assessment

Describing the Likelihood of Outcomes

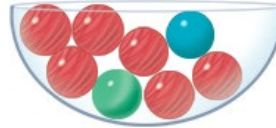
Describing Events Using the Language of Chance

Thinks outcomes of an experiment are always equally likely to happen



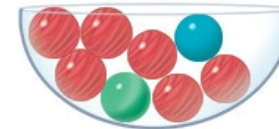
"I choose green. The chance of getting any colour is always the same."

Describes the likelihood of an event or outcome (e.g., impossible, likely, certain)



"It is **likely** that I will get red."

Makes predictions based on likelihoods



"If I draw a marble 8 times and put it back each time, I predict I will get red 6 times."

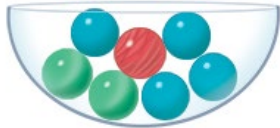
Observations/Documentation

Activity 8 Assessment

Describing the Likelihood of Outcomes

Describing Events Using the Language of Chance (con't)

Lists all possible outcomes for an experiment



"I could get green, blue, or red, but not yellow or purple."

Compares the likelihoods of two outcomes



"It is **more likely** that I will get blue than green."

Identifies flexibly the likelihoods of outcomes in a simple probability experiment



"Blue is most likely, red is least likely, green is unlikely, and yellow is impossible."

Observations/Documentation

Activity 9 Assessment

Who's Likely to Win?

Drawing Conclusions Based on Data

Asks and answers simple questions about an experiment

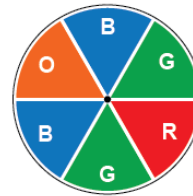


"If I toss the coin, I could get heads or tails. Getting heads or tails is equally likely."

Makes simple decisions based on data

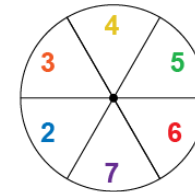
"I can roll a 1, 2, 3, 4, 5, or 6. I would choose to roll a number less than 5 rather than a number greater than 5 because I'm more likely to be right."

Connects fairness of a game to equally-likely outcomes

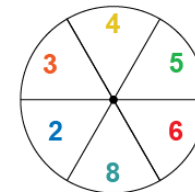


"There is an equal chance of landing on green or blue because they cover the same amount of space. So, if I need to land on green and my partner on blue, the game is fair. In 12 spins, I expect the pointer to land on green 4 times and on blue 4 times."

Creates a game that is fair or unfair and justifies why it is or isn't fair



"Fair: rolling an even number or rolling an odd number because the outcomes are equally likely."



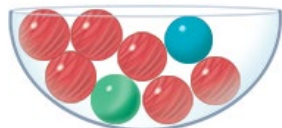
"Unfair: rolling an even number or rolling an odd number because it is more likely for the pointer to land on an even number."

Observations/Documentation

Activity 10 Assessment Consolidation

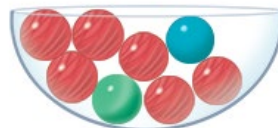
Describing Events Using the Language of Chance

Thinks outcomes of an experiment are always equally likely to happen



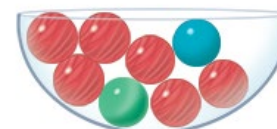
"I choose green. The chance of getting any colour is always the same."

Describes the likelihood of an event or outcome (e.g., impossible, likely, certain)



"It is **likely** that I will get red."

Makes predictions based on likelihoods



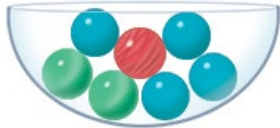
"If I draw a marble 8 times and put it back each time, I predict I will get red 6 times."

Observations/Documentation

Activity 10 Assessment Consolidation

Describing Events Using the Language of Chance (con't)

Lists all possible outcomes for an experiment



"I could get green, blue, or red,
but not yellow or purple."

Compares the likelihoods of two outcomes



"It is **more likely** that I will get blue than green."

Identifies flexibly the likelihoods of outcomes in a simple probability experiment



"Blue is most likely, red is least likely, green is unlikely, and yellow is impossible."

Observations/Documentation

Drawing Conclusions Based on Data

Asks and answers simple questions about an experiment

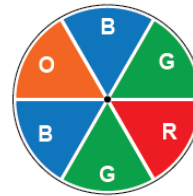


“If I toss the coin, I could get heads or tails. Getting heads or tails is equally likely.”

Makes simple decisions based on data

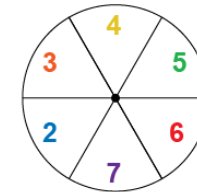
“I can roll a 1, 2, 3, 4, 5, or 6. I would choose to roll a number less than 5 rather than a number greater than 5 because I’m more likely to be right.”

Connects fairness of a game to equally-likely outcomes

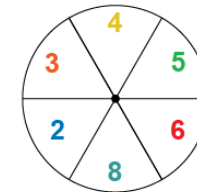


“There is an equal chance of landing on green or blue because they cover the same amount of space. So, if I need to land on green and my partner on blue, the game is fair. In 12 spins, I expect the pointer to land on green 4 times and on blue 4 times.”

Creates a game that is fair or unfair and justifies why it is or isn’t fair



“Fair: rolling an even number or rolling an odd number because the outcomes are equally likely.”



“Unfair: rolling an even number or rolling an odd number because it is more likely for the pointer to land on an even number.”

Observations/Documentation

Name _____ Date _____

**Math Mat
Master 1**

Thinking Space

My Math Learning

I feel good about:

I wonder:

I am learning about:

I need more time with:

Name _____ Date _____

**Math Mat
Master 3**

Ten-Frames

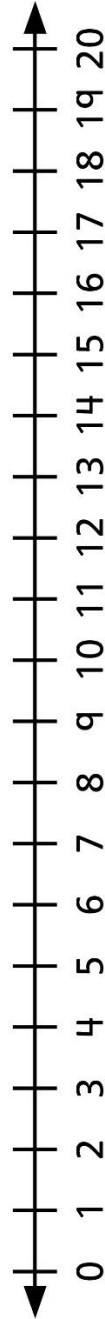
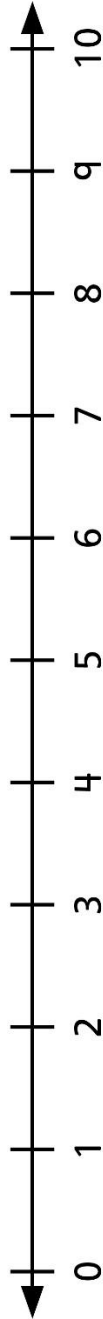
Name _____ Date _____

**Math Mat
Master 4**

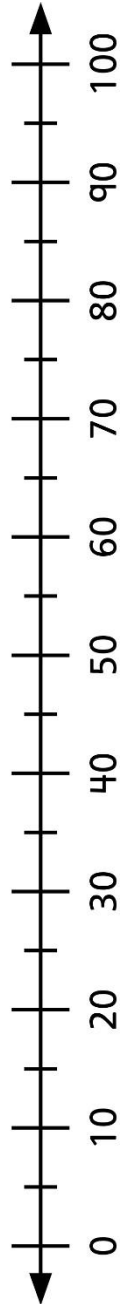
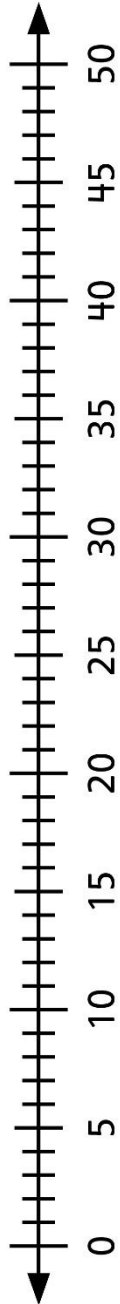
Hundred Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Number Lines



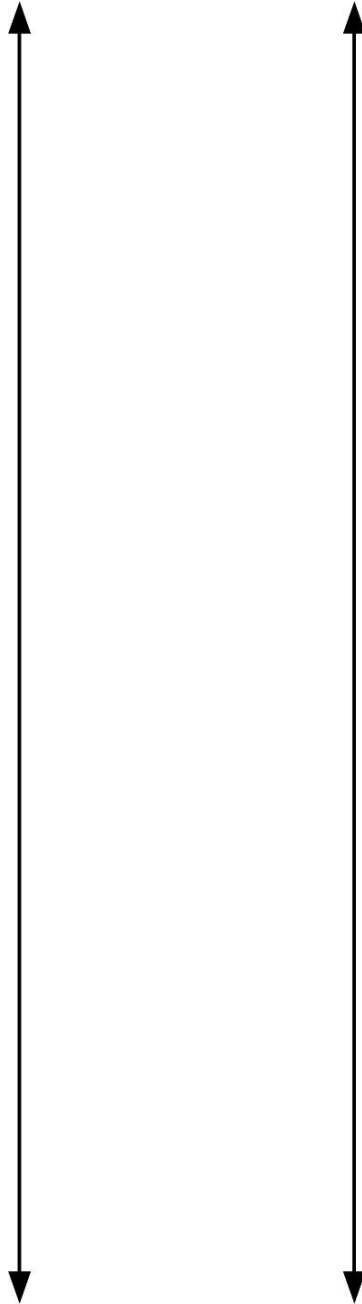
Number Lines



Name _____ Date _____

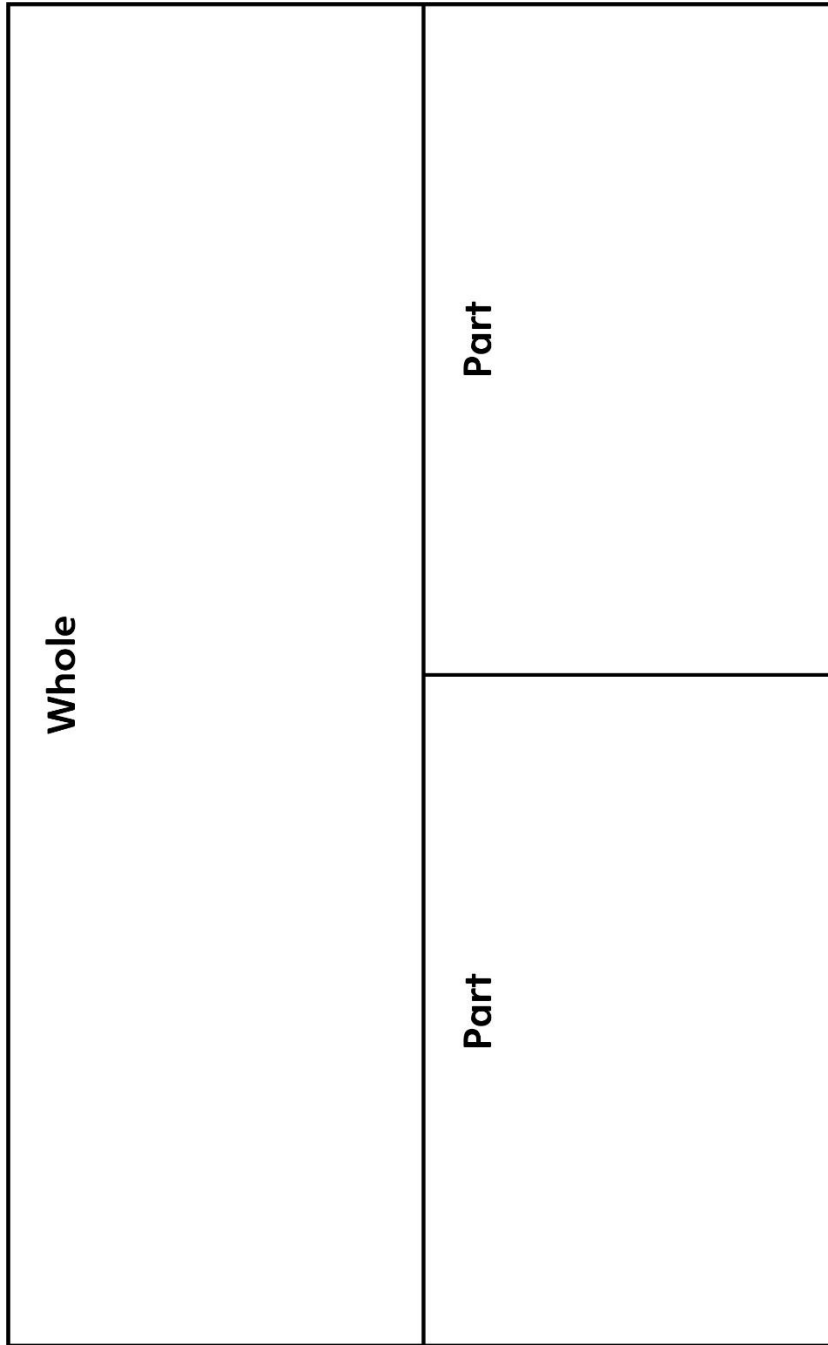
**Math Mat
Master 7**

Open Number Lines



**Math Mat
Master 8**

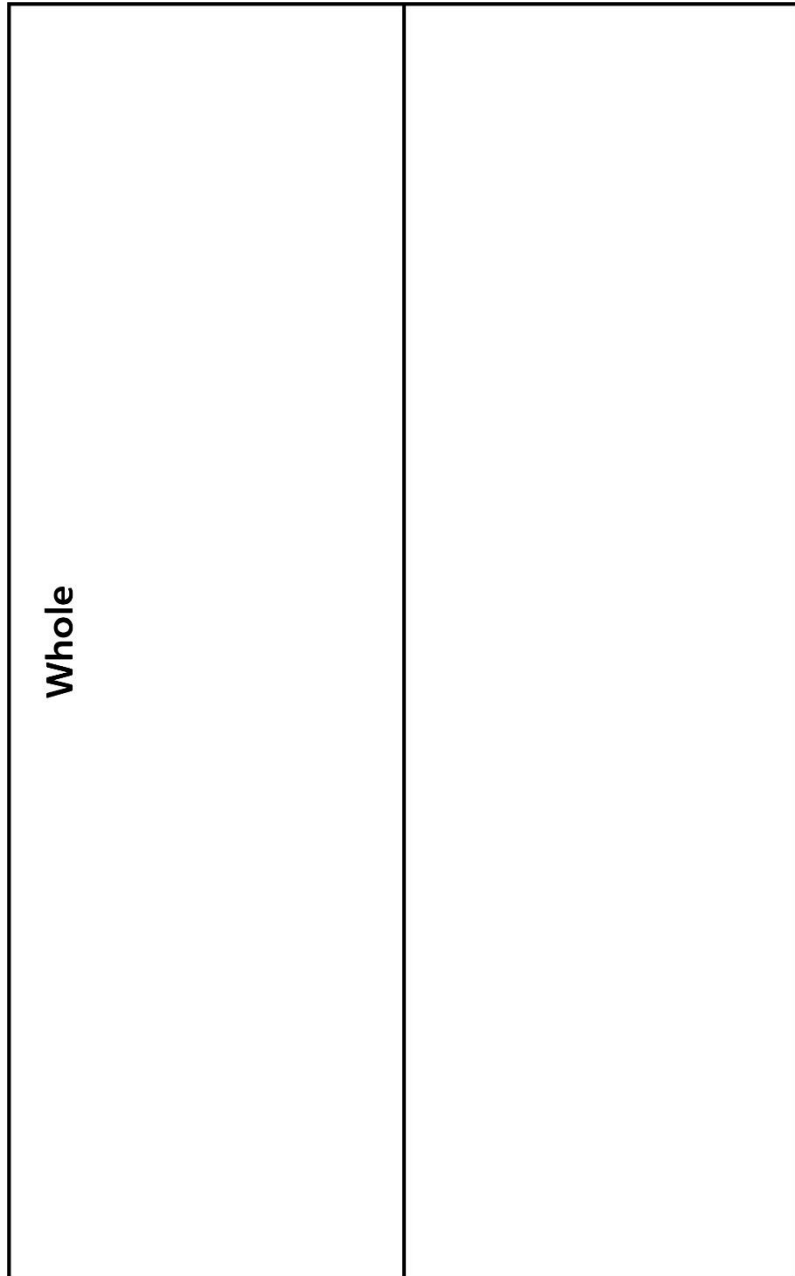
Part-Part-Whole Mat



Name _____ Date _____

**Math Mat
Master 9**

Parts-to-Whole Mat



Name _____ Date _____

Math Mat
Master 10

Place-Value Mat

Ones	
Tens	
Hundreds	

My Number

Place-Value Mat

Tenths	
•	
Ones	
Tens	
Hundreds	
Thousands	

My Number

Name _____ Date _____

Math Mat
Master 12

10 + 10 Addition Chart

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

Name _____ Date _____

Math Mat
Master 13

5 x 5 Multiplication Chart

×	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Name _____ Date _____

Math Mat
Master 14

10 x 10 Multiplication Chart

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Name _____ Date _____

**Math Mat
Master 15**

10 by 10 Chart

Name _____ Date _____

**Math Mat
Master 16**

Estimation Mat

<p>My Estimate</p>

Name _____ Date _____

Math Mat
Master 17

Sorting Mat

Yes	No

Name _____ Date _____

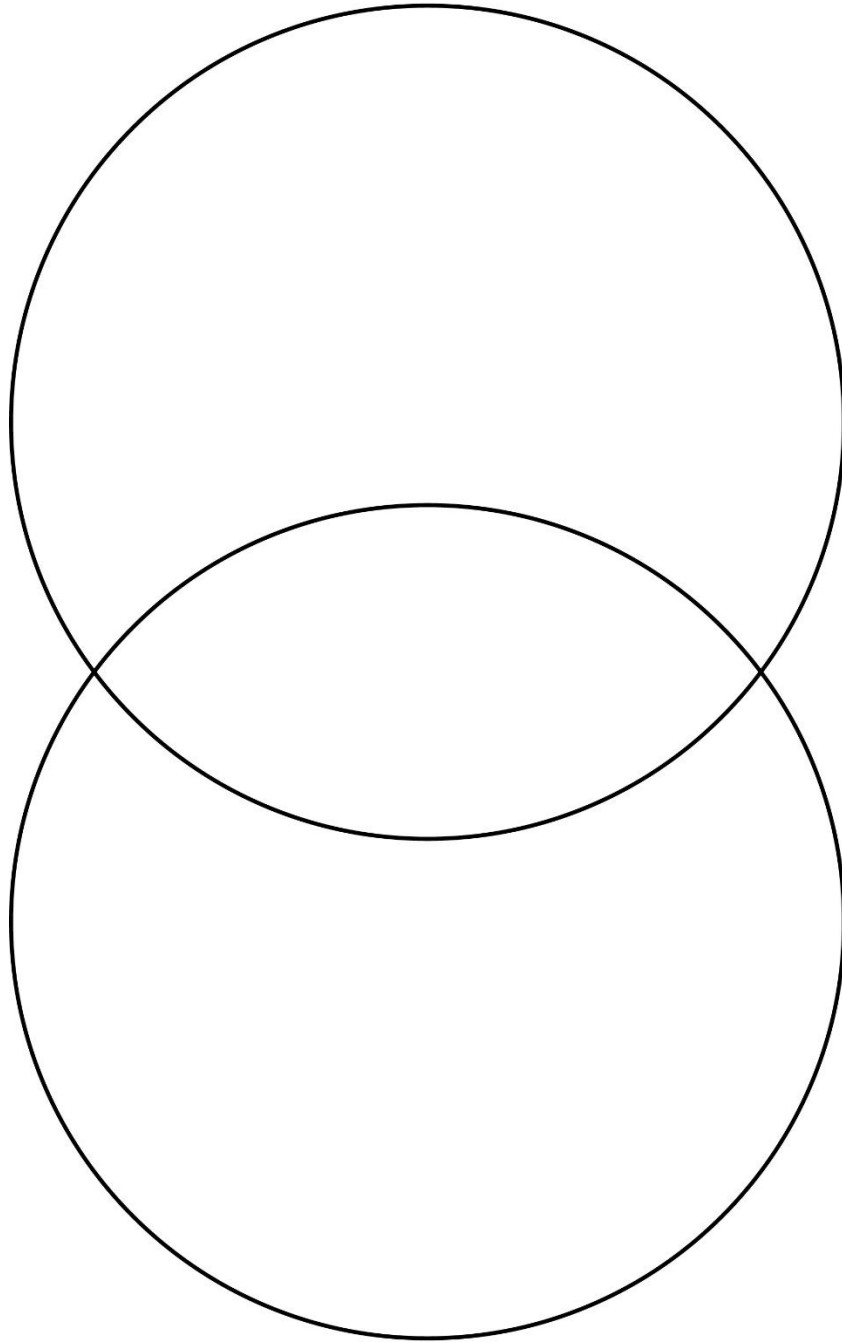
**Math Mat
Master 18**

3-Column Chart

Name _____ Date _____

**Math Mat
Master 19**

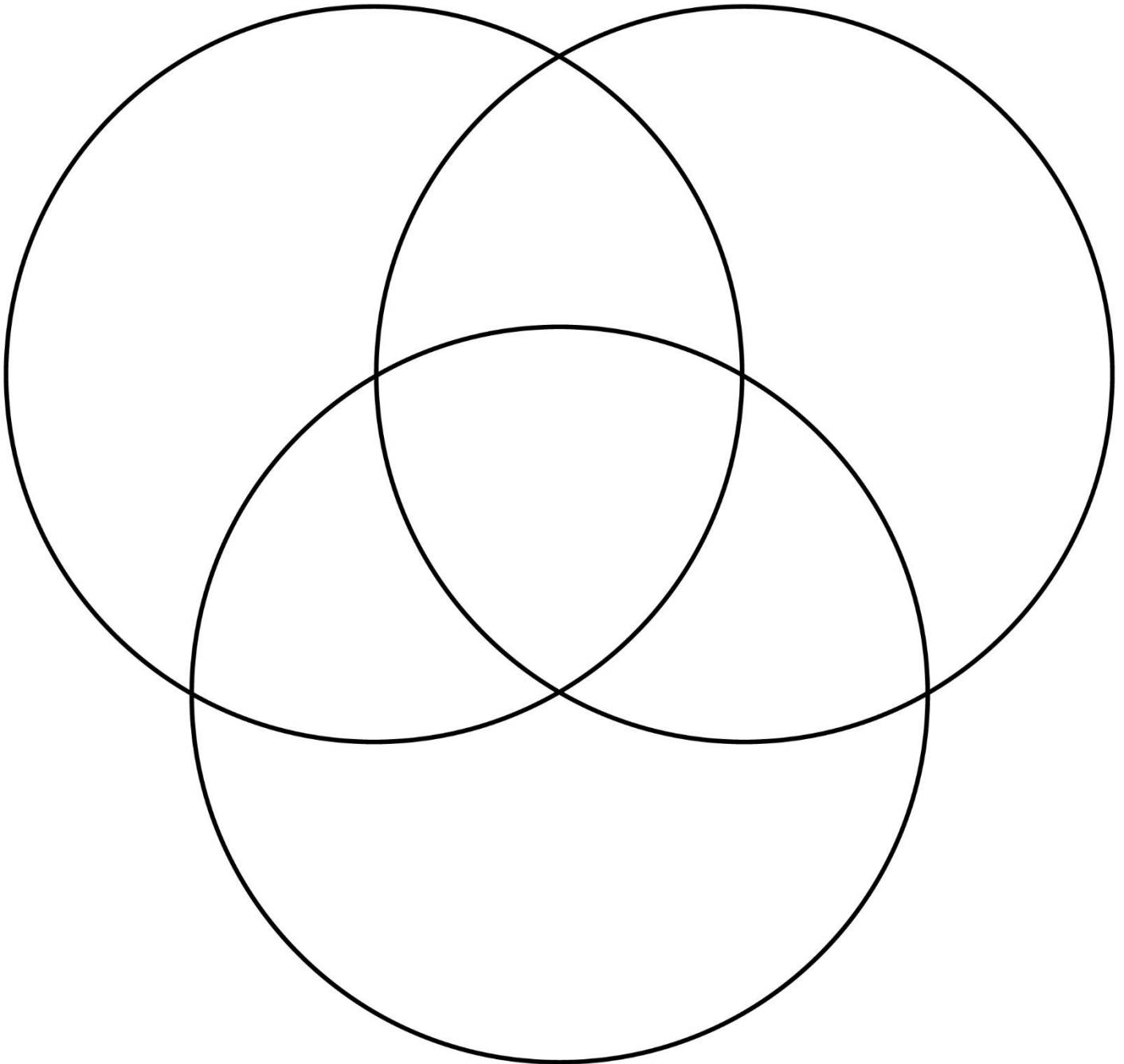
Venn Diagram



Name _____ Date _____

**Math Mat
Master 20**

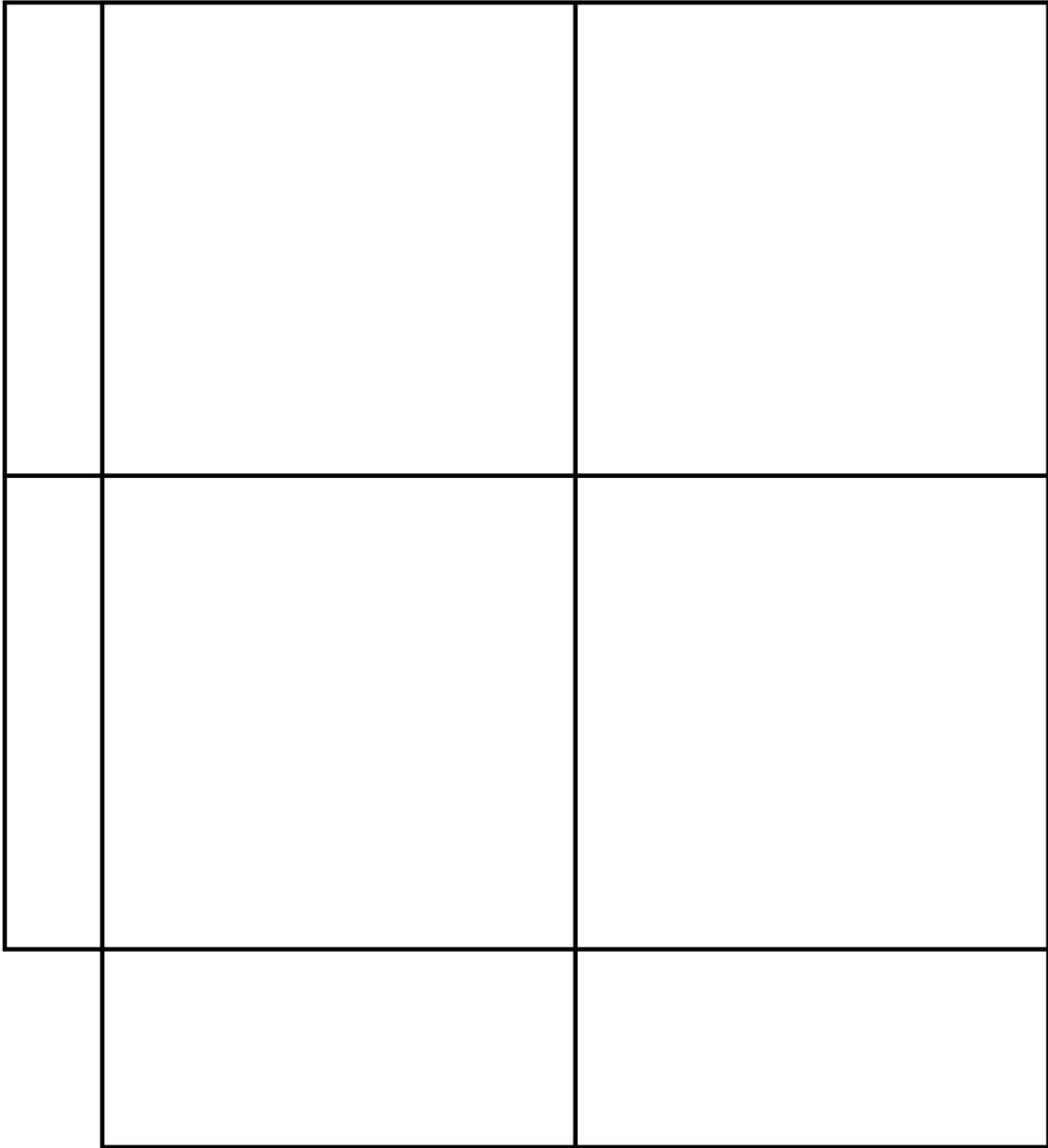
Venn Diagram



Name _____ Date _____

**Math Mat
Master 21**

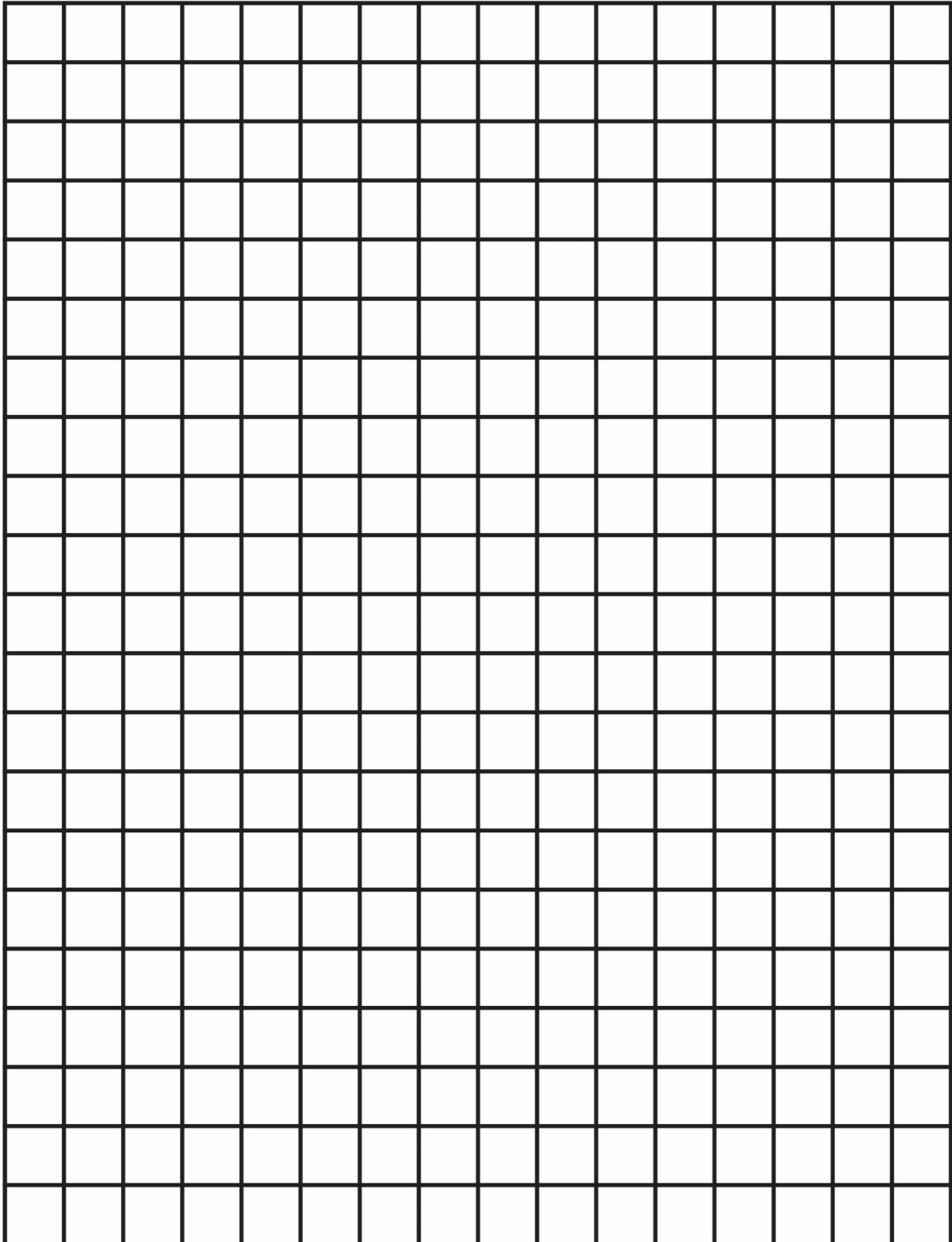
Carroll Diagram



Name _____ Date _____

**Math Mat
Master 22**

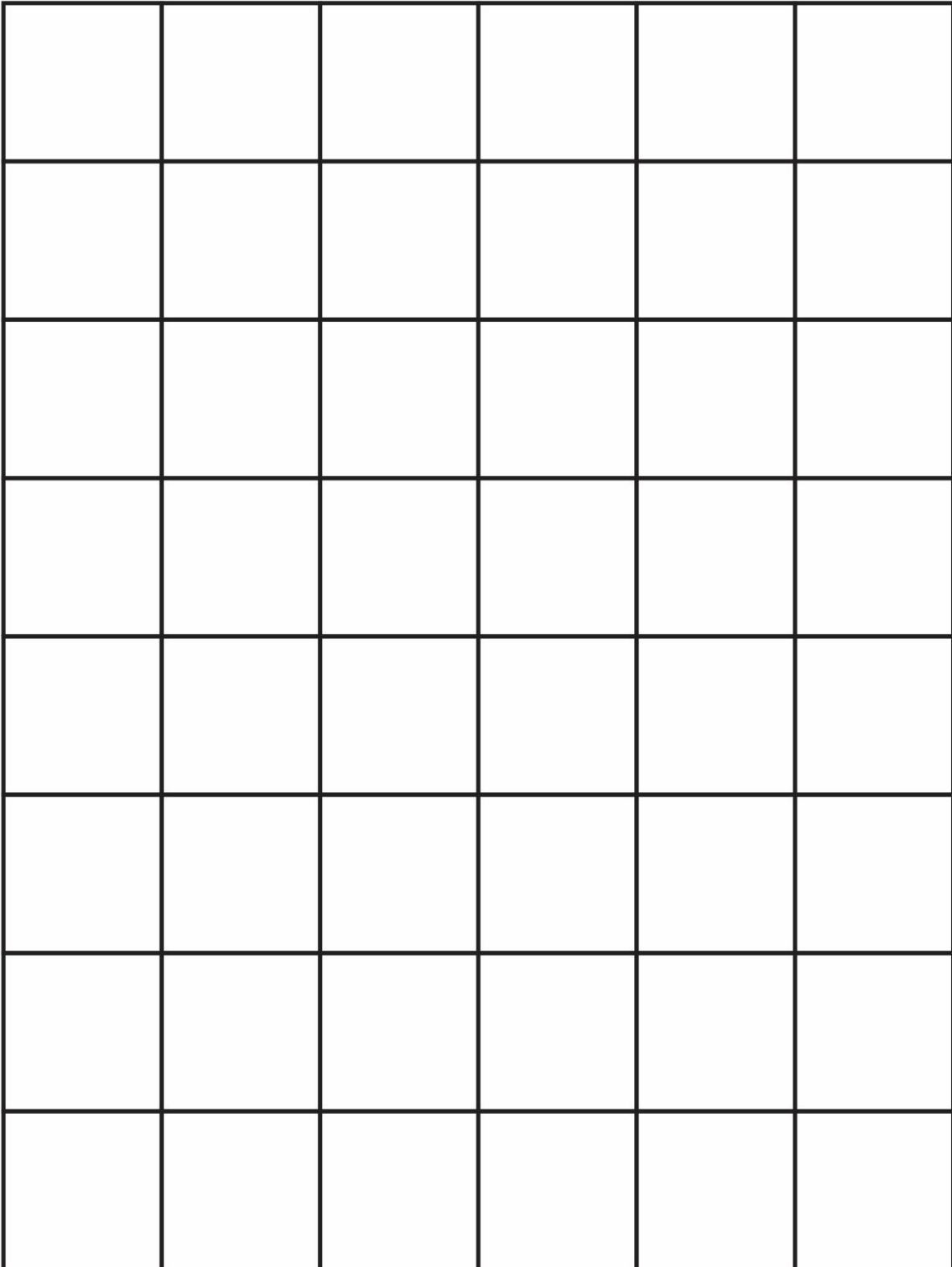
1-cm Grid Paper



Name _____ Date _____

**Math Mat
Master 23**

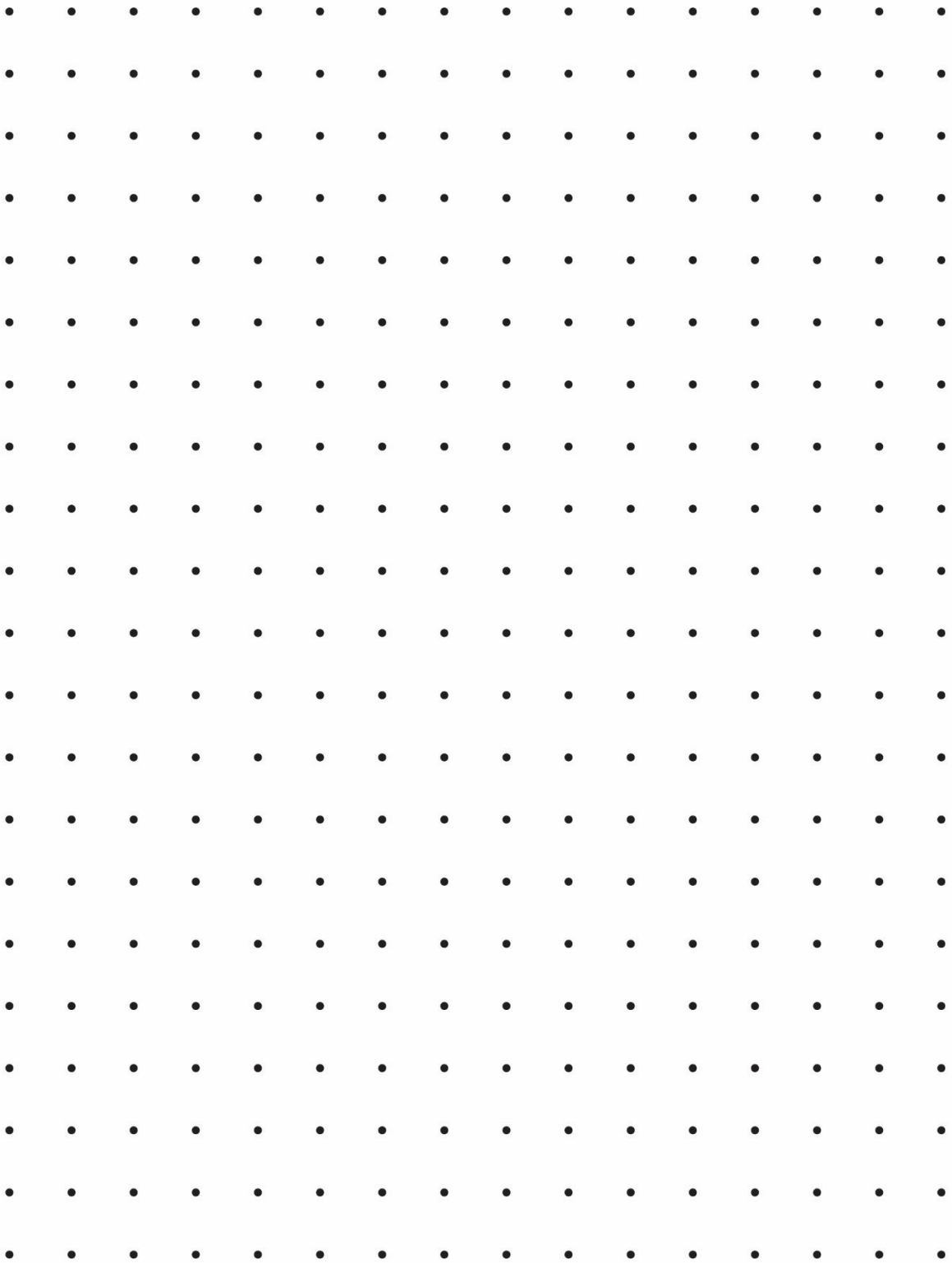
Colour Tile Grid



Name _____ Date _____

**Math Mat
Master 24**

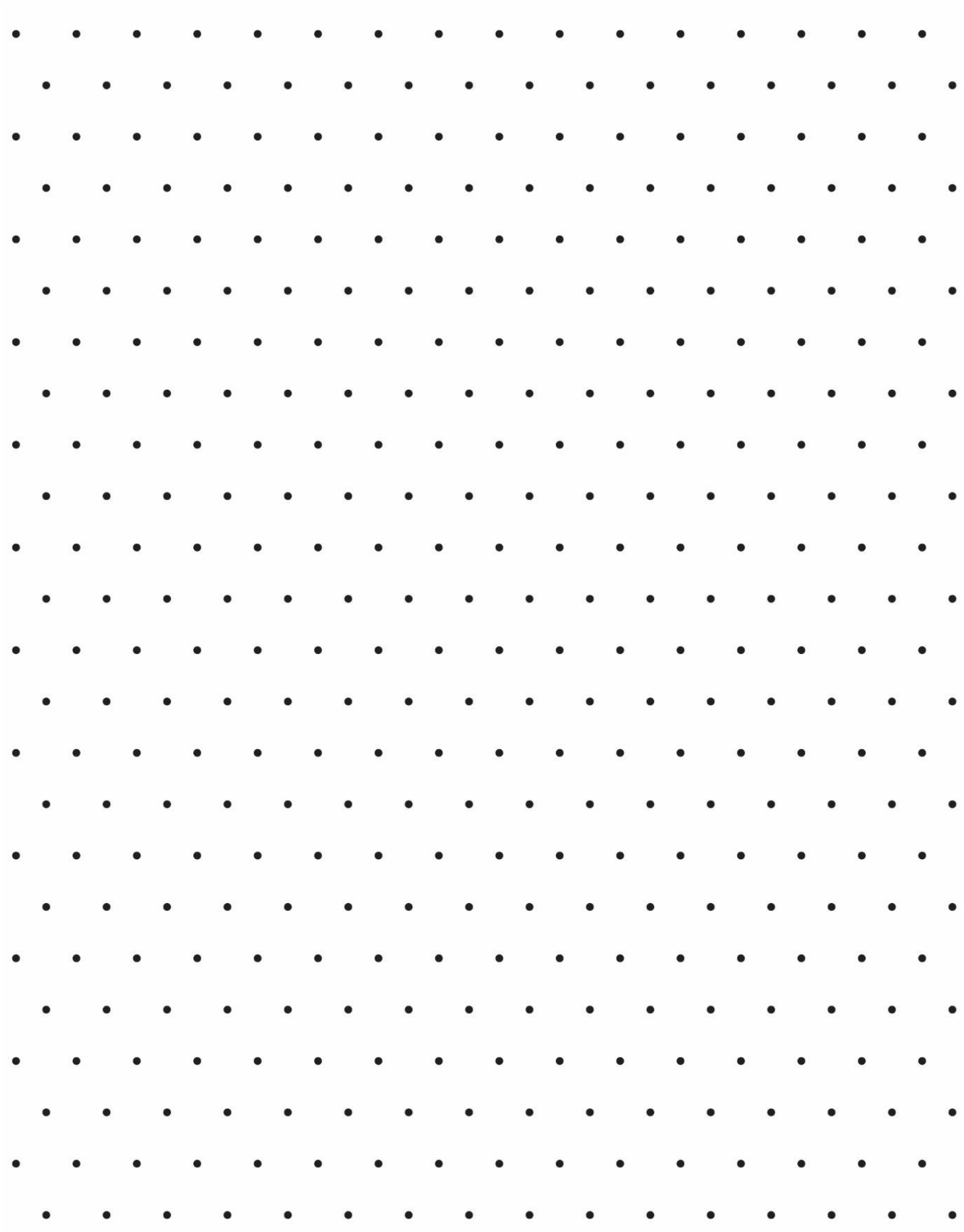
Square Dot Paper



Name _____ Date _____

Math Mat
Master 25

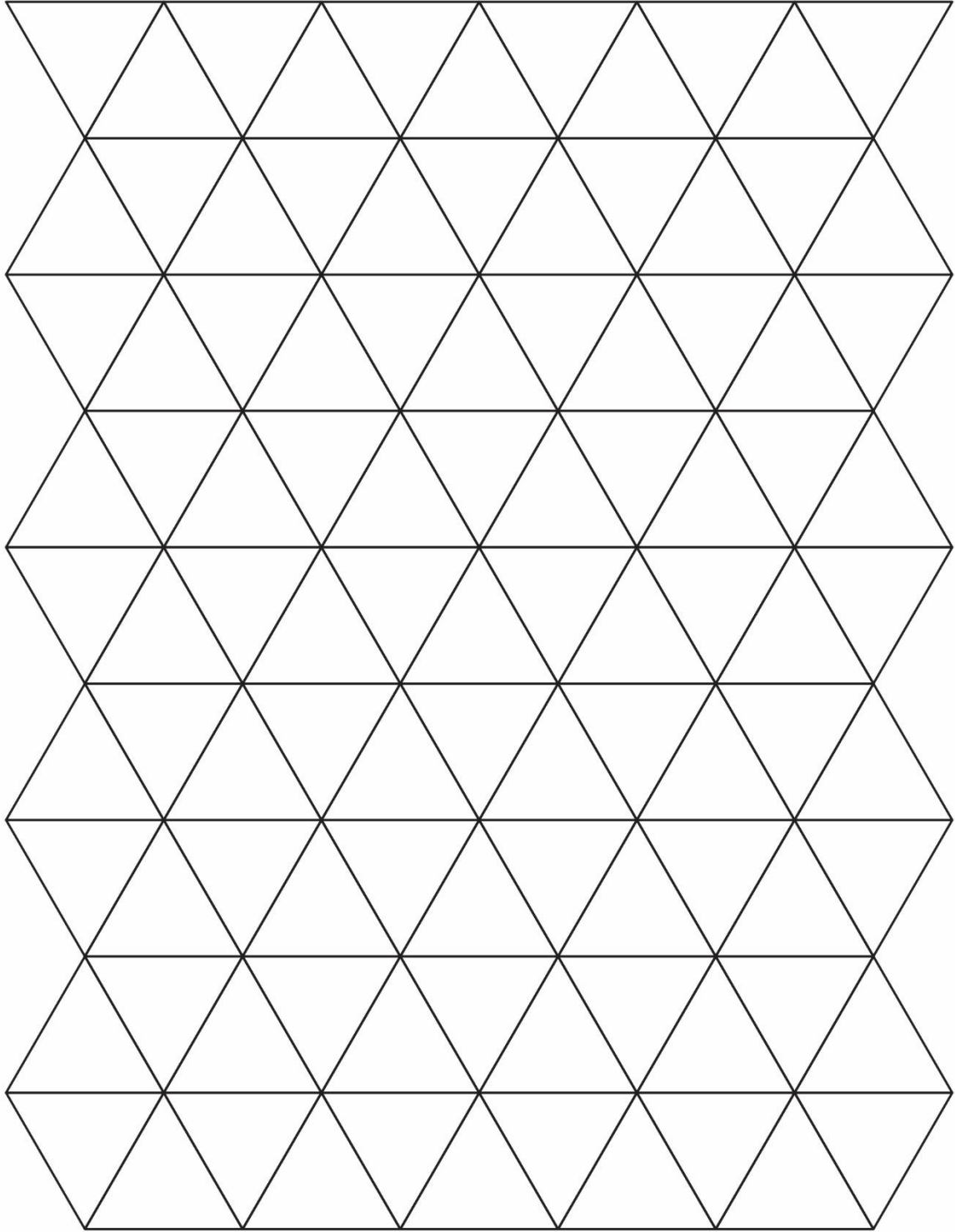
Triangular Dot Paper



Name _____ Date _____

**Math Mat
Master 26**

Triangular Grid Paper

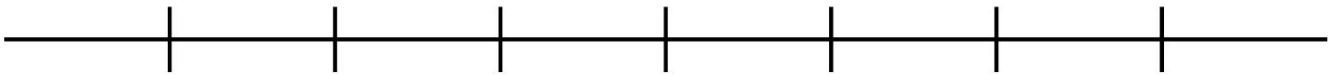


Name _____ Date _____

**Math Mat
Master 27**

Line Plot

Title _____

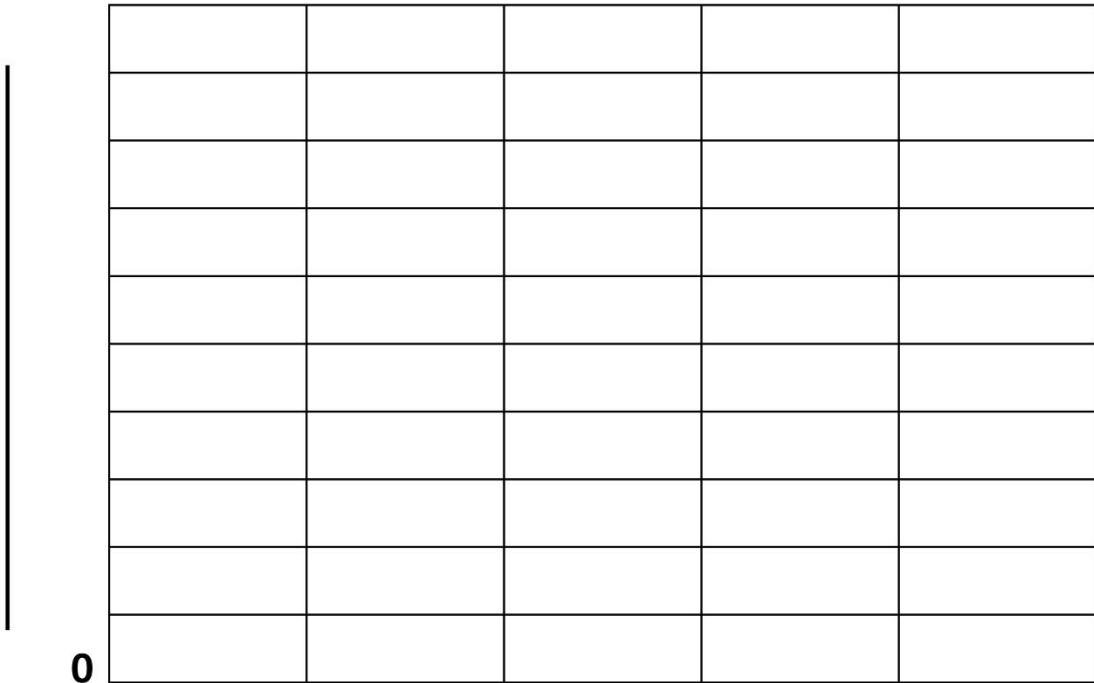


Name _____ Date _____

**Math Mat
Master 28**

Graphing Mat

Title _____

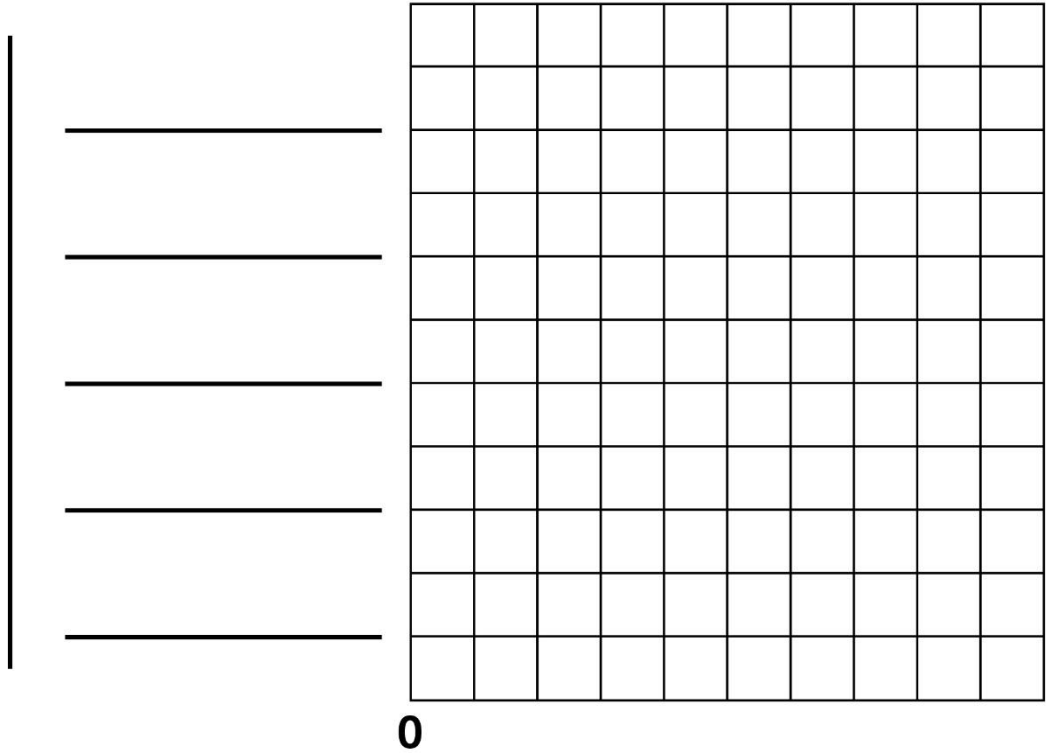


Name _____ Date _____

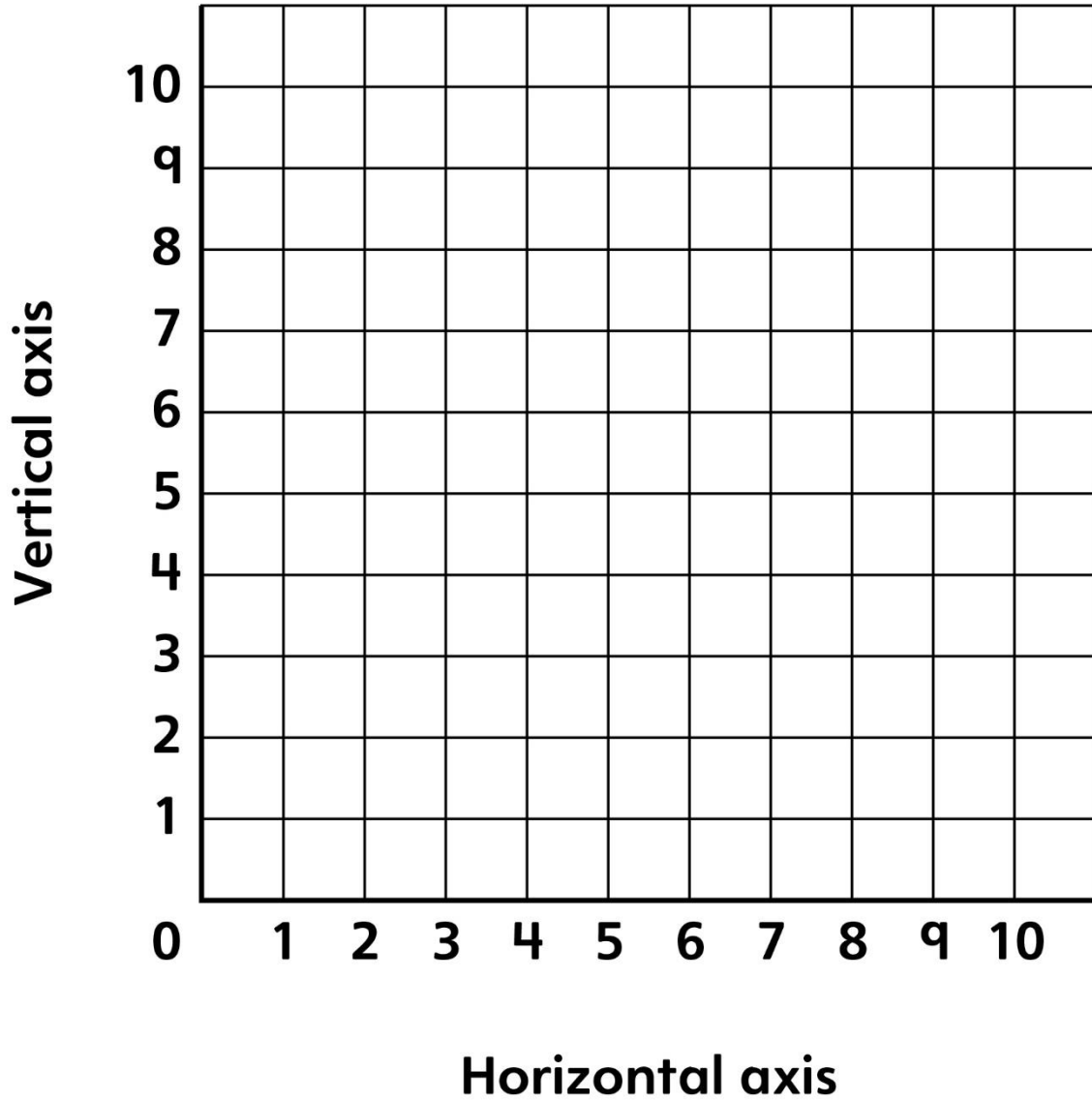
Math Mat
Master 29

Horizontal Graphing Mat

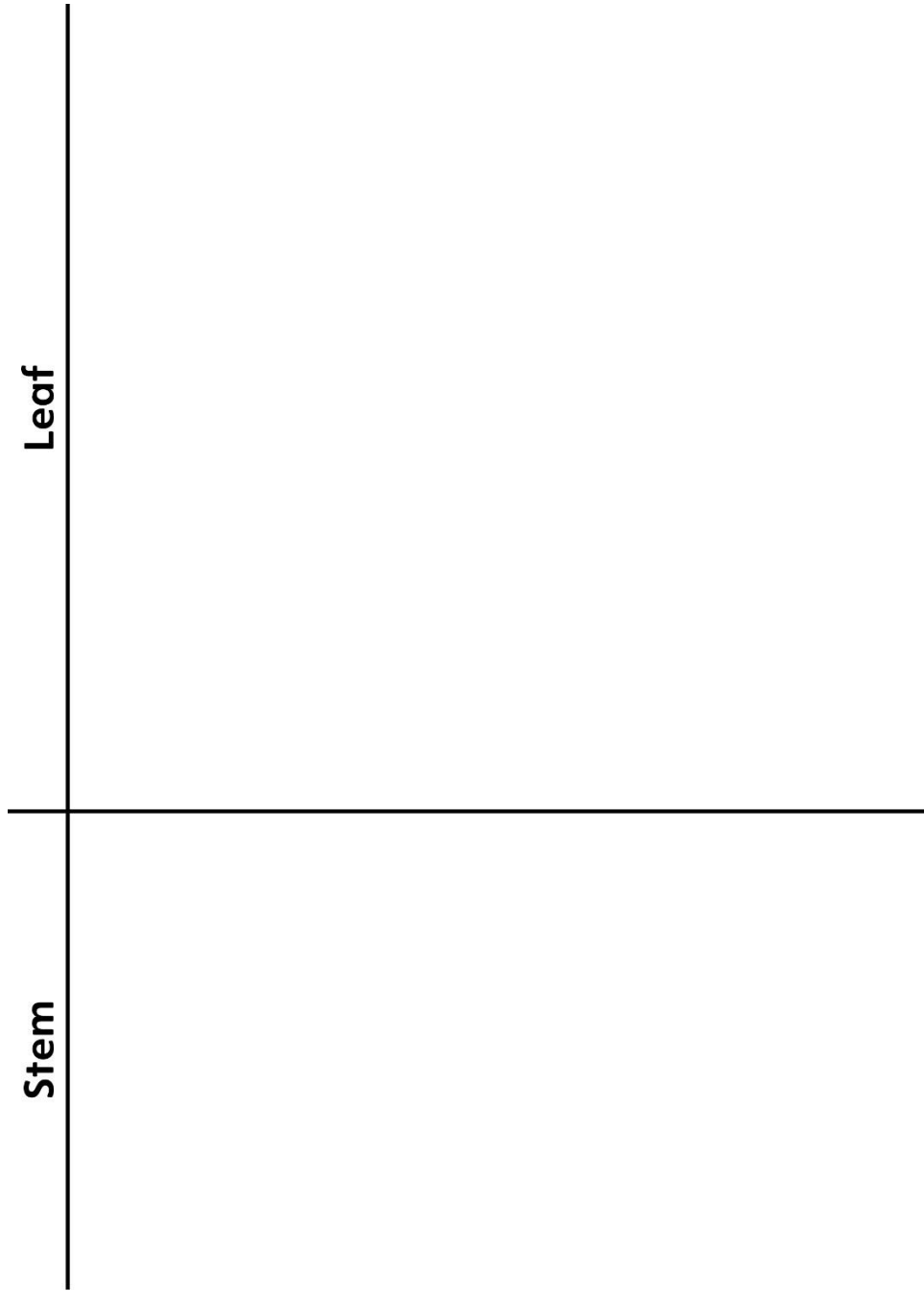
Title _____



Coordinate Grid



Stem-and-Leaf Plot



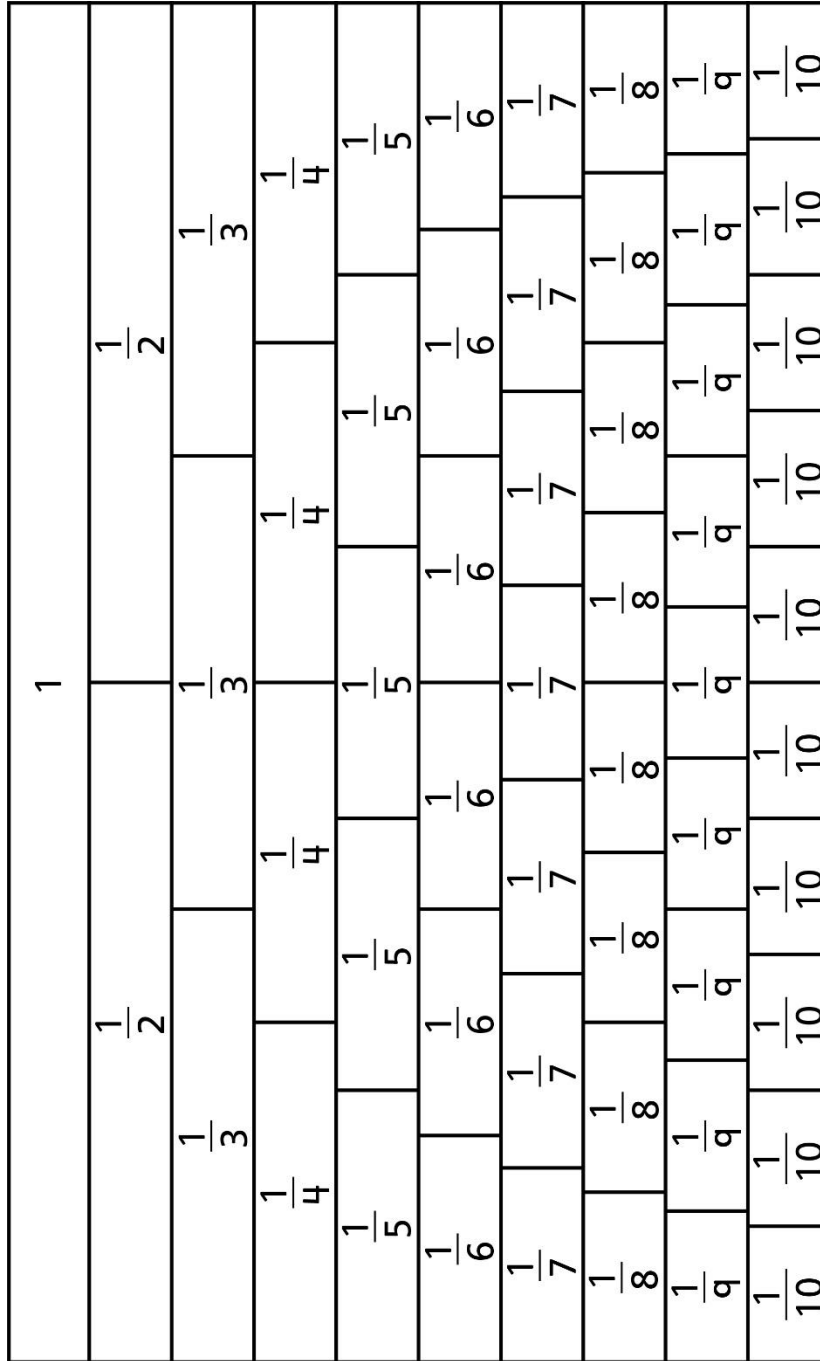
Name _____ Date _____

**Math Mat
Master 32**

Calendar

Saturday					
Friday					
Thursday					
Wednesday					
Tuesday					
Monday					
Sunday					

Fraction Strips



Name _____

Date _____

**Math Mat
Master 34**

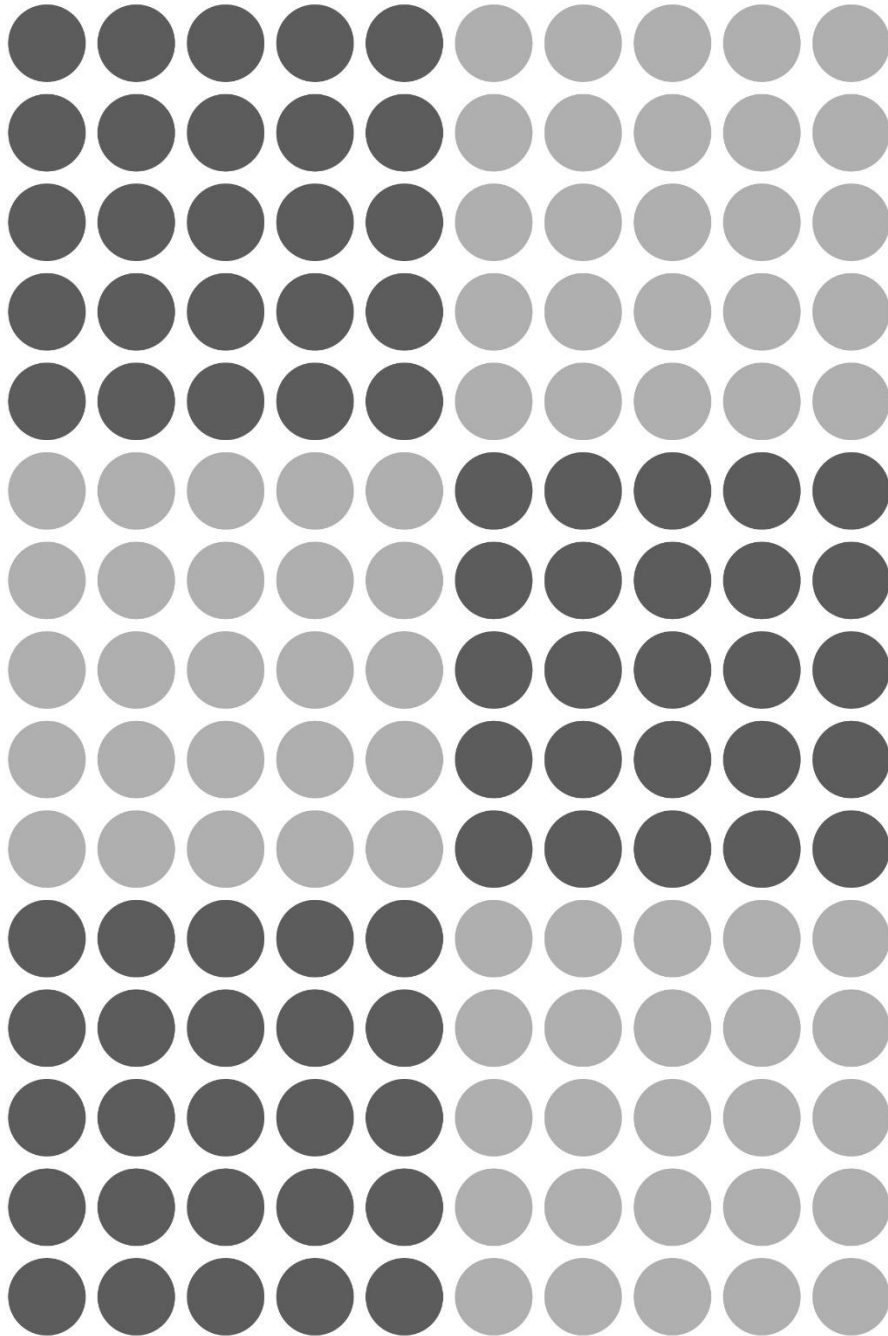
Money



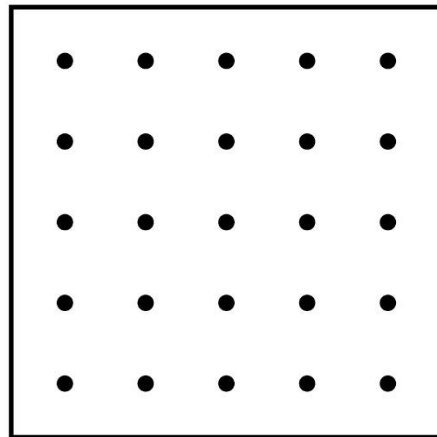
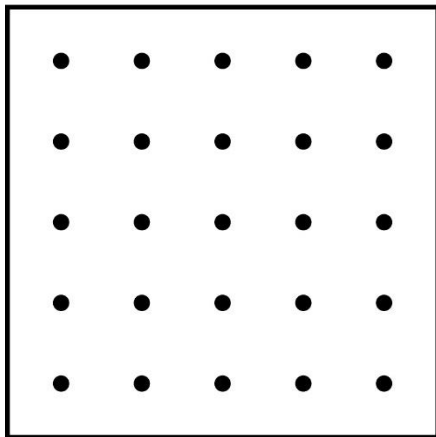
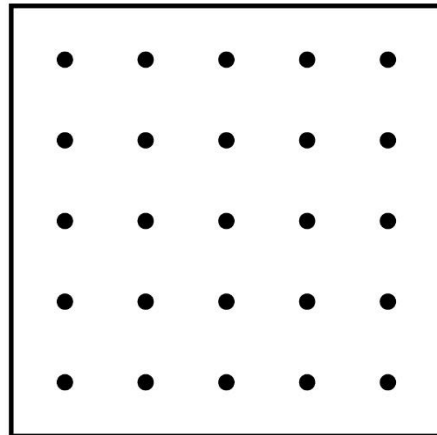
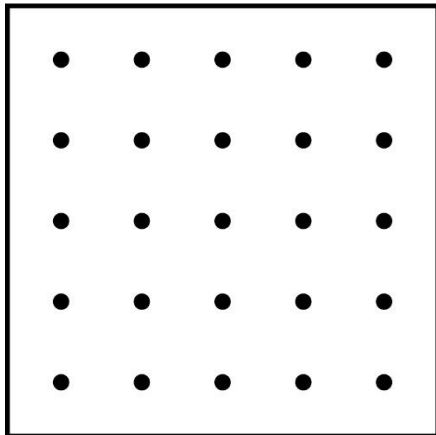
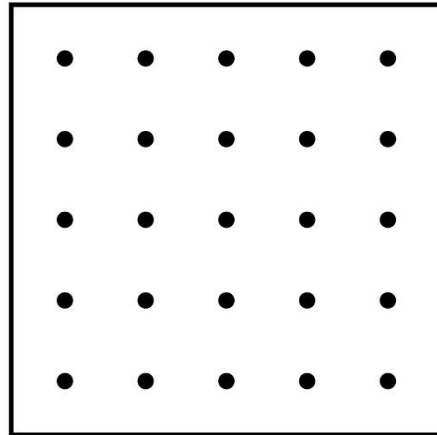
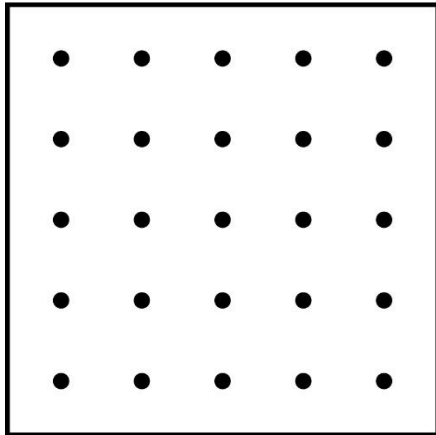
Amount: _____



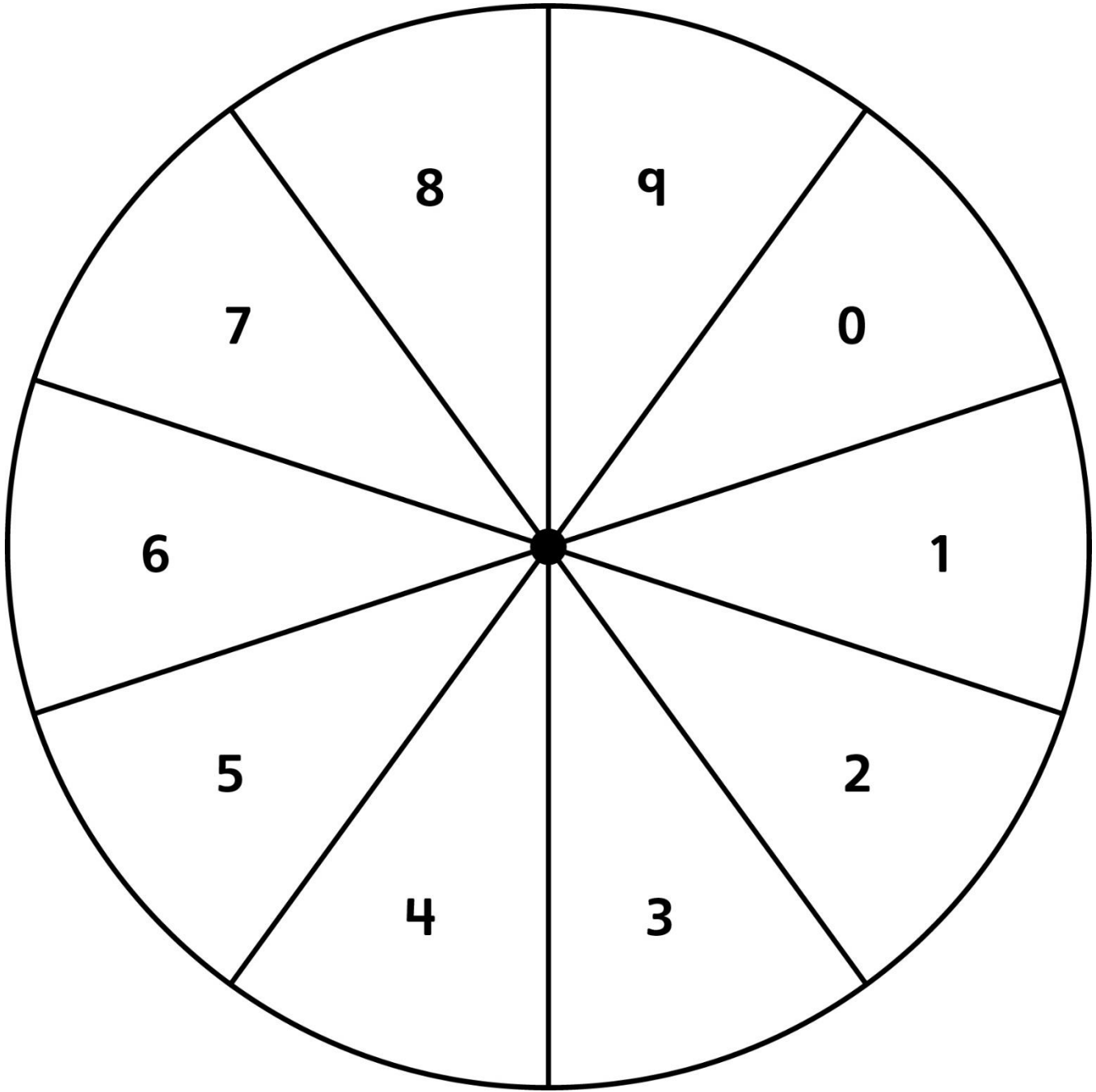
Dot Array



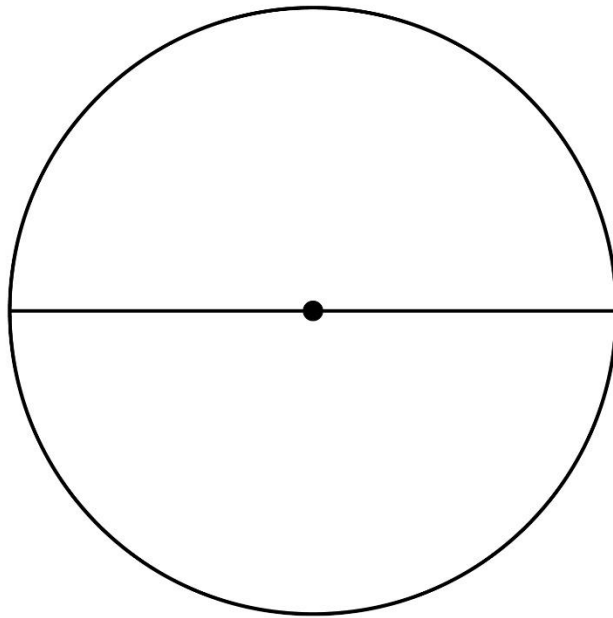
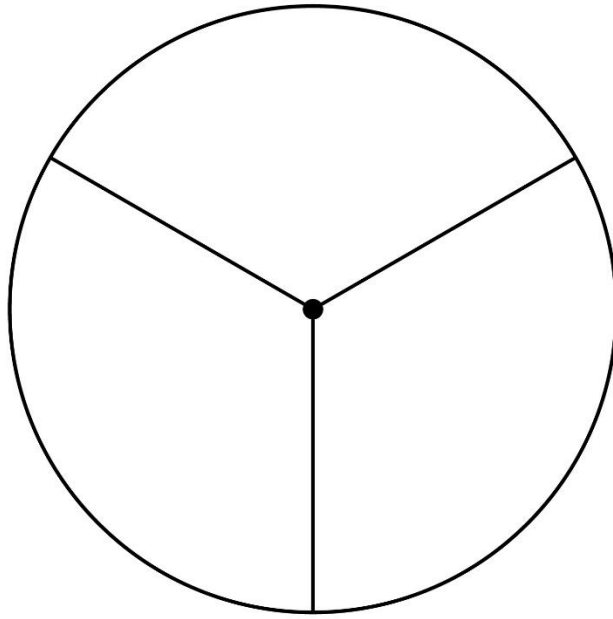
Geoboards



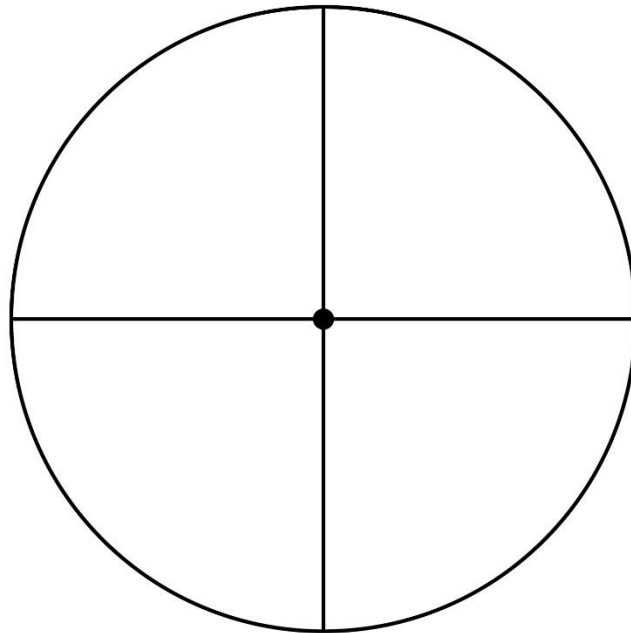
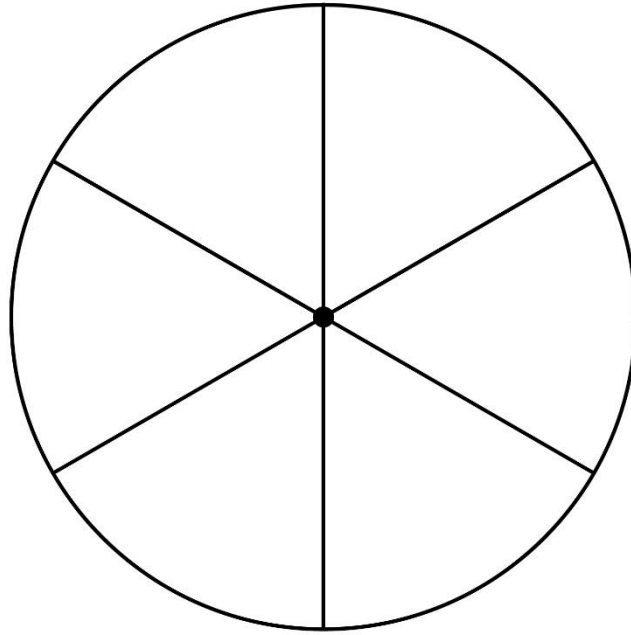
Spinner



Spinners



Spinners



Clocks

