Name________________________________ Date_____________________

Math Mat
Master 1

Thinking Space

Name________________________________ Date_____________________

Math Mat Master 2

12 × 12 Multiplication Chart

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Name________________________________ Date_____________________

Math Mat Master 3

2-Column Chart

Name________________________________ Date_____________________

Math Mat Master 4

3-Column Chart

Name________________________________ Date_____________________

Math Mat Master 5

Budget Sheet

Goal: ______________________ **Timeline:** ______________________

Earnings	Amount ($)
Total Earned	

Expenses	Amount ($)
Total Spent	

Savings (Total earned – Total spent):

Name_______________________________ Date_____________________

Math Mat Master 6

Balance Sheet

Opening Balance: ______________________

Transaction	Credit	Debit	Balance

Name________________________________ Date_____________________

Math Mat Master 7

Place-Value Mat

Representing

	Billions	Millions			Thousands			Hundreds			Units			Decimals		
		Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
													•			
Standard form																
Expanded form																
Word form																

Name________________________________ Date_____________________

Math Mat Master 8

Place-Value Mat

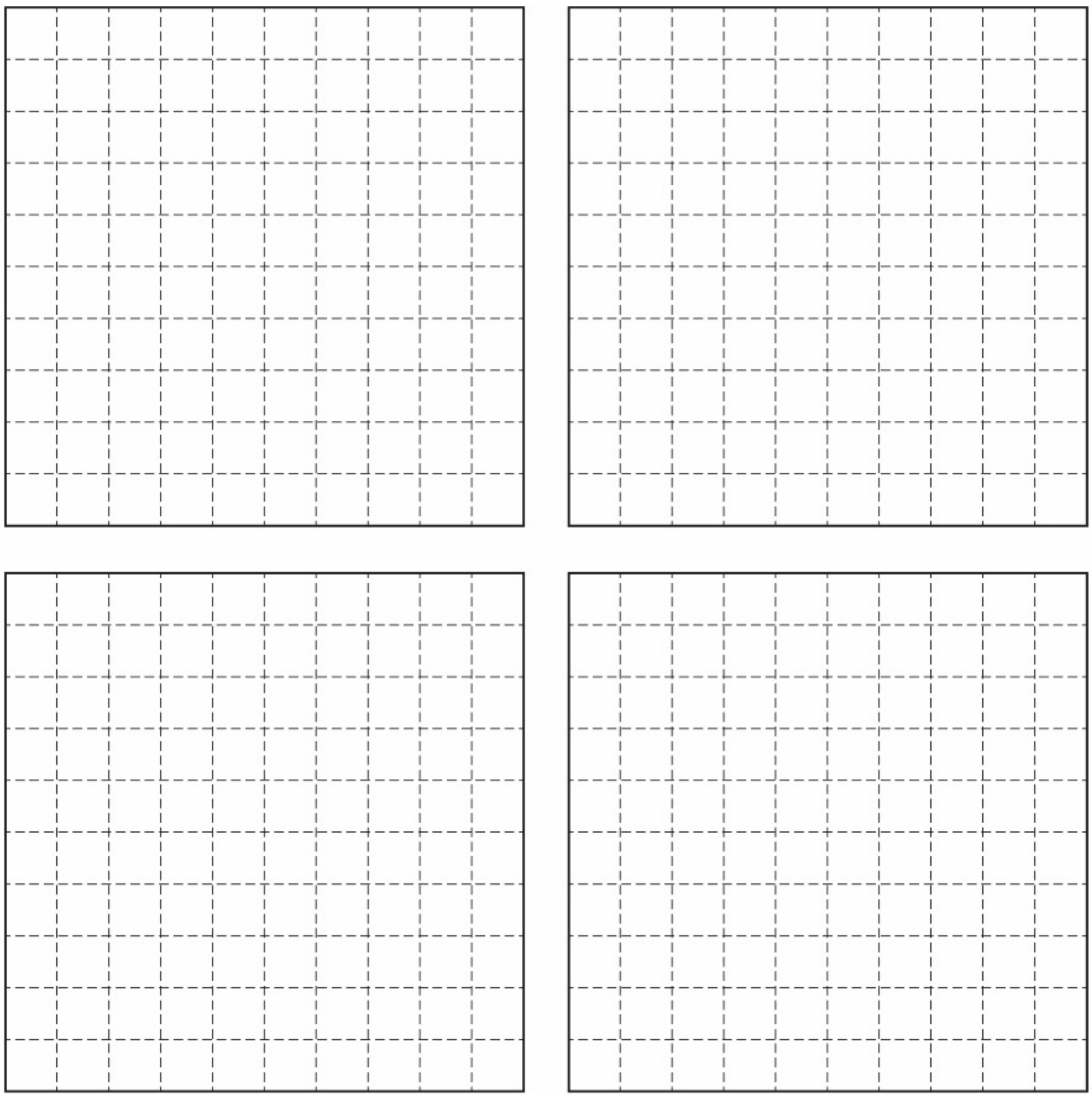
Comparing

Billions	Millions			Thousands			Hundreds			Units			Decimals		
	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

Name________________________________ Date_____________________

Math Mat Master 9

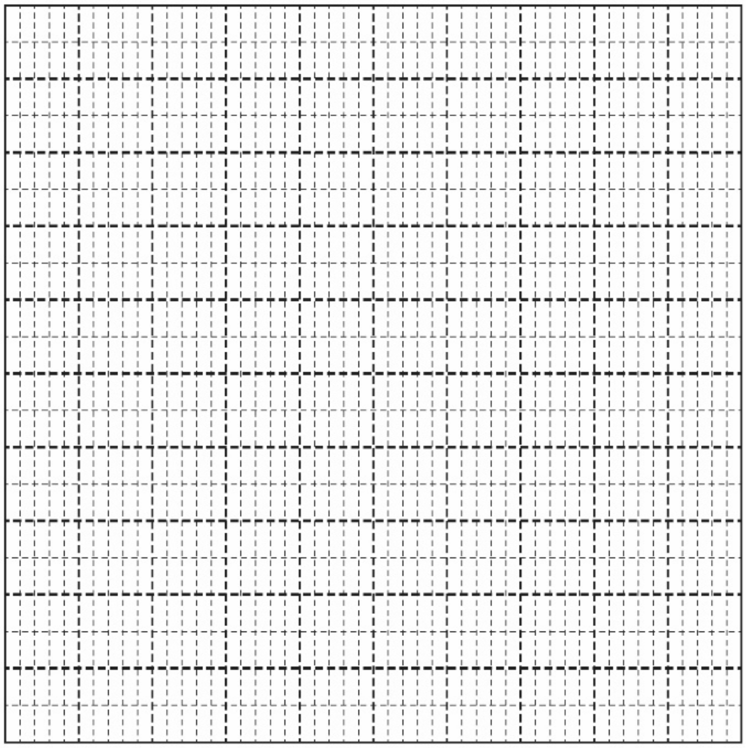
Hundredths Grids

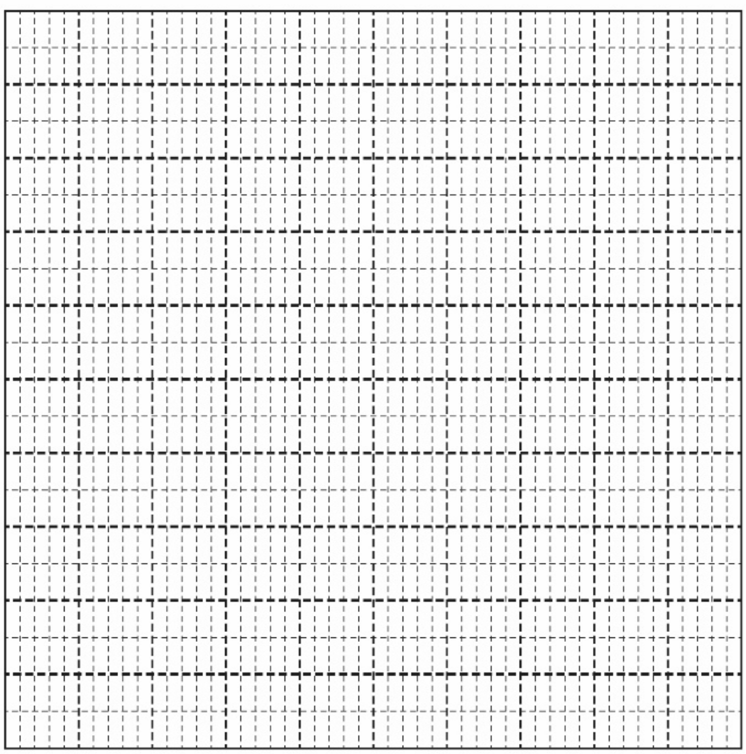


Name________________________________ Date_____________________

Math Mat
Master 10

Thousandths Grids





Name_________________________________ Date ______________________

Math Mat
Master 11

0.5-cm Grid

Name________________________________ Date_____________________

Math Mat Master 12

1-cm Grid

Name________________________________ Date_____________________

Math Mat Master 13

Coding Grid

Code

Code

Name________________________________ Date _____________________

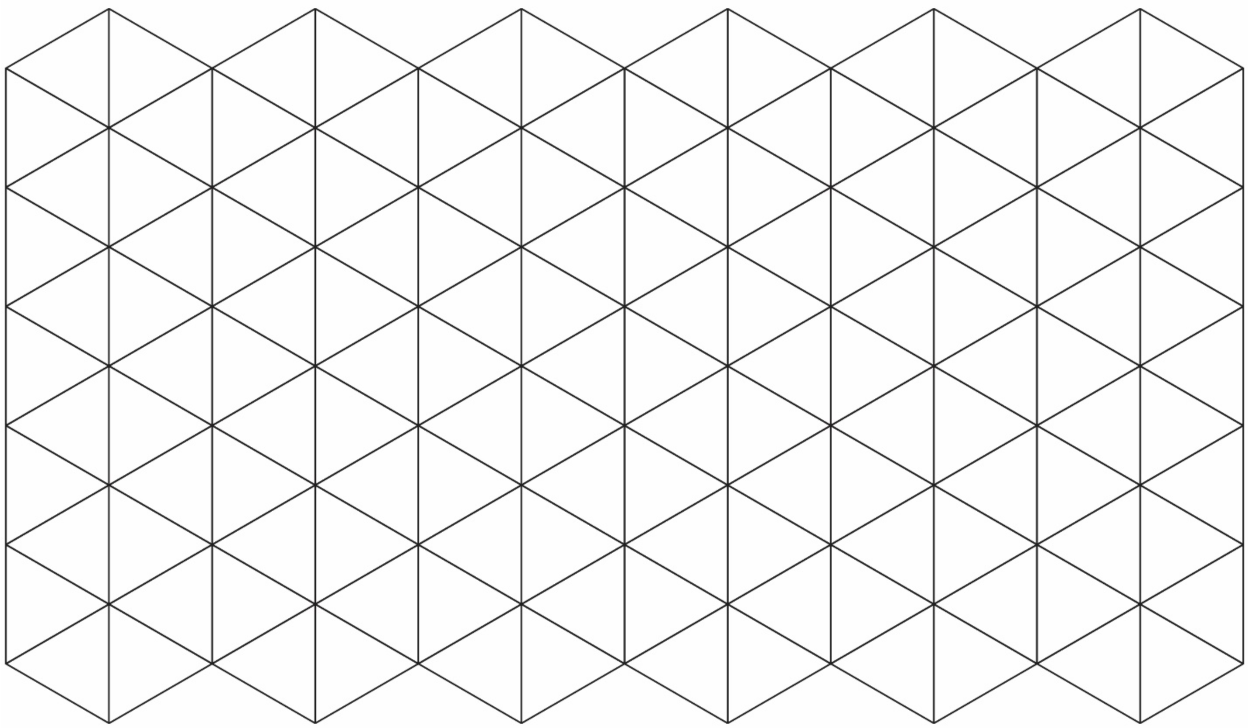
Math Mat
Master 14

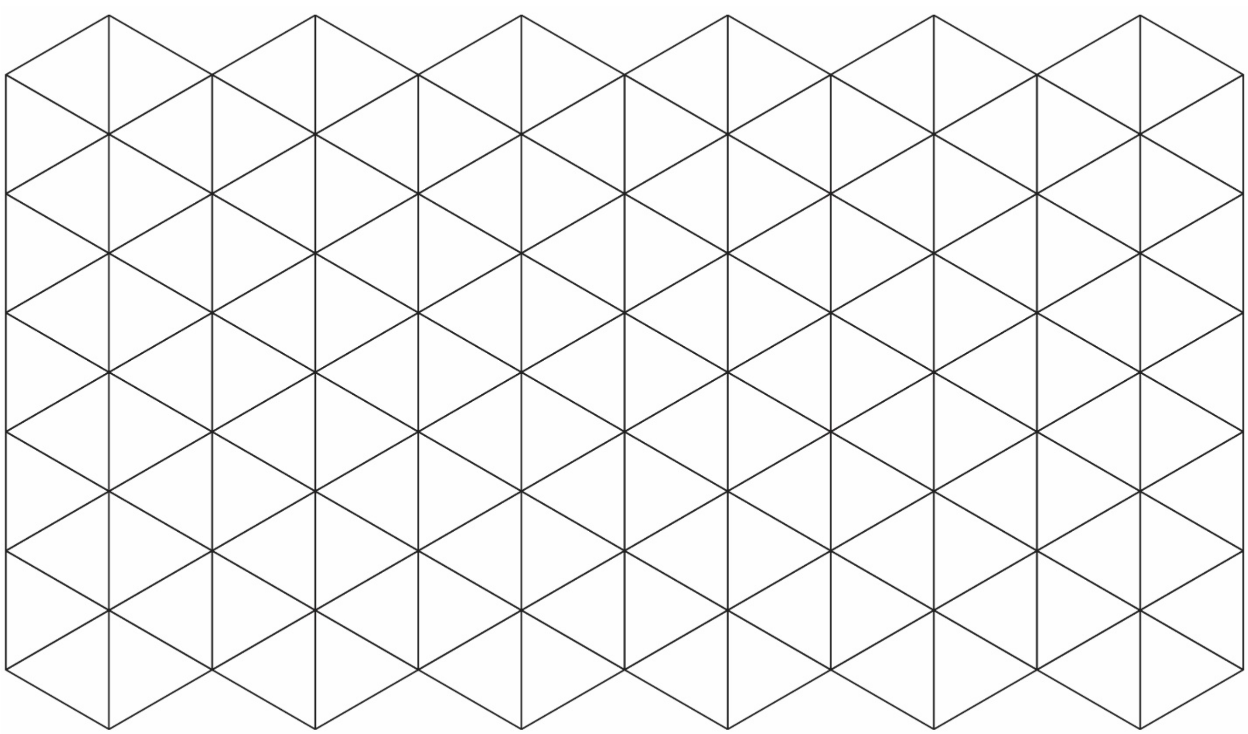
Square Dot Grid

Name________________________________ Date_____________________

Math Mat Master 15

Triangular Grid

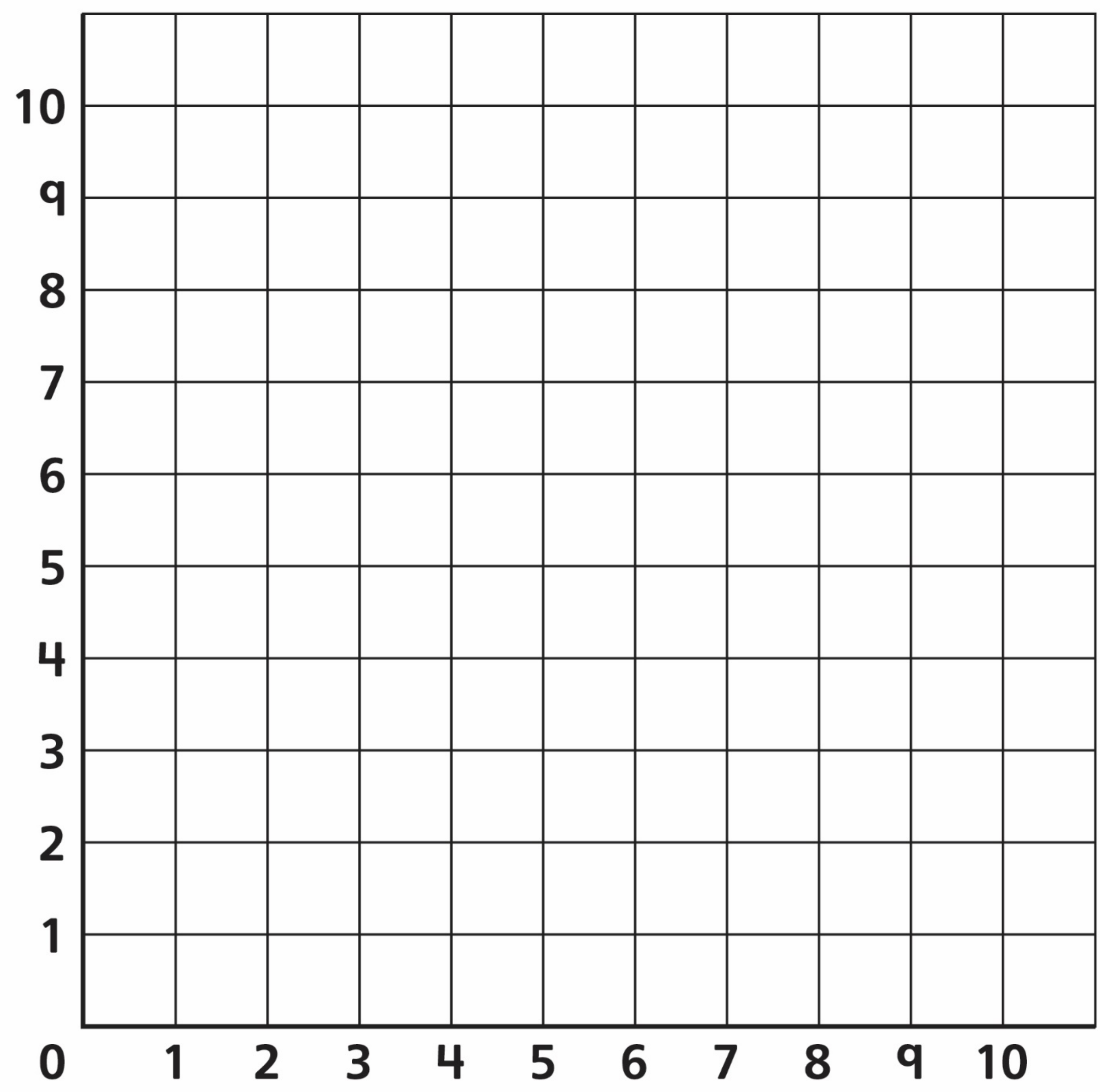




Name________________________________ Date_____________________

Math Mat Master 16

Coordinate Grid

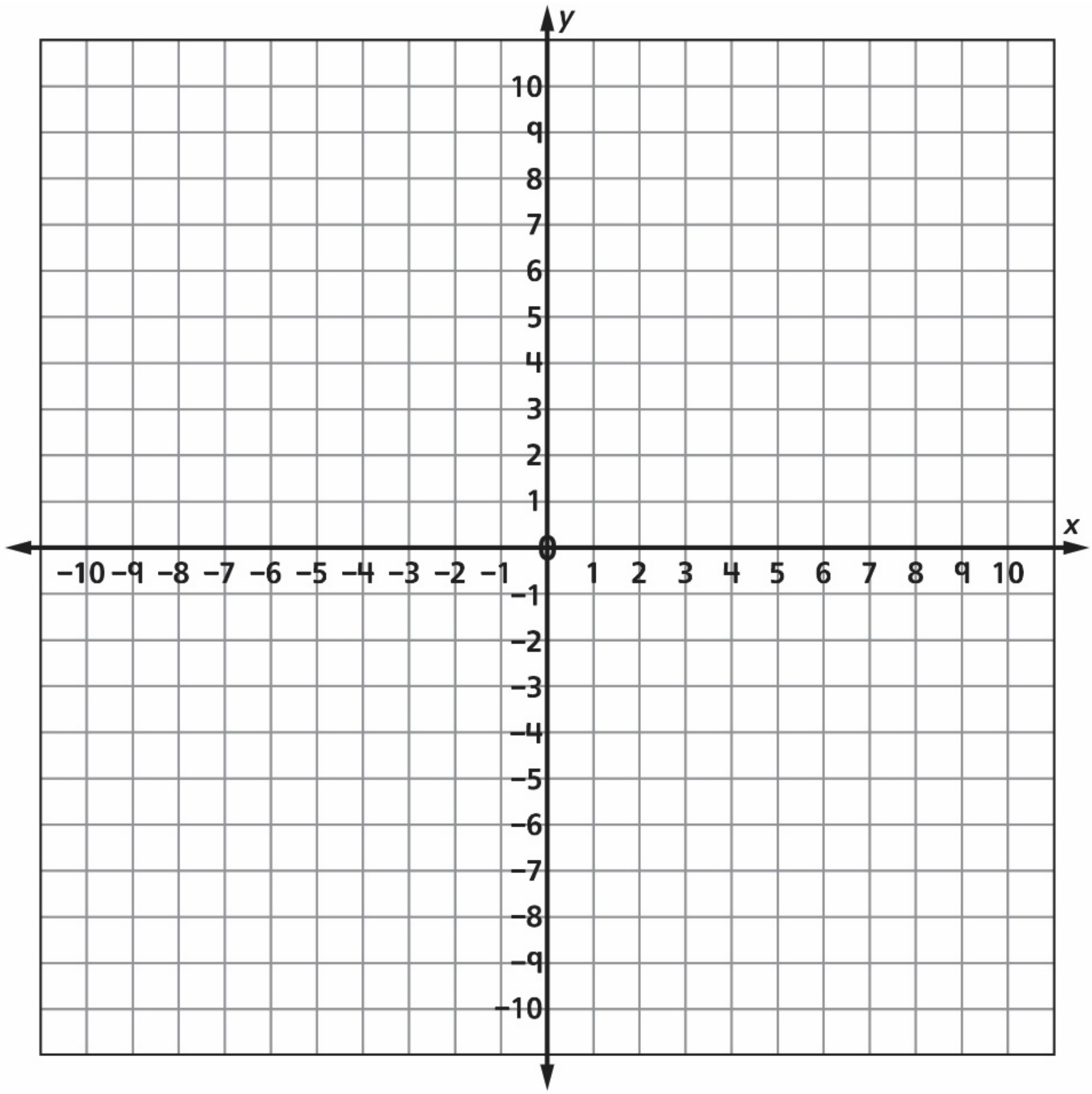


Name_______________________________ Date____________________

Math Mat Master 17

Coordinate Grid

4 Quadrants



Name________________________________ Date_____________________

Math Mat Master 18

Carroll Diagram

Name______________________________ Date____________________

Math Mat Master 19

Coding Tables

Code:

Code:

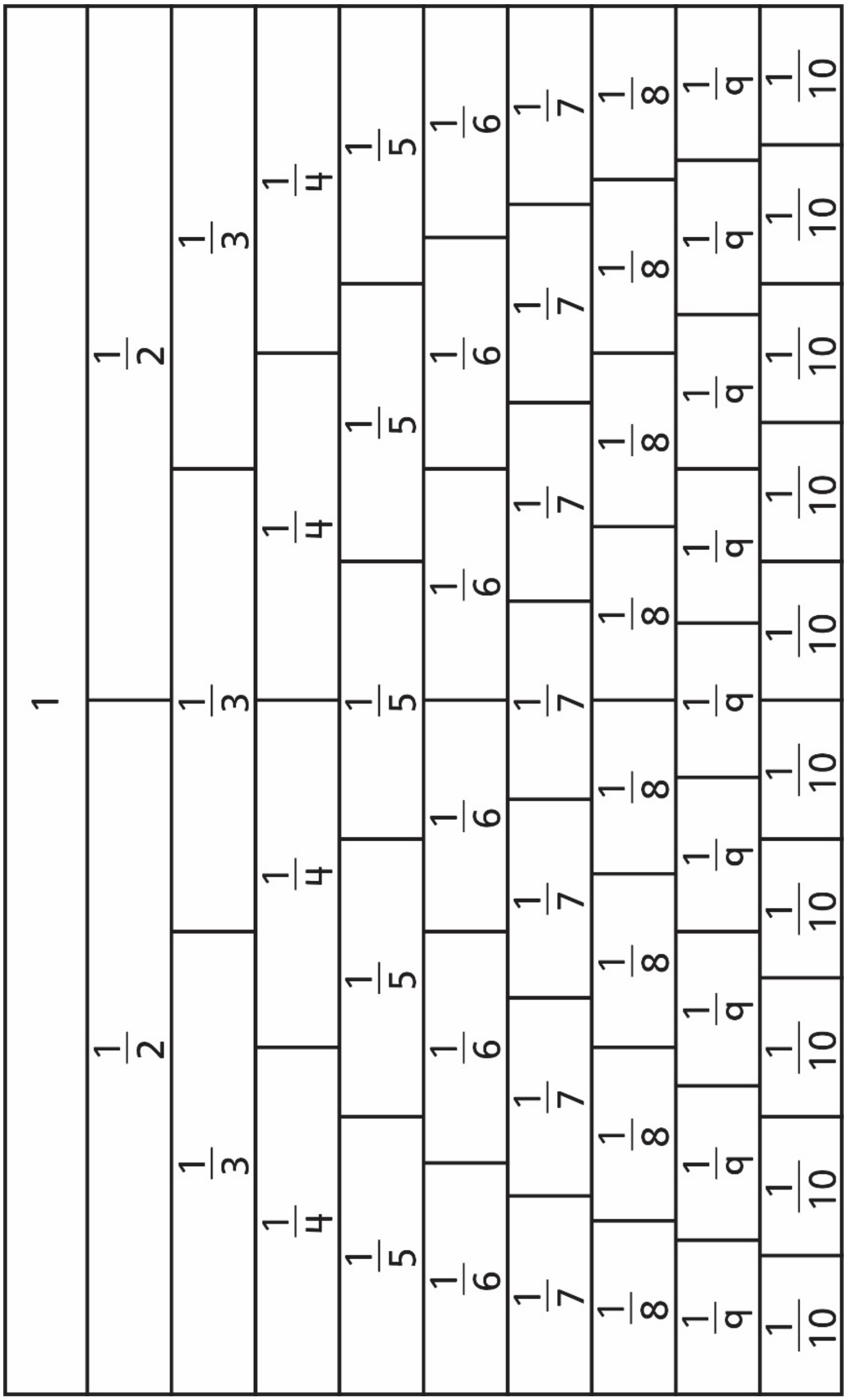
Code:

Code:

Name________________________________ Date_____________________

Math Mat Master 20

Fraction Strips

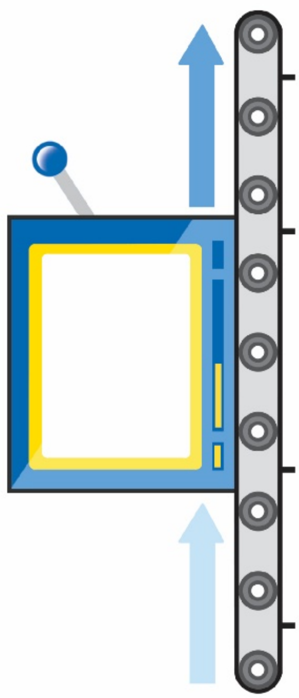


Name________________________________ Date_____________________

Math Mat Master 21

Input/Output Table

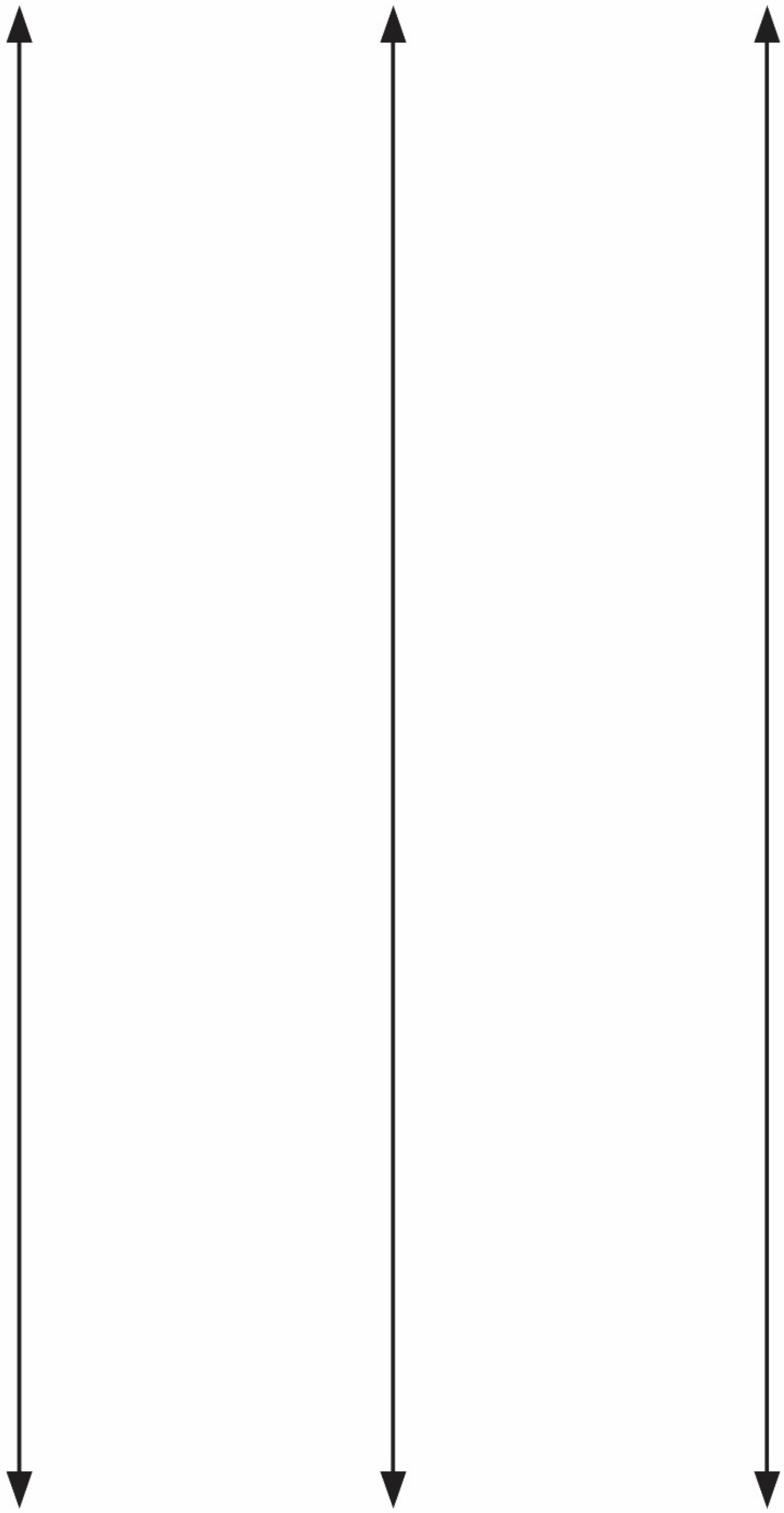
Input								
Output								



Name________________________________ Date_____________________

Math Mat Master 22

Open Number Lines



Name________________________________ Date_____________________

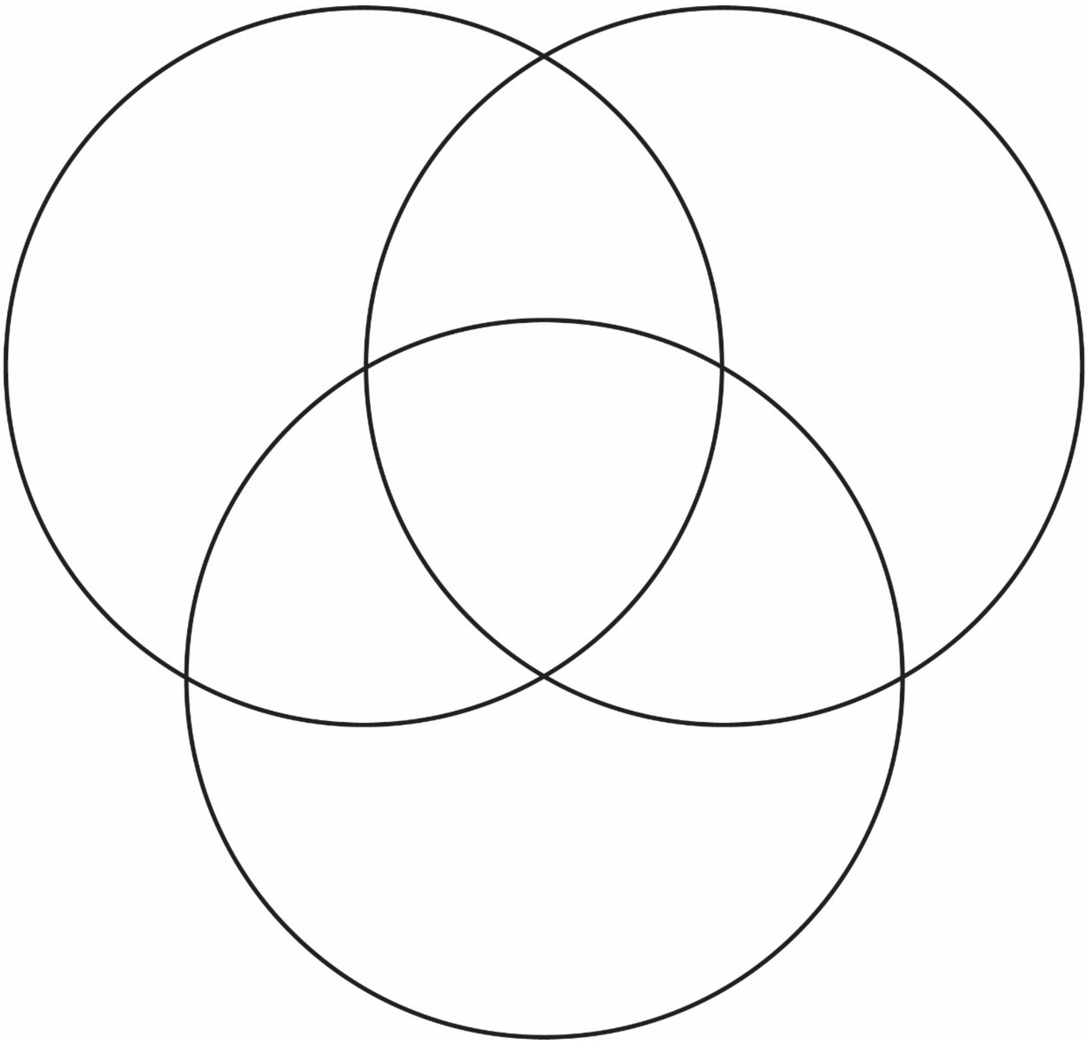
Math Mat
Master 23

Ratio Tables

Name________________________________ Date_____________________

Math Mat Master 24

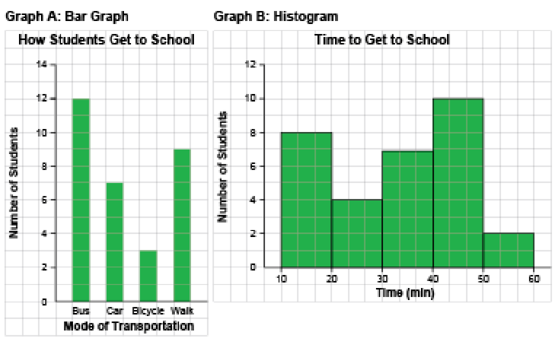
Venn Diagram



Activity 1 Assessment
Exploring Line Graphs

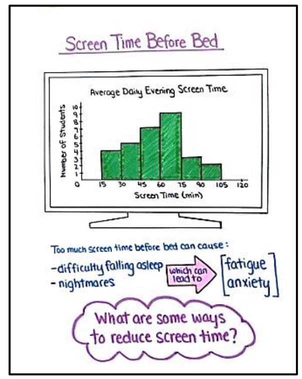
Creating and Interpreting Graphs

Uses common attributes (basic shape, scale, titles, and labels) to create different graph types.



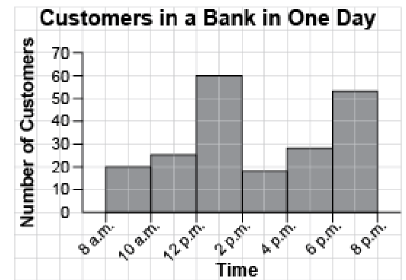
"I created a bar graph and a histogram about getting to school."

Chooses graph types based on the data (e.g., line graphs, histograms) and justifies choice.



"I created a histogram to show the amount of screen time students have in the evening. Since my audience is Grade 6 students, I made the graph look more fun and engaging by drawing the histogram in a TV screen."

Uses graphs to answer some questions within and beyond the data.



"I drew lines to find how old Benji was when he was 80 cm tall: about 2 years 9 months. I assumed Benji continued to grow at the same rate and estimated he would be about 125 cm tall at age 11."

Observations/Documentation

Activity 1 Assessment
Exploring Line Graphs

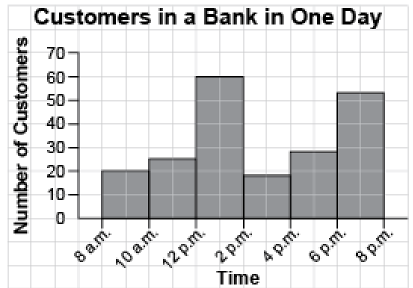
Creating and Interpreting Graphs (cont'd)

Uses attributes of graph and measures of central tendency to draw some conclusions.

Brad had these practice times, in seconds, for the 400-m sprint: 73, 64, 55, 81, 68, 62, 57, 64

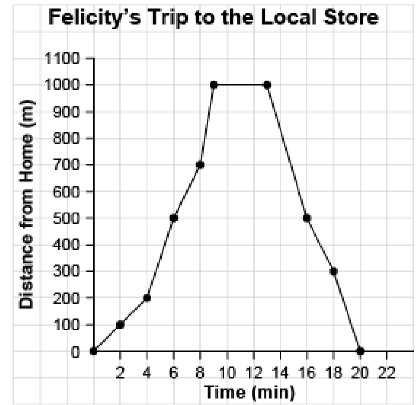
"I determined the range: 26; mode: 64; median: 64; mean: 65.5. Brad's average practice time is about 64 s."

Analyzes data, draws conclusions, and makes convincing arguments.



"I would use the data to convince the bank to have more staff on between 12 noon and 2 p.m. and between 6 p.m. and 8 p.m. as that is when the bank is busiest."

Fluently solves problems by graphing data and interpreting the results.



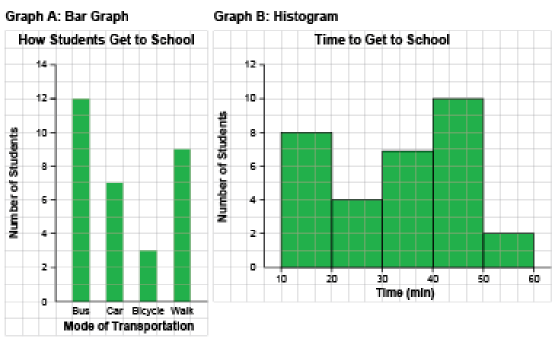
"From the graph, I see Felicity spent 4 minutes at the store as her distance from home did not change."

Observations/Documentation

Activity 2 Assessment
Exploring Histograms

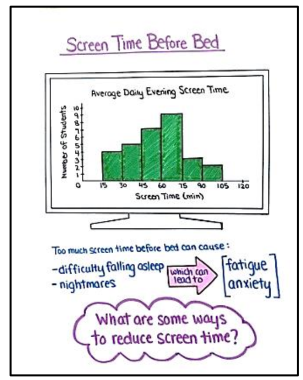
Creating and Interpreting Graphs

Uses common attributes (basic shape, scale, titles, and labels) to create different graph types.



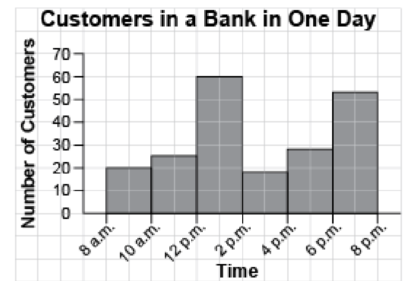
"I created a bar graph and a histogram about getting to school."

Chooses graph types based on the data (e.g., line graphs, histograms) and justifies choice.



"I created a histogram to show the amount of screen time students have in the evening. Since my audience is Grade 6 students, I made the graph look more fun and engaging by drawing the histogram in a TV screen."

Uses graphs to answer some questions within and beyond the data.



"I drew lines to find how old Benji was when he was 80 cm tall: about 2 years 9 months. I assumed Benji continued to grow at the same rate and estimated he would be about 125 cm tall at age 11."

Observations/Documentation

Activity 2 Assessement
Exploring Histograms

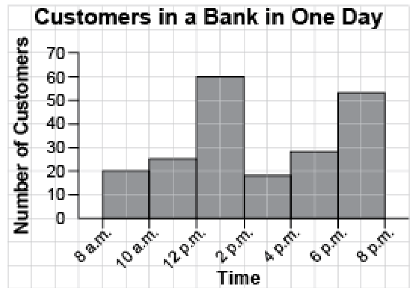
Creating and Interpreting Graphs (cont'd)

Uses attributes of graph and measures of central tendency to draw some conclusions.

Brad had these practice times, in seconds, for the 400-m sprint: 73, 64, 55, 81, 68, 62, 57, 64

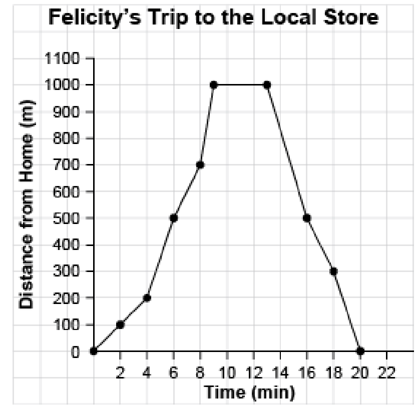
"I determined the range: 26; mode: 64; median: 64; mean: 65.5. Brad's average practice time is about 64 s."

Analyzes data, draws conclusions, and makes convincing arguments.



"I would use the data to convince the bank to have more staff on between 12 noon and 2 p.m. and between 6 p.m. and 8 p.m. as that is when the bank is busiest."

Fluently solves problems by graphing data and interpreting the results.



"From the graph, I see Felicity spent 4 minutes at the store as her distance from home did not change."

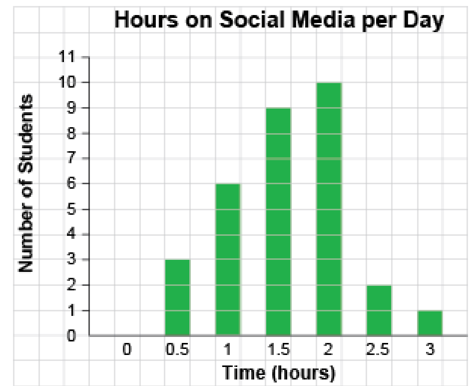
Observations/Documentation

Activity 3 Assessment
Collecting and Organizing Data

Collecting and Organizing Data		
Recognizes the difference between first- and second-hand data. “I measured the height of the tomato plant daily, so that is first-hand data. I got the heights of the basketball players from the Internet, so that is second-hand data.”	Formulates questions to help with data collection. “I wanted to find my classmates’ favourite raw vegetable. I asked: What is your favourite raw vegetable: cauliflower, broccoli, celery, carrot, cucumber, other?”	Chooses best method to collect data (e.g., first- or second-hand data, survey vs experiment, databases vs electronic media). “To find out what people think about the renovations to the community centre, I would collect first-hand data using a questionnaire.”
Observations/Documentation		

Data Management and Probability

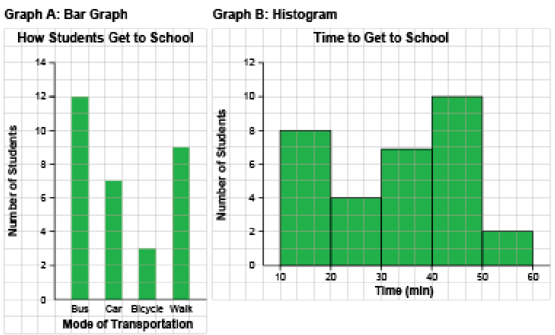
Activity 3 Assessment
Collecting and Organizing Data

Collecting and Organizing Data (cont'd)		
Chooses representative sampling technique to collect relevant data (e.g., simple/systematic random, stratified). "I can't survey everyone who enters the community centre. I will use systematic random sampling and survey every 10th person."	Represents collected data using appropriate organizers. "I would display the data in a bar graph so that it is easy for others to see how satisfied the community is with the renovations."	Uses collected data to draw conclusions and make informed decisions.  "This graph tells me that more of my Grade 6 classmates spend between 1.5 h and 2 h a day on social media. This is a sample of the Grade 6 students and is not representative of all Grade 6 classes across Canada."
Observations/Documentation		

Activity 4 Assessment
Interpreting Graphs to Solve Problems

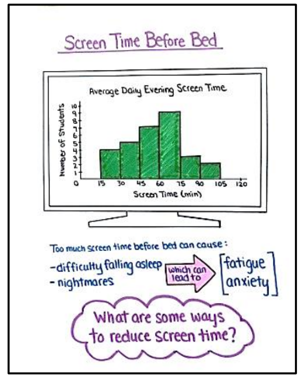
Creating and Interpreting Graphs

Uses common attributes (basic shape, scale, titles, and labels) to create different graph types.



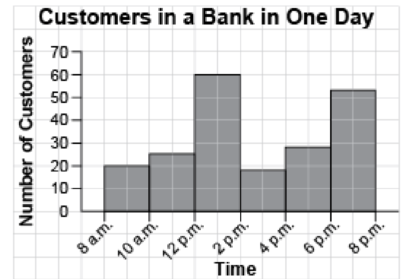
"I created a bar graph and a histogram about getting to school."

Chooses graph types based on the data (e.g., line graphs, histograms) and justifies choice.



"I created a histogram to show the amount of screen time students have in the evening. Since my audience is Grade 6 students, I made the graph look more fun and engaging by drawing the histogram in a TV screen."

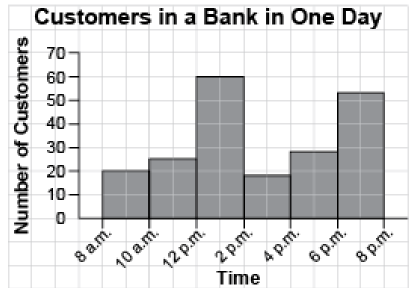
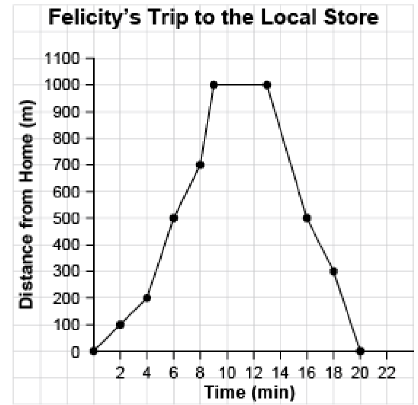
Uses graphs to answer some questions within and beyond the data.



"I drew lines to find how old Benji was when he was 80 cm tall: about 2 years 9 months. I assumed Benji continued to grow at the same rate and estimated he would be about 125 cm tall at age 11."

Observations/Documentation

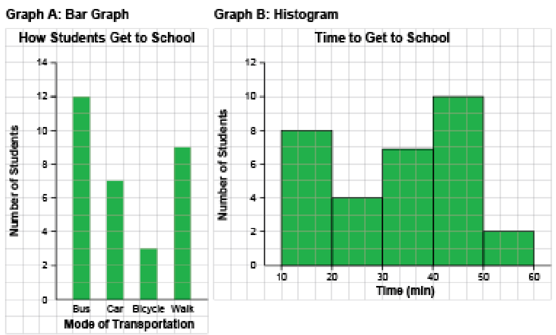
Activity 4 Assessment
Interpreting Graphs to Solve Problems

Creating and Interpreting Graphs (cont'd)		
Uses attributes of graph and measures of central tendency to draw some conclusions. Brad had these practice times, in seconds, for the 400-m sprint: 73, 64, 55, 81, 68, 62, 57, 64 "I determined the range: 26; mode: 64; median: 64; mean: 65.5. Brad's average practice time is about 64 s."	Analyzes data, draws conclusions, and makes convincing arguments.  "I would use the data to convince the bank to have more staff on between 12 noon and 2 p.m. and between 6 p.m. and 8 p.m. as that is when the bank is busiest."	Fluently solves problems by graphing data and interpreting the results.  "From the graph, I see Felicity spent 4 minutes at the store as her distance from home did not change."
Observations/Documentation		

Activity 5 Assessment
Determining Range and Measures of Central Tendency

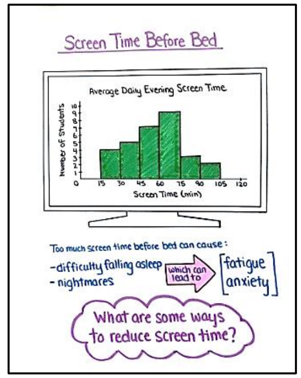
Creating and Interpreting Graphs

Uses common attributes (basic shape, scale, titles, and labels) to create different graph types.



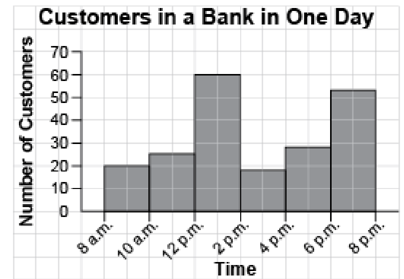
"I created a bar graph and a histogram about getting to school."

Chooses graph types based on the data (e.g., line graphs, histograms) and justifies choice.



"I created a histogram to show the amount of screen time students have in the evening. Since my audience is Grade 6 students, I made the graph look more fun and engaging by drawing the histogram in a TV screen."

Uses graphs to answer some questions within and beyond the data.



"I drew lines to find how old Benji was when he was 80 cm tall: about 2 years 9 months. I assumed Benji continued to grow at the same rate and estimated he would be about 125 cm tall at age 11."

Observations/Documentation

Activity 5 Assessment

Determining Range and Measures of Central Tendency

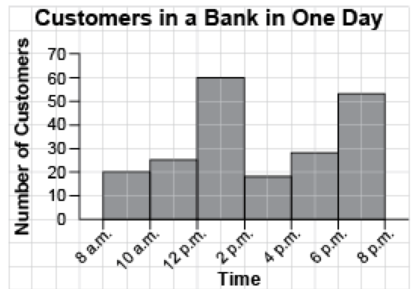
Creating and Interpreting Graphs (cont'd)

Uses attributes of graph and measures of central tendency to draw some conclusions.

Brad had these practice times, in seconds, for the 400-m sprint: 73, 64, 55, 81, 68, 62, 57, 64

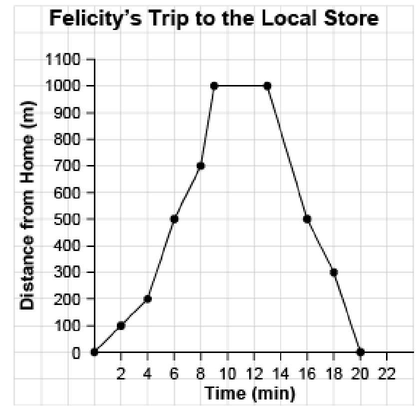
"I determined the range: 26; mode: 64; median: 64; mean: 65.5. Brad's average practice time is about 64 s."

Analyzes data, draws conclusions, and makes convincing arguments.



"I would use the data to convince the bank to have more staff on between 12 noon and 2 p.m. and between 6 p.m. and 8 p.m. as that is when the bank is busiest."

Fluently solves problems by graphing data and interpreting the results.



"From the graph, I see Felicity spent 4 minutes at the store as her distance from home did not change."

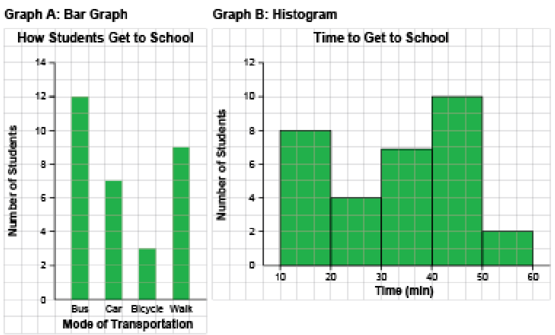
Observations/Documentation

Activity 6 Assessment

Data Management Consolidation

Creating and Interpreting Graphs

Uses common attributes (basic shape, scale, titles, and labels) to create different graph types.



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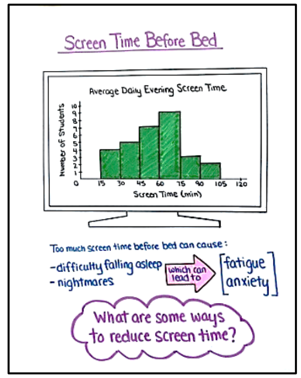

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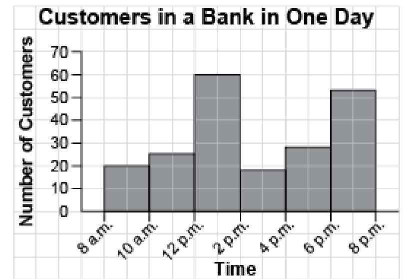
Uses graphs to answer some questions within and beyond the data.



"I drew lines to find how old Benji was when he was 80 cm tall: about 2 years 9 months. I assumed Benji continued to grow at the same rate and estimated he would be about 125 cm tall at age 11."

Observations/Documentation

Activity 6 Assessement
Data Management Consolidation

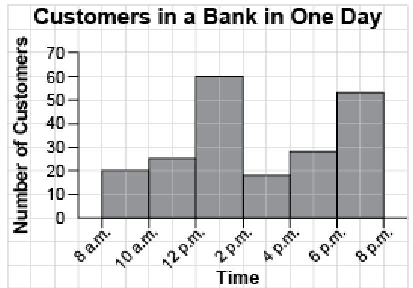
Creating and Interpreting Graphs (cont'd)

Uses attributes of graph and measures of central tendency to draw some conclusions.

Brad had these practice times, in seconds, for the 400-m sprint: 73, 64, 55, 81, 68, 62, 57, 64

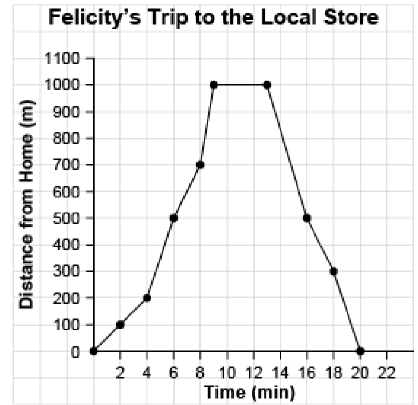
"I determined the range: 26; mode: 64; median: 64; mean: 65.5. Brad's average practice time is about 64 s."

Analyzes data, draws conclusions, and makes convincing arguments.



"I would use the data to convince the bank to have more staff on between 12 noon and 2 p.m. and between 6 p.m. and 8 p.m. as that is when the bank is busiest."

Fluently solves problems by graphing data and interpreting the results.



"From the graph, I see Felicity spent 4 minutes at the store as her distance from home did not change."

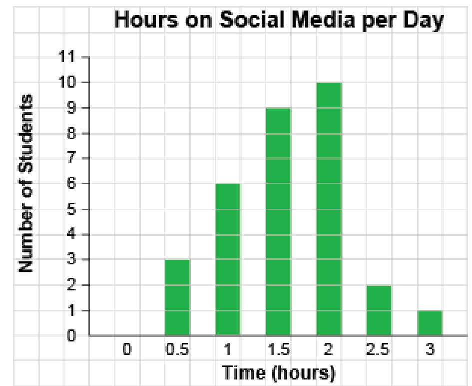
Observations/Documentation

Activity 6 Assessment
Data Management Consolidation

Collecting and Organizing Data		
Recognizes the difference between first- and second-hand data. "I measured the height of the tomato plant daily, so that is first-hand data. I got the heights of the basketball players from the Internet, so that is second-hand data."	Formulates questions to help with data collection. "I wanted to find my classmates' favourite raw vegetable. I asked: What is your favourite raw vegetable: cauliflower, broccoli, celery, carrot, cucumber, other?"	Chooses best method to collect data (e.g., first- or second-hand data, survey vs experiment, databases vs electronic media). "To find out what people think about the renovations to the community centre, I would collect first-hand data using a questionnaire."
Observations/Documentation		

Data Management and Probability

Activity 6 Assessment
Data Management Consolidation

Collecting and Organizing Data (cont'd)		
Chooses representative sampling technique to collect relevant data (e.g., simple/systematic random, stratified). "I can't survey everyone who enters the community centre. I will use systematic random sampling and survey every 10th person."	Represents collected data using appropriate organizers. "I would display the data in a bar graph so that it is easy for others to see how satisfied the community is with the renovations."	Uses collected data to draw conclusions and make informed decisions.  "This graph tells me that more of my Grade 6 classmates spend between 1.5 h and 2 h a day on social media. This is a sample of the Grade 6 students and is not representative of all Grade 6 classes across Canada."
Observations/Documentation		

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 1a

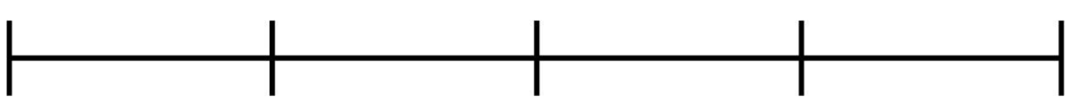
Exploring Probability

Part A

The pointer on this spinner is spun.
Determine the probability of each outcome.

Event	Likelihood Term	Fraction	Decimal	Percent
not an even number				
12				
a number between 4 and 9				
a number less than 3				
a number less than 10				

Draw a probability line. Include benchmark terms, fractions, decimals, and/or percents. Place each outcome on the line.



Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 1b

Exploring Probability (cont'd)

Part B

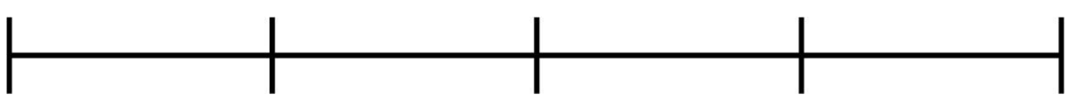
Use the probability line from Part A.
Predict the results of spinning the pointer 100 times.

Event	**Prediction**
not an even number	
12	
a number between 4 and 9	
a number less than 3	
a number less than 10	

A student conducted the experiment 100 times.

Event	**Results**
not an even number	18
12	0
a number between 4 and 9	26
a number less than 3	6
a number less than 10	50

How do your predictions compare with these results?
Show the results on another probability line.



Compare the probability lines. What do you notice?
Why might this be?

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 2a

All Possible Outcomes

Part A

Two students tossed a coin and spun the pointer on this spinner to do a probability experiment

Make a tree diagram to determine all possible outcomes.

How many possible outcomes are there? How do you know?

List the outcomes in a table.

Name________________________________ Date_____________________

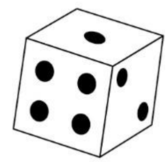
Data Management
Unit 2 Line Master 2b

All Possible Outcomes (cont'd)

Part B

Use two objects to design your own probability experiment.

Determine all possible outcomes for your experiment.



Choose one possible outcome.
Determine the theoretical probability of that outcome.
Record the probability using a fraction, decimal, or percent.

Determine the "odds in favour" of that outcome.

What do you notice about the sum of the theoretical probabilities of an outcome occurring and not occurring? Justify your thinking.

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 3a

Probability with Number Cubes

Part A: Single-Outcome Events

A number cube labelled from 1 to 6 is rolled.

What are the possible outcomes?

What is the theoretical probability of each outcome?

- rolling a 4
- rolling a 1 or a 3
- rolling an odd number
- rolling a number less than 3

Roll the number cube 30 times. Record your results.

Outcome	1	2	3	4	5	6
Results						

Find the experimental probability of each outcome.

- rolling a 4
- rolling a 1 or a 3
- rolling an odd number
- rolling a number less than 3

How do these probabilities compare with the theoretical probabilities? Explain.

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 3b

Probability with Number Cubes (cont'd)

Combine your results with those of another pair.

Outcome	1	2	3	4	5	6
Combined Results						

What is the experimental probability of each outcome now?

- rolling a 4
- rolling an odd number
- rolling a 1 or a 3
- rolling a number less than 3

How do the experimental probabilities compare with the theoretical probabilities now? Explain.

What do you think might happen if you rolled the number cube 500 times?

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 3c

Probability with Number Cubes (cont'd)

Part B: Experiments Involving Two Independent Events

Two number cubes labelled from 1 to 6 are rolled and the numbers added.

Use a tree diagram or a table to find all possible outcomes.

Choose 3 sums. Determine the theoretical probability of rolling each sum.

Sum	Theoretical Probability

Roll the number cubes 30 times. Record your results.

Sum	2	3	4	5	6	7	8	9	10	11	12
Results											

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 3d

Probability with Number Cubes (cont'd)

Find the experimental probability of each of your 3 sums.

Sum	**Experimental Probability**

How do these probabilities compare with the theoretical probabilities? Explain.

Combine your results with others who used the same sums.

Sum	2	3	4	5	6	7	8	9	10	11	12
Results											

What is the experimental probability of each sum now?

Sum	**Experimental Probability**

Name________________________________ Date_____________________

Data Management
Unit 2 Line Master 3e

Probability with Number Cubes (cont'd)

How do the experimental probabilities compare with the theoretical probabilities now? Explain.

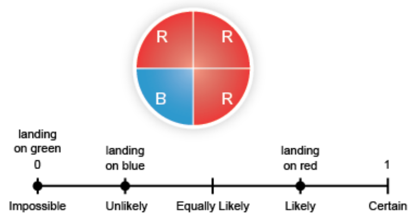
What do you think might happen if you rolled the number cubes 500 times?

Data Management and Probability

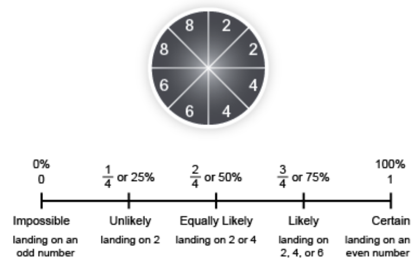
Activity 7 Assessment

Exploring Theoretical Probability

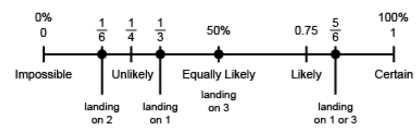
<table>
<tr><th colspan="4">Fractions, Decimals, and Percents on a Probability Line</th></tr>
<tr>
<td>Represents the theoretical probability of events happening using words on a probability line.



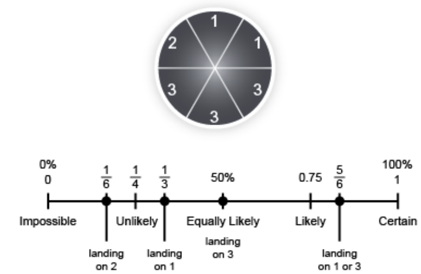
"I know that since no sector on the spinner is green, the likelihood of landing on green is impossible."</td>
<td>Represents the theoretical probability of events happening using fractions and percents on a probability line.



"Since 2 of the 8 sectors have "2", the likelihood of landing on 2 is $\frac{1}{4}$ or 25%. I placed it one-fourth of the way along the line."</td>
<td>Represents the theoretical probability of events happening using fractions, decimals, and percents, and uses benchmarks to place them on a probability line.



"The likelihood of landing on 2 is $\frac{1}{6}$, which is between 0 and $\frac{1}{4}$, but closer to $\frac{1}{4}$."</td>
<td>Flexibly represents probabilities on a probability line and analyzes data to make predictions and informed decisions about experimental results.



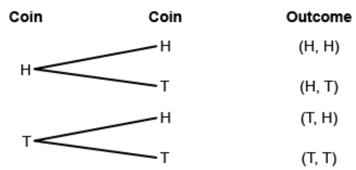
"I predict that if the spinner was spun 600 times, it would land on 2 about 100 times."</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Data Management and Probability

Activity 8 Assessment
Independent Events

Listing All Possible Outcomes of an Experiment

Uses a tree diagram to determine all possible outcomes of an experiment.



“There are 3 possible outcomes: 2 heads, 2 tails, and 1 head and 1 tail.”

Uses a table or organized list to determine all possible outcomes of an experiment.

The principal can choose from 2 colours of pants (purple or red) and 3 colours of shirts (green, orange, or pink).

Combination
Purple pants and green shirt
Purple pants and orange shirt
Purple pants and pink shirt
Red pants and green shirt
Red pants and orange shirt
Red pants and pink shirt

“I chose one pant colour, then matched it with each shirt colour.”

Determines the theoretical probability using a tree diagram, table, or organized list.

Outcome	Theoretical Probability
2 heads	1 out of 4, or $\frac{1}{4}$, or 0.25, or 25%
1 head and 1 tail	2 out of 4, or $\frac{2}{4} = \frac{1}{2}$, or 0.5, or 50%
2 tails	1 out of 4, or $\frac{1}{4}$, or 0.25, or 25%

“I divided the number of favourable outcomes by the total number of outcomes to find the theoretical probabilities.”

Flexibly determines theoretical probability and knows that the sum of probabilities is 1 or 100%.

Outcome	Theoretical Probability
2 heads	1 out of 4, or $\frac{1}{4}$, or 0.25, or 25%
1 head and 1 tail	2 out of 4, or $\frac{2}{4} = \frac{1}{2}$, or 0.5, or 50%
2 tails	1 out of 4, or $\frac{1}{4}$, or 0.25, or 25%

“It is certain that one of the possible outcomes will occur, and the probability of a certain event is 1. So, the sum of the probabilities of all possible outcomes must be 1 or 100%.”

Observations/Documentation

Activity 9 Assessment
Conducting Experiments

Comparing Theoretical and Experimental Probabilities

Conducts single-outcome experiment and calculates experimental probabilities.

"I tossed the coins 20 times and got 8H and 12T.
The experimental probabilities are:
H: $\frac{2}{5}$, T: $\frac{3}{5}$."

Conducts experiment involving 2 events and calculates experimental probabilities.

"I tossed the coins 20 times and got 3HH, 6TT, 11HT.
The experimental probabilities are:
HH: $\frac{3}{20}$, TT: $\frac{3}{10}$, HT: $\frac{11}{20}$."

Determines and compares the theoretical and experimental probabilities.

Outcome	Theoretical Probability	Experimental Probability
HH	$\frac{1}{4}$	$\frac{3}{20}$
HT	$\frac{1}{2}$	$\frac{11}{20}$
TT	$\frac{1}{4}$	$\frac{3}{10}$

"The actual result was different than the theoretical probability, but that is to be expected."

Determines and compares probabilities after a greater number of trials.

Outcome	Theoretical Probability	Experimental Probability
HH	$\frac{1}{4}$	$\frac{6}{25}$
HT	$\frac{1}{2}$	$\frac{1}{2}$
TT	$\frac{1}{4}$	$\frac{13}{50}$

"I used the Pearson Probability Tool to toss the coins 500 times. The results got closer to the theoretical probabilities."

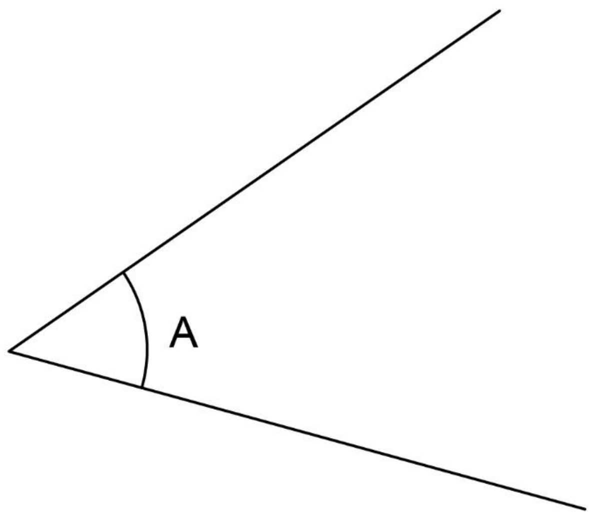
Observations/Documentation

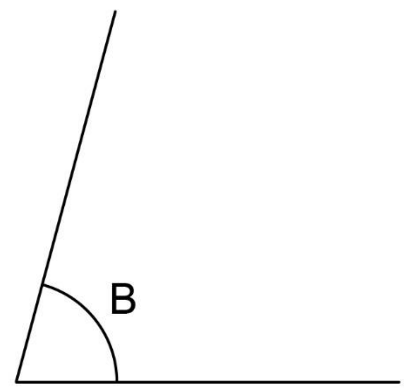
Name________________________________ Date_____________________

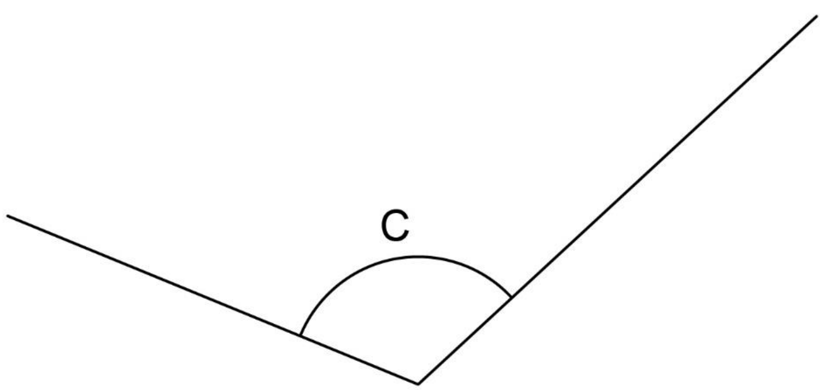
Geometry
Unit 1A Line Master 1a

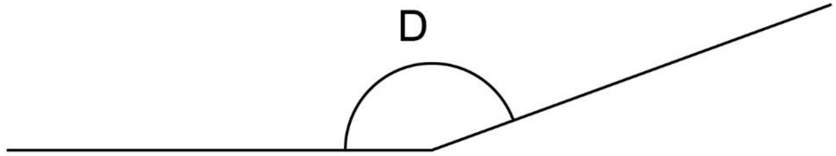
What's My Measure?

Measure each angle.







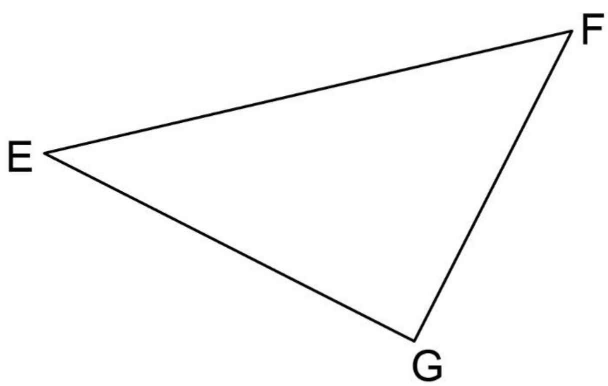


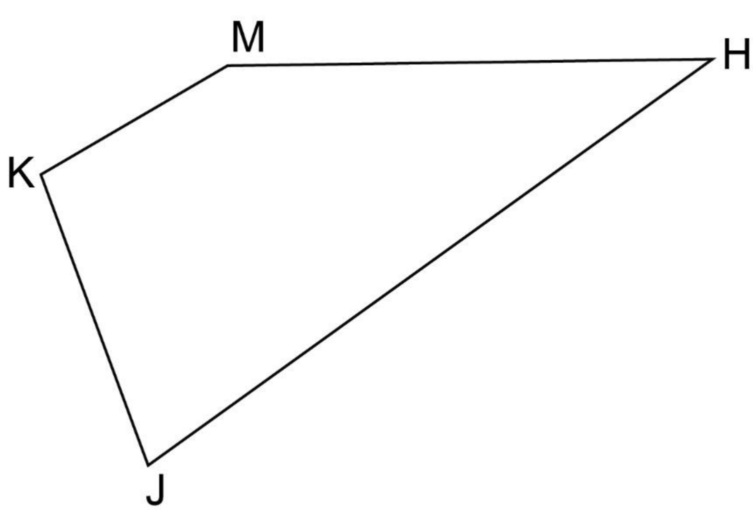
Name________________________________ Date_____________________

Geometry
Unit 1A Line Master 1b

What's My Measure? (cont'd)

Measure the angles in each shape.

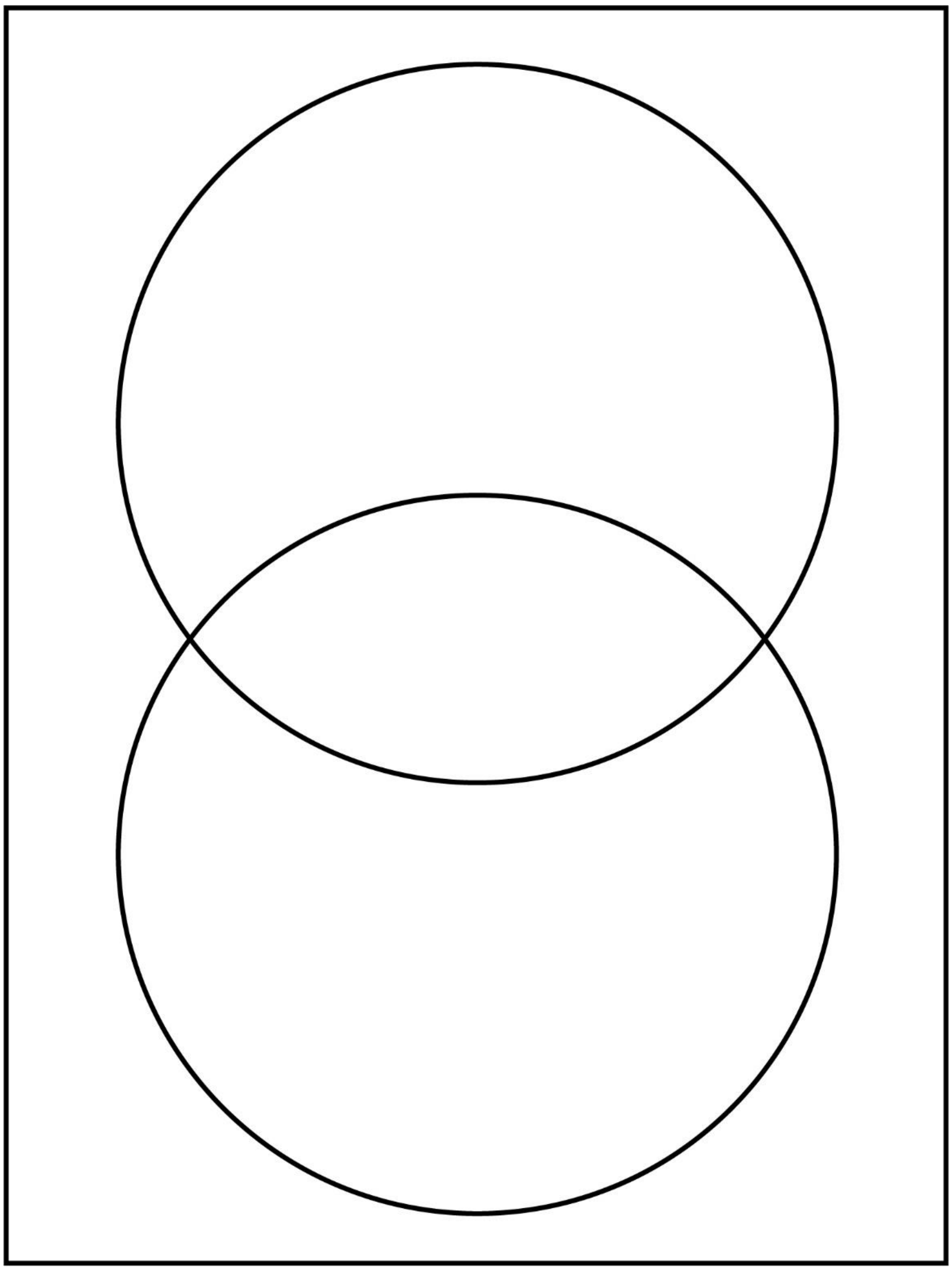




Name________________________________ Date_____________________

Geometry
Unit 1A Line Master 2

Venn Diagram



Name________________________________ Date_____________________

Geometry
Unit 1A Line Master 3

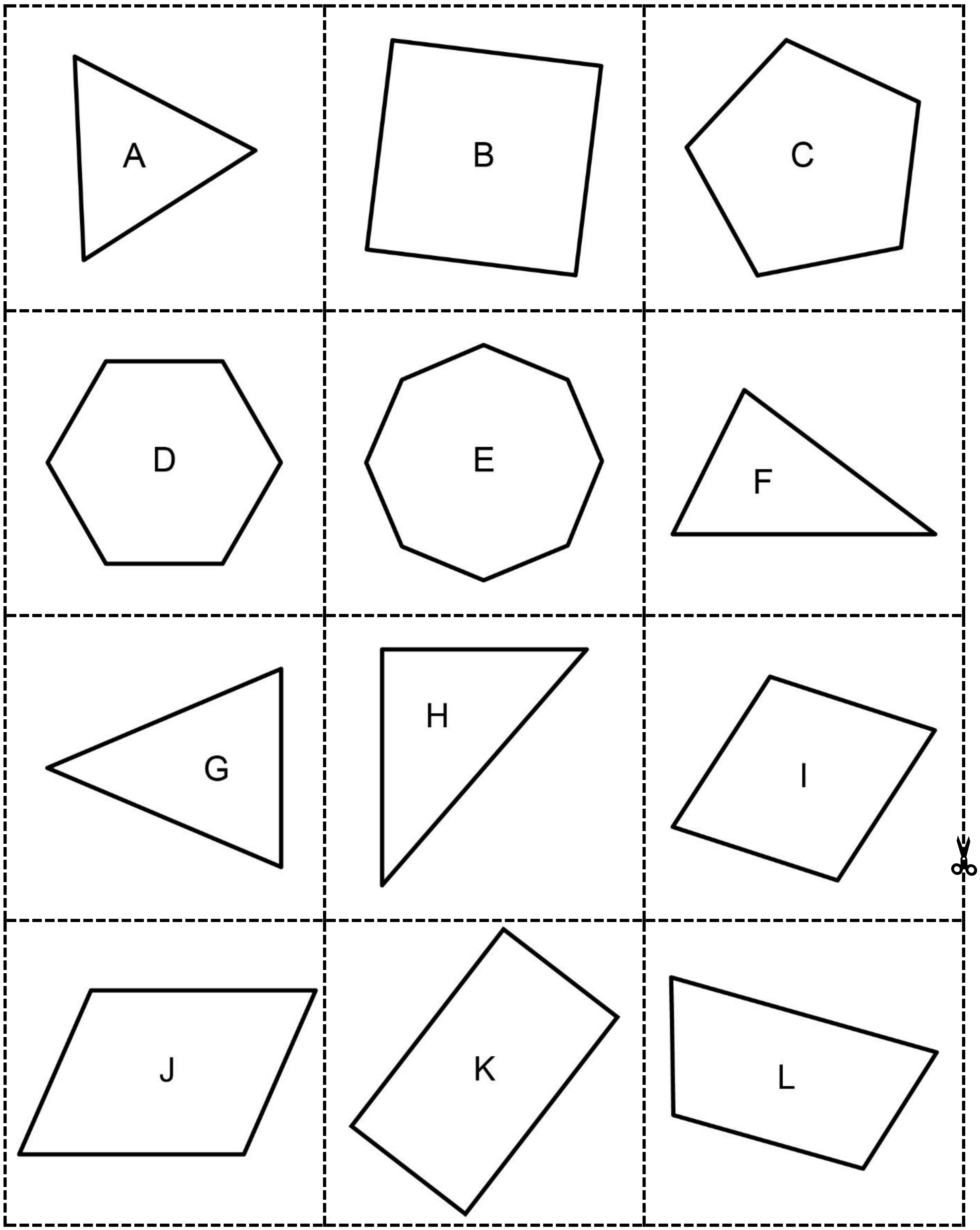
Which Type of Triangle Am I?

ΔABC AB = 5 cm BC = 7 cm $\angle B = 55°$	ΔDEF FE = 6 cm $\angle F = 50°$ $\angle E = 50°$
ΔGHJ GH = 4 cm GJ = 7 cm $\angle G = 90°$	ΔKMN KM = 8 cm KN = 6 cm $\angle K = 130°$
ΔPQR PQ = 5 cm PR = 5 cm $\angle P = 110°$	ΔSTU ST = 5 cm SU = 6 cm TU = 7 cm

Name________________________________ Date_____________________

Geometry
Unit 1A Line Master 4a

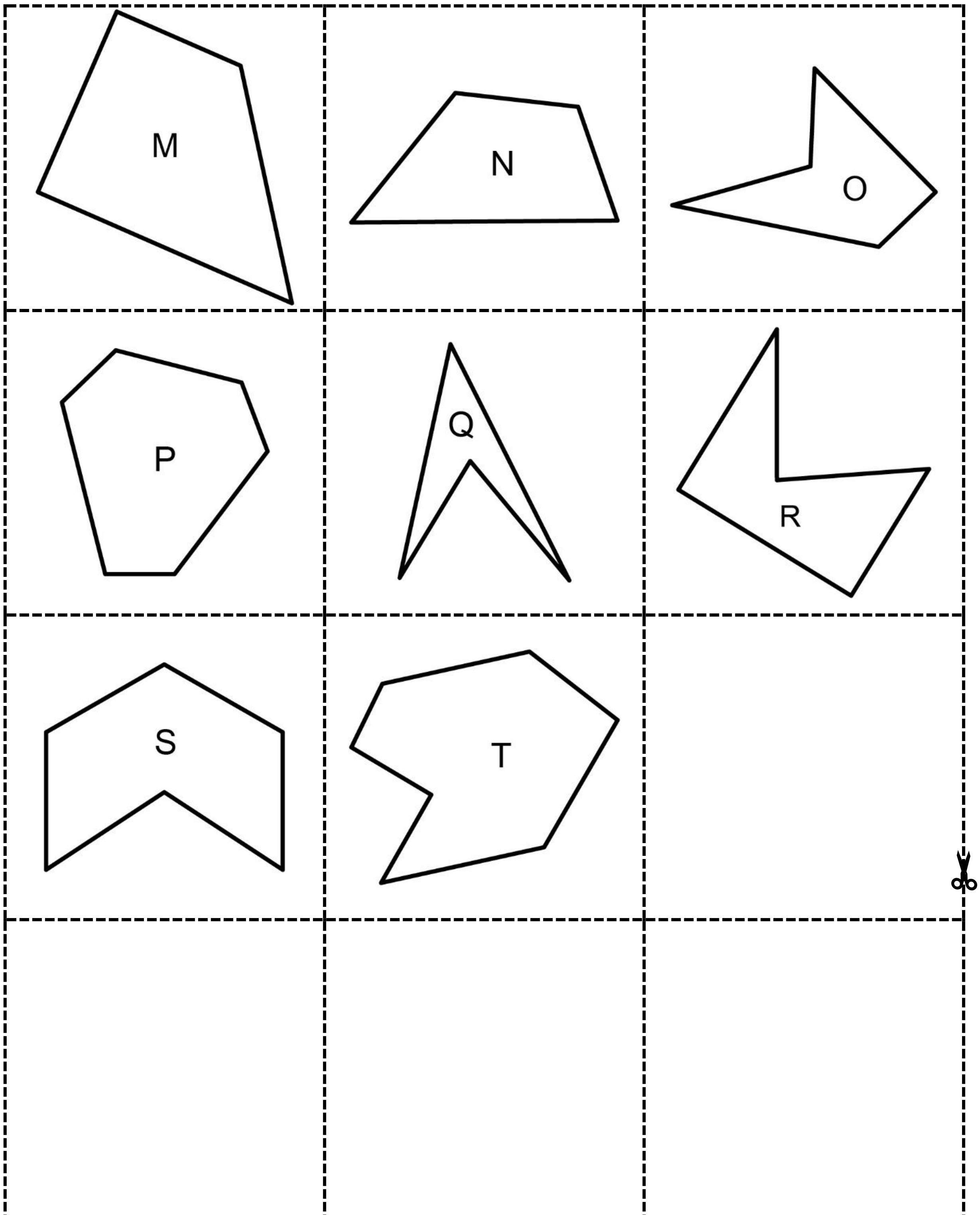
Polygon Cards



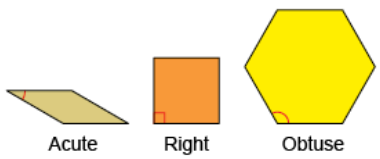
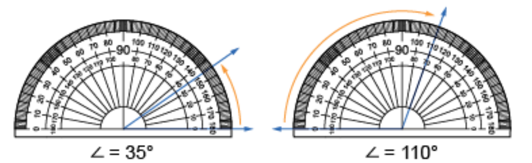
Name________________________________ Date_____________________

Geometry
Unit 1A Line Master 4b

Polygon Cards (cont'd)



Activity 1 Assessment
Classifying and Measuring Angles

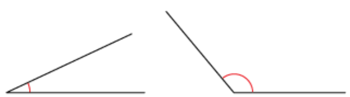
Measuring and Constructing Angles		
Identifies and compares different types of angles using the benchmark of 90°.  "This is an acute angle because it is less than 90°. This is an obtuse angle because it is greater than 90°."	Compares and measures angles using appropriate non-standard units.  "The acute angle in the trapezoid equals 2 acute angles in the tan parallelogram, or 60°; the obtuse angle equals 4 of the acute angles, or 120°."	Compares and measures angles using a protractor.  "I can use the protractor to compare and measure angles. The two scales on the protractor make it easier to measure acute and obtuse angles."
Observations/Documentation		

Geometry

Activity 1 Assessment
Classifying and Measuring Angles

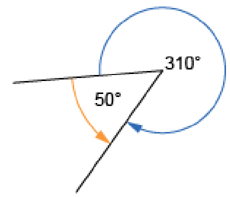
Measuring and Constructing Angles (cont'd)

Flexibly estimates, compares and measures angles using standard units and benchmarks.



"The first angle is about halfway between 0° and 45°, so it is about 25°. The second angle is less than halfway between 90° and 180°, so it's about 130°."

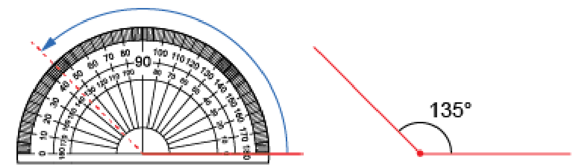
Measures angles using a 360° protractor and states the relationships between angles.



"I measured the angle clockwise and got 310°. I measured it counterclockwise and got 50°. The sum of the angles is 360° because they form a complete circle."

Flexibly estimates, compares, measures, and constructs angles using various tools.

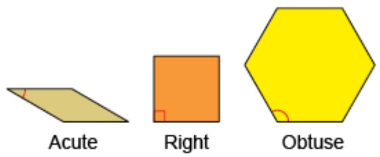
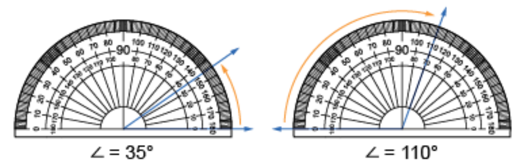
Draw a 135° angle.



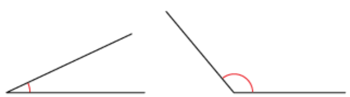
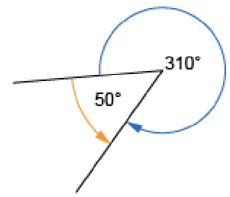
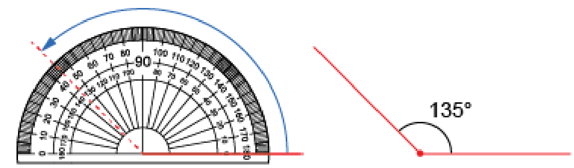
"I drew a horizontal line, aligned the protractor, then followed the outer scale around to 135° and made a mark. I joined the mark to the end of the line."

Observations/Documentation

Activity 2 Assessment
Measuring and Constructing Angles

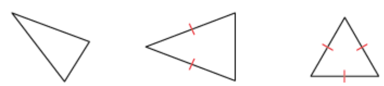
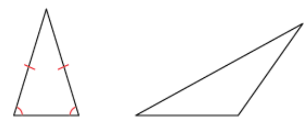
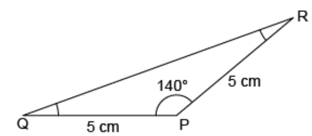
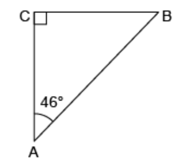
Measuring and Constructing Angles		
Identifies and compares different types of angles using the benchmark of 90°.  “This is an acute angle because it is less than 90°. This is an obtuse angle because it is greater than 90°.”	Compares and measures angles using appropriate non-standard units.  “The acute angle in the trapezoid equals 2 acute angles in the tan parallelogram, or 60°; the obtuse angle equals 4 of the acute angles, or 120°.”	Compares and measures angles using a protractor.  “I can use the protractor to compare and measure angles. The two scales on the protractor make it easier to measure acute and obtuse angles.”
Observations/Documentation		

Activity 2 Assessment
Measuring and Constructing Angles

Measuring and Constructing Angles (cont'd)		
Flexibly estimates, compares and measures angles using standard units and benchmarks.  "The first angle is about halfway between 0° and 45°, so it is about 25°. The second angle is less than halfway between 90° and 180°, so it's about 130°."	Measures angles using a 360° protractor and states the relationships between angles.  "I measured the angle clockwise and got 310°. I measured it counterclockwise and got 50°. The sum of the angles is 360° because they form a complete circle."	Flexibly estimates, compares, measures, and constructs angles using various tools. Draw a 135° angle.  "I drew a horizontal line, aligned the protractor, then followed the outer scale around to 135° and made a mark. I joined the mark to the end of the line."
Observations/Documentation		

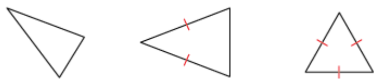
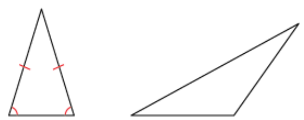
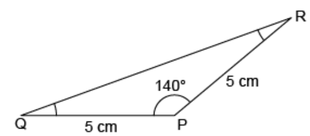
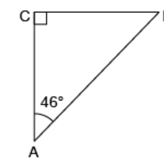
Geometry

Activity 3 Assessment
Classifying Triangles

Properties of Triangles			
Recognizes various triangles by the number of equal sides.	Understands that triangles can be classified by side lengths and/or angle measures.	Constructs and identifies triangles given some side and angle measures.	Uses various geometric properties to determine unknown side and angle measures.
 "I know the first is scalene, the second is isosceles, and the third is equilateral by looking at the number of equal sides."	 "The first triangle is an acute isosceles triangle because it has 2 equal sides and all acute angles. The second triangle is an obtuse scalene triangle because it has no equal sides and an obtuse angle."	ΔPQR, with PR = 5 cm, PQ = 5 cm, ∠P = 140°  "I drew PQ = 5 cm and used a protractor to make a 140° angle at P. I drew PR = 5 cm, then connected R to Q to make the third side. Angles Q and R are each 20° because the interior angles must add to 180°.This is an obtuse isosceles triangle."	 "This is an isosceles right triangle. ∠B = 90° – 46° so ∠B = 44°. The interior angles must add to 180°. I know that side AC and CB are the same."
Observations/Documentation			

Geometry

Activity 4 Assessment
Identifying and Constructing Triangles

Properties of Triangles			
Recognizes various triangles by the number of equal sides.  "I know the first is scalene, the second is isosceles, and the third is equilateral by looking at the number of equal sides."	Understands that triangles can be classified by side lengths and/or angle measures.  "The first triangle is an acute isosceles triangle because it has 2 equal sides and all acute angles. The second triangle is an obtuse scalene triangle because it has no equal sides and an obtuse angle."	Constructs and identifies triangles given some side and angle measures. $\triangle PQR$, with PR = 5 cm, PQ = 5 cm, $\angle P = 140°$  "I drew PQ = 5 cm and used a protractor to make a 140° angle at P. I drew PR = 5 cm, then connected R to Q to make the third side. Angles Q and R are each 20° because the interior angles must add to 180°.This is an obtuse isosceles triangle."	Uses various geometric properties to determine unknown side and angle measures.  "This is an isosceles right triangle. $\angle B = 90° – 46°$ so $\angle B = 44°$. The interior angles must add to 180°. I know that side AC and CB are the same."
Observations/Documentation			

Geometry

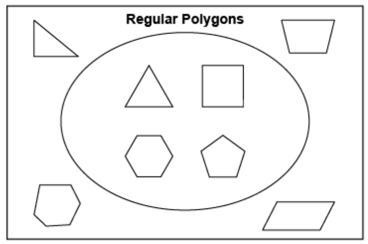
Activity 5 Assessment
Investigating Polygons

Investigating Polygons

Recognizes a polygon as a closed shape with straight lines.

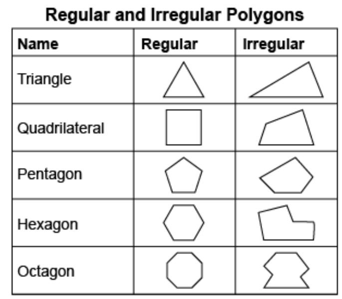
"I know these are polygons because they are closed shapes with straight sides."

Understands that regular polygons have equal sides and equal angles.



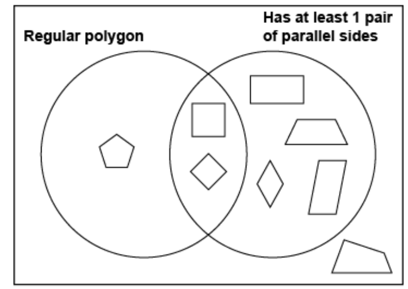
"The shapes inside the loop are regular polygons because they have equal sides and equal angles."

Describes differences and similarities between regular and irregular polygons.



"The polygons in the second row are both quadrilaterals because they both have 4 sides. The square is a regular polygon because it has 4 equal sides and 4 equal angles, but the other quadrilateral is irregular because it does not have any equal sides."

Flexibly identifies and classifies polygons.



"I sorted the polygons using the Venn diagram. The irregular quadrilateral is outside of the loops because it has neither attribute."

Observations/Documentation

Geometry

Activity 6 Assessment
2-D Shapes and Angles Consolidation

Measuring and Constructing Angles

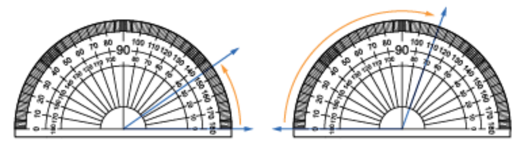
Identifies and compares different types of angles using the benchmark of 90°.

"This is an acute angle because it is less than 90°. This is an obtuse angle because it is greater than 90°."

Compares and measures angles using appropriate non-standard units.

"The acute angle in the trapezoid equals 2 acute angles in the tan parallelogram, or 60°; the obtuse angle equals 4 of the acute angles, or 120°."

Compares and measures angles using a protractor.



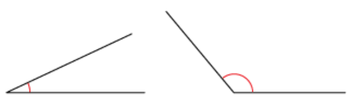
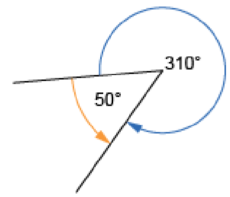
"I can use the protractor to compare and measure angles. The two scales on the protractor make it easier to measure acute and obtuse angles."

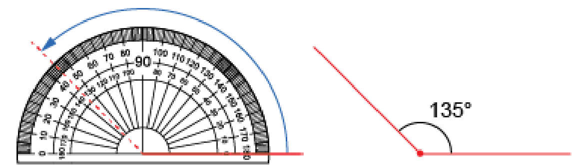
Observations/Documentation

Geometry

Activity 6 Assessment

2-D Shapes and Angles Consolidation

<table>
<tr><th colspan="3">Measuring and Constructing Angles (cont’d)</th></tr>
<tr>
<td>Flexibly estimates, compares and measures angles using standard units and benchmarks.

“The first angle is about halfway between 0° and 45°, so it is about 25°. The second angle is less than halfway between 90° and 180°, so it’s about 130°.”</td>
<td>Measures angles using a 360° protractor and states the relationships between angles.


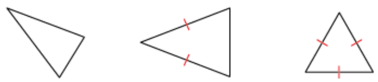
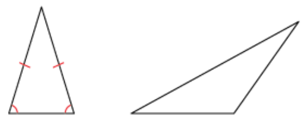
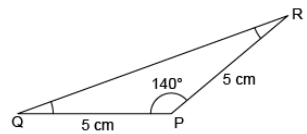
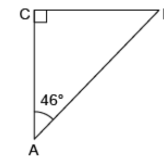
“I measured the angle clockwise and got 310°. I measured it counterclockwise and got 50°. The sum of the angles is 360° because they form a complete circle.”</td>
<td>Flexibly estimates, compares, measures, and constructs angles using various tools.
Draw a 135° angle.


“I drew a horizontal line, aligned the protractor, then followed the outer scale around to 135° and made a mark. I joined the mark to the end of the line.”</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Geometry

Activity 6 Assessment

2-D Shapes and Angles Consolidation

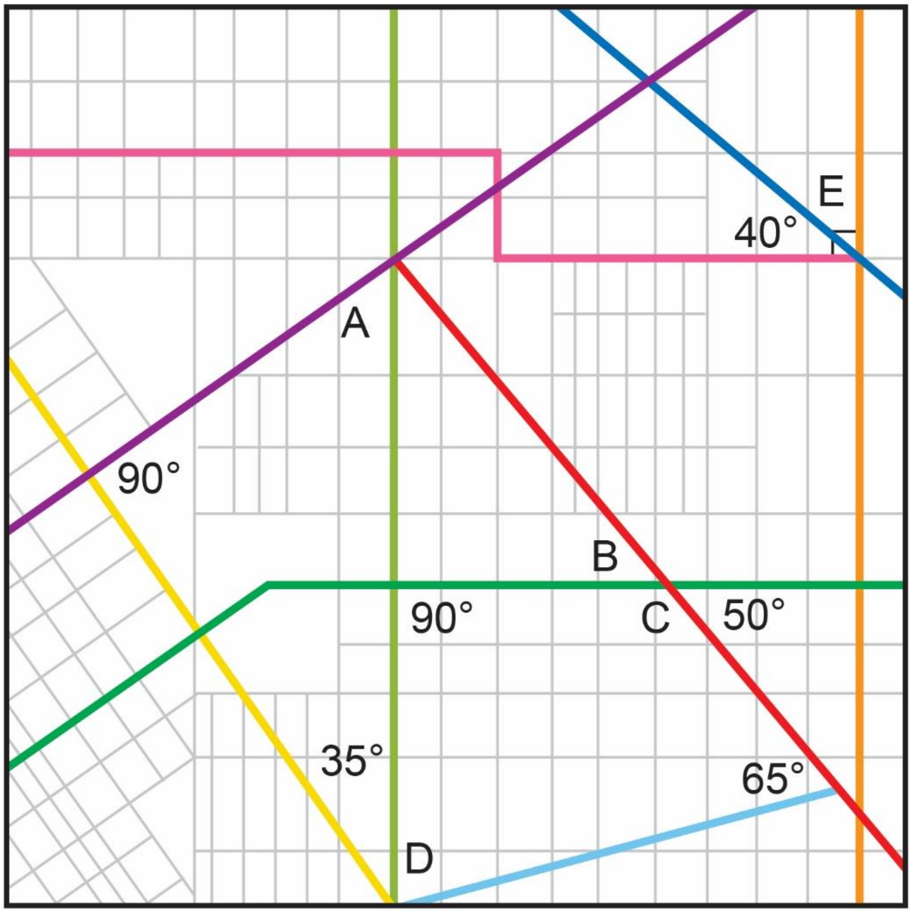
Properties of Triangles			
Recognizes various triangles by the number of equal sides.  “I know the first is scalene, the second is isosceles, and the third is equilateral by looking at the number of equal sides.”	Understands that triangles can be classified by side lengths and/or angle measures.  “The first triangle is an acute isosceles triangle because it has 2 equal sides and all acute angles. The second triangle is an obtuse scalene triangle because it has no equal sides and an obtuse angle.”	Constructs and identifies triangles given some side and angle measures. ∆PQR, with PR = 5 cm, PQ = 5 cm, ∠P = 140°  “I drew PQ = 5 cm and used a protractor to make a 140° angle at P. I drew PR = 5 cm, then connected R to Q to make the third side. Angles Q and R are each 20° because the interior angles must add to 180°.This is an obtuse isosceles triangle.”	Uses various geometric properties to determine unknown side and angle measures.  “This is an isosceles right triangle. ∠B = 90° – 46° so ∠B = 44°. The interior angles must add to 180°. I know that side AC and CB are the same.”
Observations/Documentation			

Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 1a

Angle Puzzles

Puzzle A



∠A:

∠B:

∠C:

∠D:

∠E:

Sum of angles A to E:

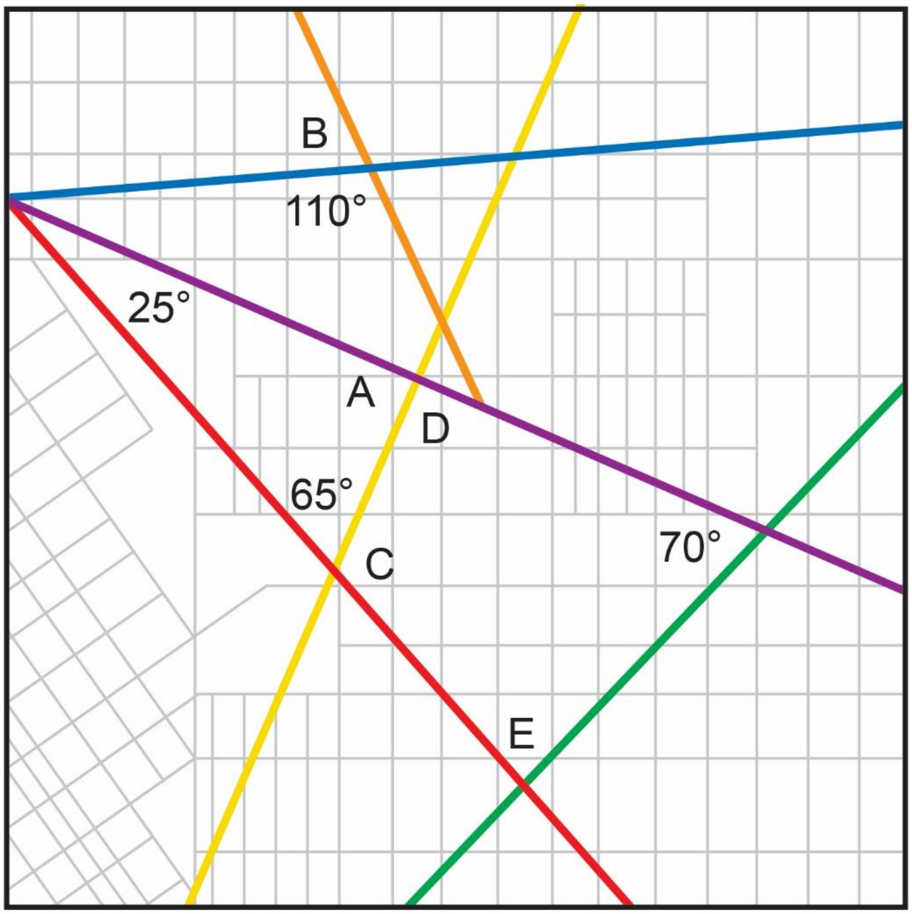
Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 1b

Angle Puzzles (cont'd)

Puzzle B

Measure the angles in each shape.



∠A: ∠B: ∠C:

∠D: ∠E:

Sum of angles A to E:

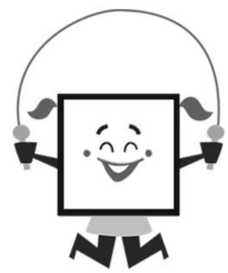
Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 2a

Who's the Suspect Shape?

Cards

Sayo Square



- 4 equal sides
- 4 right angles
- 2 pairs of opposite angles equal
- opposite sides equal
- opposite sides parallel
- 2 equal diagonals
- 4 lines of symmetry
- rotational symmetry of order 4
- diagonals that intersect at right angles
- diagonals bisect each other

Roger Rhombus

- 4 equal sides
- 2 lines of symmetry
- rotational symmetry of order 2
- 2 pairs of parallel sides
- opposite sides parallel
- opposite sides equal
- 2 pairs of opposite angles equal
- diagonals that intersect at right angles
- diagonals bisect each other
- 2 lines of symmetry
- rotational symmetry of order 2

Roscoe Rectangle

- 4 right angles
- 2 pairs of opposite angles equal
- opposite sides equal
- opposite sides parallel
- 2 equal diagonals
- 2 lines of symmetry
- rotational symmetry of order 2
- diagonals bisect each other

Padma Parallelogram

- 2 pairs of opposite angles equal
- opposite sides equal
- opposite sides parallel
- rotational symmetry of order 2
- diagonals bisect each other

Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 2b

Who's the Suspect Shape? (cont'd)

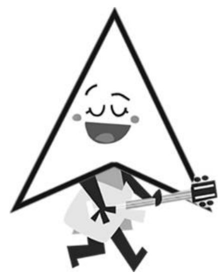
Cards

Curtis Convex Kite

- diagonals that intersect at right angles
- 2 pairs of adjacent sides equal
- 1 line of symmetry
- 2 equal angles
- 1 bisected diagonal

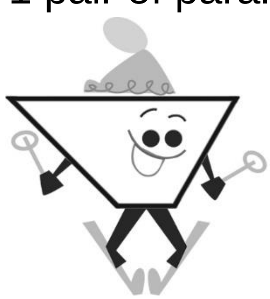
Cleo Concave Kite

- 1 reflex angle
- 2 pairs of adjacent sides equal
- 1 line of symmetry
- 2 equal angles
- 1 bisected diagonal



Trina Trapezoid

- exactly 1 pair of parallel sides



Imene Isosceles Trapezoid

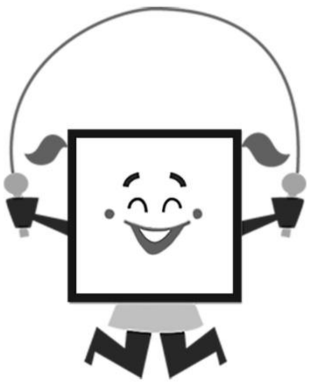
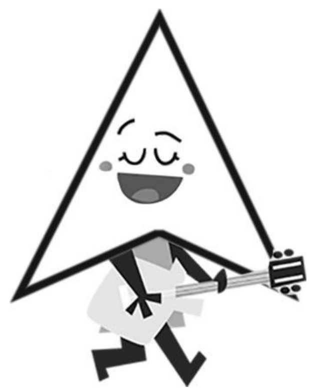
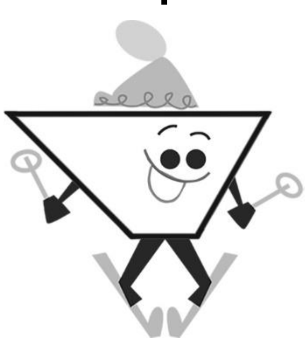
- exactly 1 pair of parallel sides
- exactly 1 pair of opposite sides equal
- 2 equal diagonals
- 2 pairs of equal angles
- 1 line of symmetry

Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 2c

Who's the Suspect Shape? (cont'd)

Cards

Sayo Square 	**Roger Rhombus** 	**Roscoe Rectangle** 
Padma Parallelogram 	**Curtis Convex Kite** 	**Cleo Concave Kite** 
Trina Trapezoid 	**Imene Isosceles Trapezoid** 	

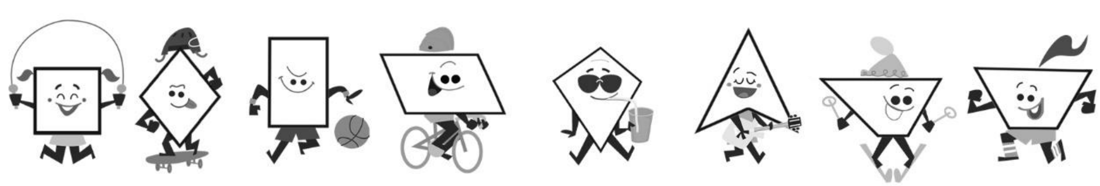
Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 3

Who's the Suspect Shape?

Checklist

	Properties
	Has 4 right angles.
	Has 1 reflex angle.
	Has 2 equal angles.
	Has 2 pairs of opposite angles equal.
	Has 1 line of symmetry.
	Has 2 lines of symmetry.
	Has 4 lines of symmetry.
	Has rotational symmetry of order 2.
	Has rotational symmetry of order 4.
	Has 4 equal sides.
	Has exactly 1 pair of equal sides.
	Has opposite sides equal.
	Has opposite sides parallel.
	Has 2 pairs of adjacent sides equal.
	Has exactly 1 pair of parallel sides.
	Has equal diagonals.
	Has diagonals that intersect at right angles.
	Has diagonals that bisect each other.
	Has 1 bisected diagonal.



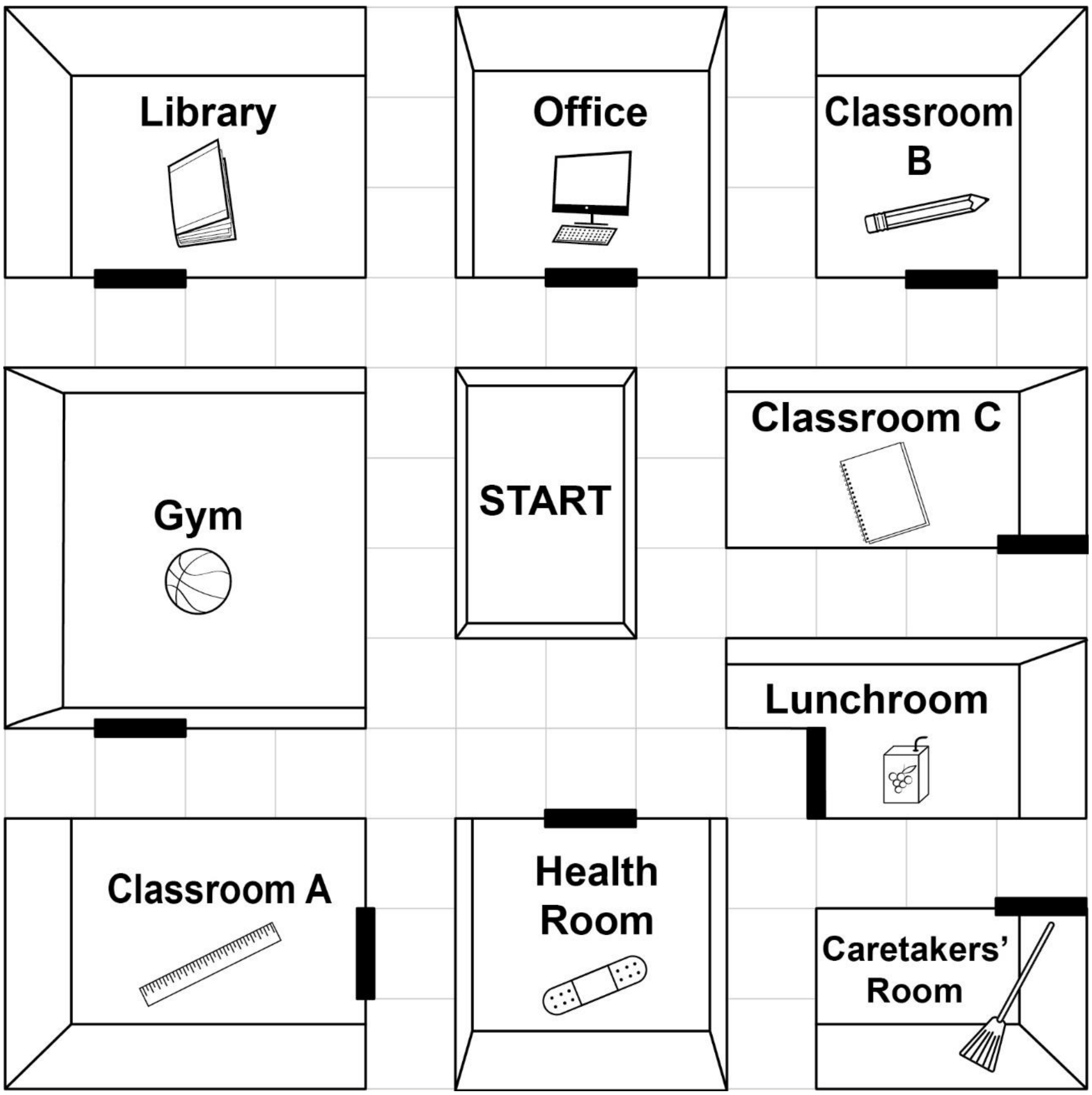
Sayo Square · Roger Rhombus · Roscoe Rectangle · Padma Parallelogram · Curtis Convex Kite · Cleo Concave Kite · Trina Trapezoid · Imene Isosceles Trapezoid

Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 4

Who's the Suspect Shape?

Gameboard



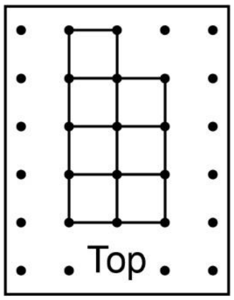
Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 5a

Building Objects from Views

Part A: Given one view

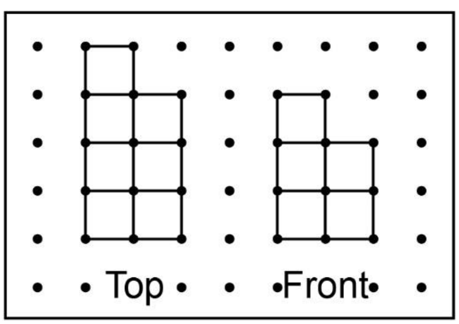
Build an object that has this top view.



How many different objects can you build?

Part B: Given two views

Build an object that has this top view and front view.



How many different objects can you build now?

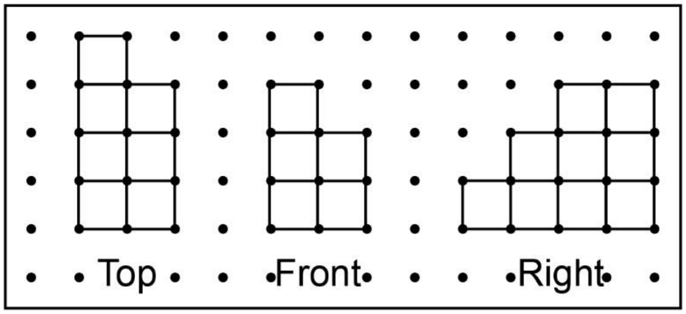
Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 5b

Building Objects from Views (cont'd)

Part C: Given three views

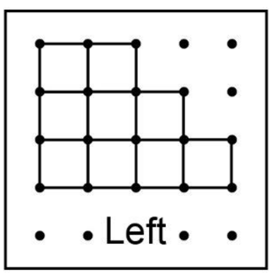
Build an object that has this top view, front view, and right-side view.



How many different objects can you build now?

Part D: Given four views

Here is the left-side view. Is your object correct?
If not, add or move cubes until it is.



What did you notice as more views were given?

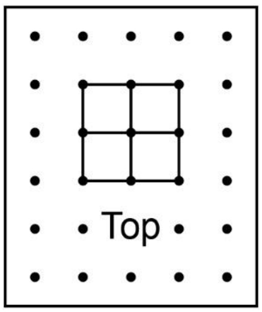
Name_________________________________ Date______________________

Geometry
Unit 1B Line Master 5c

Building Objects from Views (cont'd)

Part A: Given one view

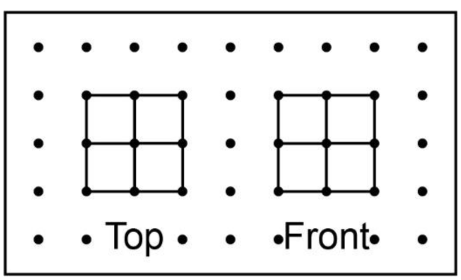
Build an object that has this top view.



How many different objects can you build?

Part B: Given two views

Build an object that has this top view and front view.



How many different objects can you build now?

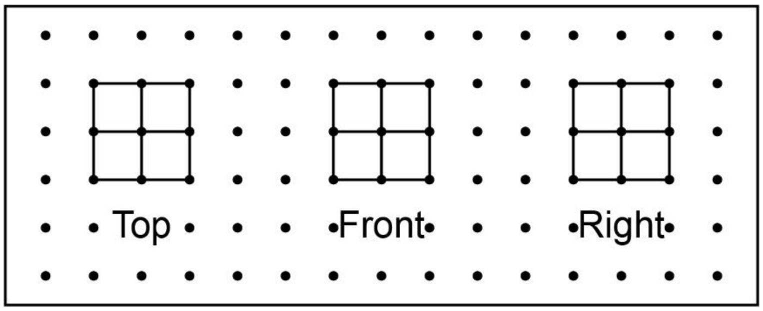
Name________________________________ Date_____________________

Geometry
Unit 1B Line Master 5d

Building Objects from Views (cont'd)

Part C: Given three views

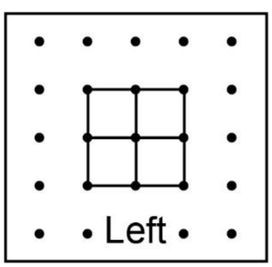
Build an object that has this top view, front view, and right-side view.



How many different objects can you build now?

Part D: Given four views

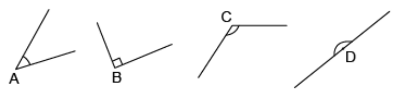
Here is the left-side view. Is your object correct?
If not, add or move cubes until it is.

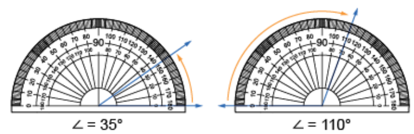


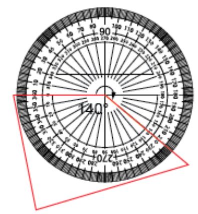
What did you notice as more views were given?

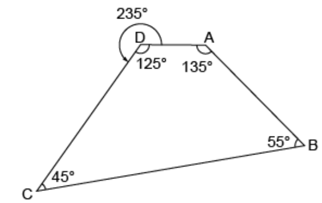
Activity 1 Assessment

Measuring and Constructing Angles

<table>
<tr><th colspan="4">Measuring and Comparing Angles</th></tr>
<tr>
<td>Identifies and compares different types of angles using benchmarks of 90° and 180°.


“A is an acute angle because it looks less than 90°. B is a 90° right angle because it looks like a square corner. C is an obtuse angle because it looks like it is between 90° and 180°. D is a 180° straight angle because it is a straight line.”</td>
<td>Compares/measures angles clockwise &counterclockwise using a 180° protractor.


“I can use a protractor to compare and measure angles. The first angle opens right, so I used the inside scale. It measures 35°. The second angle opens left, so I used the outer scale. It measures 110°.”</td>
<td>Constructs angles using a 360° protractor and states the relationships between angles.


“I used the circle protractor to measure the reflex angle: 220°. I then subtracted the angle from 360° to determine the unknown interior angle: 360° – 220° = 140°. The sum of the reflex angle and the interior angle must be 360°.”</td>
<td>Flexibly measures & constructs angles and matches angles using the additive principle.


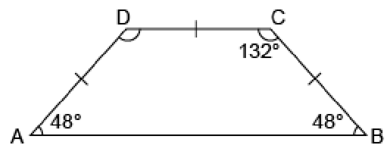
“The angle measures are 135°, 45°, 55°, and 125°, and the sum: 135° + 45 + 55° + 125° = 360°. The 235° reflex angle and 125° matching angle add to 360°.</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

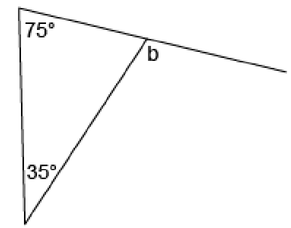
Geometry

Activity 2 Assessment

Angle Properties and Relationships

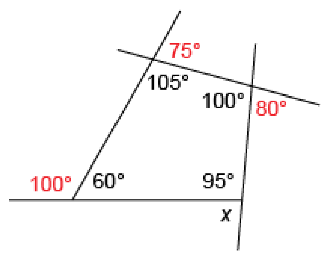
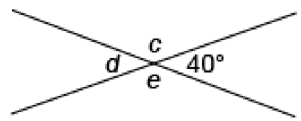
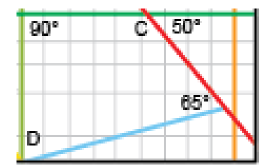
<table>
<tr><th colspan="3">Angle Properties and Relationships</th></tr>
<tr>
<td>Understands that smaller angles can be added together to determine a larger angle.


“The tan parallelogram angle is 30°, and 30° + 30° = 60°, which is the measure of the smaller angle in the red trapezoid.”</td>
<td>Understands and uses the properties of interior angles to solve for unknown angle measures.


“I know the sum of the interior angles of a quadrilateral is 360°. I add the known angle measures: 48° + 48° + 132° = 228°, then subtract: 360° − 228° = 132°, which is the measure of angle D.”</td>
<td>Understands and uses the properties of supplementary and complementary angles to solve for unknown angle measures.


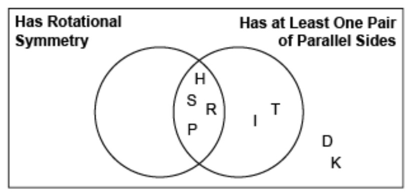
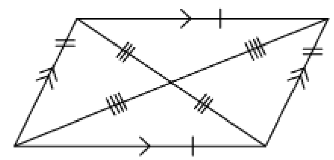
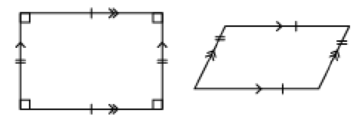
“I know that the interior angles of a triangle add to 180°, so the supplementary angle to b is 180° − 75° − 35° = 70°.
Pairs of supplementary angles have a sum of 180°, so b is 180° − 70° = 110°.”</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Activity 2 Assessment
Angle Properties and Relationships

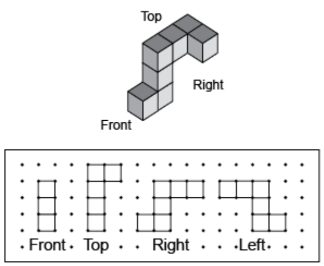
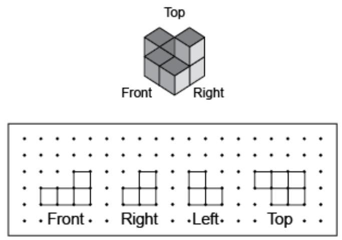
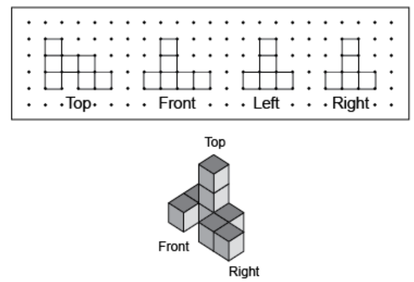
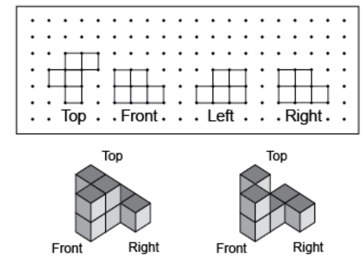
Angle Properties and Relationships (cont'd)		
Understands and uses the properties of exterior angles to solve for unknown angle measures.  "The sum of exterior angles is 360°: 75° + 80° + 100° = 255° and 360° − 255° = 85°, which is measure of the unknown angle."	Understands and uses properties of opposite angles to solve for unknown angle measures.  "I know that pairs of supplementary angles have a sum of 180° and opposite angles are equal. So, *d* is 40° because it's opposite the 40° angle. To determine the angle measure of opposite angles *c* and *e*, I subtract: 180° − 40° = 140°, which is the measure of angles *c* and *e*."	Flexibly applies the properties of various angles to solve for unknown measures.  "I used supplementary angles, ∠C = 180° − 50° = 130°. Then, I used the sum of the angles in a quadrilateral, ∠D = 360° − 90° − 130° − 65° = 75°. The unknown angle measure is 75°."
Observations/Documentation		

Geometry

Activity 3 Assessment
Properties of Quadrilaterals

Properties of Quadrilaterals			
Recognizes that quadrilaterals have 4 sides and angles that sum to 360°.  "I recognize the shapes by name. From left to right: square, rectangle, parallelogram, rhombus, isosceles trapezoid, trapezoid, convex kite (dart), and concave kite."	Understands that quadrilaterals can be classified using geometric properties.  "I sorted the quadrilaterals using the properties of rotational symmetry and at least one pair of parallel sides."	Sketches and identifies quadrilaterals when given specific properties.  "I drew a parallelogram that has opposite sides equal and parallel; opposite angles equal; and rotational symmetry of order 2."	Sketches, defines, and analyzes quadrilaterals using common geometric properties.  "A rectangle is a parallelogram because it has opposite sides equal and parallel. A parallelogram is not a rectangle because it does not have 4 right angles."
Observations/Documentation			

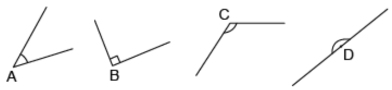
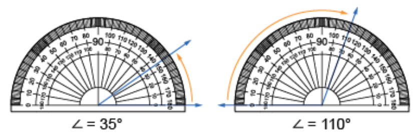
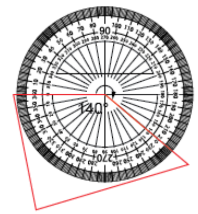
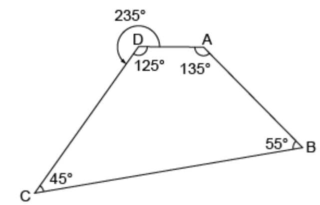
Activity 4 Assessment
Constructing 3-D Objects

<table>
<tr><th colspan="4">Drawing Views</th></tr>
<tr>
<td>Understands that 3-D objects can be represented in 2-D with different views.

“3-D objects can be represented on paper to show different views. I can match the object to the different views by laying the object on top of the views.”</td>
<td>Draws top, front, and side views of objects and matches views to a 3-D object.

“I used square dot paper to draw and label each view and match the object to the drawings.”</td>
<td>Constructs a 3-D object using given views.

“I constructed a 3-D object using the views. I started with the top view, then added the front view. Each additional view provided more information for building the 3-D object.”</td>
<td>Analyzes multiple 3-D objects from different perspectives using the same views.

“I visualized and built more than one 3-D object from the set of views (e.g., a cube can sometimes be placed behind other cubes without changing the views). When I change the orientation of the object, the perspective changes the views.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Geometry

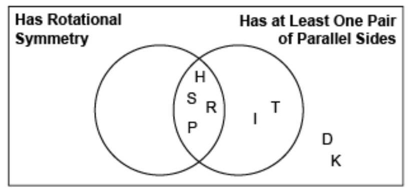
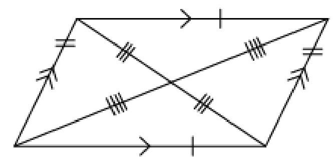
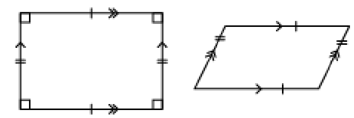
Activity 5 Assessment

2-D Shapes, Angles, and 3-D Solids Consolidation

Measuring and Comparing Angles			
Identifies and compares different types of angles using benchmarks of 90° and 180°.  "A is an acute angle because it looks less than 90°. B is a 90° right angle because it looks like a square corner. C is an obtuse angle because it looks like it is between 90° and 180°. D is a 180° straight angle because it is a straight line."	Compares/measures angles clockwise &counterclockwise using a 180° protractor.  "I can use a protractor to compare and measure angles. The first angle opens right, so I used the inside scale. It measures 35°. The second angle opens left, so I used the outer scale. It measures 110°."	Constructs angles using a 360° protractor and states the relationships between angles.  "I used the circle protractor to measure the reflex angle: 220°. I then subtracted the angle from 360° to determine the unknown interior angle: 360° – 220° = 140°. The sum of the reflex angle and the interior angle must be 360°."	Flexibly measures & constructs angles and matches angles using the additive principle.  "The angle measures are 135°, 45°, 55°, and 125°, and the sum: 135° + 45 + 55° + 125° = 360°. The 235° reflex angle and 125° matching angle add to 360°.
Observations/Documentation			

Geometry

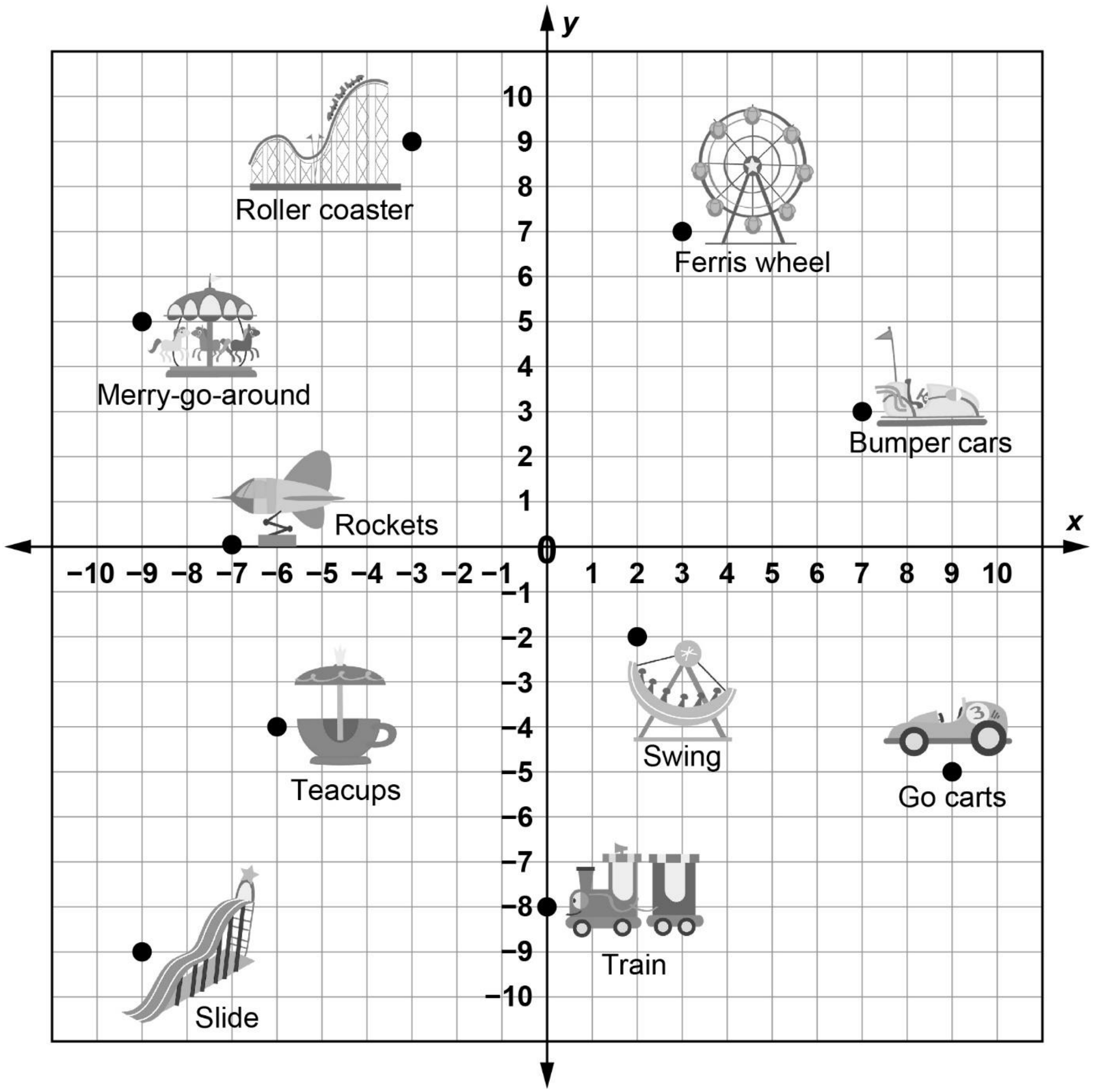
Activity 5 Assessment
2-D Shapes, Angles, and 3-D Solids Consolidation

Properties of Quadrilaterals			
Recognizes that quadrilaterals have 4 sides and angles that sum to 360°.  "I recognize the shapes by name. From left to right: square, rectangle, parallelogram, rhombus, isosceles trapezoid, trapezoid, convex kite (dart), and concave kite."	Understands that quadrilaterals can be classified using geometric properties.  "I sorted the quadrilaterals using the properties of rotational symmetry and at least one pair of parallel sides."	Sketches and identifies quadrilaterals when given specific properties.  "I drew a parallelogram that has opposite sides equal and parallel; opposite angles equal; and rotational symmetry of order 2."	Sketches, defines, and analyzes quadrilaterals using common geometric properties.  "A rectangle is a parallelogram because it has opposite sides equal and parallel. A parallelogram is not a rectangle because it does not have 4 right angles."
Observations/Documentation			

Name________________________________ Date_____________________

Geometry
Unit 2B Line Master 1

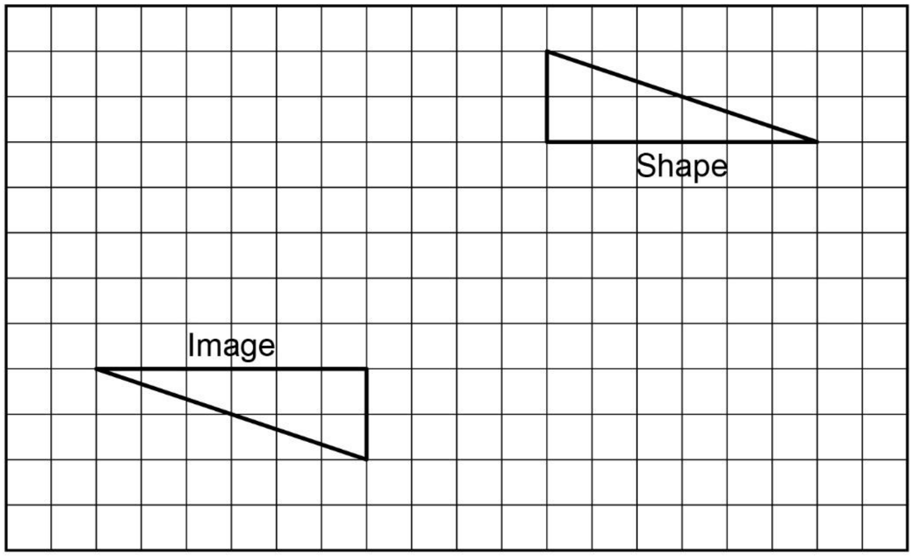
At the Amusement Park

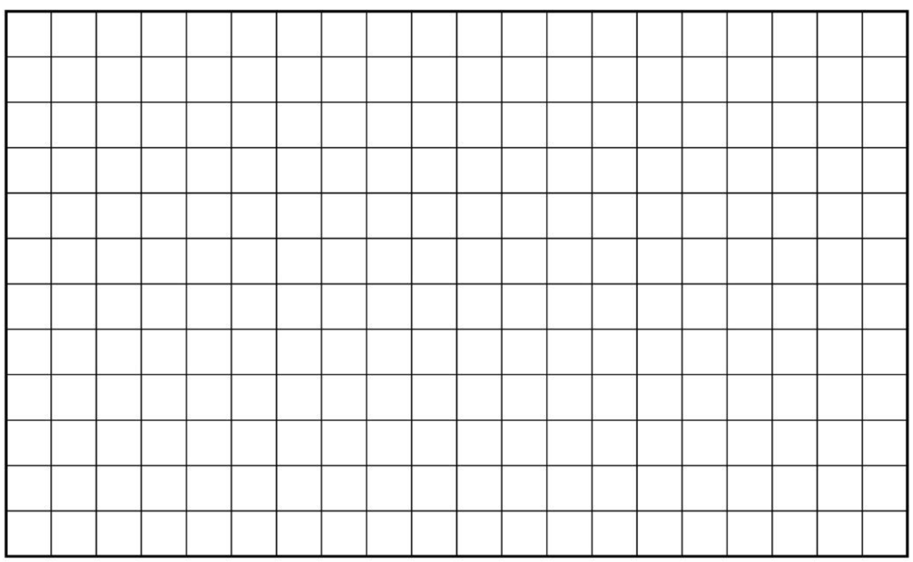


Name________________________________ Date_____________________

Geometry
Unit 2B Line Master 2

How Many Ways?



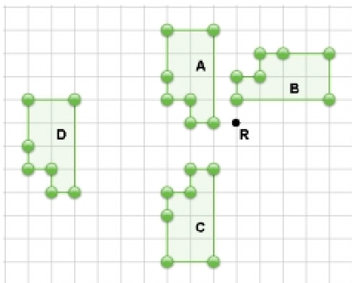


Geometry

Activity 7 Assessment
Rotating 2-D Shapes on a Grid

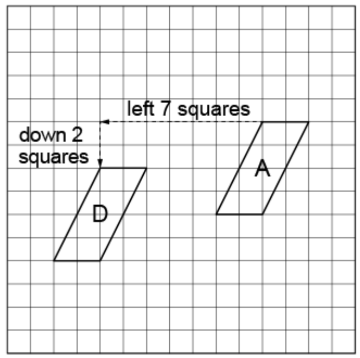
Applying and Visualizing Transformations on a Grid

Identifies and describes transformations on a grid.



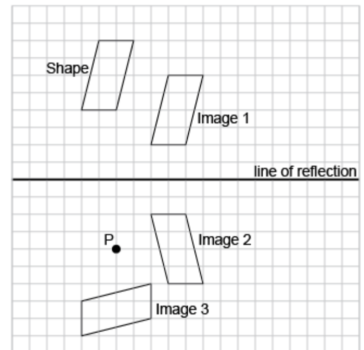
"Shape A to Shape D is a translation. Shape A is reflected in the horizontal line halfway between Shapes A and C to get Shape C. Shape A is rotated 90° clockwise about point R to get Shape B."

Describes and performs single transformations on a grid.



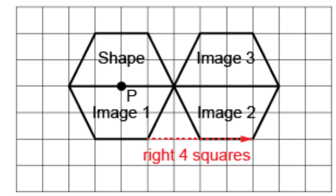
"I translated Shape A left 7 squares and down 2 squares to Image D."

Describes and performs combinations of transformations.



"I used a combination of transformations. I translated the Shape right 4 squares, down 2 squares to Image 1; I reflected Image 1 in the line of reflection shown to get Image 2; I rotated Image 2 90° clockwise about point P to get Image 3."

Visualizes, describes, and flexibly performs combinations of transformations.

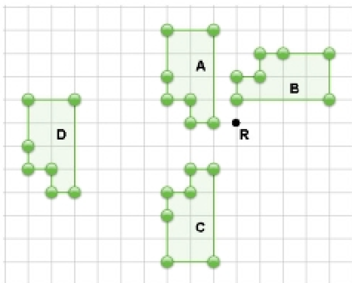
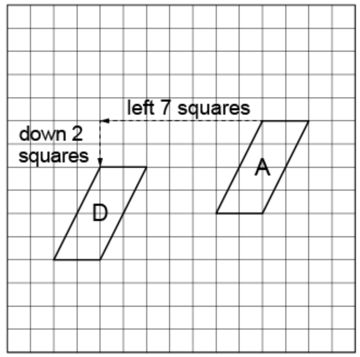
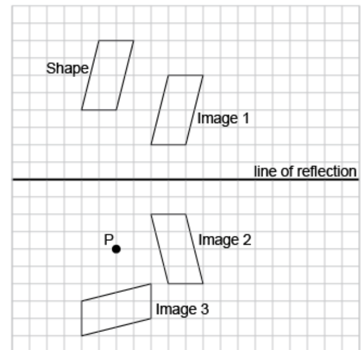
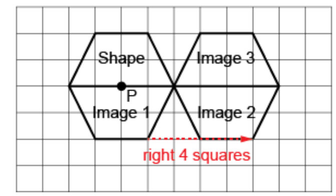


"I visualized the transformations and predicted where the images would be. I performed the transformations to check. I rotated the shape 180° about point P to get Image 1; then translated Image 1 right 4 squares to get Image 2; then reflected Image 2 in the common side to get Image 3. My predictions were correct."

Observations/Documentation

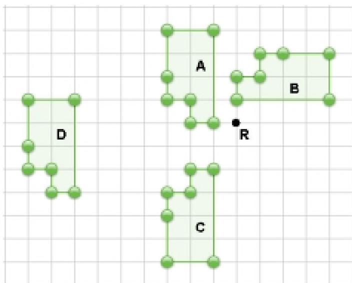
Activity 8 Assessment

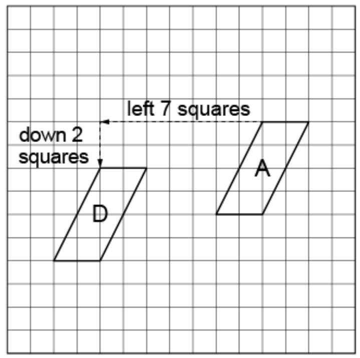
Single Transformations on a Grid

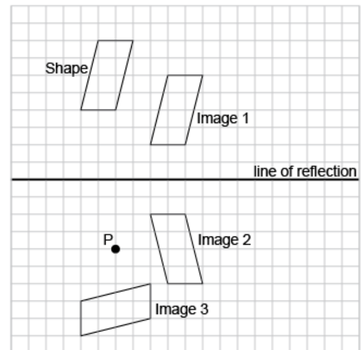
<table>
<tr><th colspan="4">Applying and Visualizing Transformations on a Grid</th></tr>
<tr>
<td>Identifies and describes transformations on a grid.

“Shape A to Shape D is a translation. Shape A is reflected in the horizontal line halfway between Shapes A and C to get Shape C. Shape A is rotated 90° clockwise about point R to get Shape B.”</td>
<td>Describes and performs single transformations on a grid.

“I translated Shape A left 7 squares and down 2 squares to Image D.”</td>
<td>Describes and performs combinations of transformations.

“I used a combination of transformations. I translated the Shape right 4 squares, down 2 squares to Image 1; I reflected Image 1 in the line of reflection shown to get Image 2; I rotated Image 2 90° clockwise about point P to get Image 3.”</td>
<td>Visualizes, describes, and flexibly performs combinations of transformations.

“I visualized the transformations and predicted where the images would be. I performed the transformations to check. I rotated the shape 180° about point P to get Image 1; then translated Image 1 right 4 squares to get Image 2; then reflected Image 2 in the common side to get Image 3. My predictions were correct.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

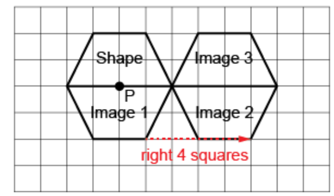
Activity 9 Assessment

Combining Transformations on a Grid

<table>
<tr><th colspan="4">Applying and Visualizing Transformations on a Grid</th></tr>
<tr>
<td>Identifies and describes transformations on a grid.


“Shape A to Shape D is a translation. Shape A is reflected in the horizontal line halfway between Shapes A and C to get Shape C. Shape A is rotated 90° clockwise about point R to get Shape B.”</td>
<td>Describes and performs single transformations on a grid.


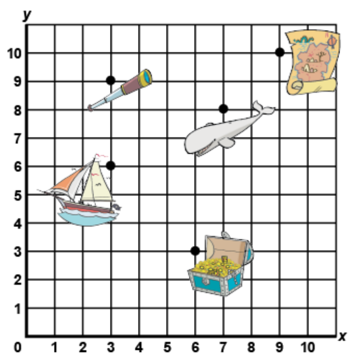
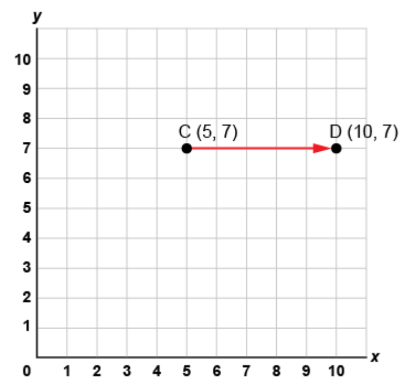
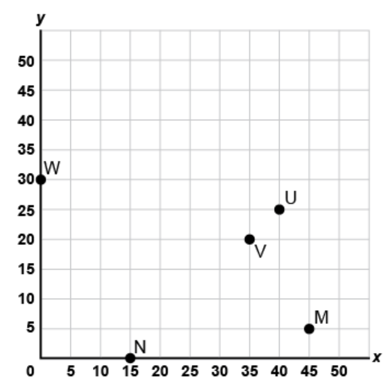
“I translated Shape A left 7 squares and down 2 squares to Image D.”</td>
<td>Describes and performs combinations of transformations.


“I used a combination of transformations. I translated the Shape right 4 squares, down 2 squares to Image 1; I reflected Image 1 in the line of reflection shown to get Image 2; I rotated Image 2 90° clockwise about point P to get Image 3.”</td>
<td>Visualizes, describes, and flexibly performs combinations of transformations.


“I visualized the transformations and predicted where the images would be. I performed the transformations to check. I rotated the shape 180° about point P to get Image 1; then translated Image 1 right 4 squares to get Image 2; then reflected Image 2 in the common side to get Image 3. My predictions were correct.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Geometry

Activity 10 Assessment
Plotting and Reading Coordinates

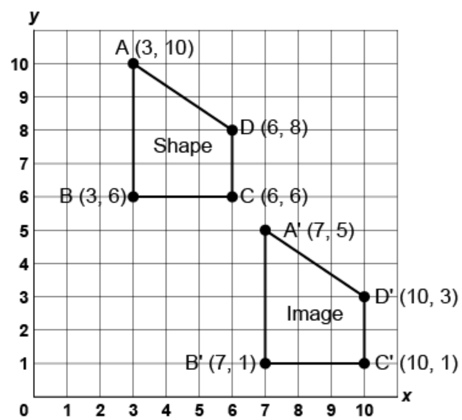
Locating and Mapping Shapes in 1st Quadrant of the Cartesian Plane		
Describes the location of 2-D shape/objects on the grid.  “The treasure chest is located at (6,3).”	Describes translations of points by describing distance, direction, and coordinates.  “I plotted the point C(5, 7), then translated it right 5 squares to C’(10, 5). The *x*-coordinate increased by 5.”	Plots and locates points on a grid using various scales and labels the coordinates.  “To plot each point, I counted by 5s along each axis and labelled the coordinates: W(0,30), N(15,0), V(35,20), U(40,25), M(45,5).”
Observations/Documentation		

Geometry

Activity 10 Assessment
Plotting and Reading Coordinates

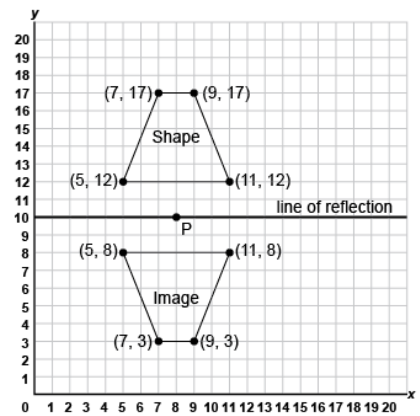
Locating and Mapping Shapes in 1st Quadrant of the Cartesian Plane (cont'd)

Translates or reflects shapes and labels coordinates of the image.



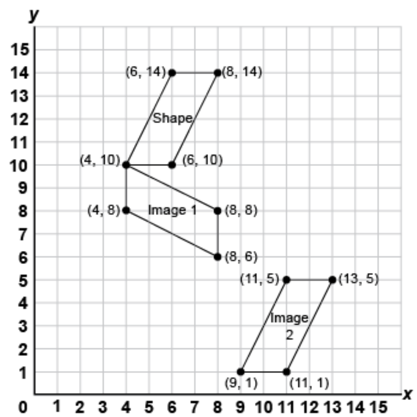
"I translated the quadrilateral right 4 squares, then down 5 squares. The *x*-coordinate of each vertex of the image increased by 4 and each *y*-coordinate decreased by 5."

Analyzes and locates the vertices of 2-D shapes before and after rotations.



"I rotated the shape 180° about P(8, 10). I chose point P because it is on the line of symmetry of the trapezoid, so when I rotate it 180°, the image is also a reflection."

Visualizes and predicts the location of 2-D shapes after transformations using various scales.

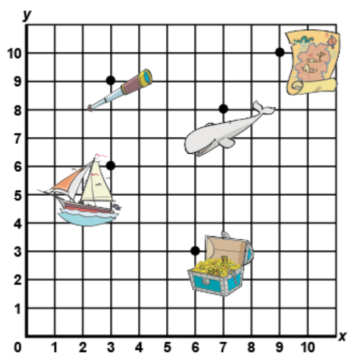
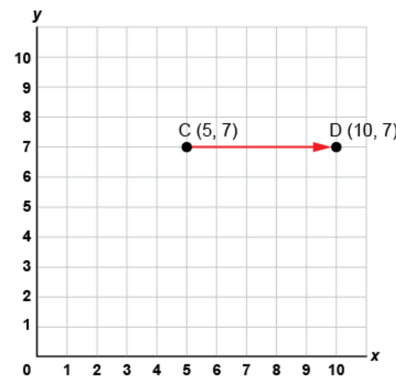
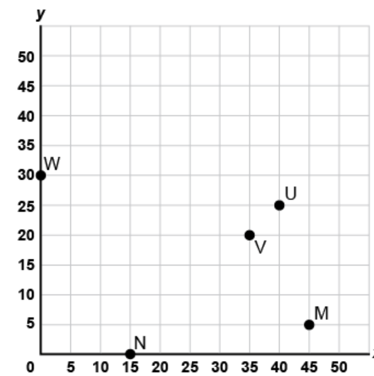


"I visualized and predicted the location of the image after different transformations and identified the coordinates. Image 1 is a rotation 90° clockwise, and Image 2 is a translation right 5 squares, down 9 squares."

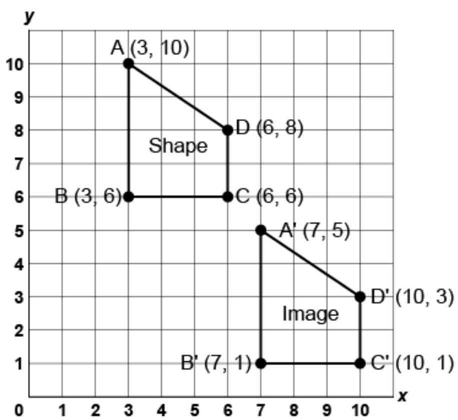
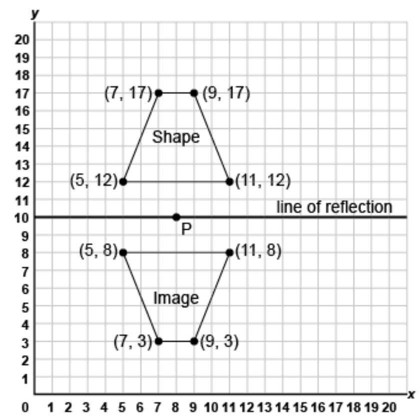
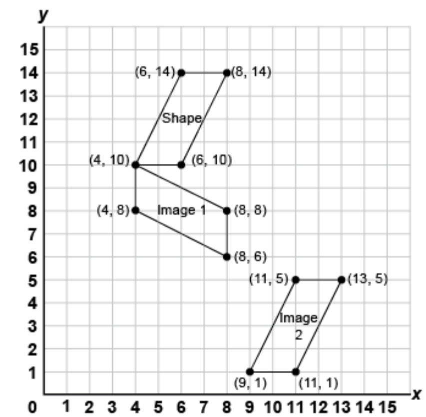
Observations/Documentation

Geometry

Activity 11 Assessment
Transformations on a Cartesian Plane

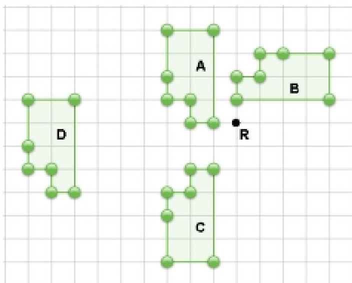
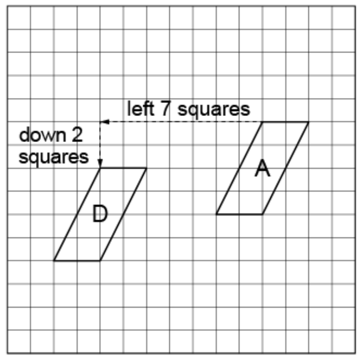
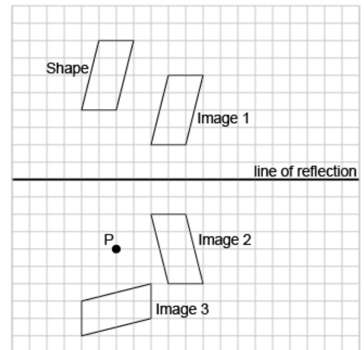
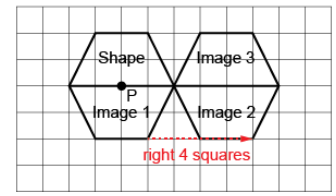
Locating and Mapping Shapes in 1st Quadrant of the Cartesian Plane		
Describes the location of 2-D shape/objects on the grid.	Describes translations of points by describing distance, direction, and coordinates.	Plots and locates points on a grid using various scales and labels the coordinates.
 “The treasure chest is located at (6,3).”	 “I plotted the point C(5, 7), then translated it right 5 squares to C’(10, 5). The *x*-coordinate increased by 5.”	 “To plot each point, I counted by 5s along each axis and labelled the coordinates: W(0,30), N(15,0), V(35,20), U(40,25), M(45,5).”
Observations/Documentation		

Activity 11 Assessment
Transformations on a Cartesian Plane

Locating and Mapping Shapes in 1st Quadrant of the Cartesian Plane (cont'd)		
Translates or reflects shapes and labels coordinates of the image.  "I translated the quadrilateral right 4 squares, then down 5 squares. The *x*-coordinate of each vertex of the image increased by 4 and each *y*-coordinate decreased by 5."	Analyzes and locates the vertices of 2-D shapes before and after rotations.  "I rotated the shape 180° about P(8, 10). I chose point P because it is on the line of symmetry of the trapezoid, so when I rotate it 180°, the image is also a reflection."	Visualizes and predicts the location of 2-D shapes after transformations using various scales.  "I visualized and predicted the location of the image after different transformations and identified the coordinates. Image 1 is a rotation 90° clockwise, and Image 2 is a translation right 5 squares, down 9 squares."
Observations/Documentation		

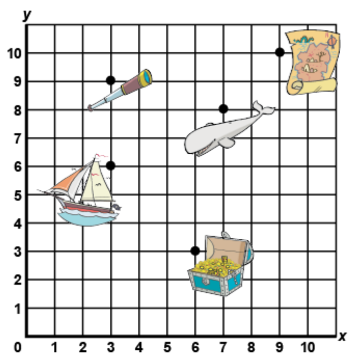
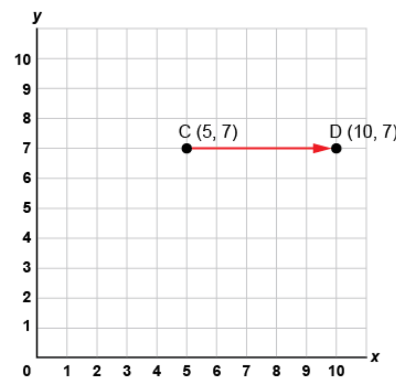
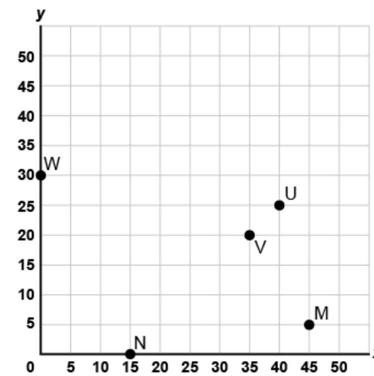
Activity 12 Assessment
Transformations Consolidation

Applying and Visualizing Transformations on a Grid

Identifies and describes transformations on a grid.	Describes and performs single transformations on a grid.	Describes and performs combinations of transformations.	Visualizes, describes, and flexibly performs combinations of transformations.
 “Shape A to Shape D is a translation. Shape A is reflected in the horizontal line halfway between Shapes A and C to get Shape C. Shape A is rotated 90° clockwise about point R to get Shape B.”	 “I translated Shape A left 7 squares and down 2 squares to Image D.”	 “I used a combination of transformations. I translated the Shape right 4 squares, down 2 squares to Image 1; I reflected Image 1 in the line of reflection shown to get Image 2; I rotated Image 2 90° clockwise about point P to get Image 3.”	 “I visualized the transformations and predicted where the images would be. I performed the transformations to check. I rotated the shape 180° about point P to get Image 1; then translated Image 1 right 4 squares to get Image 2; then reflected Image 2 in the common side to get Image 3. My predictions were correct.”

Observations/Documentation

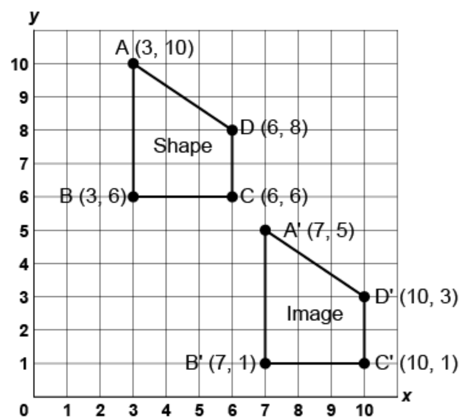
Activity 12 Assessment
Transformations Consolidation

Locating and Mapping Shapes in 1st Quadrant of the Cartesian Plane		
Describes the location of 2-D shape/objects on the grid.  "The treasure chest is located at (6,3)."	Describes translations of points by describing distance, direction, and coordinates.  "I plotted the point C(5, 7), then translated it right 5 squares to C'(10, 5). The *x*-coordinate increased by 5."	Plots and locates points on a grid using various scales and labels the coordinates.  "To plot each point, I counted by 5s along each axis and labelled the coordinates: W(0,30), N(15,0), V(35,20), U(40,25), M(45,5)."
Observations/Documentation		

Activity 12 Assessment
Transformations Consolidation

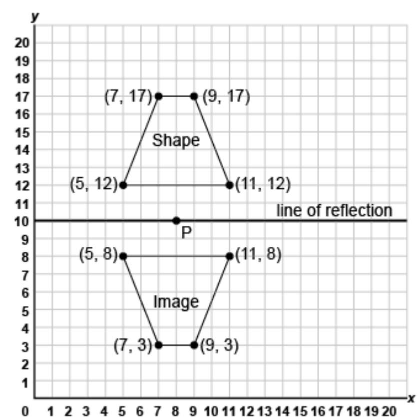
Locating and Mapping Shapes in 1st Quadrant of the Cartesian Plane (cont'd)

Translates or reflects shapes and labels coordinates of the image.



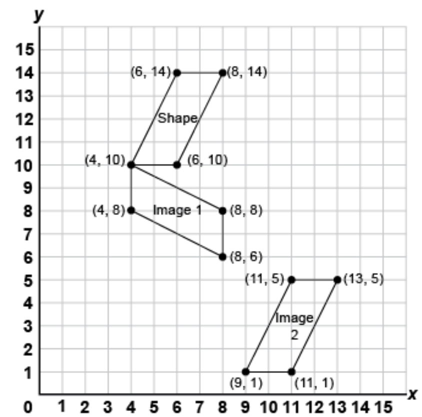
"I translated the quadrilateral right 4 squares, then down 5 squares. The *x*-coordinate of each vertex of the image increased by 4 and each *y*-coordinate decreased by 5."

Analyzes and locates the vertices of 2-D shapes before and after rotations.



"I rotated the shape 180° about P(8, 10). I chose point P because it is on the line of symmetry of the trapezoid, so when I rotate it 180°, the image is also a reflection."

Visualizes and predicts the location of 2-D shapes after transformations using various scales.



"I visualized and predicted the location of the image after different transformations and identified the coordinates. Image 1 is a rotation 90° clockwise, and Image 2 is a translation right 5 squares, down 9 squares."

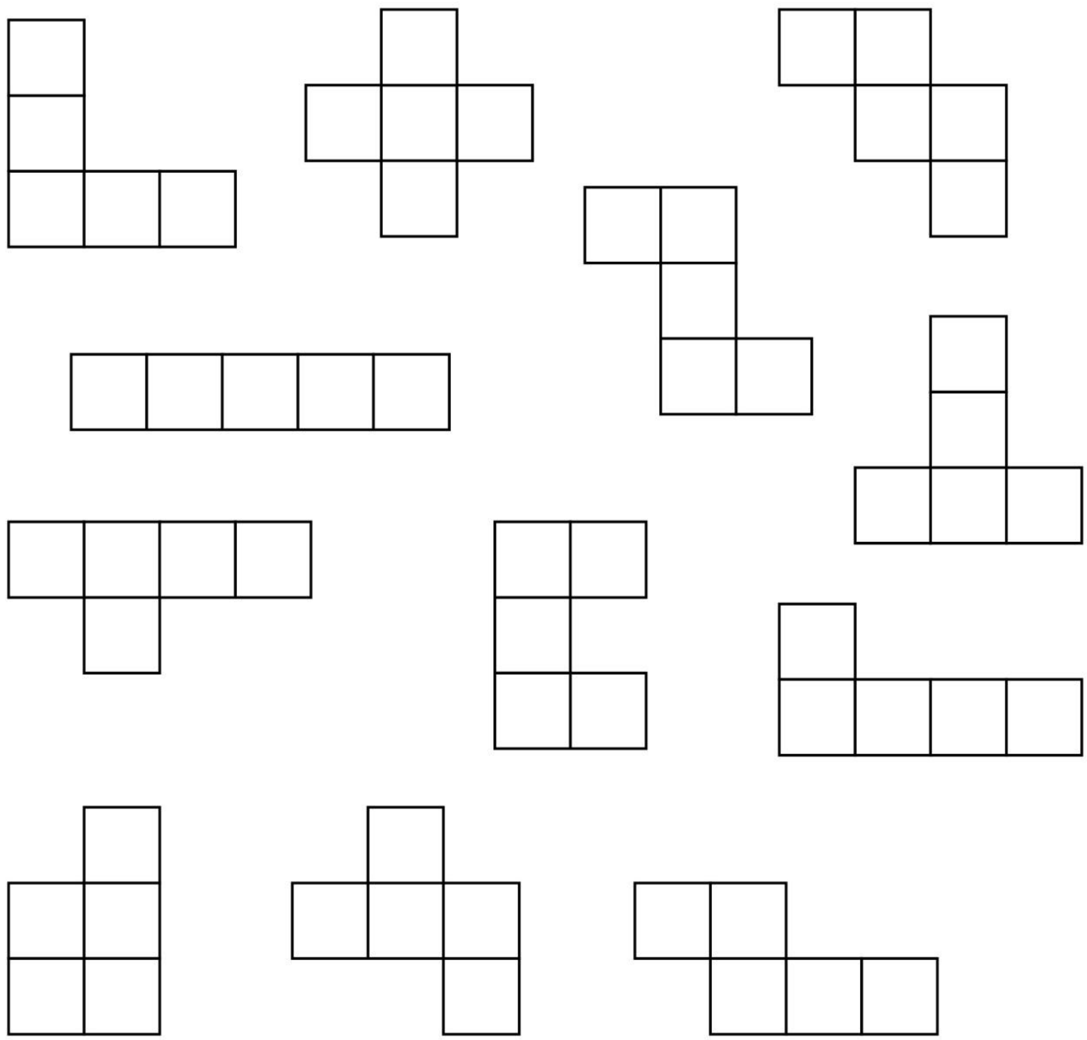
Observations/Documentation

Name________________________________ Date_____________________

Geometry
Unit 2A Line Master 1

Pentominoes

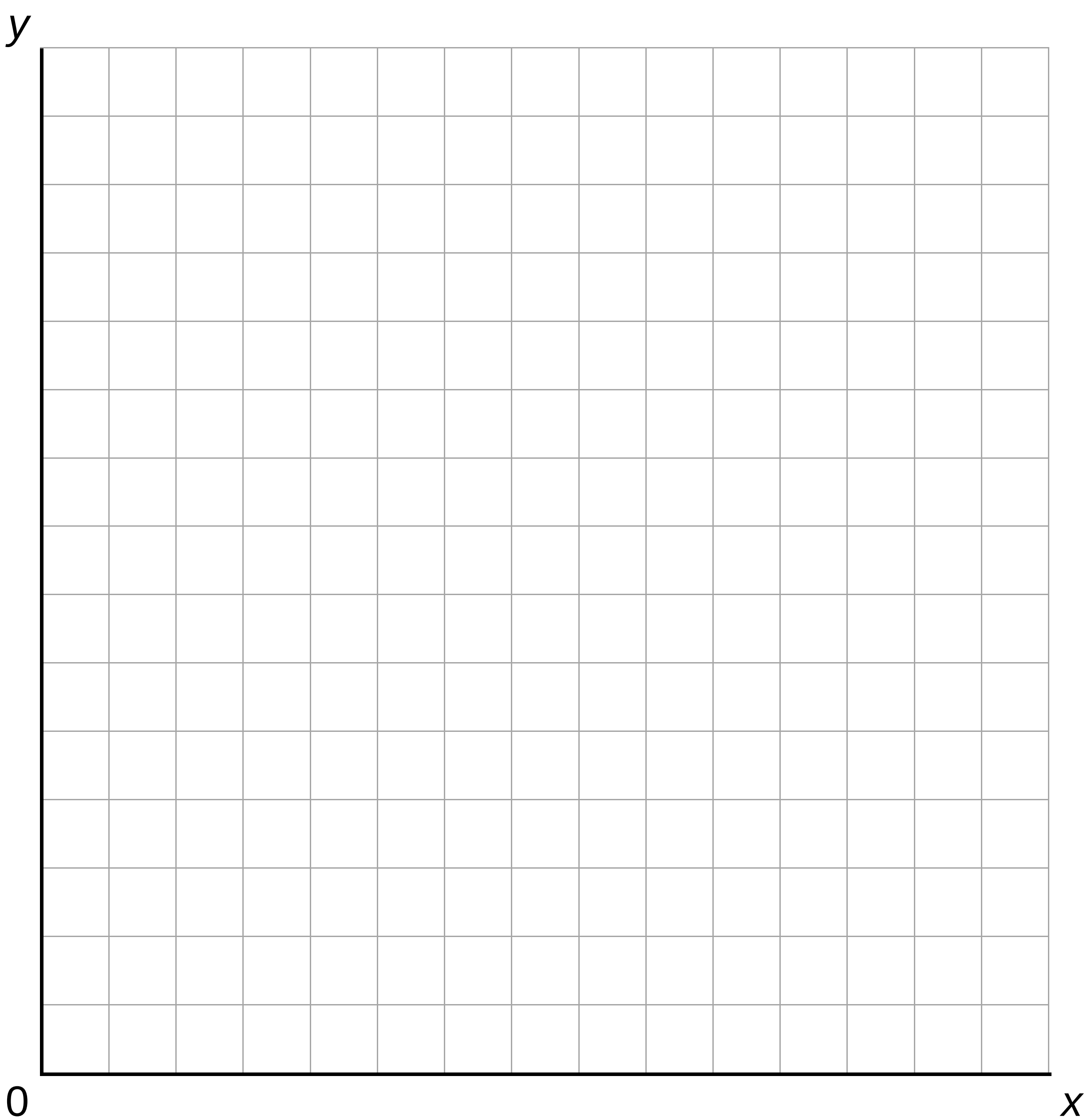
A **pentomino** is a geometric shape made from 5 squares, connected at the sides.



Name________________________________ Date_____________________

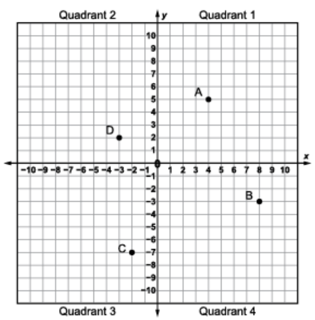
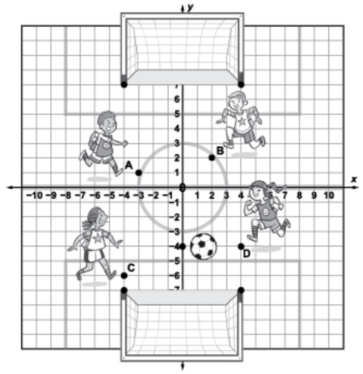
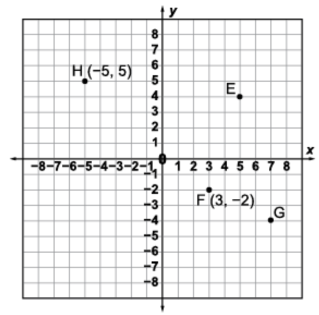
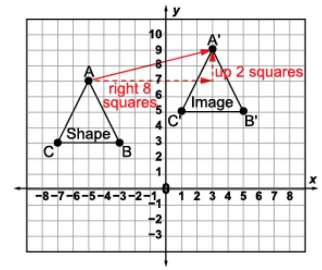
Geometry
Unit 2A Line Master 2

Coordinate Grid

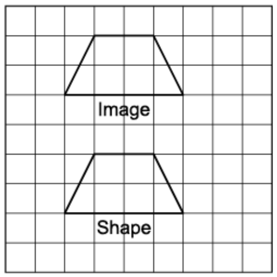
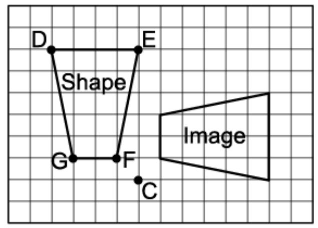
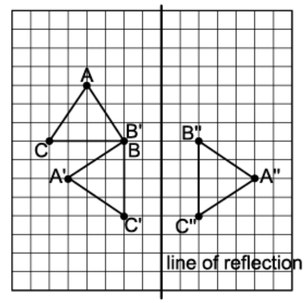
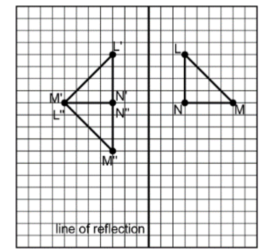


Geometry

Activity 6 Assessement
Plotting and Reading Coordinates

Plotting and Reading Coordinates in Four Quadrants of the Cartesian Plane			
Identifies coordinates to describe the location of points on a Cartesian plane.	Use coordinates to plot and describe the location of points on a Cartesian plane.	Describes how to translate one point to another point on a Cartesian plane.	Flexibly predicts and describes the location and coordinates of points after a translation using the translation vector.
 “The coordinates of point B are (8, –3).”	 “The ends of the soccer nets are located at (–4, 7) to (4, 7) and (–4, –7) to (4, –7)”	 “To move point H to point F, translate point H 8 left and 7 down.” point H(–5, 5) (–5 + 8, 5 – 7) → (3, –2)	 “To move point A to A’: A(–5, 7) → (–5 + 8, 7 + 2) → A’(3, 9) B(–3, 3) → (–3 + 8, 3 + 2) → B’(5, 5) C(–7, 3) → (–7 + 8, 3 + 2) → C’(1, 5) The translation vector is (8, 2) for all points.”
Observations/Documentation			

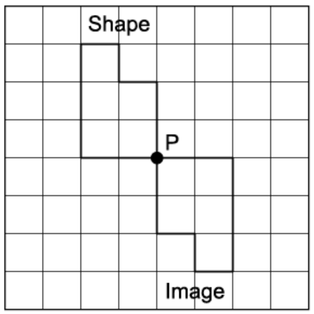
Activity 7 Assessment
Transformations on a Grid

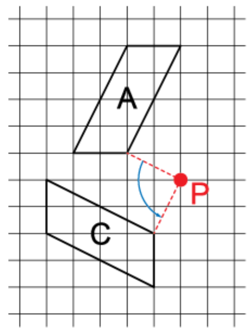
Applying and Visualizing Transformations on a Grid			
Identifies and describes transformations on a grid.  “This shows a translation because the shape and the image face the same way.”	Describes and performs single transformations on a grid.  “The shape was rotated 90° about the point of rotation C to get the Image.”	Describes and performs combinations of transformations.  “The triangle is rotated 270° clockwise about vertex B, then reflected in the vertical line.”	Visualizes, describes, and flexibly performs a combination of transformations.  “I visualize reflecting triangle LMN in the vertical line of reflection, then rotating the image 90° counterclockwise about N’ to get triangle L”M”N”.”
Observations/Documentation			

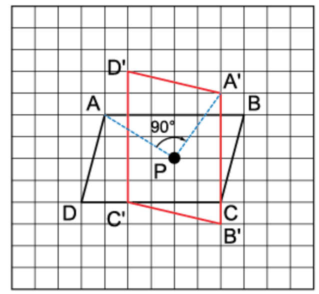
Geometry

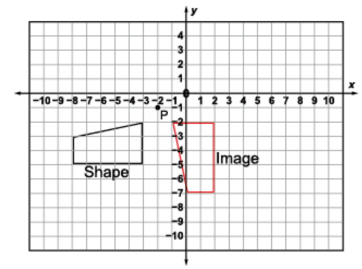
Activity 8 Assessment

Rotating 2-D Shapes up to 360°

<table>
<tr><th colspan="4">Applying and Visualizing Rotations on a Grid</th></tr>
<tr>
<td>Identifies rotation that takes a shape to its image on a grid (point of rotation on shape).


“I know the shape was rotated 180° clockwise about vertex P.”</td>
<td>Identifies rotation that takes a shape to its image on a grid (point of rotation off shape).


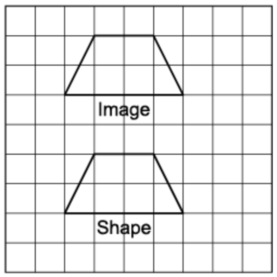
“I know the shape was rotated 90° counterclockwise about point P.”</td>
<td>Performs and describes various rotations with angles of rotation to 360°.


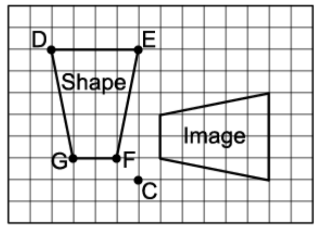
“I used the point of rotation to rotate the shape 270° counterclockwise. If I rotated the shape 90° clockwise, I would get the same final image. I know the image is correct because each vertex and its image are the same distance from point P and the angle between the lines joining matching vertices to the point of rotation is 90°.</td>
<td>Visualizes, predicts, and describes where the image of a shape will be after a rotation.


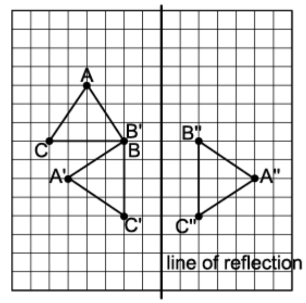
“I can picture rotating the shape 90° counterclockwise about the point of rotation, P.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

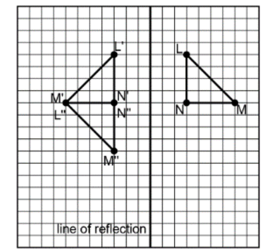
Geometry

Activity 9 Assessment
Combining Transformations on a Grid

<table>
<tr><th colspan="4">Applying and Visualizing Transformations on a Grid</th></tr>
<tr>
<td>Identifies and describes transformations on a grid.


“This shows a translation because the shape and the image face the same way.”</td>
<td>Describes and performs single transformations on a grid.


“The shape was rotated 90° about the point of rotation C to get the Image.”</td>
<td>Describes and performs combinations of transformations.


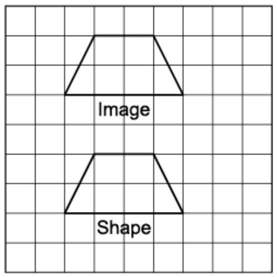
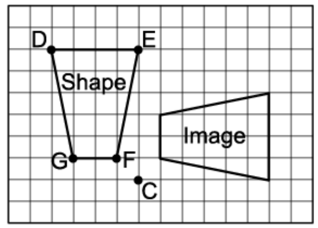
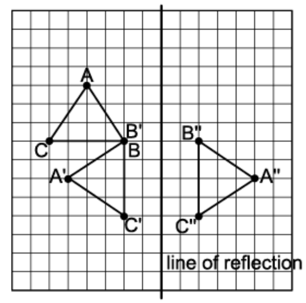
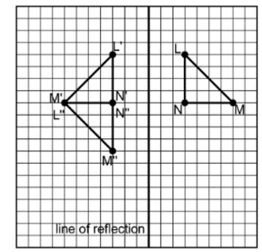
“The triangle is rotated 270° clockwise about vertex B, then reflected in the vertical line.”</td>
<td>Visualizes, describes, and flexibly performs a combination of transformations.


“I visualize reflecting triangle LMN in the vertical line of reflection, then rotating the image 90° counterclockwise about N’ to get triangle L”M”N”.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

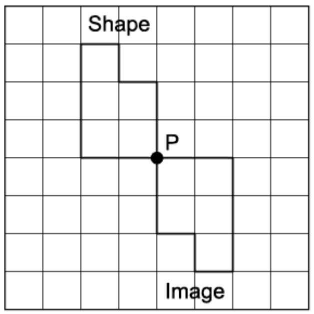
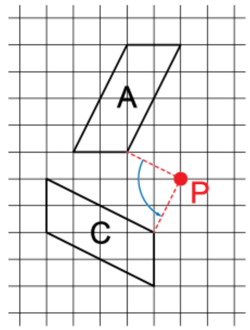
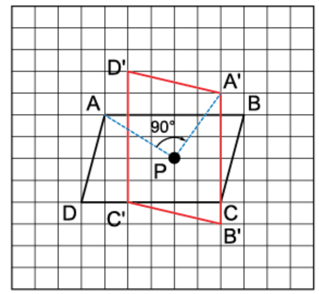
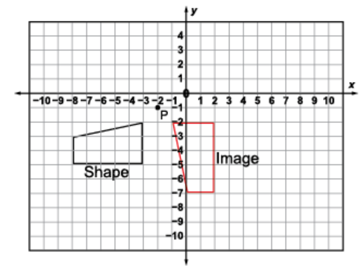
Geometry

Activity 10 Assessment

Grids and Transformations Consolidation

Applying and Visualizing Transformations on a Grid			
Identifies and describes transformations on a grid.	Describes and performs single transformations on a grid.	Describes and performs combinations of transformations.	Visualizes, describes, and flexibly performs a combination of transformations.
			
"This shows a translation because the shape and the image face the same way."	"The shape was rotated 90° about the point of rotation C to get the Image."	"The triangle is rotated 270° clockwise about vertex B, then reflected in the vertical line."	"I visualize reflecting triangle LMN in the vertical line of reflection, then rotating the image 90° counterclockwise about N' to get triangle L"M"N"."
Observations/Documentation			

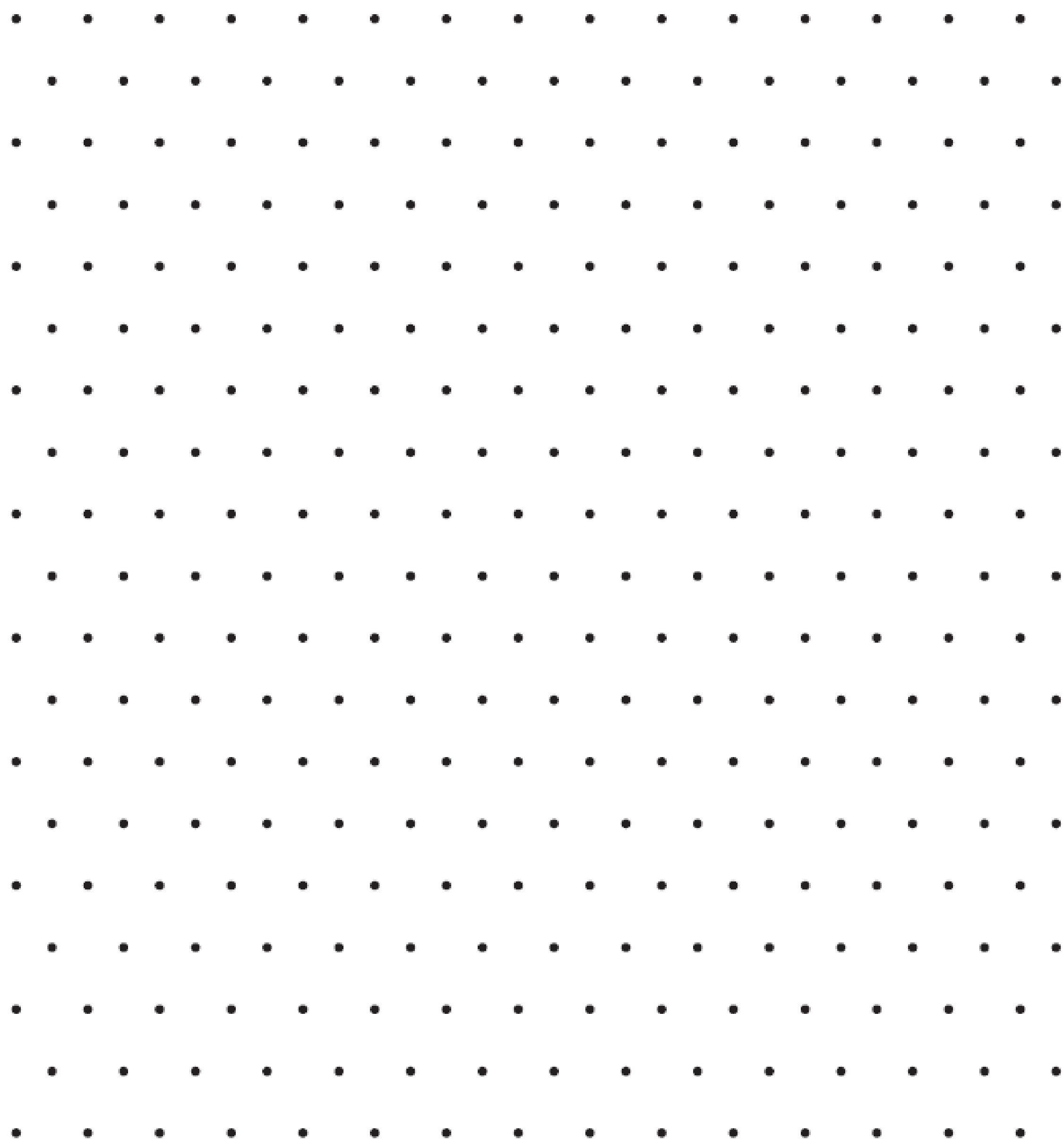
Activity 10 Assessment
Grids and Transformations Consolidation

Applying and Visualizing Rotations on a Grid (cont'd)			
Identifies rotation that takes a shape to its image on a grid (point of rotation on shape).  "I know the shape was rotated 180° clockwise about vertex P."	Identifies rotation that takes a shape to its image on a grid (point of rotation off shape).  "I know the shape was rotated 90° counterclockwise about point P."	Performs and describes various rotations with angles of rotation to 360°.  "I used the point of rotation to rotate the shape 270° counterclockwise. If I rotated the shape 90° clockwise, I would get the same final image. I know the image is correct because each vertex and its image are the same distance from point P and the angle between the lines joining matching vertices to the point of rotation is 90°."	Visualizes, predicts, and describes where the image of a shape will be after a rotation.  "I can picture rotating the shape 90° counterclockwise about the point of rotation, P."
Observations/Documentation			

Name________________________________ Date_____________________

Measurement
Unit 1A Line Master 1

1-cm Triangular Dot Paper



Name_________________________________ Date______________________

Measurement
Unit 1A Line Master 2

What the Perimeter?

Polygon	Perimeter	Rule for Perimeter
square		
rectangle		
hexagon		
octagon		
triangle		
parallelogram		
rhombus		
pentagon		
regular hexagon		

Name________________________________ Date_____________________

Measurement
Unit 1A Line Master 3

What the Area?

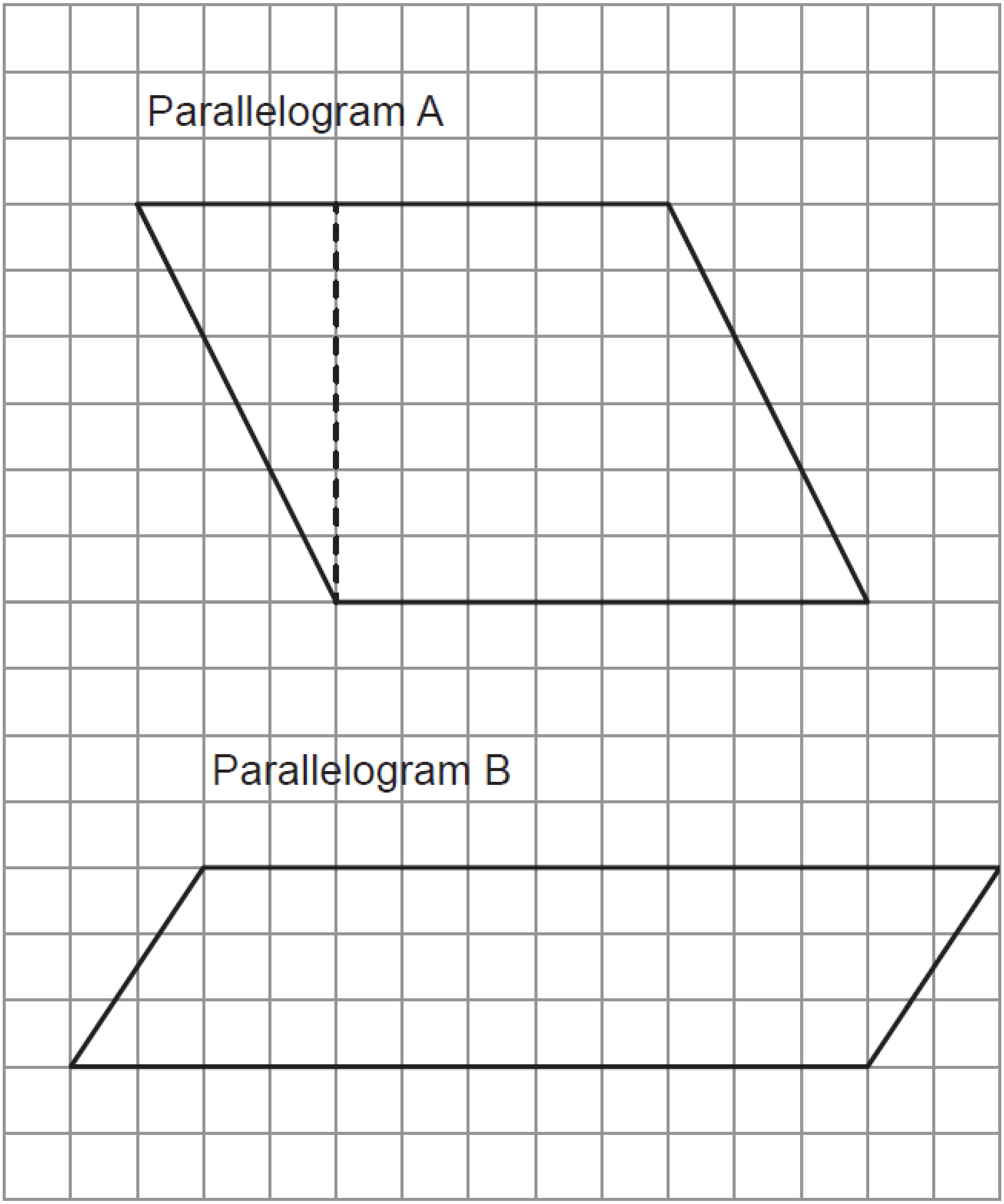
Recording Sheet

Area (cm^2)	Length (cm)	Width (cm)

Name_________________________________ Date______________________

Measurement
Unit 1A Line Master 4

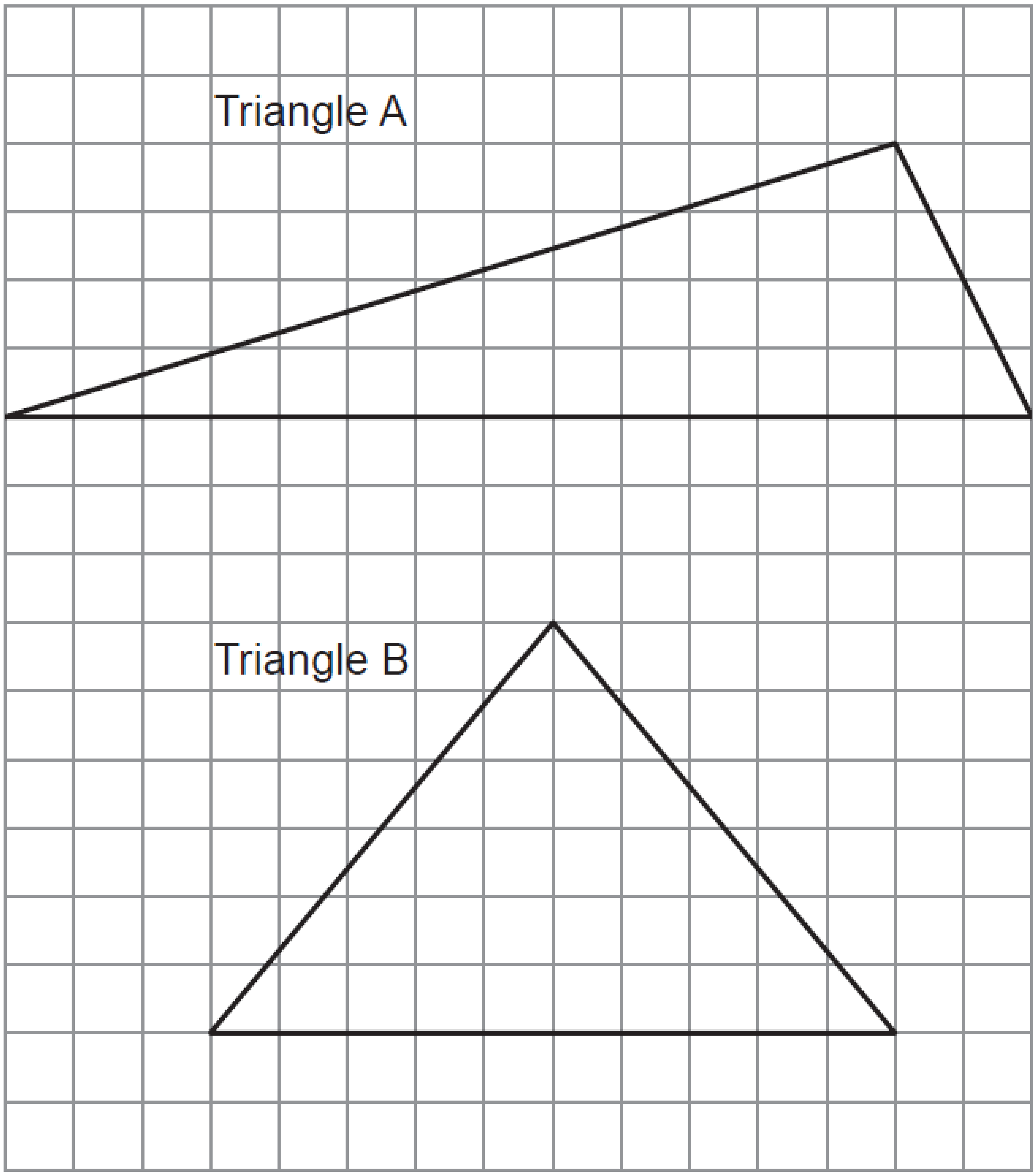
Area of Parallelograms



Name________________________________ Date_____________________

Measurement
Unit 1A Line Master 5

Area of Triangles



Name________________________________ Date_____________________

Measurement
Unit 1A Line Master 6

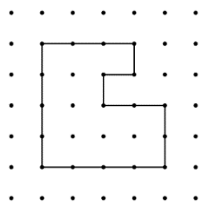
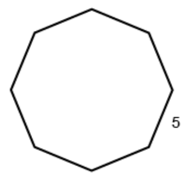
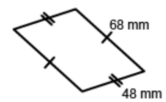
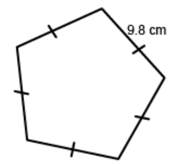
What's the Volume?

Volume (cubic units)	Length (units)	Width (units)	Area of Base (square units)	Height (units)

Measurement

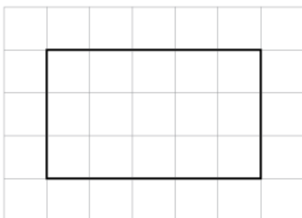
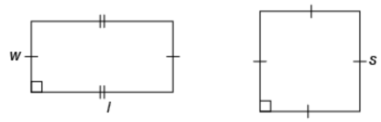
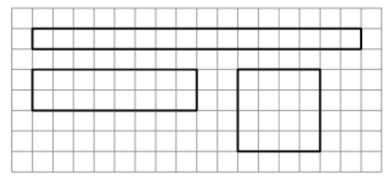
Activity 1 Assessment

Determining the Perimeter of Polygons

Using Formulas to Determine Perimeter of Polygons			
Uses standard units to measure the perimeter of irregular polygons by adding side lengths.  "The polygon is on 1-cm dot paper. I added the lengths of the sides: 3 cm + 4 cm + 4 cm + 2 cm + 2 cm + 1 cm + 1 cm + 1 cm = 18 cm; The perimeter of the shape is 18 cm."	Uses P = # of equal sides × length of a side to calculate the perimeter of regular polygons.  Regular Octagon "In a regular octagon, all sides are the same length. I multiply the length of a side by the number of sides: P = 8 × 5 cm = 40 cm. The perimeter is 40 cm."	Identifies the appropriate formula to determine the perimeter of different polygons.   "The irregular polygon is a parallelogram, so I can use the formula: $P = 2(a + b)$: 2(48 mm + 68 mm) = 2(116 mm) = 232 mm. The pentagon is a regular pentagon, so I can use the formula $P = 5s$: 5 × 9.8 cm = 49.0 cm."	Fluently applies formulas for determining perimeter of polygons to solve problems. A soccer field is 125 m by 85 m. A football field is about 92 m by 49 m. Which field has the greater perimeter? "Both fields are rectangular, so I will use the formula for the perimeter of a rectangle: $P = 2(l + w)$. Soccer field: P = 2(125 m + 88 m) = 426 m. Football field: P = 2(92 m + 49 m) = 282 m The soccer field has the greater perimeter."
Observations/Documentation			

Measurement

Activity 2 Assessment
Determining the Area of Rectangles

Measuring Area of Rectangles			
Recognizes that area is the number of congruent squares needed to cover a surface.  “On the 1-cm grid, the rectangle forms an array of 3 rows of 5 squares: $3 \times 5 = 15$; the area of the rectangle is 15 cm^2.”	Understands how length and width of a rectangle relate to its area and related formulas.  “A square has all sides equal. To determine its area, I multiply a side length by itself: $A = s \times s$, or $A = s^2$. To determine the area of a rectangle, I multiply the length by the width (or base by the height): $A = l \times w$, or $A = lw$, or $A = b \times h$, or $A = bh$.”	Constructs different rectangles for a given area and uses formulas to check the measures. Area of rectangle = 16 cm^2  “I constructed 3 different rectangles: A square with side length 4 cm: 4 cm × 4 cm = 16 cm^2. A 2-cm by 8-cm rectangle: 2 cm × 8 cm = 16 cm^2 A 1-cm by 16- cm rectangle: 1 cm × 16 cm = 16 cm^2”	Flexibly applies formulas to calculate the area of rectangles and to solve problems. Cassie charges \$4 for each 10 m^2 of driveway shovelled. How much would Cassie charge for a driveway that is 15 m by 25 m? “Area of driveway: 15 m × 25 m = 375 m^2. Determine how many 10 m^2 are in the total area: 375 ÷ 10 = 37 R5. Cassie charged: 37 × \$4 + 0.5 × \$4 = \$148 + \$2 = \$150.”
Observations/Documentation			

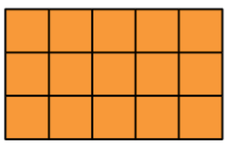
Activity 3 Assessment

Areas of Parallelograms, Triangles, and Trapezoids

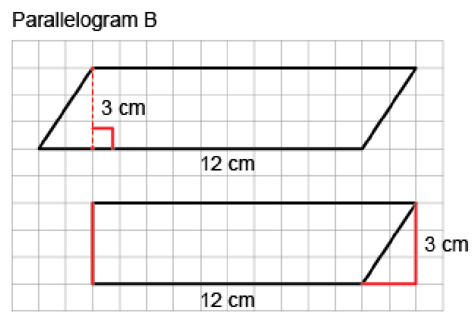
Measuring Area of Parallelograms, Triangles, and Trapezoids

Determines the area of a rectangle.

"A rectangle is an array of squares. To find the area, I multiply the number of rows by the number of columns or use the formula $A = b \times h$. This rectangle has area 5 cm × 3 cm = 15 cm^2."

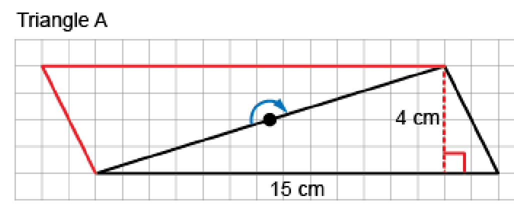


Partitions and rearranges a parallelogram to form a rectangle with the same base and height (same area).



"I partitioned the parallelogram and moved the triangle to create a rectangle.
I then found the area of the rectangle:
$A = b \times h$ = 12 cm × 3 cm= 36 cm^2.
The area of the parallelogram is also 36 cm^2."

Doubles and rotates a triangle to create a parallelogram and understands that the area of the triangle is one-half the area of the parallelogram.

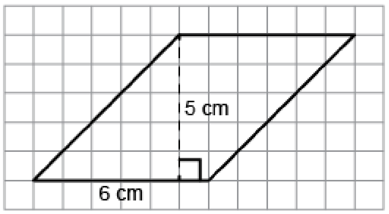
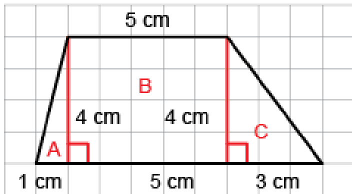
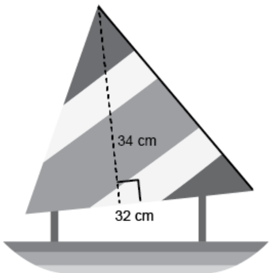


"I rotated the triangle to make a parallelogram with the same base and height. The area of the triangle is one-half the area of the parallelogram.
Area of parallelogram: 15 cm × 4 cm = 60 cm^2
Area of triangle: 60 cm^2 ÷ 2 = 30 cm^2
So, the formula for the area of a triangle is: $A = b \times h \div 2$."

Observations/Documentation

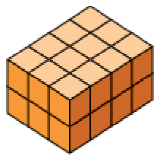
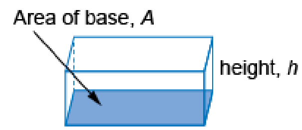
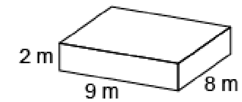
Activity 3 Assessment
Areas of Parallelograms, Triangles, and Trapezoids

Measuring Area of Parallelograms, Triangles, and Trapezoids (cont'd)

Determines the area of a trapezoid by partitioning it into triangles and rectangles, then uses formulas to determine area.  "I divided the trapezoid into 2 triangles and a rectangle. Triangle A: A = (1 cm × 4 cm) ÷ 2 = 2 cm^2 Rectangle B: A = 5 cm × 4 cm = 20 cm^2 Triangle C: A = (3 cm × 4 cm) ÷ 2 = 6 cm^2 Area of trapezoid: 2 cm^2 + 20 cm^2 + 6 cm^2 = 28 cm^2."	Constructs a parallelogram or triangle with a given area using known formulas and explains strategies used. Construct a parallelogram with area 30 cm^2.  "A parallelogram has the same area formula as a rectangle: $A = b \times h$. Since 5 × 6 = 30, I drew a horizontal line of length 6 cm for the base. I drew a vertical line of length 5 cm for the height, then drew another horizontal line segment 6 cm long. I joined each end of the line segment to the base."	Flexibly solves problems involving the area relationships among rectangles, parallelograms, and triangles and the related formulas.  What is the area of the sail on the toy boat? "I doubled the triangular sail to make a parallelogram with the same base and height. I found the area of the parallelogram: 34 cm × 32 cm = 1088 cm^2, then divided the area in half to find the area of the triangle: 1088 cm^2 ÷ 2 = 544 cm^2."
Observations/Documentation		

Measurement

Activity 4 Assessment
Determining the Volume of Right Rectangular Prisms

Determining the Volume of Right Rectangular Prisms		
Understands that volume is a measure of how much space an object fills.  “The rectangular prism has a base that is a rectangle. It is made of 24 cubes, so its volume is 24 cubic units.	Uses benchmarks to estimate volume using metric units.  “I would use a large dog crate as a benchmark for 1 m^2 to measure the volume of storage room.”	Use a formula to calculate the volume of a rectangular prism.   “I determined the area of the base: 9 m × 8 m = 72 m^2. Then I multiplied the area of the base by the height: 72 m^2 × 2 m = 144 m^3. The volume of the box is 144 m^3.”
Observations/Documentation		

Measurement

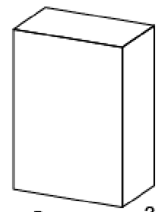
Activity 4 Assessment

Determining the Volume of Right Rectangular Prisms

<table>
<tr><th colspan="3">Determining the Volume of Right Rectangular Prisms (cont'd)</th></tr>
<tr>
<td>Constructs different rectangular prisms for a given volume.

Make as many different rectangular prisms as you can with a volume of 30 cm^3.

"I made 5 different prisms. The dimensions are:
1 cm by 1 cm by 30 cm; 1 cm by 2 cm by 15 cm;
1 cm by 3 cm by 10 cm; 1 cm by 5 cm by 6 cm;
2 cm by 3 cm by 5 cm."</td>
<td>Sketches rectangular prisms and calculates volume using formula V = base area × height.



"The base area is: 3 cm × 5 cm = 15 cm^2.
The height is 7 cm.
Volume = 15 cm^2 × 7 cm = 105 cm^3."</td>
<td>Flexibly solves problems in various contexts that involve the volume of rectangular prisms.

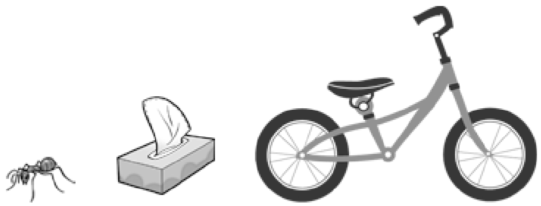
A box has volume 4500 cm^3.
The box has length 30 cm and width 15 cm.
What is the height of the box?

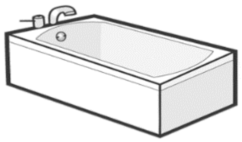
"The area of the base of the box is
30 cm × 15 cm = 450 cm^2.
V = base area × h
4500 cm^3 = 450 cm^2 × h
h = 10 cm
The box has height 10 cm."</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Measurement

Activity 5 Assessment

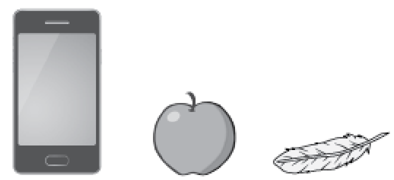
Investigating Capacity

<table>
<tr><th colspan="3">Investigating Mass and Capacity</th></tr>
<tr>
<td>Identifies which metric unit should be used to measure the mass and/or capacity of an object.

“I would use milligrams for the ant, grams for the tissue box, and kilograms for the bicycle.”</td>
<td>Uses benchmarks to estimate mass or capacity using metric units, then measures to check.


“A carton of milk has a capacity of about 1 L. I estimated that the paint can holds about 4 L. I measured to check: 3.8 L.”</td>
<td>Chooses an appropriate metric unit to estimate and measure mass and/or capacity of object and explains reasoning.

“I would use litres to measure the capacity of the bathtub because I know it has a capacity much larger than a 1-L carton of milk. I think it would take about 180 L to fill the bathtub.”</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

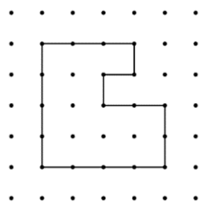
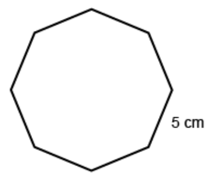
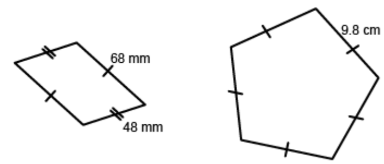
Measurement

Activity 5 Assessment
Investigating Capacity

Investigating Mass and Capacity (cont'd)		
Explains the relationship between metric units of mass and/or capacity and converts between units. Rhianna drinks 1500 mL of milk at school in one week. How many litres does she drink? “I know 1000 mL = 1 L, so 500 mL = 0.5 L; 1 L + 0.5 L = 1.5 L.”	Compares and orders items by mass and/or capacity when measures are given in different units.  0.17 kg 80 g 5 mg “I converted the mass of each object to grams: 0.17 × 1000 = 170 and 5 ÷ 1000 = 0.005. The order from least to greatest mass is feather (0.005 g), apple (80 g), and cell phone (170 g).”	Flexibly solves problems in various contexts where measures of mass and/or capacity are given in different units. One peach has a mass of 150 g. How much will it cost for 8 peaches if they sell for $5 per kg? “I found the mass of 8 peaches in kilograms: 8 × 150 g = 1200 g, or 1.2 kg; I kg costs $5; 0.2 kg is one-fifth of 1 kg and one-fifth of $5 is $1; $5 + $1 = $6.”
Observations/Documentation		

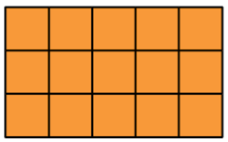
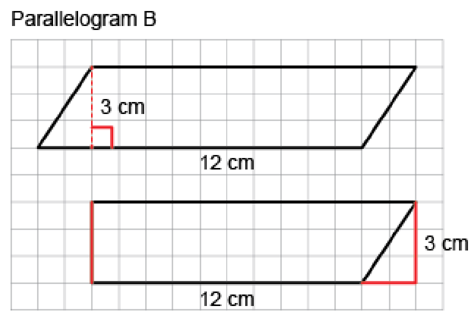
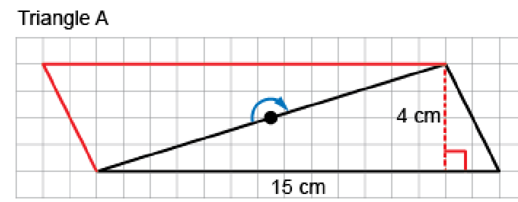
Activity 6 Assessment

Perimeter, Area, Volume, and Capacity Consolidation

Using Formulas to Determine Perimeter of Polygons			
Uses standard units to measure the perimeter of irregular polygons by adding side lengths.  "The polygon is on 1-cm dot paper. I added the lengths of the sides: 3 cm + 4 cm + 4 cm + 2 cm + 2 cm + 1 cm + 1 cm + 1 cm = 18 cm; The perimeter of the shape is 18 cm."	Uses P = # of equal sides × length of a side to calculate the perimeter of regular polygons.  Regular Octagon "In a regular octagon, all sides are the same length. I multiply the length of a side by the number of sides: P = 8 × 5 cm = 40 cm. The perimeter is 40 cm."	Identifies the appropriate formula to determine the perimeter of different polygons.  "The irregular polygon is a parallelogram, so I can use the formula: $P = 2(a + b)$: 2(48 mm + 68 mm) = 2(116 mm) = 232 mm. The pentagon is a regular pentagon, so I can use the formula $P = 5s$: 5 × 9.8 cm = 49.0 cm."	Fluently applies formulas for determining perimeter of polygons to solve problems. A soccer field is 125 m by 85 m. A football field is about 92 m by 49 m. Which field has the greater perimeter? "Both fields are rectangular, so I will use the formula for the perimeter of a rectangle: $P = 2(l + w)$. Soccer field: P = 2(125 m + 88 m) = 426 m. Football field: P = 2(92 m + 49 m) = 282 m The soccer field has the greater perimeter."
Observations/Documentation			

Activity 6 Assessment

Perimeter, Area, Volume, and Capacity Consolidation

Measuring Area of Parallelograms, Triangles, and Trapezoids		
Determines the area of a rectangle. "A rectangle is an array of squares. To find the area, I multiply the number of rows by the number of columns or use the formula $A = b \times h$. This rectangle has area 5 cm × 3 cm = 15 cm^2." 	Partitions and rearranges a parallelogram to form a rectangle with the same base and height (same area).  "I partitioned the parallelogram and moved the triangle to create a rectangle. I then found the area of the rectangle: $A = b \times h$ = 12 cm × 3 cm= 36 cm^2. The area of the parallelogram is also 36 cm^2."	Doubles and rotates a triangle to create a parallelogram and understands that the area of the triangle is one-half the area of the parallelogram.  "I rotated the triangle to make a parallelogram with the same base and height. The area of the triangle is one-half the area of the parallelogram. Area of parallelogram: 15 cm × 4 cm = 60 cm^2 Area of triangle: 60 cm^2 ÷ 2 = 30 cm^2 So, the formula for the area of a triangle is: $A = b \times h \div 2$."
Observations/Documentation		

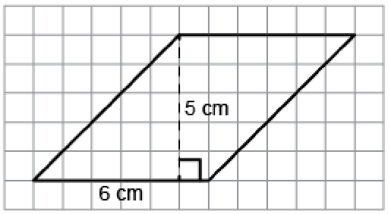
Measurement

Activity 6 Assessment

Perimeter, Area, Volume, and Capacity Consolidation

Measuring Area of Parallelograms, Triangles, and Trapezoids (cont’d)

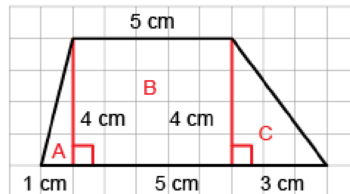
Determines the area of a trapezoid by partitioning it into triangles and rectangles, then uses formulas to determine area.



“I divided the trapezoid into 2 triangles and a rectangle.
Triangle A: A = (1 cm × 4 cm) ÷ 2 = 2 cm^2
Rectangle B: A = 5 cm × 4 cm = 20 cm^2
Triangle C: A = (3 cm × 4 cm) ÷ 2 = 6 cm^2
Area of trapezoid:
2 cm^2 + 20 cm^2 + 6 cm^2 = 28 cm^2.”

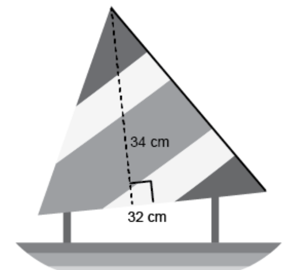
Constructs a parallelogram or triangle with a given area using known formulas and explains strategies used.

Construct a parallelogram with area 30 cm^2.



“A parallelogram has the same area formula as a rectangle: $A = b \times h$. Since 5 × 6 = 30, I drew a horizontal line of length 6 cm for the base.
I drew a vertical line of length 5 cm for the height, then drew another horizontal line segment 6 cm long. I joined each end of the line segment to the base.”

Flexibly solves problems involving the area relationships among rectangles, parallelograms, and triangles and the related formulas.



What is the area of the sail on the toy boat?

“I doubled the triangular sail to make a parallelogram with the same base and height. I found the area of the parallelogram:
34 cm × 32 cm = 1088 cm^2, then divided the area in half to find the area of the triangle:
1088 cm^2 ÷ 2 = 544 cm^2.”

Observations/Documentation

Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 1

Order the Measures

Set 1

2.5 m	390 cm	450 mm	0.2 km	23 dm

Which attribute is being measured?

Set 2

6 L	2.4 kL	1100 mL	11 hL	110 L

Which attribute is being measured?

Set 3

600 g	3500 mg	45 hg	405 dg	0.5 kg

Which attribute is being measured?

Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 2a

Conversion Problems

Problem 1

Jeremiah is at the grocery store to buy milk.
It costs $1.25 for a 250-mL carton and $7.50 for a 2-L carton.
Which is the better deal?

Without solving the problem, which do you think is the better deal?
Why do you think so?

Solve the problem. Show your work.

How did converting between units help you solve the problem?

Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 2b

Conversion Problems (cont'd)

Problem 2

Cherries are on sale for $9.00 per kilogram.
Chevon bought 300 g of cherries.
How much did Chevon pay for the cherries?

Use estimation. About how much did Chevon pay for the cherries?
How did you make your estimate?

Solve the problem. Show your work.

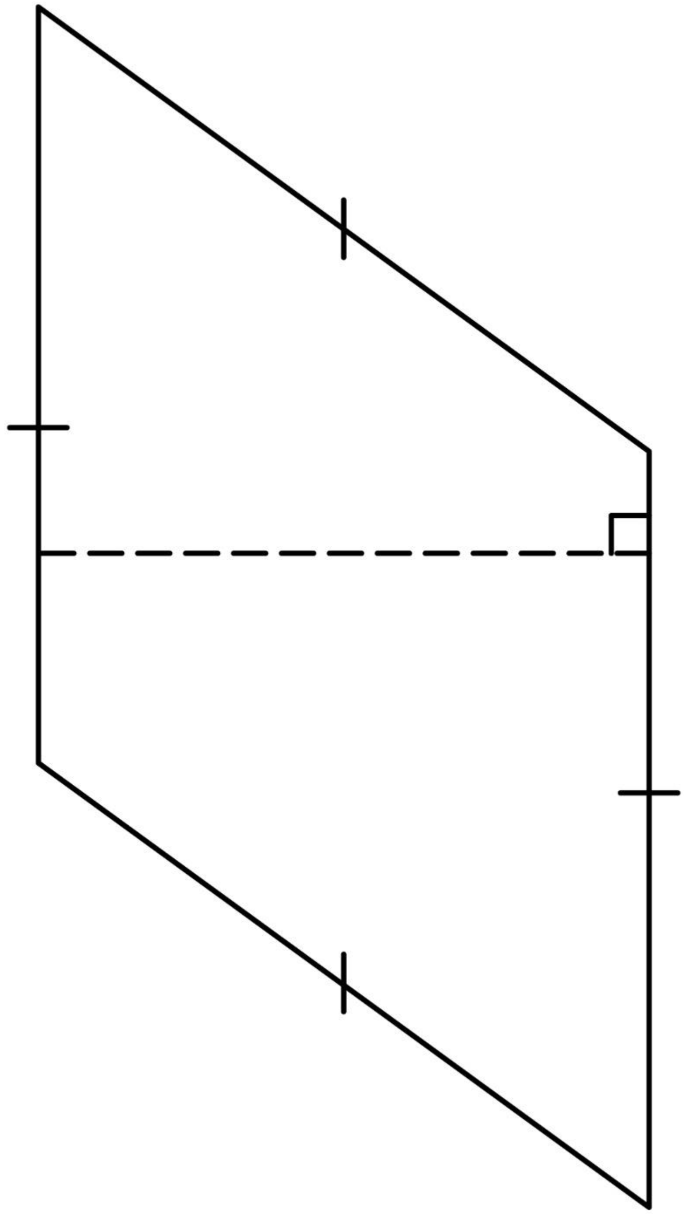
How did converting between units help you solve the problem?

Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 3a

Area of Quadrilaterals

Rhombus

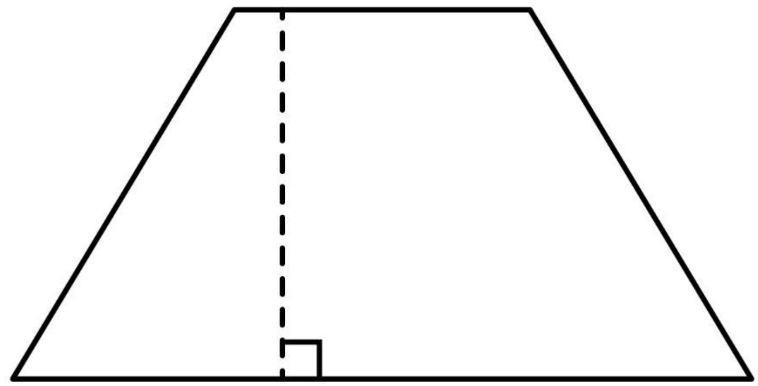


Name________________________________ Date_____________________

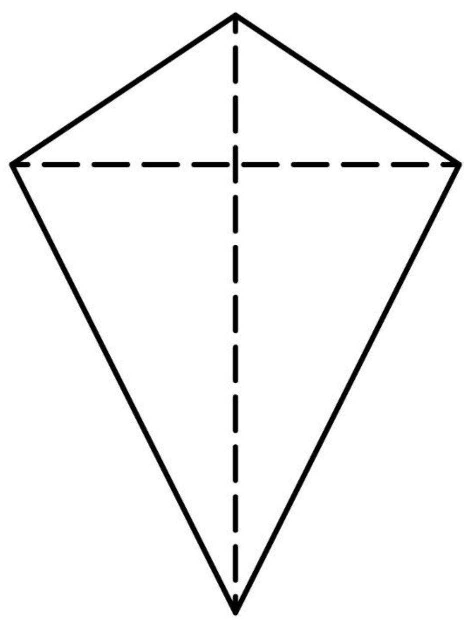
Measurement
Unit 1B Line Master 3b

Area of Quadrilaterals (cont'd)

Trapezoid



Kite

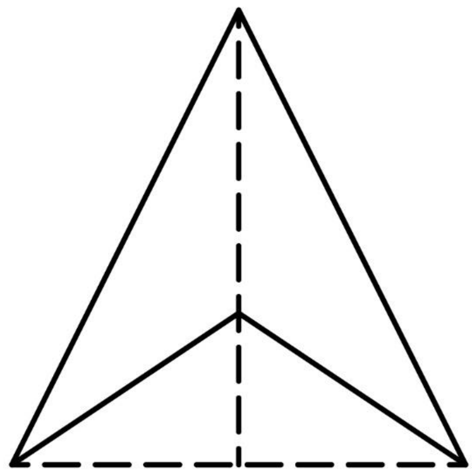


Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 3c

Area of Quadrilaterals (cont'd)

Dart

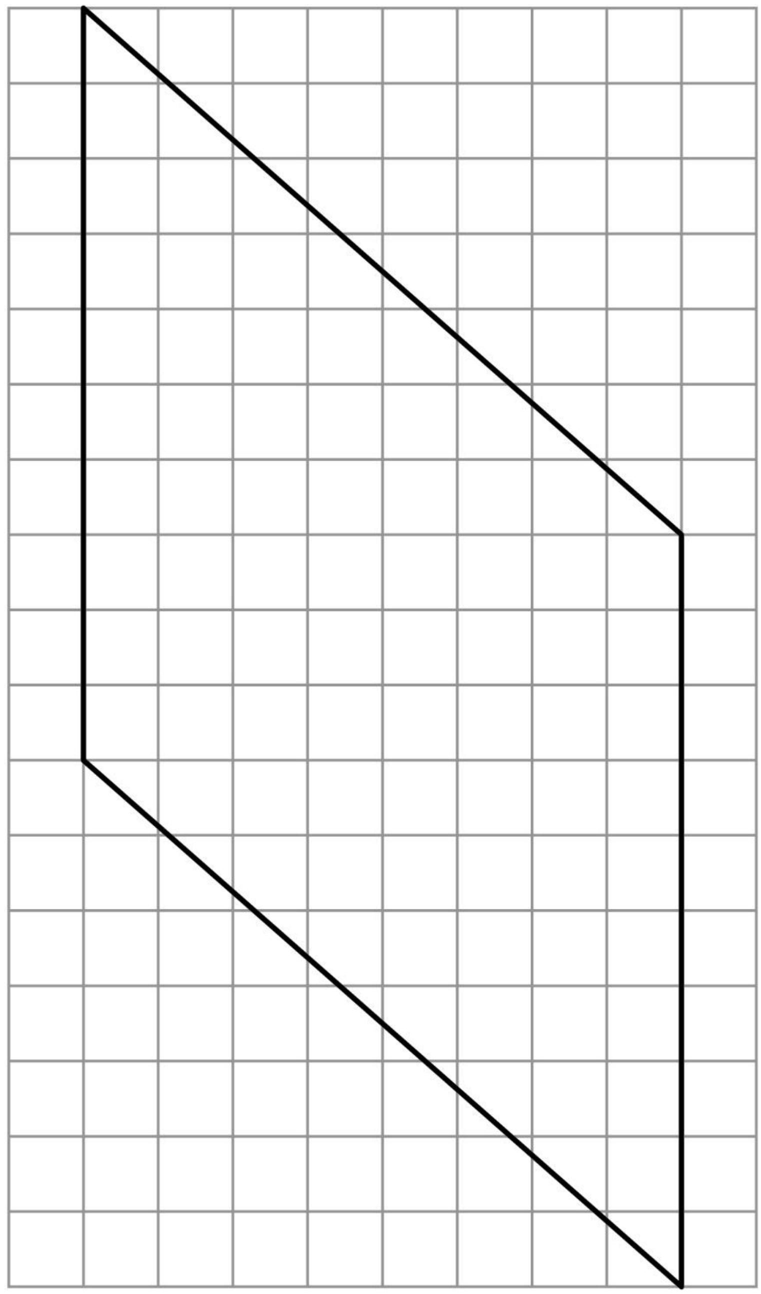


Name______________________________ Date____________________

Measurement
Unit 1B Line Master 3d

Area of Quadrilaterals (cont'd)

Rhombus

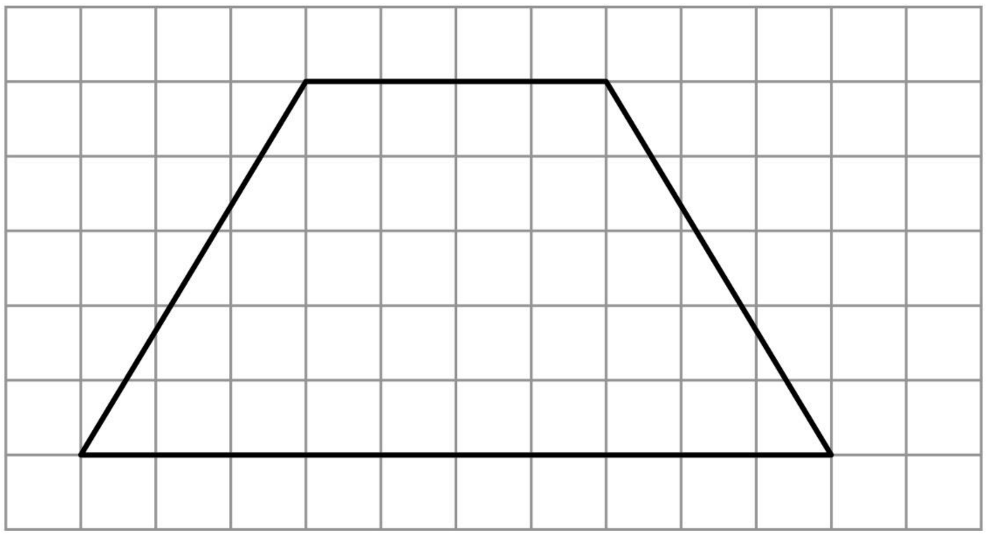


Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 3e

Area of Quadrilaterals (cont'd)

Trapezoid

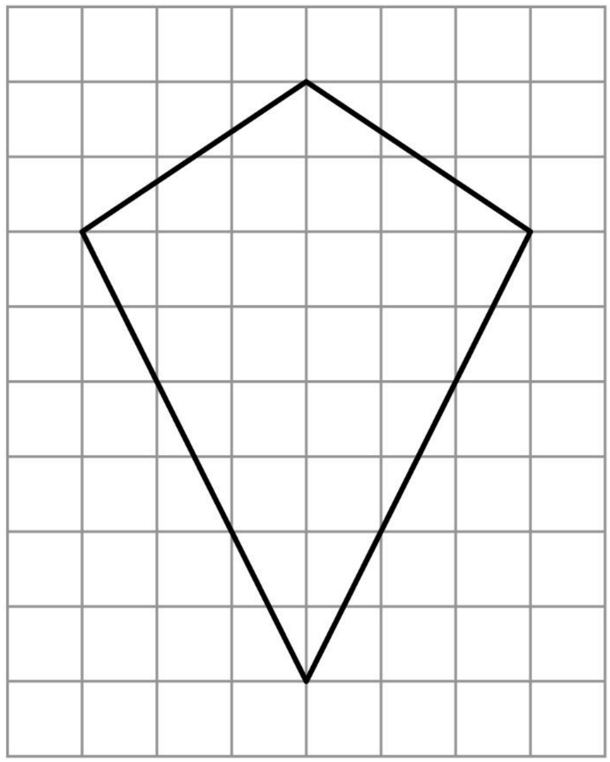


Name________________________________ Date_____________________

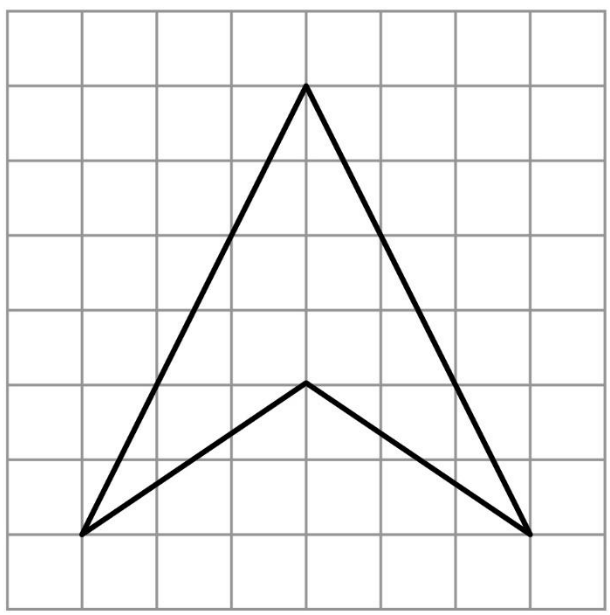
Measurement
Unit 1B Line Master 3f

Area of Quadrilaterals (cont'd)

Kite



Dart

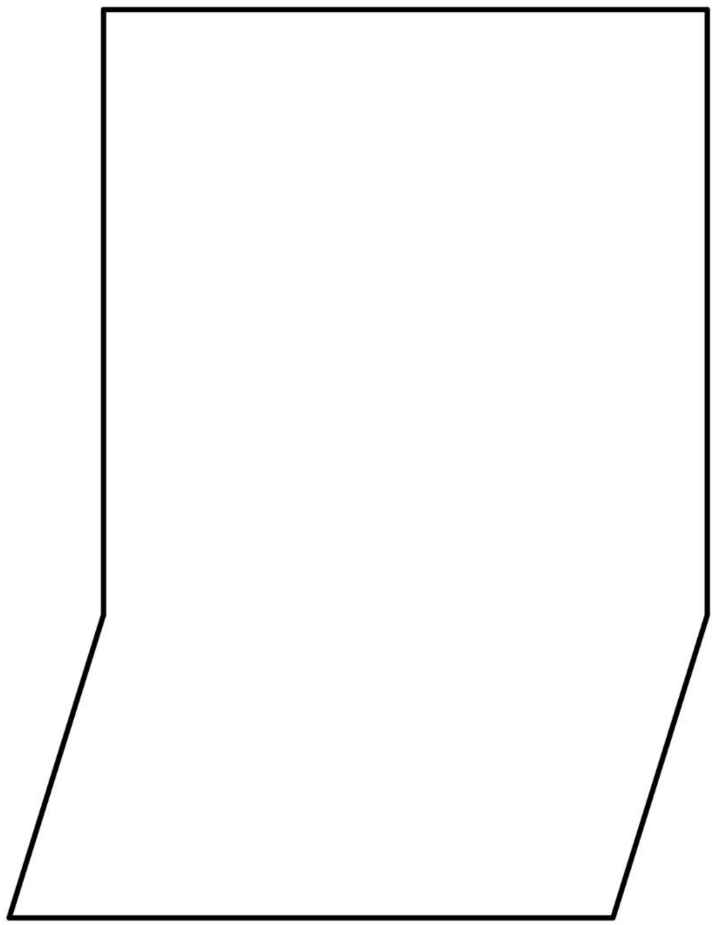


Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 4a

Area of Composite Shapes

Shape A

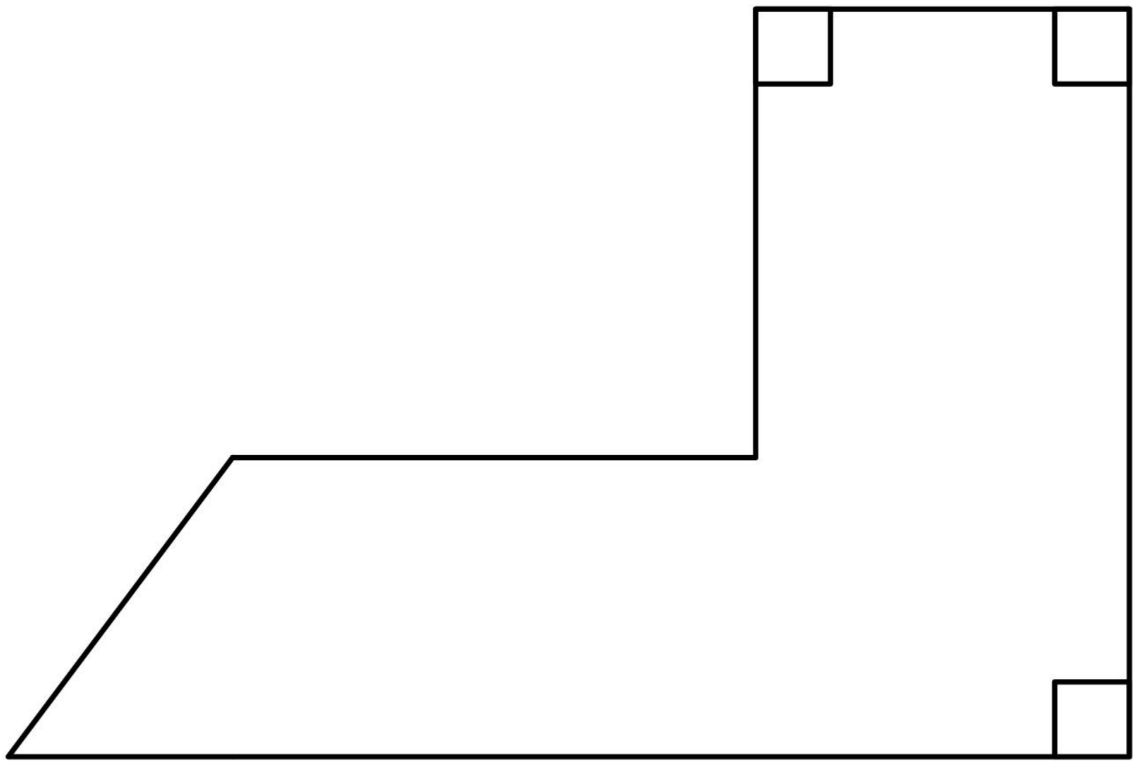


Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 4b

Area of Composite Shapes (cont’d)

Shape B

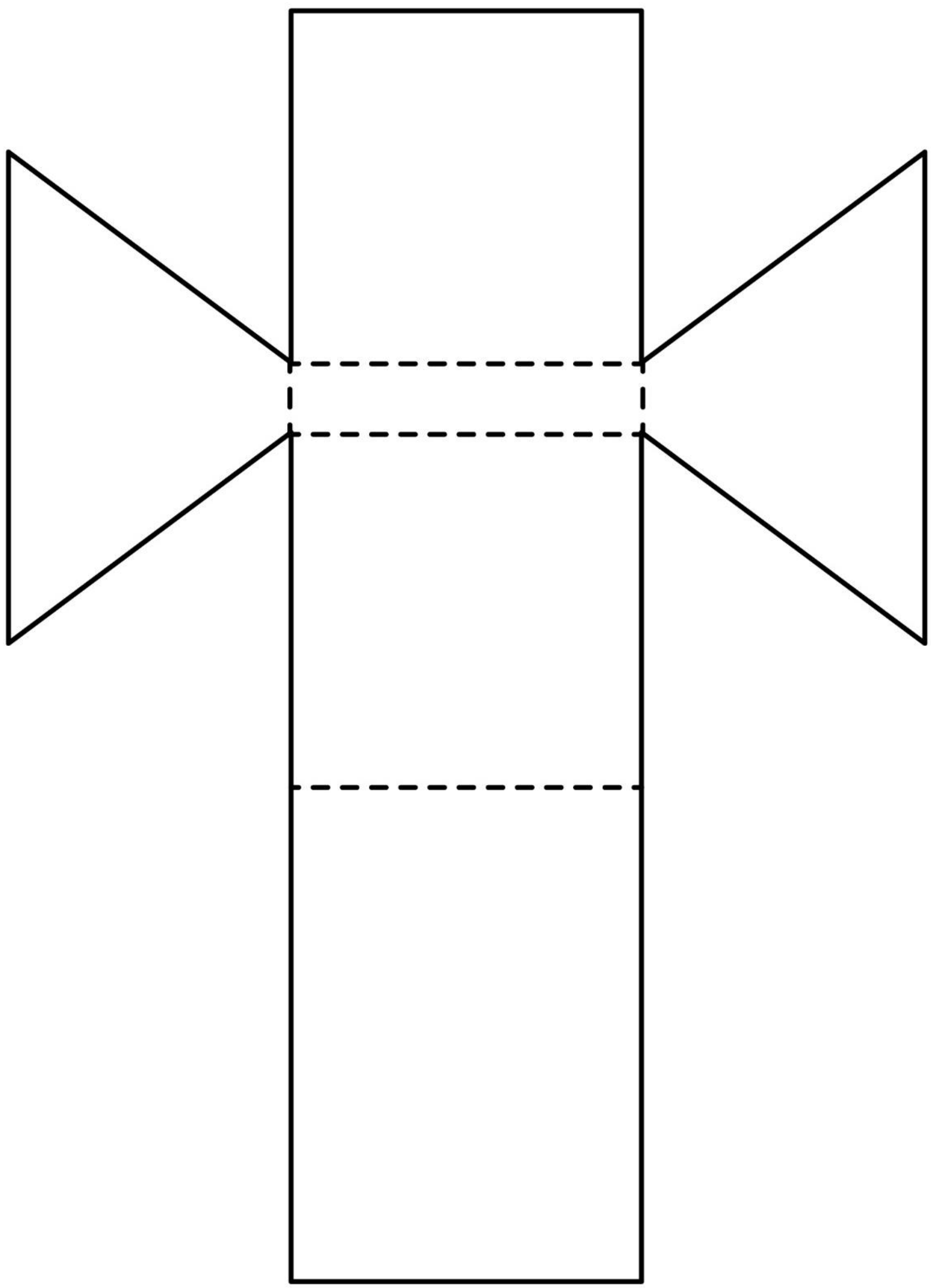


Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 5a

Nets of 3-D Objects

Net A

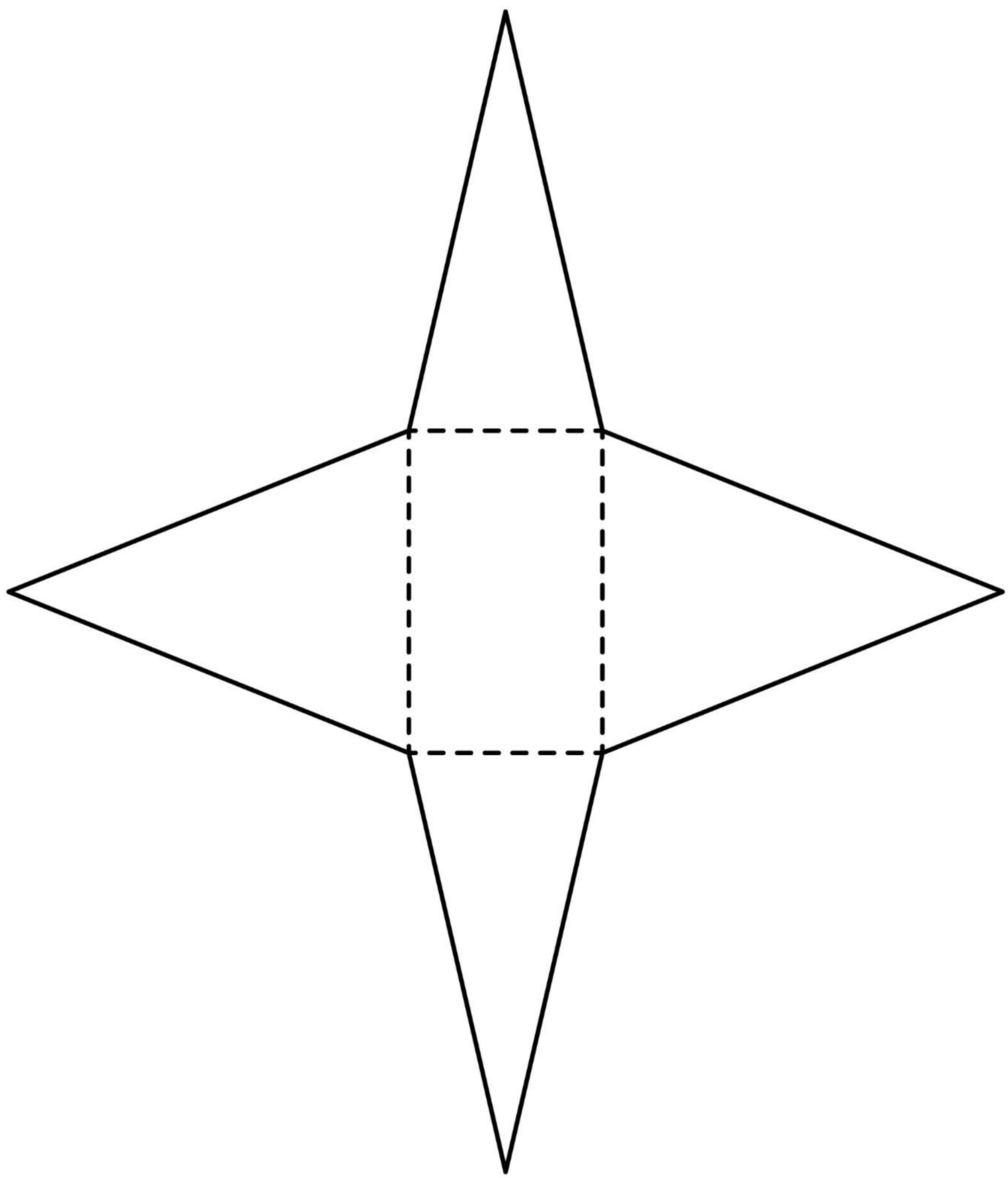


Name________________________________ Date_____________________

Measurement
Unit 1B Line Master 5b

Nets of 3-D Objects (cont'd)

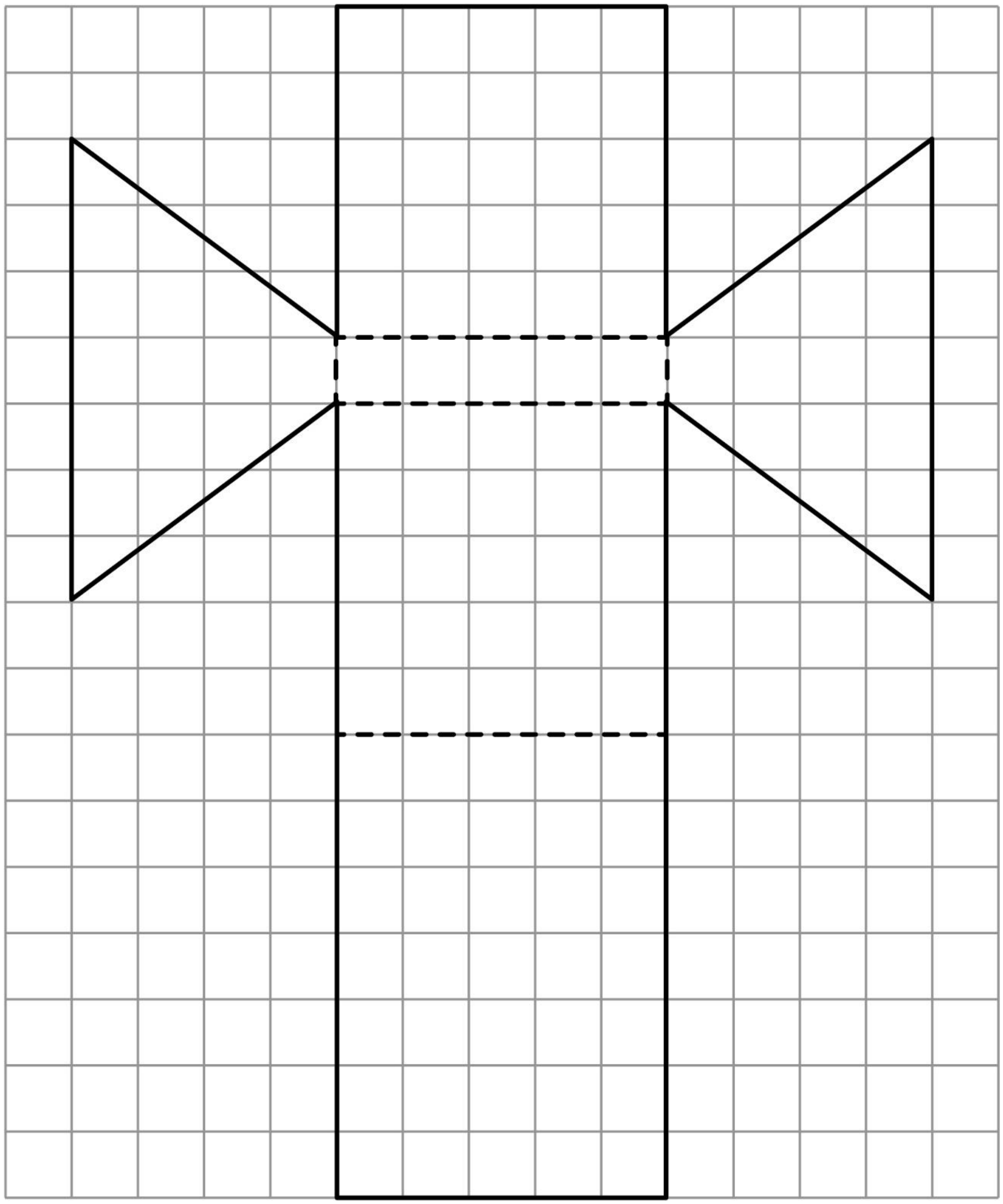
Net B



Name________________________________ Date_____________________

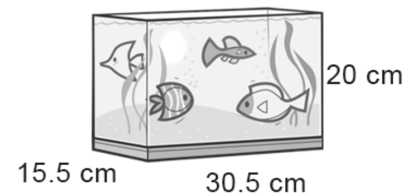
Measurement
Unit 1B Line Master 5c

Nets of 3-D Objects (cont'd)

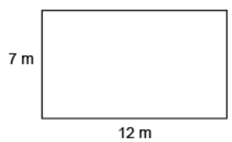


Measurement

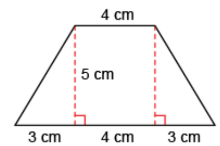
Activity 1 Assessment
Relationships Among Metric Units

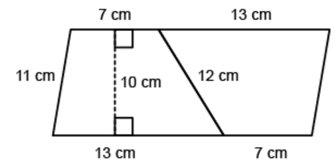
Understanding Relationships Among Metric Units			
Understands the relationship among metric units of mass, capacity, length, and area.	Uses metric relationships to convert from smaller to larger units to solve problems.	Uses metric relationships to convert from larger to smaller units to solve problems.	Use metric relationships to estimate, measure, and solve problems.
 Length = 14.2 cm “14.4 ÷ 100 = 0.142; the cell phone’s length is 14.2 cm or 0.142 m. I can visualize the phone being about 15 fingers long, but I can’t visualize 0.142 of a metre stick. I would give the length in centimetres.”	 \$9.00/kg What would 300 g of cherries cost? “I know 1 kg = 1000 g; cherries cost \$9.00 per 1000 g. So, 100 g would cost \$9.00 ÷10, or \$0.90. 300 g would cost \$0.90 × 3, or \$2.70.”	 \$1.25 for 250 mL \$7.50 for 2 L Which is the better deal? “I know that 2 L = 2000 mL. It takes four 250-mL cartons to make 1 L, and eight 250-mL cartons to make 2 L; 8 × \$1.25 = \$10; the 2-L carton for \$7.50 is the better deal.”	 Which metric unit would you use in an ad to sell the fish tank? “I might list the dimensions in millimetres: 155 mm by 305 mm by 200 mm because the tank may seem bigger. Reasonably, I would list the dimensions in centimetres because prospective buys would be able to relate to the units better.”
Observations/Documentation			

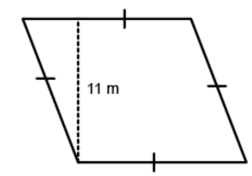
Activity 2 Assessment
Determining Area

<table>
<tr><th colspan="4">Determining Area</th></tr>
<tr>
<td>Understands area as an attribute of 2-D shapes that can be measured and compared.


$A = b \times h$
$A = 12 \text{ m} \times 7 \text{ m}$
$A = 84 \text{ m}^2$

"I determined the area of the rectangle by multiplying the length of the base by the height."</td>
<td>Determines area by decomposing shapes into smaller shapes, then adding their areas.


"I decomposed the trapezoid into a rectangle and 2 triangles.
Area of rectangle:
4 cm × 5 cm= 20 cm^2
Area of each triangle:
3 cm × 5 cm ÷ 2 = 7.5 cm^2.
Area of trapezoid:
20 cm^2 + 7.5 cm^2 + 7.5 cm^2
= 35 cm^2."</td>
<td>Determines area by composing and decomposing shapes into shapes with known area formulas.


"I doubled the trapezoid to make a parallelogram.
I know the area of the trapezoid is one-half the area of the parallelogram: (13 + 7) × 10 ÷ 2 = 20 × 10 ÷ 2 = 100. The area of the trapezoid is 100 cm^2."</td>
<td>Flexibly composes/decomposes composite polygons and irregular shapes to solve problems


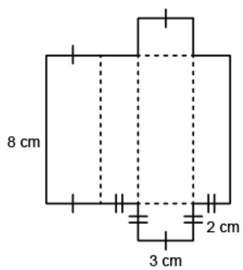
A garden is shaped like a rhombus. The perimeter of the garden is 60 m. The height of the rhombus is 11 m. What is the area of the garden?

"Side length of rhombus:
60 m ÷ 4 = 15 m. A rhombus is a parallelogram with all sides equal. So, to find the area of the rhombus, I use this formula:
$A = b \times h$; 15 m × 11 m = 165 m^2.
The area of the garden is 165 m^2."</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Activity 3 Assessment
Surface Area of Prisms and Pyramids

Using Nets to Determine Surface Area of Prisms and Pyramids

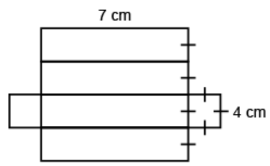
Uses nets to calculate surface area by adding the partial areas.



"I added the partial areas:

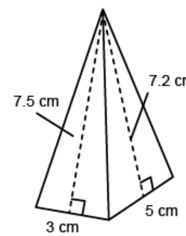
Area of rectangle: 7 cm × 4 cm = 28 cm^2
Area of 4 rectangles: 4 × 28 cm^2 = 112 cm^2
Area of square: 4 cm × 4 cm = 16 cm^2
Area of 2 squares: 2 × 16 cm^2 = 32 cm^2
Surface area of prism: 112 cm^2 + 32 cm^2 = 144 cm^2

Uses net to show relationship between areas of faces and surface area of prism/pyramid.



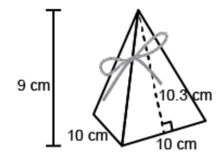
Surface Area = Sum of the areas of the 3 pairs of congruent rectangles
SA = 2(8 cm × 3 cm) + 2(8 cm × 2 cm) + 2(2 cm × 3 cm)
= 2(24 cm^2) + 2(16 cm^2) + 2(6 cm^2)
= 48 cm^2 + 32 cm^2 + 12 cm^2
= 92 cm^2

Determines surface area by visualizing net and adding the areas of its faces.



Surface Area = Area of rectangle + Sum of the areas of the 2 pairs of congruent triangles
SA = (3 cm × 5 cm) + 2(5 cm × 7.2 cm ÷ 2) + 2(3 cm × 7.5 cm ÷ 2)
= 15 cm^2 + 2(18 cm^2) + 2(11.25 cm^2)
= 15 cm^2 + 36 cm^2 + 22.5 cm^2
= 73.5 cm^2

Flexibly solves surface area problems by adding the areas of 2-D faces.



Which box would need less wrapping paper?

Square pyramid
SA = (10 cm × 10 cm) + 4(10 cm × 10.3 cm ÷ 2)
= 306 cm^2

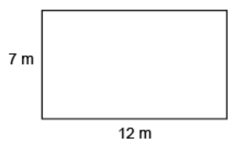
Rectangular prism
SA = 2(7 cm × 8 cm) + 2(7 cm × 9 cm) + 2(8 cm × 9 cm)
= 382 cm^2

Observations/Documentation

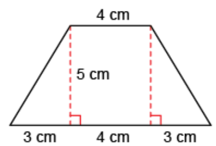
Measurement

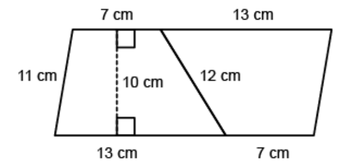
Activity 4 Assessment

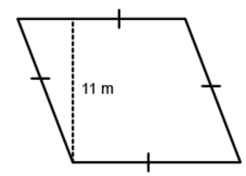
Length, Mass, Capacity, and Area Consolidation

<table>
<tr><th colspan="4">Determining Area</th></tr>
<tr>
<td>Understands area as an attribute of 2-D shapes that can be measured and compared.


$A = b \times h$
A = 12 m × 7 m
A = 84 m^2

“I determined the area of the rectangle by multiplying the length of the base by the height.”</td>
<td>Determines area by decomposing shapes into smaller shapes, then adding their areas.


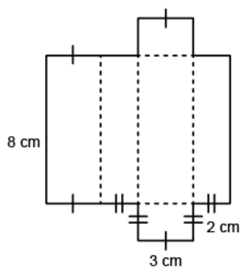
“I decomposed the trapezoid into a rectangle and 2 triangles.
Area of rectangle:
4 cm × 5 cm= 20 cm^2
Area of each triangle:
3 cm × 5 cm ÷ 2 = 7.5 cm^2.
Area of trapezoid:
20 cm^2 + 7.5 cm^2 + 7.5 cm^2
= 35 cm^2.”</td>
<td>Determines area by composing and decomposing shapes into shapes with known area formulas.


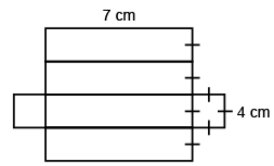
“I doubled the trapezoid to make a parallelogram.
I know the area of the trapezoid is one-half the area of the parallelogram: (13 + 7) × 10 ÷ 2 = 20 × 10 ÷ 2 = 100. The area of the trapezoid is 100 cm^2.”</td>
<td>Flexibly composes/decomposes composite polygons and irregular shapes to solve problems


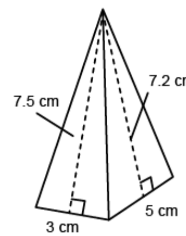
A garden is shaped like a rhombus. The perimeter of the garden is 60 m. The height of the rhombus is 11 m. What is the area of the garden?

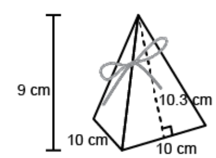
“Side length of rhombus:
60 m ÷ 4 = 15 m. A rhombus is a parallelogram with all sides equal. So, to find the area of the rhombus, I use this formula:
$A = b \times h$; 15 m × 11 m = 165 m^2.
The area of the garden is 165 m^2.”</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Activity 4 Assessment
Length, Mass, Capacity, and Area Consolidation

<table>
<tr><th colspan="4">Using Nets to Determine Surface Area of Prisms and Pyramids</th></tr>
<tr>
<td>Uses nets to calculate surface area by adding the partial areas.


“I added the partial areas:
Area of rectangle: 7 cm × 4 cm = 28 cm^2
Area of 4 rectangles: 4 × 28 cm^2 = 112 cm^2
Area of square: 4 cm × 4 cm = 16 cm^2
Area of 2 squares: 2 × 16 cm^2 = 32 cm^2
Surface area of prism: 112 cm^2 + 32 cm^2 = 144 cm^2</td>
<td>Uses net to show relationship between areas of faces and surface area of prism/pyramid.


Surface Area = Sum of the areas of the 3 pairs of congruent rectangles
SA = 2(8 cm × 3 cm) + 2(8 cm × 2 cm) + 2(2 cm × 3 cm)
= 2(24 cm^2) + 2(16 cm^2) + 2(6 cm^2)
= 48 cm^2 + 32 cm^2 + 12 cm^2
= 92 cm^2</td>
<td>Determines surface area by visualizing net and adding the areas of its faces.


Surface Area = Area of rectangle + Sum of the areas of the 2 pairs of congruent triangles
SA = (3 cm × 5 cm) + 2(5 cm × 7.2 cm ÷ 2) + 2(3 cm × 7.5 cm ÷ 2)
= 15 cm^2 + 2(18 cm^2) + 2(11.25 cm^2)
= 15 cm^2 + 36 cm^2 + 22.5 cm^2
= 73.5 cm^2</td>
<td>Flexibly solves surface area problems by adding the areas of 2-D faces.


Which box would need less wrapping paper?
Square pyramid
SA = (10 cm × 10 cm) + 4(10 cm × 10.3 cm ÷ 2)
= 306 cm^2
Rectangular prism
SA = 2(7 cm × 8 cm) + 2(7 cm × 9 cm) + 2(8 cm × 9 cm)
= 382 cm^2</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Name________________________________ Date_____________________

Number
Unit 1 Line Master 1a

Place-Value Chart to 1 Million

Units	Ones	
	Tens	
	Hundreds	
Thousands	Thousands	
	Ten Thousands	
	Hundred Thousands	
	Millions	

Name________________________________ Date_____________________

Number
Unit 1 Line Master 1b

Place-Value Chart to Hundred Millions

Units	Ones	
	Tens	
	Hundreds	
Thousands	Ones	
	Tens	
	Hundreds	
Millions	Ones	
	Tens	
	Hundreds	

Name________________________________ Date_____________________

Number
Unit 1 Line Master 1c

Place-Value Chart to Billions

Units	Ones	
	Tens	
	Hundreds	
Thousands	Ones	
	Tens	
	Hundreds	
Millions	Ones	
	Tens	
	Hundreds	
	Billions	

Name________________________________ Date_____________________

Number
Unit 1 Line Master 1d

Place-Value Chart to Trillions

Units	O	
	T	
	H	
Thousands	O	
	T	
	H	
Millions	O	
	T	
	H	
Billions	O	
	T	
	H	
Trillions	O	
	T	
	H	

Name________________________________ Date_____________________

Number
Unit 1 Line Master 2a

Connect 15: Beyond 1 Million

START Where is 76 596?	seventy-six thousand five hundred ninety-six Where is 2 000 000 + 40 000 + 6000 + 500 + 20 + 1?
2 046 521 Where is a number with 4 hundred thousands, 2 ten thousands, 6 thousands, 8 hundreds, 2 ones?	four hundred twenty-six thousand eight hundred two Where is 9 000 000?
9 million Where is 70 000 000 + 8 000 000 + 600 000 + 5000 + 800 + 20 + 4?	78 605 824 Where is 234 904?
200 000 + 30 000 + 4000 + 900 + 4 Where is a number with 5 hundred thousands, 4 tens, 5 ones?	500 045 Where is 345 thousand?
345 000 Where is 20 000 + 6?	20 006 Where is 300 000 + 5000 + 300 + 5?

Name________________________________ Date_____________________

Number
Unit 1 Line Master 2b

Connect 15: Beyond 1 Million (cont'd)

305 305 Where is forty-eight thousand?	48 000 Where is 900 000 + 90 000 + 6000 + 100 + 20 + 5?
996 125 Where is a number with 8 hundred thousands, 2 ten thousands, 7 thousands, 4 hundreds, 8 ones?	eight hundred twenty-seven thousand four hundred eight Where is 1 895 005?
one million eight hundred ninety-five thousand five **END**	___________________________ Where is ___________________________?
___________________________ Where is ___________________________?	___________________________ Where is ___________________________?
___________________________ Where is ___________________________?	___________________________. Where is ___________________________?

Name________________________________ Date_____________________

Number
Unit 1 Line Master 3a

Connect 15: Up to 1 Million

START Where is 76 596?	seventy-six thousand five hundred ninety-six Where is 900 000 + 40 000 + 6000 + 500 + 20 + 1?
946 521 Where is a number with 4 hundred thousands, 2 ten thousands, 6 thousands, 8 hundreds, 2 ones?	four hundred twenty-six thousand eight hundred two Where is 1 000 000?
1 million Where is 600 000 + 5000 + 800 + 20 + 4?	605 824 Where is a number that is 30 thousands more than 204 904?
200 000 + 30 000 + 4000 + 900 + 4 Where is a number with 5 hundred thousands, 4 tens, 5 ones?	500 045 Where is 345 thousand?
345 000 Where is 20 000 + 6?	20 006 Where is 300 000 + 5000 + 300 + 5?

Name________________________________ Date_____________________

Number
Unit 1 Line Master 3b

Connect 15: Up to 1 Million (cont'd)

305 305 Where is 20 thousands + 20 thousands + 8 thousands?	48 000 Where is 900 000 + 90 000 + 6000 + 100 + 20 + 5?
996 125 Where is a number with 8 hundred thousands, 2 ten thousands, 7 thousands, 4 hundreds, 8 ones?	eight hundred twenty-seven thousand four hundred eight Where is 895 005?
eight hundred ninety-five thousand five **END**	___________________________ Where is ___________________________?
___________________________ Where is ___________________________?	___________________________ Where is ___________________________?
___________________________ Where is ___________________________?	___________________________. Where is ___________________________?

Name________________________________ Date_____________________

Number
Unit 1 Line Master 4

0.5 cm Grid Paper

Name________________________________ Date_____________________

Number
Unit 1 Line Master 5

1-cm Grid Paper

Name________________________________ Date_____________________

Number
Unit 1 Line Master 6

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

Name________________________________ Date_____________________

Number
Unit 1 Line Master 7

Open Number Lines

Name________________________________ Date_____________________

Number
Unit 1 Line Master 8

12 × 12 Multiplication Chart

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Name________________________________ Date_____________________

Number
Unit 1 Line Master 9

Connect 10: Up to 100 000

START Where is 7596?	seven thousand five hundred ninety-six Where is 1000 + 400 + 60 + 50?
1465 Where is a number with 2 ten thousands, 6 thousands, 8 hundreds, 2 ones?	twenty-six thousand eight hundred two Where is 90 000?
90 thousand Where is 6000 + 500 + 80 + 4?	6584 Where is 23 494?
20 000 + 3000 + 400 + 90 + 4 Where is a number with 5 thousands, 4 tens, 5 ones?	5045 Where is 45 thousand?
45 000 Where is 2000 + 6?	2006 **END**

Name________________________________ Date_____________________

Number
Unit 1 Line Master 10a

Link 3! Gameboard A: Up to 1 Million

605 040	876 543	87 643	50 053
904 005	548 632	9680	423 075
427 089	747 747	207 089	1 000 000
48 632	100 968	968 086	823 075
474 747	405 060	765 432	304 056

Name________________________________ Date_____________________

Number
Unit 1 Line Master 10b

Link 3! Gameboard A Cards: Up to 1 Million

9000 + 600 + 80	876 thousand 5 hundred 43	800 000 + 20 000 + 3000 + 70 + 5	Forty-eight thousand six hundred thirty-two	Nine hundred sixty-eight thousand eighty-six
87 thousand 6 hundred 43	200 000 + 7000 + 80 + 9	400 000 + 70 000 + 4000 + 700 + 40 + 7	Nine hundred four thousand five	500 000 + 40 000 + 8000 + 600 + 30 + 2
Four hundred twenty-three thousand seventy-five	One hundred thousand nine hundred sixty-eight	Four hundred twenty-seven thousand eighty-nine	747 thousand 747	765 thousand 432
Four hundred five thousand sixty	605 thousand 40	1 million	300 000 + 4000 + 50 + 6	50 000 + 50 + 3

Name________________________________ Date_____________________

Number
Unit 1 Line Master 11a

Link 3! Gameboard B: Beyond 1 Million

70 605 040	876 543	87 643	8 350 053
12 004 005	10 548 632	9680	4 823 075
427 089	1 747 747	4 207 089	3 040 506
6 048 632	100 968	1 204 005	823 075
1 474 747	30 405 060	8 765 432	304 056

Name________________________________ Date_____________________

Number
Unit 1 Line Master 11b

Link 3! Gameboard B Cards: Beyond 1 Million

One million two hundred four thousand five	10 000 000 + 500 000 + 40 000 + 8000 + 600 + 30 + 2	8 million 765 thousand 432	8 000 000 + 300 000 + 50 000 + 50 + 3
Six million forty-eight thousand six hundred thirty-two	Twelve million four thousand five	1 million 747 thousand 747	300 000 + 4000 + 50 + 6
800 000 + 20 000 + 3000 + 70 + 5	1 000 000 + 400 000 + 70 000 + 4000 + 700 + 40 + 7	Four hundred twenty-seven thousand eighty-nine	3 million 40 thousand 5 hundred 6
876 thousand 5 hundred 43	4 000 000 + 200 000 + 7000 + 80 + 9	One hundred thousand nine hundred sixty-eight	70 million 605 thousand 40
1 000 000 + 9000 + 600 + 80	87 thousand 6 hundred 43	Four million eight hundred twenty-three thousand seventy-five	Thirty million four hundred five thousand sixty

Name________________________________ Date_____________________

Number
Unit 1 Line Master 12a

Link 3! Gameboard C: Up to 1 Billion

70 605 040	876 543	87 643	8 350 053
12 004 005	10 548 632	1 009 680	4 823 075
504 427 089	1 747 747	4 207 089	3 040 506
6 048 632	1 000 968 000	1 000 204 005	823 075
1 474 747	31 405 060	8 765 432	10 350 304 050

Name________________________________ Date_____________________

Number
Unit 1 Line Master 12b

Link 3! Gameboard C Cards: Up to 1 Billion

One hundred million two hundred four thousand five	10 000 000 + 500 000 + 40 000 + 8000 + 600 + 30 + 2	8 million 765 thousand 432	8 000 000 + 300 000 + 50 000 + 50 + 3
Six million forty-eight thousand six hundred thirty-two	Twelve million four thousand five	1 million 747 thousand 747	10 000 000 000 + 300 000 000 + 50 000 000 + 300 000 + 4000 + 50
800 000 + 20 000 + 3000 + 70 + 5	1 000 000 + 400 000 + 70 000 + 4000 + 700 + 40 + 7	Five hundred four million four hundred twenty-seven thousand eighty-nine	3 million 40 thousand 5 hundred 6
876 thousand 5 hundred 43	4 000 000 + 200 000 + 7000 + 80 + 9	One billion nine hundred sixty-eight thousand	70 million 605 thousand 40
1 000 000 + 9000 + 600 + 80	87 thousand 6 hundred 43	Four million eight hundred twenty-three thousand seventy-five	Thirty-one million four hundred five thousand sixty

Name________________________________ Date_____________________

Number
Unit 1 Line Master 13a

Link 3! Gameboard D: Up to 100 000

74 747	4747	90 680
9608	54 632	20 089
8632	2098	23 075
20 375	87 643	80 632

Name________________________________ Date_____________________

Number
Unit 1 Line Master 13b

Link 3! Gameboard D Cards: Up to 100 000

Two thousand ninety-eight	87 thousand 6 hundred 43	Nine thousand six hundred eight
4 thousand 7 hundred 47	4 000 000 + 200 000 + 7000 + 80 + 9	Twenty thousand three hundred seventy-five
90 000 + 600 + 80	70 000 + 4000 + 700 + 40 + 7	Fifty-four thousand six hundred thirty-two
Eight thousand six hundred thirty-two	20 000 + 3000 + 70 + 5	20 thousand 89

Name________________________________ Date_____________________

Number
Unit 1 Line Master 14

Prime or Composite?

Prime	Composite
Prime	Composite
Prime	Composite
Prime	Composite
Prime	Composite
Prime	Composite
Prime	Composite

Number

Activity 1 Assessment

Representing Larger Numbers (to 1 000 000 and Beyond)

Extending Whole Number Understanding

Represents 5-digit numbers on place-value chart (decomposes in one way).

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"71 283 has 7 ten-thousands, 1 thousand, 2 hundreds, 8 tens, and 3 ones."

Represents same number in multiple ways (e.g., words, expanded form, place-value chart).

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"71 238; seventy-one thousand two hundred eighty-three; 70 000 + 1000 + 200 + 80 + 3"

Uses relationships among place-value positions to read a number in more than one way.

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"7 ten-thousands, 1 thousand, 2 hundreds, 8 ten, and 3 ones can also be 71 thousands, 2 hundreds, and 83 ones."

Observations/Documentation

Number

Activity 1 Assessment

Representing Larger Numbers (to 1 000 000 and Beyond)

Extending Whole Number Understanding (cont'd)

Uses place-value to compare numbers.

Ten thousands	Thousands	Hundreds	Tens	Ones
7	1	2	8	3
7	3	1	9	3

"Both numbers have 3 ten-thousands. Since 3 thousands is more than 1 thousand, 73 193 is greater than 71 283."
73 193 > 71 283

Uses place value to compare and order numbers.

65 218, 56 812, 65 018, 65 208

"I compared the digits in each place-value position. From least to greatest:
56 812, 65 018, 65 208, 65 218."

Extends whole number understanding up to and beyond 1 000 000.

"To represent 1 639 587, I have to add 2 columns to the place value chart: one for hundred-thousands and one for millions."

Observations/Documentation

Number

Activity 2 Assessment
Representing Numbers in Different Forms

Extending Whole Number Understanding

Represents 5-digit numbers on place-value chart (decomposes in one way).

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"71 283 has 7 ten-thousands, 1 thousand, 2 hundreds, 8 tens, and 3 ones."

Represents same number in multiple ways (e.g., words, expanded form, place-value chart).

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"71 238; seventy-one thousand two hundred eighty-three; 70 000 + 1000 + 200 + 80 + 3"

Uses relationships among place-value positions to read a number in more than one way.

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"7 ten-thousands, 1 thousand, 2 hundreds, 8 ten, and 3 ones can also be 71 thousands, 2 hundreds, and 83 ones."

Observations/Documentation

Number

Activity 2 Assessment
Representing Numbers in Different Forms

Extending Whole Number Understanding (cont’d)

Uses place-value to compare numbers.

Ten thousands	Thousands	Hundreds	Tens	Ones
7	1	2	8	3
7	3	1	9	3

“Both numbers have 3 ten-thousands. Since 3 thousands is more than 1 thousand, 73 193 is greater than 71 283.”
73 193 > 71 283

Uses place value to compare and order numbers.

65 218, 56 812, 65 018, 65 208

“I compared the digits in each place-value position. From least to greatest:
56 812, 65 018, 65 208, 65 218.”

Extends whole number understanding up to and beyond 1 000 000.

“To represent 1 639 587, I have to add 2 columns to the place value chart: one for hundred-thousands and one for millions.”

Observations/Documentation

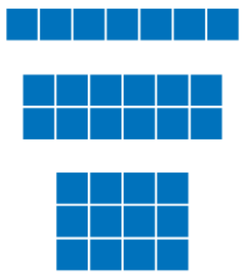
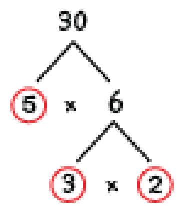
Number

Activity 3 Assessment
Identifying Factors and Multiples

Determining Multiples and Factors			
Uses concrete materials to find multiples.  “To find multiples of 4, I added a row of 4 tiles each time and counted on: 4, 8, 12, ….”	Uses skip-counting or repeated addition. 4, 8, 12, 16, 20, …	Uses familiar basic facts to identify some multiples and factors. 2 × 4 = 8 3 × 4 = 12 10 × 4 = 40 “I thought of the multiplication facts for 4 that I know.”	Uses efficient, systematic strategies to determine multiples and identify all factors. “To find factors of 8, I start 8 ÷ 1 = 8 Factors are 1 and 8. 8 ÷ 2 = 4 Factors are 2 and 4. 8 ÷ 3 = X 8 ÷ 4 = 2 So, 1, 2, 4, and 8 are all factors.”
Observations/Documentation			

Number

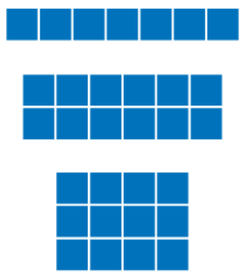
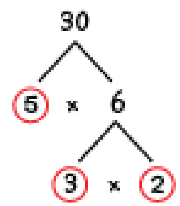
Activity 3 Assessment
Identifying Factors and Multiples

Determining Multiples and Factors (cont'd)			
Uses concrete materials to identify prime and composite numbers.  "7 is prime because it has only 2 factors, 1 and 7. 12 is composite because it has more than 2 factors: 1 and 12, 2 and 6, and 3 and 4."	Writes a composite number as a product of its prime factors.  "30 = 2 × 3 × 5"	Identifies common factors and multiples for a pair of numbers. Multiples of 4: 4, 8, **12**, 16, 20, **24**, 28 Multiples of 6: 6, **12**, 18, **24**, 30 "Two common multiples are 12 and 24."	Solves problems involving common factors and multiples "Choir practice is every 5th day. Gymnastics is every 3rd day. That means choir and gymnastics both happen every 15th day."
Observations/Documentation			

Activity 4 Assessment
Identifying Prime and Composite Numbers

Determining Multiples and Factors			
Uses concrete materials to find multiples.  “To find multiples of 4, I added a row of 4 tiles each time and counted on: 4, 8, 12, ….”	Uses skip-counting or repeated addition. 4, 8, 12, 16, 20, …	Uses familiar basic facts to identify some multiples and factors. $2 \times 4 = 8$ $3 \times 4 = 12$ $10 \times 4 = 40$ “I thought of the multiplication facts for 4 that I know.”	Uses efficient, systematic strategies to determine multiples and identify all factors. “To find factors of 8, I start $8 \div 1 = 8$ Factors are 1 and 8. $8 \div 2 = 4$ Factors are 2 and 4. $8 \div 3 = X$ $8 \div 4 = 2$ So, 1, 2, 4, and 8 are all factors.”
Observations/Documentation			

Activity 4 Assessment
Identifying Prime and Composite Numbers

Determining Multiples and Factors (cont'd)			
Uses concrete materials to identify prime and composite numbers.  "7 is prime because it has only 2 factors, 1 and 7. 12 is composite because it has more than 2 factors: 1 and 12, 2 and 6, and 3 and 4."	Writes a composite number as a product of its prime factors.  "30 = 2 × 3 × 5"	Identifies common factors and multiples for a pair of numbers. Multiples of 4: 4, 8, **12**, 16, 20, **24**, 28 Multiples of 6: 6, **12**, 18, **24**, 30 "Two common multiples are 12 and 24."	Solves problems involving common factors and multiples "Choir practice is every 5th day. Gymnastics is every 3rd day. That means choir and gymnastics both happen every 15th day."
Observations/Documentation			

Number

Activity 5 Assessment

Number Relationships and Place Value Consolidation

Extending Whole Number Understanding

Represents 5-digit numbers on place-value chart (decomposes in one way).

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"71 283 has 7 ten-thousands, 1 thousand, 2 hundreds, 8 tens, and 3 ones."

Represents same number in multiple ways (e.g., words, expanded form, place-value chart).

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"71 238; seventy-one thousand two hundred eighty-three; 70 000 + 1000 + 200 + 80 + 3"

Uses relationships among place-value positions to read a number in more than one way.

Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
	7	1	2	8	3

"7 ten-thousands, 1 thousand, 2 hundreds, 8 ten, and 3 ones can also be 71 thousands, 2 hundreds, and 83 ones."

Observations/Documentation

Activity 5 Assessment
Number Relationships and Place Value Consolidation

Extending Whole Number Understanding (con't)

Uses place-value to compare numbers.

Ten thousands	Thousands	Hundreds	Tens	Ones
7	1	2	8	3
7	3	1	9	3

"Both numbers have 3 ten-thousands. Since 3 thousands is more than 1 thousand, 73 193 is greater than 71 283."
73 193 > 71 283

Uses place value to compare and order numbers.

65 218, 56 812, 65 018, 65 208

"I compared the digits in each place-value position. From least to greatest:
56 812, 65 018, 65 208, 65 218."

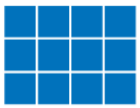
Extends whole number understanding up to and beyond 1 000 000.

"To represent 1 639 587, I have to add 2 columns to the place value chart: one for hundred-thousands and one for millions."

Observations/Documentation

Number

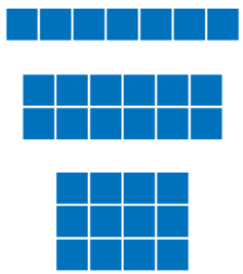
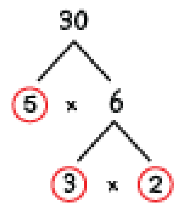
Activity 5 Assessment
Number Relationships and Place Value Consolidation

Determining Multiples and Factors			
Uses concrete materials to find multiples.  “To find multiples of 4, I added a row of 4 tiles each time and counted on: 4, 8, 12, ….”	Uses skip-counting or repeated addition. 4, 8, 12, 16, 20, …	Uses familiar basic facts to identify some multiples and factors. 2 × 4 = 8 3 × 4 = 12 10 × 4 = 40 “I thought of the multiplication facts for 4 that I know.”	Uses efficient, systematic strategies to determine multiples and identify all factors. “To find factors of 8, I start 8 ÷ 1 = 8 Factors are 1 and 8. 8 ÷ 2 = 4 Factors are 2 and 4. 8 ÷ 3 = X 8 ÷ 4 = 2 So, 1, 2, 4, and 8 are all factors.”
Observations/Documentation			

Number

Activity 5 Assessment

Number Relationships and Place Value Consolidation

Determining Multiples and Factors (con't)			
Uses concrete materials to identify prime and composite numbers.  "7 is prime because it has only 2 factors, 1 and 7. 12 is composite because it has more than 2 factors: 1 and 12, 2 and 6, and 3 and 4."	Writes a composite number as a product of its prime factors.  "30 = 2 × 3 × 5"	Identifies common factors and multiples for a pair of numbers. Multiples of 4: 4, 8, **12**, 16, 20, **24**, 28 Multiples of 6: 6, **12**, 18, **24**, 30 "Two common multiples are 12 and 24."	Solves problems involving common factors and multiples "Choir practice is every 5th day. Gymnastics is every 3rd day. That means choir and gymnastics both happen every 15th day."
Observations/Documentation			

Name________________________________ Date_____________________

Number
Unit 2 Line Master 1

Claim Your Prize!

Skill-testing Question:

Answer:

Skill-testing Question:

Answer:

Skill-testing Question:

Answer:

Skill-testing Question:

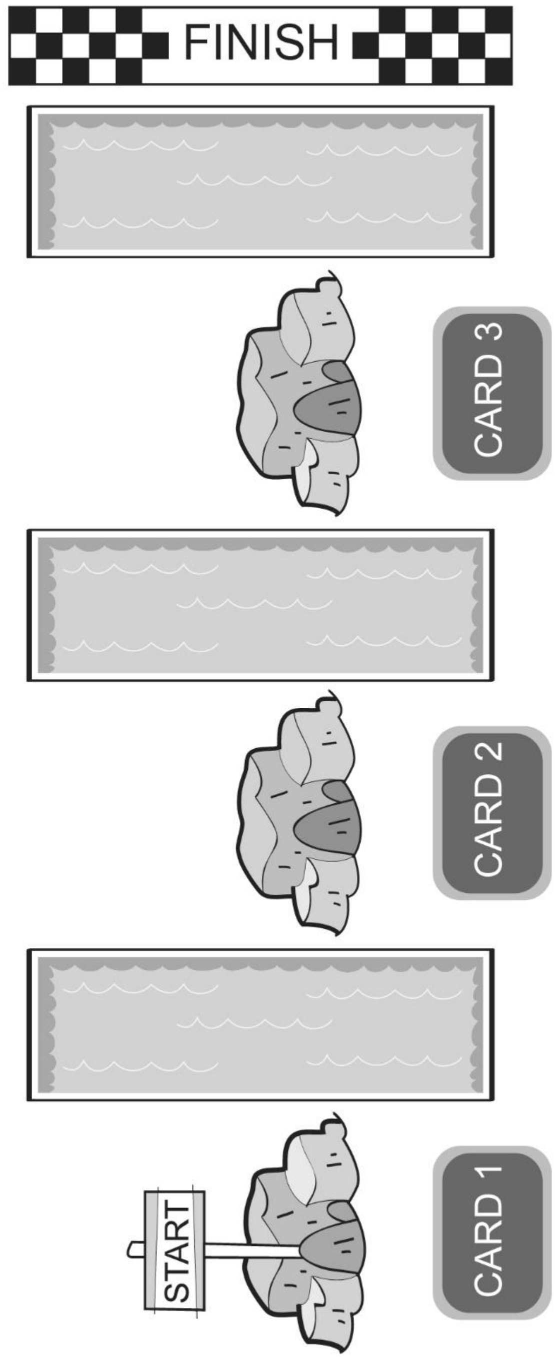
Answer:

Name________________________________ Date_____________________

Number
Unit 2 Line Master 2

Splash Challenge!

Gameboard



Name________________________________ Date_____________________

Number
Unit 2 Line Master 3a

Splash Challenge!

Game Cards

$(6 + 3) \times 4 \div 6$	$18 - 12 + 8 \div 4$
$4 \times 10 - 5 \times 7$	$81 \div (12 - 3) - 8$
$27 - (6 \times 3 + 7)$	$3 + 144 \div 12 - 4$
$3 \times 12 \div 9 - 1$	$60 - 5 \times 11 + (8 \div 4)$

Name_______________________________ Date____________________

Number
Unit 2 Line Master 3b

Splash Challenge! (cont'd)

Game Cards

89 × 4 – 348	85 – 79
(123 + 74) × 0	(214 + 36) – (125 + 123)
19 × 5 – (48 + 43)	215 ÷ 5 – 21
(21 × 4) ÷ (17 + 11)	104 ÷ 2 – (18 + 33)

Name_______________________________ Date____________________

Number
Unit 2 Line Master 3c

Splash Challenge! (cont'd)

Game Cards

4 tickets cost $24. How much is 1 ticket?	Nadia walked 21 km in 3 h. How far did Nadia walk in 1 h?
$4.20 for 6 juice boxes. How much is 1 juice box?	18 chairs in 2 rows. How many in 1 row?
56 apples in 7 baskets. How many in 1 basket?	36 flowers in 3 bunches. How many in 1 bunch?
28 people at 7 tables. How many at 1 table?	36 tennis balls in 12 cans. How many in 1 can?

Name________________________________ Date_____________________

Number
Unit 2 Line Master 3d

Splash Challenge! (cont'd)

Game Cards

Name________________________________ Date_____________________

Ratios

8:4 = 2:__	__:6 = 3:2
12:24 = __:4	35:20 = 7:__
55:44 = __:4	3:__ = 9:24
8:3 = 40:__	9:__ = 27:6

Number

Activity 6 Assessment
Solving Problems with Whole Numbers

<table>
<tr><th colspan="3">Developing Fluency with Whole Number Operations</th></tr>
<tr>
<td>Understands number relationships and properties and applies them to whole number operations.

? – 240 = 720   50 × ? = 2000
720 + 240 = 960   2000 ÷ 50 = 40

“I solved each equation using an operation I am comfortable with.”</td>
<td>Uses estimation to check reasonableness of solutions.

A forklift can carry 2000 kg. An operator is unloading boxes of shoes weighing 78 kg. How many boxes can the forklift safely carry at one time?
78 × ? = 2000

“78 is close to 80. I know 80 × 20 = 1600 and 80 × 5 = 400. 1600 + 400 = 2000. An estimate of 25 boxes seems reasonable.”</td>
<td>Uses mental math strategies to solve single-step equations with larger numbers.

78 × 25 = (70 + 8) × (20 + 5)
= (70 × 20) + (8 × 20) + (70 × 5) + (8 × 5)
= 1400 + 160 + 350 + 40
= 1950

  78
× 25
1400 (70 × 20)
160 (20 × 8)
350 (70 × 5)
+ 40 (8 × 5)
1950

| | 70 | 8 |
| 20 | 1400 | 160 |
| 5 | 350 | 40 |

“I decomposed the numbers to make multiplying easier.”</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Activity 6 Assessment
Solving Problems with Whole Numbers

Developing Fluency with Whole Number Operations (cont'd)		
Solves multi-step equations using mental math strategies and properties of operations. 1560 + 1682 – 440 – 602 = ? 1560 – 440 = **1120** 1682 – 602 = **1080** **1120** + **1080** = 2200	Uses order of operations to solve equations and explains the effect when order is not followed. 9 × 8 – 3 + 16 ÷ 4 = 72 – 3 + 4 = 73 "I have to do multiplication and division first. If the order isn't followed and I perform the operations in the order in which they appear, I get 21 R1."	Flexibly selects mental math strategies and applies order of operations to solve multi-step equations/problems. To claim the prize in a contest, you must answer this skill-testing question: 19 + 11 × 6 – 4 = ? 19 + 11 × 6 – 4 = 19 + 66 – 4 = 20 – 1 + 66 – 4 = 20 + 66 –1 – 4 = 86 – 5 = 81
Observations/Documentation		

Activity 7 Assessment
Estimating Reasonable of Solutions

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<tr><th colspan="3">Developing Fluency with Whole Number Operations</th></tr>
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? – 240 = 720
720 + 240 = 960

50 × ? = 2000
2000 ÷ 50 = 40

“I solved each equation using an operation I am comfortable with.”</td>
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A forklift can carry 2000 kg. An operator is unloading boxes of shoes weighing 78 kg. How many boxes can the forklift safely carry at one time?
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$78 \times 25 = (70 + 8) \times (20 + 5)$
$= (70 \times 20) + (8 \times 20) + (70 \times 5) + (8 \times 5)$
$= 1400 + 160 + 350 + 40$
$= 1950$

$\begin{array}{rl} 78 & \\ \times\ 25 & \\ \hline 1400 & (70 \times 20) \\ 160 & (20 \times 8) \\ 350 & (70 \times 5) \\ +\ 40 & (8 \times 5) \\ \hline 1950 & \end{array}$

$\begin{array}{|c|c|c|} \hline & 70 & 8 \\ \hline 20 & 1400 & 160 \\ \hline 5 & 350 & 40 \\ \hline \end{array}$

“I decomposed the numbers to make multiplying easier.”</td>
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<tr><th colspan="3">Observations/Documentation</th></tr>
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</table>

Number

Activity 7 Assessment
Estimating Reasonable of Solutions

Developing Fluency with Whole Number Operations (cont'd)		
Solves multi-step equations using mental math strategies and properties of operations. 1560 + 1682 – 440 – 602 = ? 1560 – 440 = **1120** 1682 – 602 = **1080** **1120** + **1080** = 2200	Uses order of operations to solve equations and explains the effect when order is not followed. $9 \times 8 - 3 + 16 \div 4 = 72 - 3 + 4$ $= 73$ "I have to do multiplication and division first. If the order isn't followed and I perform the operations in the order in which they appear, I get 21 R1."	Flexibly selects mental math strategies and applies order of operations to solve multi-step equations/problems. To claim the prize in a contest, you must answer this skill-testing question: $19 + 11 \times 6 - 4 = ?$ $19 + 11 \times 6 - 4 = 19 + 66 - 4$ $= 20 - 1 + 66 - 4$ $= 20 + 66 - 1 - 4$ $= 86 - 5$ $= 81$
Observations/Documentation		

Number

Activity 8 Assessment
The Order of Operations

Developing Fluency with Whole Number Operations

Understands number relationships and properties and applies them to whole number operations.

$? - 240 = 720$

$720 + 240 = 960$

$50 \times ? = 2000$

$2000 \div 50 = 40$

"I solved each equation using an operation I am comfortable with."

Uses estimation to check reasonableness of solutions.

A forklift can carry 2000 kg. An operator is unloading boxes of shoes weighing 78 kg. How many boxes can the forklift safely carry at one time?
78 × ? = 2000

"78 is close to 80. I know 80 × 20 = 1600 and 80 × 5 = 400. 1600 + 400 = 2000. An estimate of 25 boxes seems reasonable."

Uses mental math strategies to solve single-step equations with larger numbers.

$$\begin{aligned} 78 \times 25 &= (70 + 8) \times (20 + 5) \\ &= (70 \times 20) + (8 \times 20) + (70 \times 5) + (8 \times 5) \\ &= 1400 + 160 + 350 + 40 \\ &= 1950 \end{aligned}$$

$$\begin{array}{rl} 78 & \\ \times\ 25 & \\ \hline 1400 & (70 \times 20) \\ 160 & (20 \times 8) \\ 350 & (70 \times 5) \\ +\ 40 & (8 \times 5) \\ \hline 1950 & \end{array}$$

	70	8
20	1400	160
5	350	40

"I decomposed the numbers to make multiplying easier."

Observations/Documentation

Number

Activity 8 Assessment

The Order of Operations

Developing Fluency with Whole Number Operations (cont'd)		
Solves multi-step equations using mental math strategies and properties of operations. 1560 + 1682 – 440 – 602 = ? 1560 – 440 = **1120** 1682 – 602 = **1080** **1120** + **1080** = 2200	Uses order of operations to solve equations and explains the effect when order is not followed. 9 × 8 – 3 + 16 ÷ 4 = 72 – 3 + 4 = 73 "I have to do multiplication and division first. If the order isn't followed and I perform the operations in the order in which they appear, I get 21 R1."	Flexibly selects mental math strategies and applies order of operations to solve multi-step equations/problems. To claim the prize in a contest, you must answer this skill-testing question: 19 + 11 × 6 – 4 = ? 19 + 11 × 6 – 4 = 19 + 66 – 4 = 20 – 1 + 66 – 4 = 20 + 66 –1 – 4 = 86 – 5 = 81
Observations/Documentation		

Number

Activity 9 Assessment
Mental Math Strategies

Developing Fluency with Whole Number Operations

Understands number relationships and properties and applies them to whole number operations.	Uses estimation to check reasonableness of solutions.	Uses mental math strategies to solve single-step equations with larger numbers.
$? - 240 = 720$ $720 + 240 = 960$ $50 \times ? = 2000$ $2000 \div 50 = 40$ "I solved each equation using an operation I am comfortable with."	A forklift can carry 2000 kg. An operator is unloading boxes of shoes weighing 78 kg. How many boxes can the forklift safely carry at one time? $78 \times ? = 2000$ "78 is close to 80. I know 80 × 20 = 1600 and 80 × 5 = 400. 1600 + 400 = 2000. An estimate of 25 boxes seems reasonable."	$78 \times 25 = (70 + 8) \times (20 + 5)$ $= (70 \times 20) + (8 \times 20) + (70 \times 5) + (8 \times 5)$ $= 1400 + 160 + 350 + 40$ $= 1950$ $\begin{array}{r l} 78 & \\ \times\ 25 & \\ \hline 1400 & (70 \times 20) \\ 160 & (20 \times 8) \\ 350 & (70 \times 5) \\ +\ 40 & (8 \times 5) \\ \hline 1950 & \end{array}$ $\begin{array}{c\|c\|c} & 70 & 8 \\ \hline 20 & 1400 & 160 \\ \hline 5 & 350 & 40 \end{array}$ "I decomposed the numbers to make multiplying easier."

Observations/Documentation

Number

Activity 9 Assessment
Mental Math Strategies

Developing Fluency with Whole Number Operations (cont'd)		
Solves multi-step equations using mental math strategies and properties of operations. 1560 + 1682 – 440 – 602 = ? 1560 – 440 = **1120** 1682 – 602 = **1080** **1120** + **1080** = 2200	Uses order of operations to solve equations and explains the effect when order is not followed. 9 × 8 – 3 + 16 ÷ 4 = 72 – 3 + 4 = 73 "I have to do multiplication and division first. If the order isn't followed and I perform the operations in the order in which they appear, I get 21 R1."	Flexibly selects mental math strategies and applies order of operations to solve multi-step equations/problems. To claim the prize in a contest, you must answer this skill-testing question: 19 + 11 × 6 – 4 = ? 19 + 11 × 6 – 4 = 19 + 66 – 4 = 20 – 1 + 66 – 4 = 20 + 66 –1 – 4 = 86 – 5 = 81
Observations/Documentation		

Numbers

Activity 10 Assessment

Unit Rates

Representing Equivalent Ratios and Rates

Represents and records ratios and rates symbolically.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using rates:

Glue Sticks	10	20	30	40	50	60
Cost ($)	4	8	12	16	20	24

"I skip-counted by 10s and 4s."

Represents and creates equivalent ratios and rates.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

"The ratio of glue sticks to cost is 10:4. To find the cost of 60 glue sticks, I multiply each term by 6."

10 × 6 : 4 × 6
60 : 24

Represents and creates in-between ratios and rates.

A crafter sells 2 hand-painted pots for $18. How much will the crafter make if 7 pots are sold?

For example, using rates:

Pots Sold	2	4	6	8	10
Amount Made ($)	18	36	54	72	90

"7 is halfway between 6 and 8, so I find the number halfway between 54 and 72, which is $63.00."

Flexibly solves problems involving ratios, including percents, and rates.

The ratio of dogs to cats in the animal shelter is 8:12. Show the comparison using percents.

"The whole is 8 + 12 = 20.
Since percent is "out of 100",
I multiply each term in the ratio by 5 because 5 × 20 = 100.
8 × 5:12 × 5, or 40:60
40% of the animals are dogs and 60% are cats."

Observations/Documentation

Numbers

Activity 11 Assessment
Exploring Ratios

Representing Equivalent Ratios and Rates

Represents and records ratios and rates symbolically.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using rates:

Glue Sticks	10	20	30	40	50	60
Cost ($)	4	8	12	16	20	24

"I skip-counted by 10s and 4s."

Represents and creates equivalent ratios and rates.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using ratios:

"The ratio of glue sticks to cost is 10:4. To find the cost of 60 glue sticks, I multiply each term by 6."

10 × 6 : 4 × 6
60 : 24

Represents and creates in-between ratios and rates.

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8 × 5:12 × 5, or 40:60
40% of the animals are dogs and 60% are cats."

Observations/Documentation

Number

Activity 12 Assessment
Fluency with Whole Numbers Consolidation

Developing Fluency with Whole Number Operations

Understands number relationships and properties and applies them to whole number operations.	Uses estimation to check reasonableness of solutions.	Uses mental math strategies to solve single-step equations with larger numbers.
? – 240 = 720 720 + 240 = 960 50 × ? = 2000 2000 ÷ 50 = 40 "I solved each equation using an operation I am comfortable with."	A forklift can carry 2000 kg. An operator is unloading boxes of shoes weighing 78 kg. How many boxes can the forklift safely carry at one time? 78 × ? = 2000 "78 is close to 80. I know 80 × 20 = 1600 and 80 × 5 = 400. 1600 + 400 = 2000. An estimate of 25 boxes seems reasonable."	78 × 25 = (70 + 8) × (20 + 5) = (70 × 20) + (8 × 20) + (70 × 5) + (8 × 5) = 1400 + 160 + 350 + 40 = 1950 78 × 25 1400 (70 × 20) 160 (20 × 8) 350 (70 × 5) + 40 (8 × 5) 1950 "I decomposed the numbers to make multiplying easier."

	70	8
20	1400	160
5	350	40

Observations/Documentation

Number

Activity 12 Assessment
Fluency with Whole Numbers Consolidation

Developing Fluency with Whole Number Operations (cont'd)		
Solves multi-step equations using mental math strategies and properties of operations. 1560 + 1682 – 440 – 602 = ? 1560 – 440 = **1120** 1682 – 602 = **1080** **1120** + **1080** = 2200	Uses order of operations to solve equations and explains the effect when order is not followed. 9 × 8 – 3 + 16 ÷ 4 = 72 – 3 + 4 = 73 "I have to do multiplication and division first. If the order isn't followed and I perform the operations in the order in which they appear, I get 21 R1."	Flexibly selects mental math strategies and applies order of operations to solve multi-step equations/problems. To claim the prize in a contest, you must answer this skill-testing question: 19 + 11 × 6 – 4 = ? 19 + 11 × 6 – 4 = 19 + 66 – 4 = 20 – 1 + 66 – 4 = 20 + 66 –1 – 4 = 86 – 5 = 81
Observations/Documentation		

Number

Activity 12 Assessment
Fluency with Whole Numbers Consolidation

Representing Equivalent Ratios and Rates

Represents and records ratios and rates symbolically.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using rates:

Glue Sticks	10	20	30	40	50	60
Cost ($)	4	8	12	16	20	24

"I skip-counted by 10s and 4s."

Represents and creates equivalent ratios and rates.

10 glue sticks cost $4.
How much will 60 glue sticks cost?

For example, using ratios:

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10 × 6 : 4 × 6
60 : 24

Represents and creates in-between ratios and rates.

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The ratio of dogs to cats in the animal shelter is 8:12. Show the comparison using percents.

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8 × 5:12 × 5, or 40:60
40% of the animals are dogs and 60% are cats."

Observations/Documentation

Name________________________________ Date_____________________

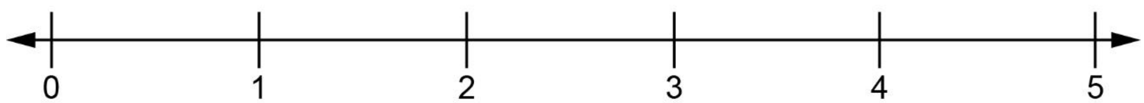
Number
Unit 3 Line Master 1

Representing Fractions

Whole: Unit:

Rods selected:

Fraction modelled:



Equivalent fractions:

Name________________________________ Date_____________________

Number
Unit 3 Line Master 2

Fraction Strips

1									
$\frac{1}{2}$	$\frac{1}{2}$								
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$							
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$						
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$					
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$				
$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$			
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$		
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

Name________________________________ Date_____________________

Number
Unit 3 Line Master 3

Relational Rods

White White White White White White White White White White

Red Red Red Red Red

Light Green Light Green Light Green White

Purple Purple Red

Yellow Yellow

Dark Green Purple

Black Light Green

Brown Red

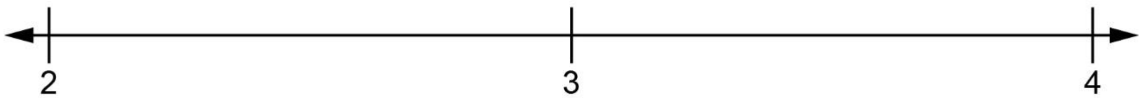
Blue White

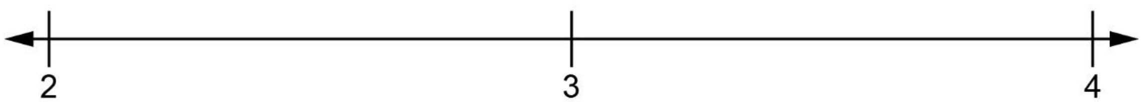
Orange

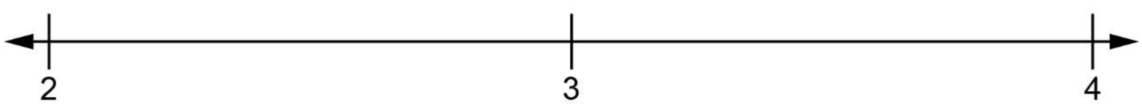
Name________________________________ Date_____________________

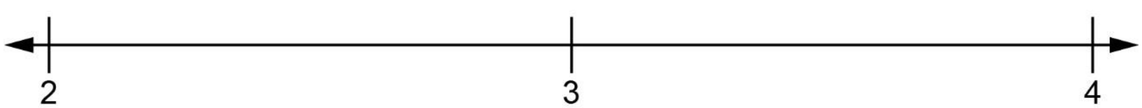
Number
Unit 3 Line Master 4a

Number Lines (2 to 4)





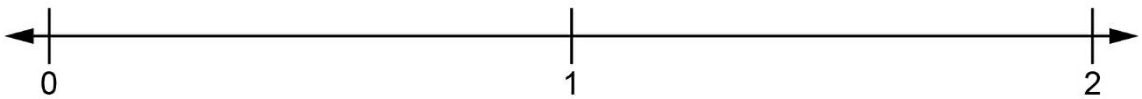


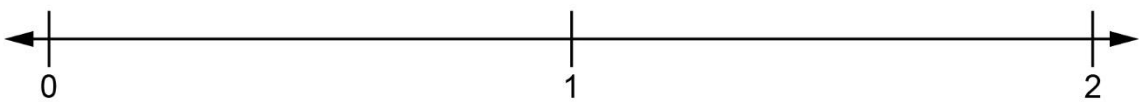


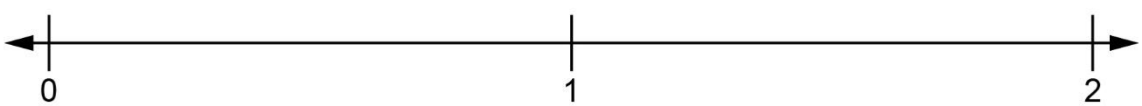
Name________________________________ Date_____________________

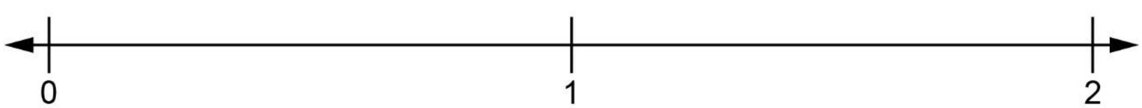
Number
Unit 3 Line Master 4b

Number Lines (0 to 2)









Name________________________________ Date_____________________

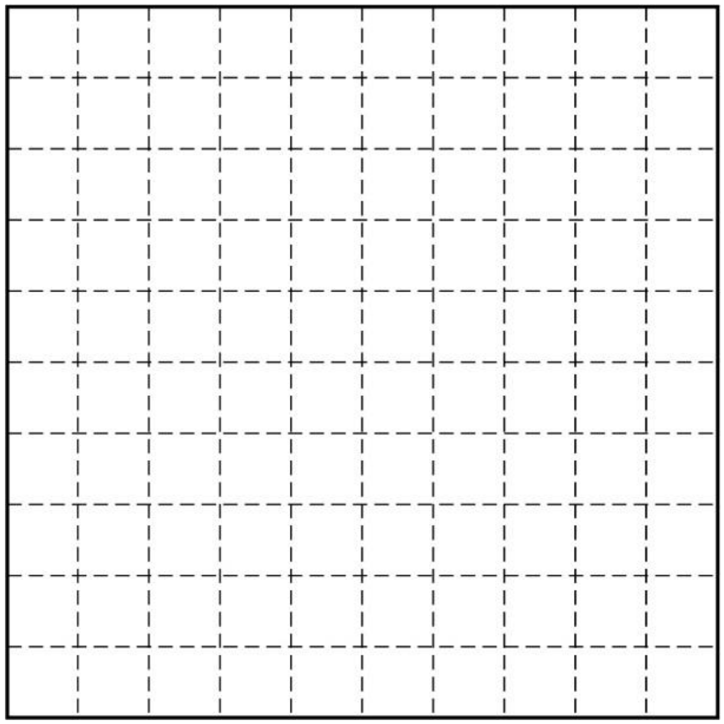
Number
Unit 3 Line Master 4c

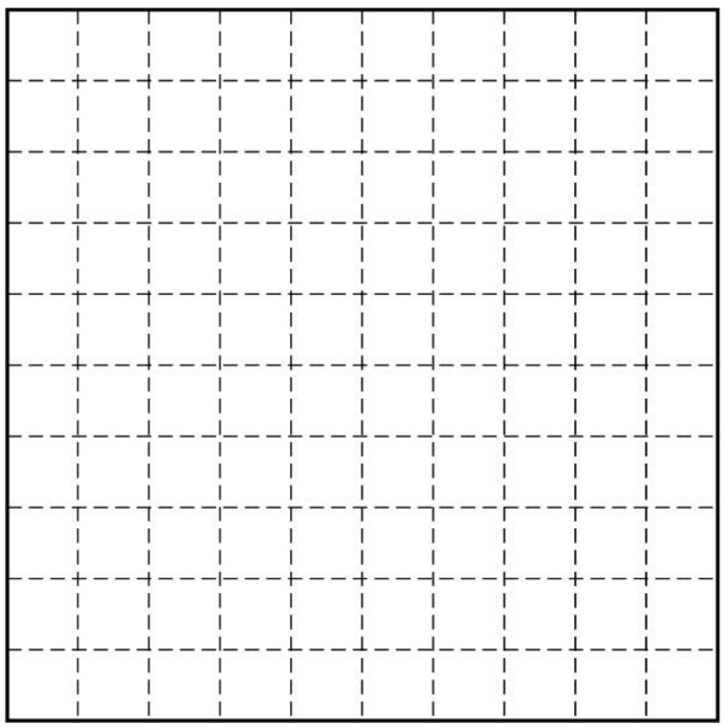
Open Number Lines

Name________________________________ Date_____________________

Number
Unit 3 Line Master 5

Hundredths Grids





Name________________________________ Date_____________________

Number
Unit 3 Line Master 6

Place-Value Mat (Thousandths)

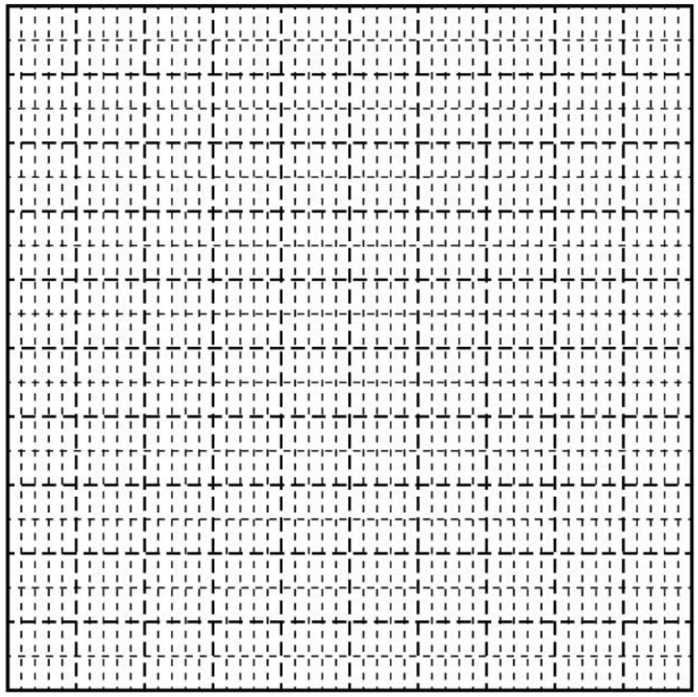
Thousands	Hundreds	Tens	Ones	•	Tenths	Hundredths	Thousandths

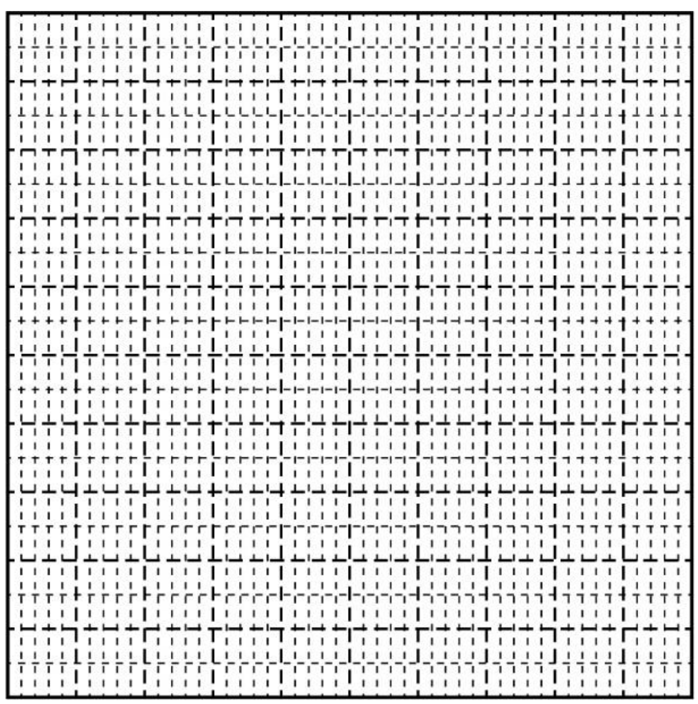
My Number

Name_______________________________ Date____________________

Number
Unit 3 Line Master 7

Thousandths Grids





Name_______________________________ Date____________________

Number
Unit 3 Line Master 8a

Electricity Usage

Appliance	On-Time per day	On-Time per day (decimal)	On-Time per day (fraction)	On-Time per day (%)
Bathroom lighting	2 h 57 min		$\frac{12}{100}$	
Cooking stove, ventilation	2 h 12 min	0.09		
Dishwasher	1 h 7 min			5%
Floor heating	4 h 5 min			17%
Iron, vacuum cleaner	2 h 2 min		$\frac{8}{100}$	
Lighting	7 h 58 min	0.33		
Refrigerator	15 h 36 min		$\frac{65}{100}$	
TV, modem, PC, video	12 h 42 min			53%
Washing machine	32 min	0.02		
Water heater	5 h 46 min		$\frac{24}{100}$	

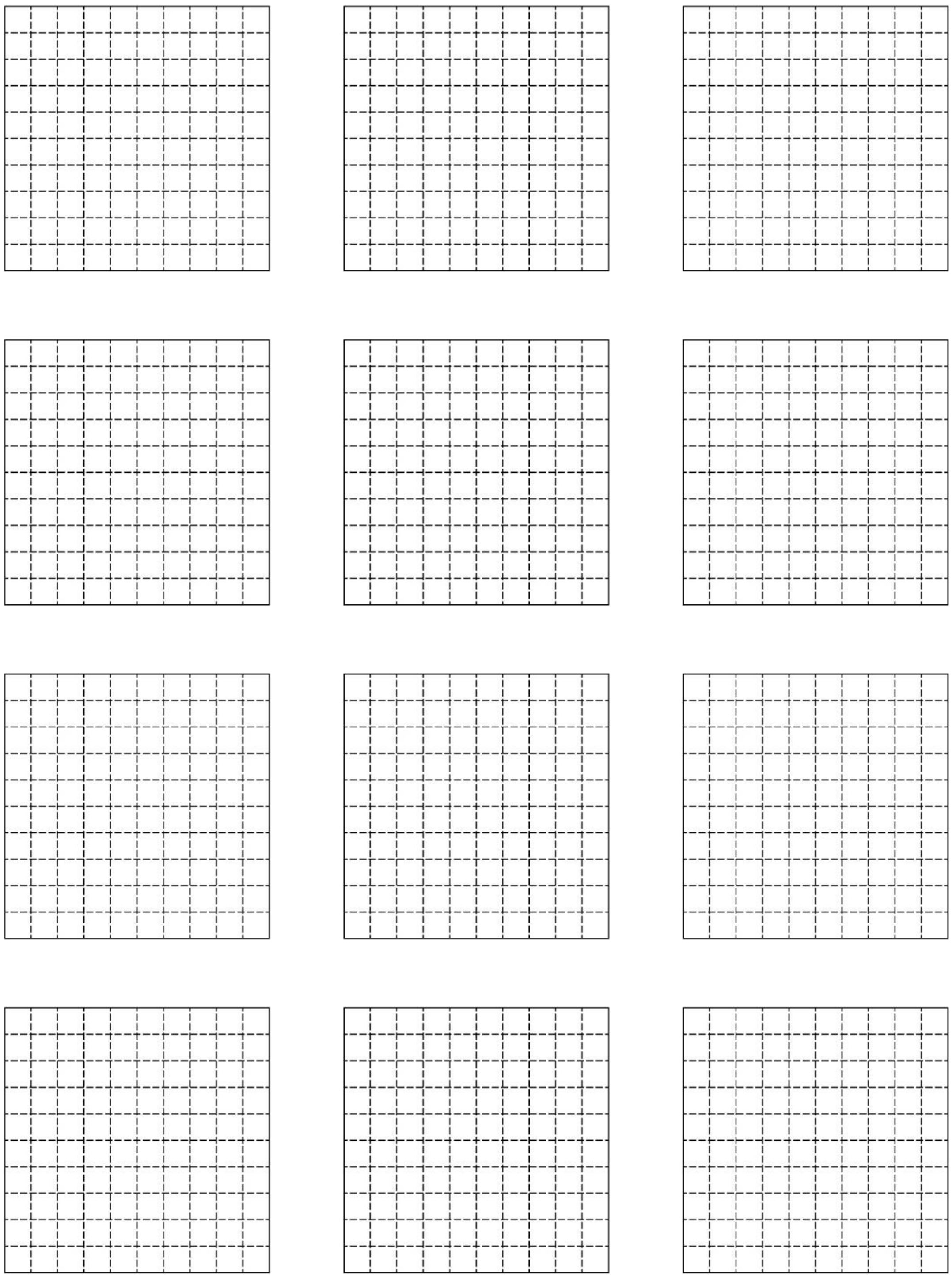
Source: https://www.researchgate.net/figure/Operation-times-and-energy-consumption-of-home-appliances_tbl1_268406195

Name________________________________ Date_____________________

Number
Unit 3 Line Master 8b

Electricity Usage

Grids

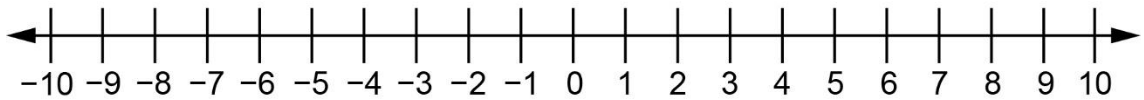


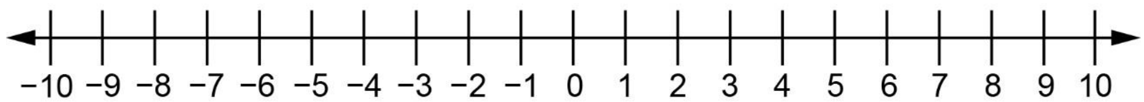
Name________________________________ Date_____________________

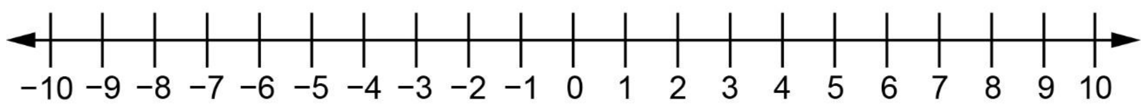
Number
Unit 3 Line Master 9a

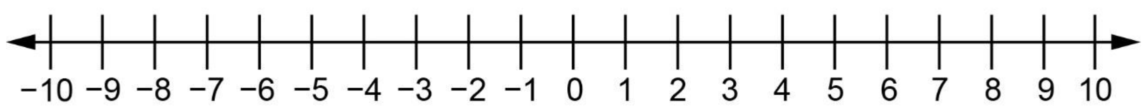
Number Lines (−10 to 10)

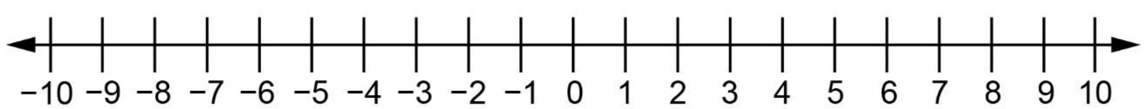
Horizontal

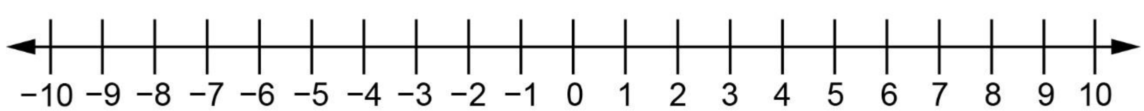










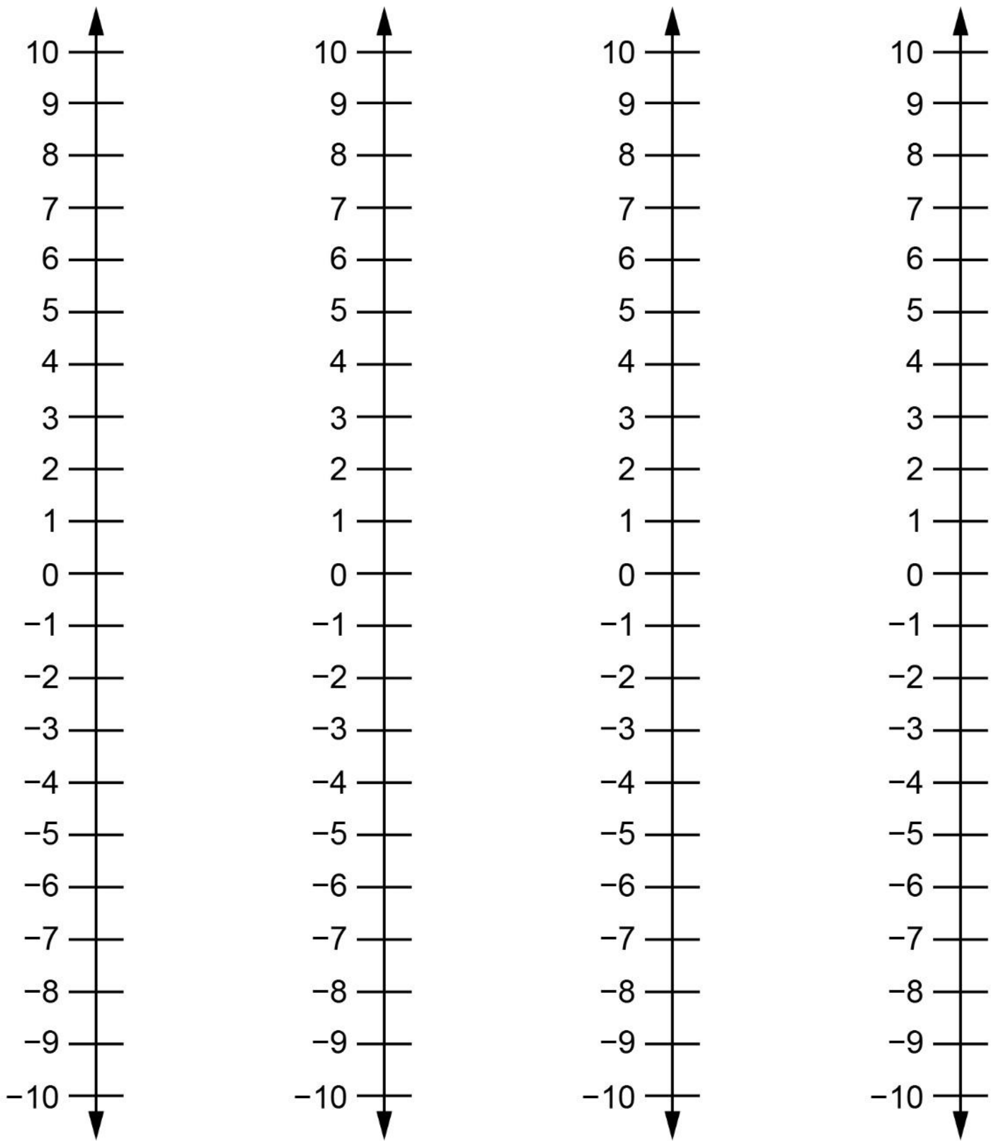


Name________________________________ Date_____________________

Number
Unit 3 Line Master 9b

Number Lines (–10 to 10)

Vertical



Name________________________________ Date_____________________

Number
Unit 3 Line Master 10

Integer Situations

The temperature is 7°C above zero.	The car is parked 2 floors below ground level.
A student withdrew $5 from a bank account.	The golfer was 4 under par for the round.
The song dropped 1 position on the hit chart.	The barn swallow was flying at an altitude of 2 m above the ground.
The dancer took 3 steps backward.	The child deposited $6 into the piggy bank.
The student walked down 9 flights of stairs.	The item was on sale for $10 off.

Name________________________________ Date_____________________

Number
Unit 3 Line Master 11a

Elevations Below Sea Level

Place	Country	Elevation (Below Sea Level)
Laguna del Carbon	Argentina	−105 m
Lake Eyre	Australia	−16 m
Baku	Azerbaijan	−28 m
Lake Assal	Djibouti	−153 m
Lake Enriquillo	Dominican Republic	−46 m
Allenby Bridge	Jordan–West Bank	−381 m
Dead Sea	Jordan–West Bank–Israel	−430 m
Atyrau Airport	Kazakhstan	−22 m
Badwater Basin, Death Valley, California	United States	−85 m
Jericho	West Bank	−258 m

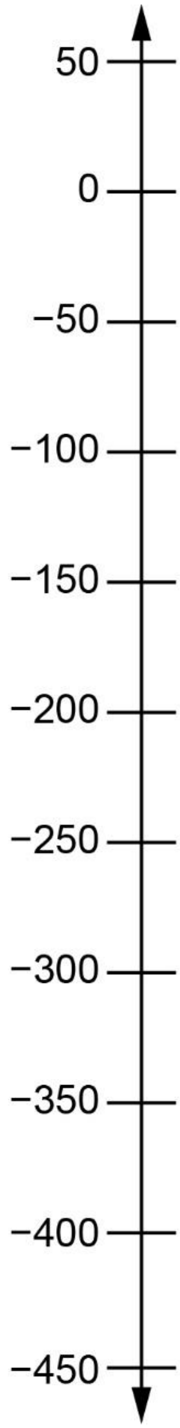
Source: https://en.wikipedia.org/wiki/List_of_places_on_land_with_elevations_below_sea_level

Name________________________________ Date_____________________

Number
Unit 3 Line Master 11b

Elevations Below Sea Level

Number Line



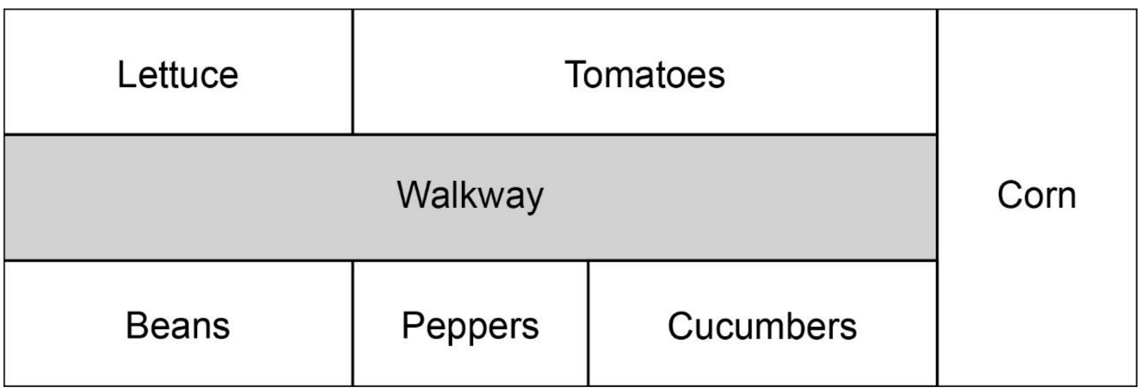
Name________________________________ Date_____________________

Number
Unit 3 Line Master 12a

Centre Tasks

Centre A: The Garden (Representing Fractions)

The residents of an apartment building decided to make a rectangular community garden.
Their design is shown below.
The walkway is part of the garden.
What fraction of the garden does each type of vegetable cover?
Explain.



Name________________________________ Date_____________________

Number
Unit 3 Line Master 12b

Centre Tasks (cont'd)

Centre B: Planting Seeds (Comparing Fractions)

Seeds come in small packages, with different numbers of seeds in each, depending on the type of vegetable.

This table shows the fraction of the garden each package of seeds will cover.

Vegetable	Lettuce	Tomatoes	Corn	Peppers	Cucumbers	Beans
Fraction of garden covered with 1 package of seeds	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{3}$

Use the fractions you identified in Centre A. Determine how many packages of each seed the gardeners should buy.

Name________________________________ Date_____________________

Number
Unit 3 Line Master 12c

Centre Tasks (cont'd)

Centre C: Tending to the Garden (Working with Percents)

These tasks need to be completed daily to maintain the garden.

Task	**Time (h)**
Watering	2
Weeding	4
Fertilizing	0.5
Pruning	1
Maintenance of Walkway	1
Picking/Cleaning Crop	1.5

The gardeners want to divide up the tasks equally.
To do this, they would like a visual that shows each time as a percent of the total daily time: 10 h.
Create a visual to help the gardeners.

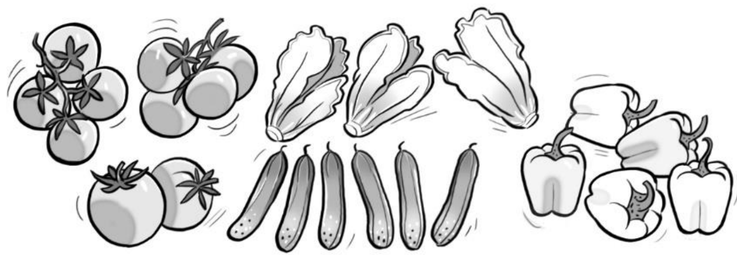
Name________________________________ Date_____________________

Number
Unit 3 Line Master 12d

Centre Tasks (cont’d)

Centre D: Harvesting Vegetables (Fractions of a Set)

One day in mid-August, 24 vegetables were harvested from the garden.
Here is the harvest:



- Show each type of vegetable as a fraction of the whole harvest for that day.
- Order the fractions from least to greatest.
- Create a visual to show the harvest.
  Partition the rectangle to show the harvest
  of each type of vegetable.

Today’s Harvest

Name______________________________ Date____________________

Number
Unit 3 Line Master 12e

Centre Tasks (cont'd)

Centre E: Recording Temperatures (Interpreting Integers)

The gardeners recorded the temperatures daily.
This table shows the temperatures for the first 10 days of May.

Date	Daytime High (°C)	Nighttime Low (°C)
May 1	15	−3
May 2	12	−7
May 3	23	4
May 4	24	15
May 5	23	10
May 6	29	16
May 7	28	8
May 8	15	−4
May 9	19	0
May 10	17	−1

- Which day had the coldest daytime temperature?
- Which day had the coldest nighttime temperature?
- Frost is possible any time the nighttime temperature drops to 4°C or lower.
  For which dates was there a risk of frost?
- Order the nighttime temperatures from highest to lowest.

Name________________________________ Date_____________________

Number
Unit 3 Line Master 12f

Centre Tasks (cont'd)

Centre F: Applying Fertilizer (Relating Fractions, Decimals, and Percents)

The gardeners want to use an organic fertilizer that is high in nitrogen and low in potash.
Here are their options.

Natural Nutrients Fertilizer	Greener Growers Fertilizer	Perfect Plants Fertilizer
Nitrogen: $\frac{1}{5}$	Nitrogen: 0.15	Nitrogen: 5%
Phosphate: $\frac{1}{10}$	Phosphate: 0.2	Phosphate: 10%
Potash: $\frac{1}{20}$	Potash: 0.05	Potash: 5%

- Which fertilizer best matches their needs?
- For the chosen fertilizer, express the value of each chemical as:
  - a fraction
  - a decimal
  - a percent
- Identify the fertilizer that has the most phosphate.
  Show your thinking.

Name________________________________ Date_____________________

Number
Unit 3 Line Master 12g

Centre Tasks (cont'd)

Answers

Centre A:

Lettuce: $\frac{2}{18}$ or $\frac{1}{9}$; Tomatoes: $\frac{3}{18}$ or $\frac{1}{6}$; Corn: $\frac{3}{18}$ or $\frac{1}{6}$;
Cucumbers: $\frac{2}{18}$ or $\frac{1}{9}$; Peppers: $\frac{1}{18}$; Beans: $\frac{2}{18}$ or $\frac{1}{9}$

Centre B:

Lettuce: 1 package; Tomatoes: 2 packages; Corn: 1 package;
Cucumbers: 1 package; Peppers: 1 package; Beans: 1 package

Centre C:

Visual to show: Watering: 20%; Weeding: 40%; Fertilizing: 5%;
Pruning: 10%; Maintenance of Walkway: 10%;
Picking/Cleaning Crop: 15%

Centre D:

Tomatoes: $\frac{10}{24}$, or $\frac{5}{12}$; Cucumbers: $\frac{6}{24}$, or $\frac{1}{4}$; Lettuce: $\frac{3}{24}$, or $\frac{1}{8}$;
Peppers: $\frac{5}{24}$;

Least to greatest: $\frac{1}{8}$, $\frac{5}{24}$, $\frac{1}{4}$, $\frac{5}{12}$

Today's Harvest

T	T	T
T	T	T
T	T	T
T	C	C
C	C	C
C	L	L
L	P	P
P	P	P

Name________________________________ Date_____________________

Number
Unit 3 Line Master 12h

Centre Tasks (cont'd)

Answers

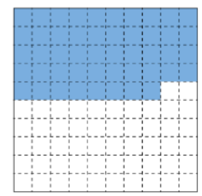
Centre E:
May 2; May 2; May 1, May 2, May 3, May 8, May 9, May 10;
16, 15, 10, 8, 4, 0, −1, −3, −4, −7

Centre F: Natural Nutrients Fertilizer; Nitrogen: $\frac{1}{5}$, 0.2, 20%;
Phosphate: $\frac{1}{10}$, 0.1, 10%; Potash: $\frac{1}{20}$; 0.05, 5%;
Greener Growers Fertilizer; 20%.

Number

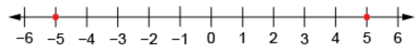
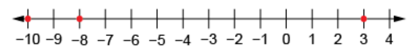
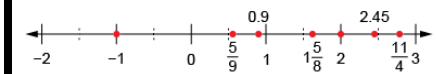
Activity 13 Assessment

Representing Fractions

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  "I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$."	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). "To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater."	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  "I have forty-eight hundredths, which is the same as $\frac{48}{100}$."	Understands the base-ten place-value system and uses it to compare and order decimals. "Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths."
Observations/Documentation			

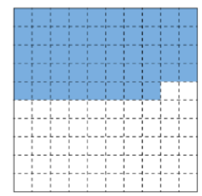
Number

Activity 13 Assessment
Representing Fractions

Exploring Fractions, Decimals, Percents, and Integers (cont'd)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

Number

Activity 14 Assessment
Comparing and Ordering Fractions

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  “I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$.”	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). “To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater.”	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  “I have forty-eight hundredths, which is the same as $\frac{48}{100}$.”	Understands the base-ten place-value system and uses it to compare and order decimals. “Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths.”
Observations/Documentation			

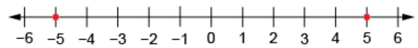
Number

Activity 14 Assessment

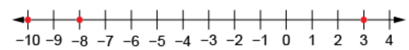
Comparing and Ordering Fractions

<table>
<tr><th colspan="4">Exploring Fractions, Decimals, Percents, and Integers (cont’d)</th></tr>
<tr>
<td>Understands percent as “out of 100” and makes connections with decimals and fractions.

“0.52 is read as 52 hundredths and since percent is ‘out of 100,’ it can also be thought of as 52% of something.”</td>
<td>Understands that a negative number is the opposite of its corresponding positive number.



“Negative 5 is the same distance from zero as positive 5.”</td>
<td>Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.



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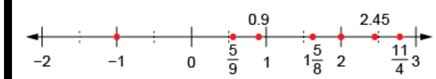
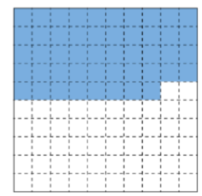
<td>Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).



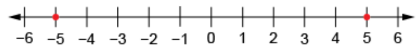
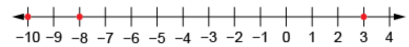
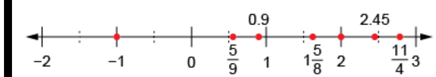
How might you use the different types of numbers in real life?</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Number

Activity 15 Assessment
Representing Decimals

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  "I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$."	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). "To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater."	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  "I have forty-eight hundredths, which is the same as $\frac{48}{100}$."	Understands the base-ten place-value system and uses it to compare and order decimals. "Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths."
Observations/Documentation			

Activity 15 Assessment
Representing Decimals

Exploring Fractions, Decimals, Percents, and Integers (cont'd)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

Activity 16 Assessment
Comparing and Ordering Decimals

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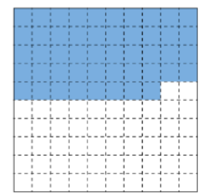
“I have forty-eight hundredths, which is the same as $\frac{48}{100}$.”</td>
<td>Understands the base-ten place-value system and uses it to compare and order decimals.
“Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths.”</td>
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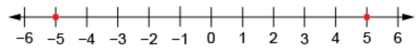
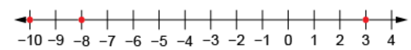
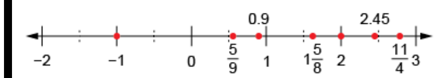
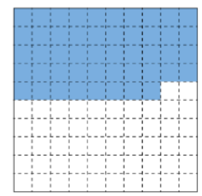
Number

Activity 16 Assessment
Comparing and Ordering Decimals

Exploring Fractions, Decimals, Percents, and Integers (cont'd)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

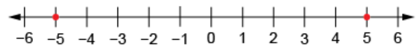
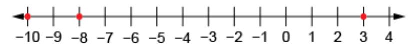
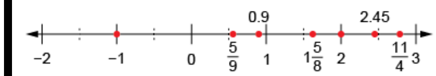
Number

Activity 17 Assessment
Comparing and Ordering Fractions and Decimals

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  “I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$.”	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). “To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater.”	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  “I have forty-eight hundredths, which is the same as $\frac{48}{100}$.”	Understands the base-ten place-value system and uses it to compare and order decimals. “Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths.”
Observations/Documentation			

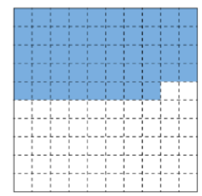
Number

Activity 17 Assessment
Comparing and Ordering Fractions and Decimals

Exploring Fractions, Decimals, Percents, and Integers (cont'd)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

Number

Activity 18 Assessment
Relating Fractions, Decimals, and Percents

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  “I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$.”	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). “To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater.”	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  “I have forty-eight hundredths, which is the same as $\frac{48}{100}$.”	Understands the base-ten place-value system and uses it to compare and order decimals. “Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths.”
Observations/Documentation			

Number

Activity 18 Assessment
Relating Fractions, Decimals, and Percents

<table>
<tr><th colspan="4">Exploring Fractions, Decimals, Percents, and Integers (cont’d)</th></tr>
<tr>
<td>Understands percent as “out of 100” and makes connections with decimals and fractions.

“0.52 is read as 52 hundredths and since percent is ‘out of 100,’ it can also be thought of as 52% of something.”</td>
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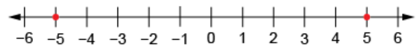
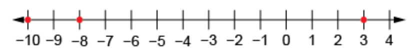
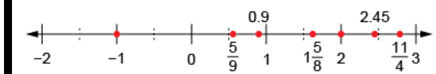


“Negative 5 is the same distance from zero as positive 5.”</td>
<td>Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.



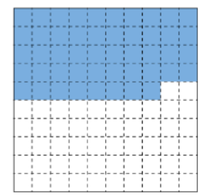
“−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero.”</td>
<td>Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).



How might you use the different types of numbers in real life?</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

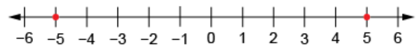
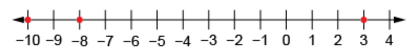
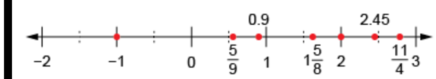
Activity 19 Assessment

Representing Integers

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  "I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$."	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). "To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater."	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  "I have forty-eight hundredths, which is the same as $\frac{48}{100}$."	Understands the base-ten place-value system and uses it to compare and order decimals. "Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths."
Observations/Documentation			

Number

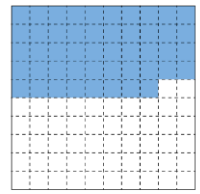
Activity 19 Assessment
Representing Integers

Exploring Fractions, Decimals, Percents, and Integers (cont'd)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

Number

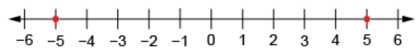
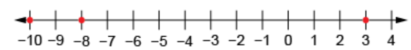
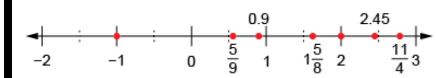
Activity 20 Assessment

Comparing and Ordering Integers

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  “I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$.”	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). “To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater.”	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  “I have forty-eight hundredths, which is the same as $\frac{48}{100}$.”	Understands the base-ten place-value system and uses it to compare and order decimals. “Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths.”
Observations/Documentation			

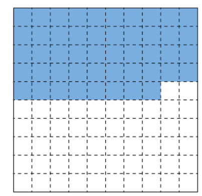
Number

Activity 20 Assessment
Comparing and Ordering Integers

Exploring Fractions, Decimals, Percents, and Integers (cont'd)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

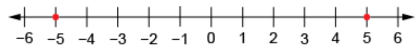
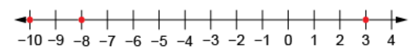
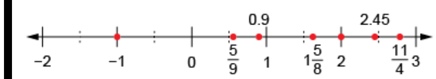
Numbers

Activity 21 Assessment
Fractions, Decimals, Percents, and Integers Consolidation

Exploring Fractions, Decimals, Percents, and Integers			
Uses counting to determine improper fractions and mixed numbers (based on equivalence).  "I counted by fifths. I have 13 one-fifths, which is the same as $\frac{13}{5}$ or $2\frac{3}{5}$."	Compares and orders fractions (e.g., using benchmarks, equivalent fractions, number sense). "To compare $\frac{13}{4}$ and $3\frac{1}{3}$, I know $\frac{13}{4}$ is the same as $3\frac{1}{4}$, but $3\frac{1}{3}$ is closer to $3\frac{1}{2}$, so I know it is greater."	Reads and understands decimals as fractions with denominators of 10, 100, or 1000.  "I have forty-eight hundredths, which is the same as $\frac{48}{100}$."	Understands the base-ten place-value system and uses it to compare and order decimals. "Even though 0.575 has more digits than 0.67, 0.575 < 0.67 because five hundred and seventy-five thousandths is less than six hundred and seventy thousandths."
Observations/Documentation			

Numbers

Activity 21 Assessment
Fractions, Decimals, Percents, and Integers Consolidation

Exploring Fractions, Decimals, Percents, and Integers (con't)			
Understands percent as "out of 100" and makes connections with decimals and fractions. "0.52 is read as 52 hundredths and since percent is 'out of 100,' it can also be thought of as 52% of something."	Understands that a negative number is the opposite of its corresponding positive number.  "Negative 5 is the same distance from zero as positive 5."	Recognizes that negative numbers have both a sign and a direction (size) and their value decreases as the number of digits increases.  "−8 is less than +3 because it is less than zero; −10 is even less than −8 because it is farther away from zero."	Flexibly connects quantities across number systems (fractions, decimals, percents, and integers).  How might you use the different types of numbers in real life?
Observations/Documentation			

Name________________________________ Date_____________________

Number
Unit 4 Line Master 1

Gemstone Tracker

Gemstone	Amber	Emerald	Garnet	Quartz	Jade
Mass	276 g	354 g	189 g	623 g	714 g

Buying Gemstones

Gemstone	Mass (g)	Price Per Gram	Price Paid ($)

Total Paid: ____________________

Selling Gemstones

Gemstone	Mass (g)	Price Per Gram	Sales ($)

Total Sales: ____________________

Profit/Loss:

Name________________________________ Date_____________________

Number
Unit 4 Line Master 2

Shopping for the Food Bank

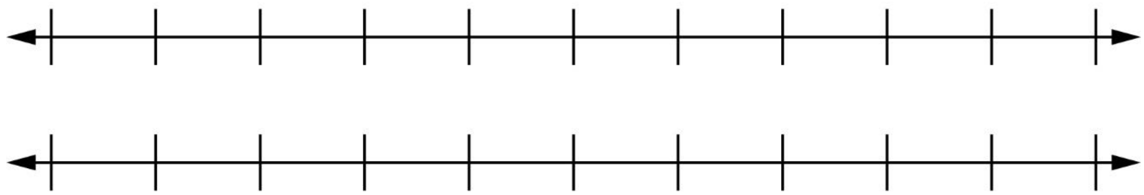
Preston is grocery shopping to buy 10 kg of food for the food bank.
Preston will choose 1 of each item.
Identify a basket of food that comes close to a total mass of 10 kg.
Estimate first, then add to check.
What is the difference between the total mass of food you chose and 10 kg? Show how you know.

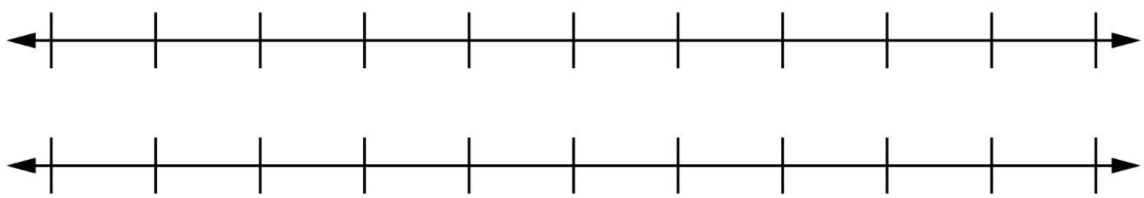
Food Item	**Mass (kg)**
Baked beans	0.550
Blueberries	1.750
Carrots	1.360
Cereal	0.640
Cheese (grated)	0.125
Chicken broth	0.985
Chicken wings	0.850
Hamburger	1.450
Potatoes	2.270
Tea bags	0.790
Tuna (3 cans)	0.510
Water	1.250

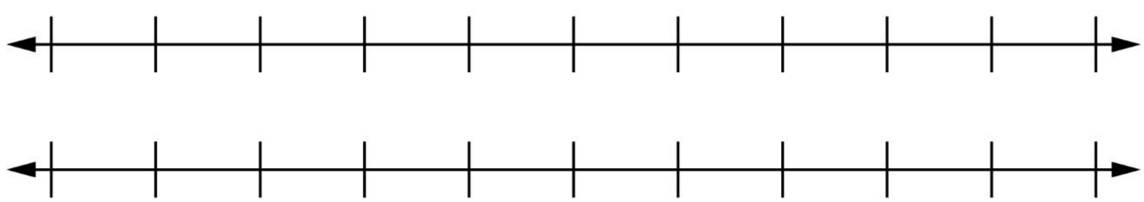
Name________________________________ Date_____________________

Number
Unit 4 Line Master 3

Double Number Lines







Name________________________________ Date_____________________

Number
Unit 4 Line Master 4

Paper Fraction Strips

Name________________________________ Date_____________________

Number
Unit 4 Line Master 5

Question and Answer Cards

Questions

Question: What is $2 \times \frac{3}{8}$?	Question: What is $3 \times \frac{5}{7}$?	Question: What is $4 \times \frac{2}{3}$?	Question: What is $6 \times \frac{3}{4}$?
Question: What is $7 \div \frac{2}{3}$?	Question: What is $9 \div \frac{3}{4}$?	Question: What is $5 \div \frac{4}{7}$?	Question: What is $5 \div \frac{4}{5}$?

Answers

Answer: $10\frac{1}{2}$	Answer: 12	Answer: $2\frac{1}{7}$	Answer: $4\frac{1}{2}$
Answer: $8\frac{3}{4}$	Answer: $\frac{3}{4}$	Answer: $2\frac{2}{3}$	Answer: $6\frac{1}{4}$

Name________________________________ Date_____________________

Number
Unit 4 Line Master 6a

Top Tipper

25% of $200	14% of $300	40% of $250
45% of $280	11% of $400	50% of $130
15% of $360	35% of $140	30% of $110
20% of $135	10% of $420	60% of $150

Name________________________________ Date_____________________

Number
Unit 4 Line Master 6b

Top Tipper (cont'd)

12% of \$340	13% of \$225	18% of \$180
19% of \$190	22% of \$125	21% of \$145
24% of \$170	23% of \$290	17% of \$160
75% of \$380	55% of \$350	8% of \$120

Name________________________________ Date_____________________

Number
Unit 4 Line Master 6c

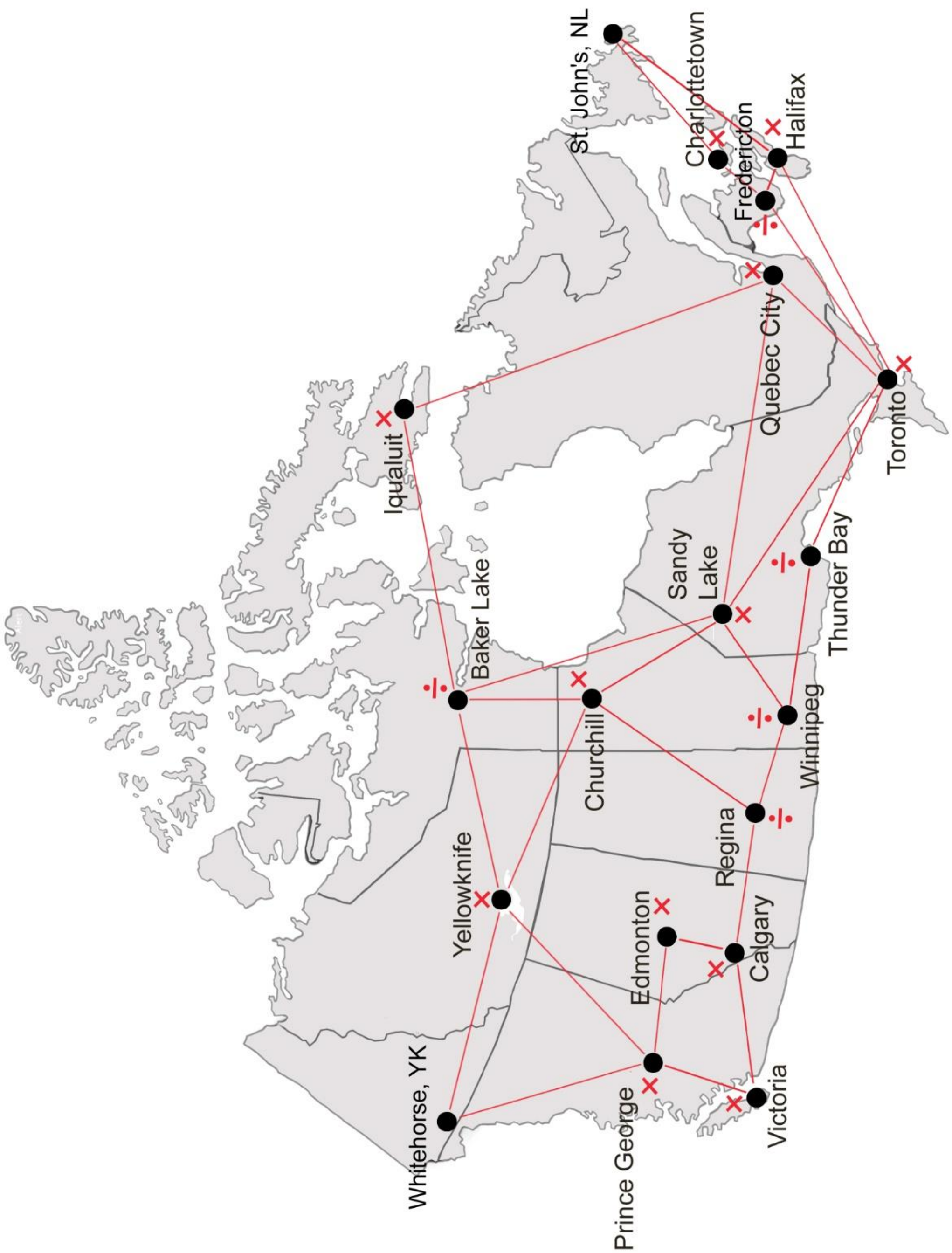
Top Tipper (cont'd)

10% of \$40	15% of \$60	20% of \$50
25% of \$20	5% of \$30	1% of \$10
30% of \$80	40% of \$90	35% of \$40
50% of \$36	6% of \$20	55% of \$60

Name________________________________ Date_____________________

Number
Unit 4 Line Master 7a

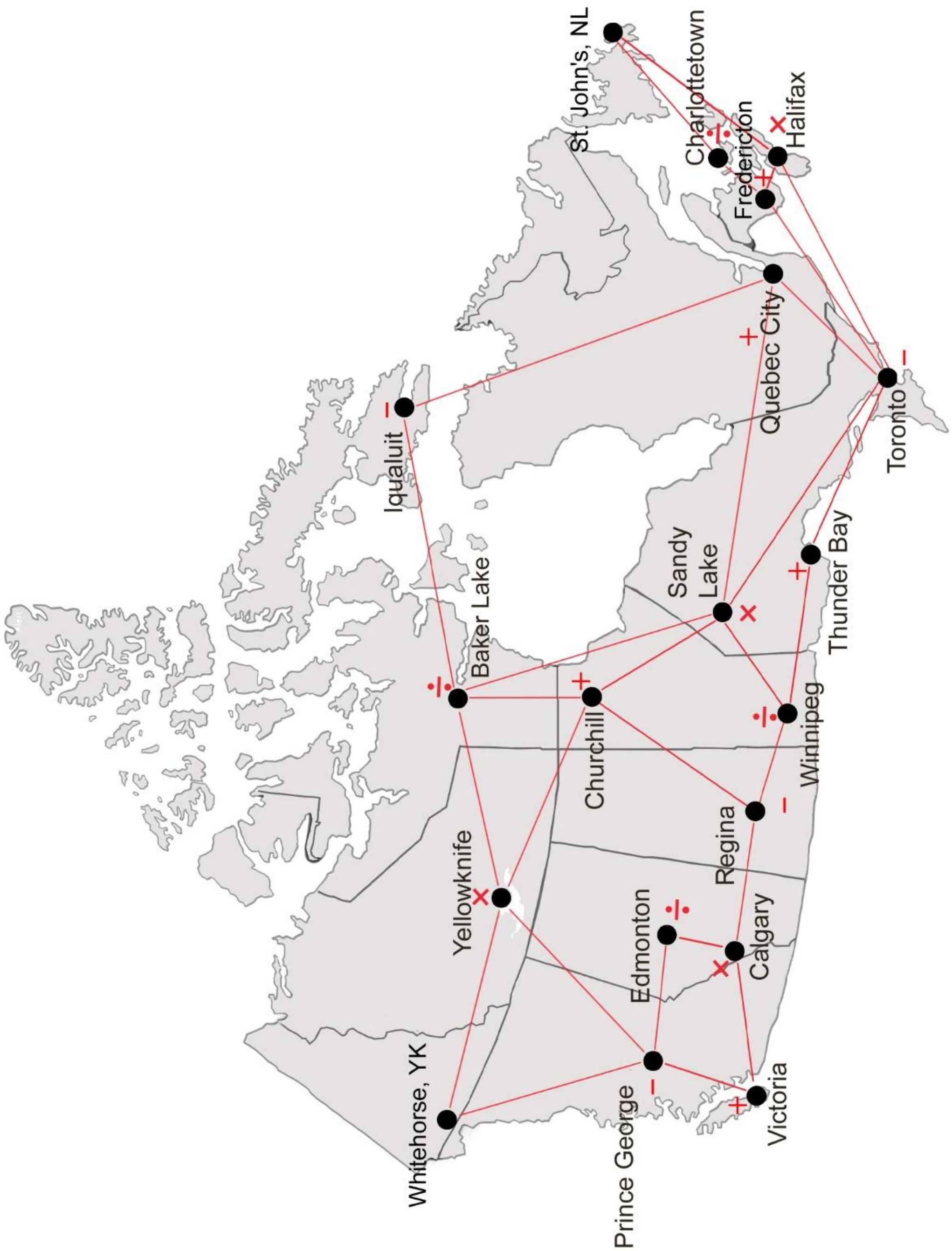
Cross Canada Challenge!
Gameboard



Name________________________________ Date_____________________

Number
Unit 4 Line Master 7b

Cross Canada Challenge!
Gameboard (ON only)



Name________________________________ Date_____________________

Number
Unit 4 Line Master 8a

Cross Canada Challenge!

Game Cards

Multiplication

7.4×6	2.76×5
3.829×8	4×0.72
4×0.9	8×1.34
3×5.204	7×4.725
9×0.7	5.63×4
2×6.06	9×5.209
8×2.125	3.055×6

Name________________________________ Date_____________________

Number
Unit 4 Line Master 8b

Cross Canada Challenge! (cont'd)

Game Cards

Division

$8.75 \div 5$	$167.4 \div 6$
$32.8 \div 4$	$77.6 \div 8$
$65.1 \div 3$	$44.1 \div 9$
$10.5 \div 6$	$170.8 \div 4$
$25.96 \div 8$	$14.736 \div 6$
$25.75 \div 5$	$56.08 \div 4$
$13.94 \div 2$	$8.785 \div 7$

Name________________________________ Date_____________________

Number
Unit 4 Line Master 8c

Cross Canada Challenge! (cont'd)

Game Cards (ON only)

Multiplication

7.4×6	2.76×5
3.829×8	4×0.72
215×0.3	500×0.4
773×0.6	$5 \times \frac{7}{8}$
$\frac{4}{9} \times 3$	$8 \times \frac{3}{5}$
10% of 350	15% of 240
4% of 800	75% of 420

Name________________________________ Date_____________________

Cross Canada Challenge! (cont'd)

Game Cards (ON only)

Division

$8.75 \div 5$	$167.4 \div 6$
$32.8 \div 100$	$77.6 \div 8$
$29.5 \div 10$	$156 \div 0.4$
$162 \div 0.6$	$872 \div 0.5$
$356 \div 0.2$	$293 \div 0.1$
$9 \div \frac{3}{5}$	$4 \div \frac{5}{6}$
$7 \div \frac{2}{3}$	$6 \div \frac{3}{4}$

Name________________________________ Date_____________________

Number
Unit 4 Line Master 8e

Cross Canada Challenge! (cont'd)

Game Cards (ON only)

Addition

12.35 + 143.226	29.7 + 81.07
8.9 + 12.297 + 9.03	215.05 + 74.543
267.788 + 121.962	41.9 + 57.006
43.008 + 105.409	$\frac{6}{5} + \frac{7}{5}$
$\frac{5}{8} + \frac{11}{8}$	$\frac{1}{4} + \frac{2}{3}$
$2\frac{3}{4} + 3\frac{5}{8}$	$1\frac{2}{5} + 3\frac{7}{10}$
$\frac{1}{6} + \frac{5}{12}$	$\frac{1}{2} + \frac{3}{8}$

Name________________________________ Date_____________________

Number
Unit 4 Line Master 8f

Cross Canada Challenge! (cont'd)

Game Cards (ON only)

Subtraction

121.5 – 37.309	29.654 – 14.022
57.28 – 38.176	16.79 – 9.84
33.007 – 29.999	73.01 – 22.1
179.4 – 75.04	$\frac{9}{5} - \frac{4}{5}$
$8 - \frac{2}{3}$	$\frac{7}{4} - \frac{3}{4}$
$2\frac{3}{4} - 1\frac{3}{8}$	$5\frac{9}{10} - 4\frac{2}{5}$
$\frac{3}{4} - \frac{1}{3}$	$\frac{2}{3} - \frac{5}{9}$

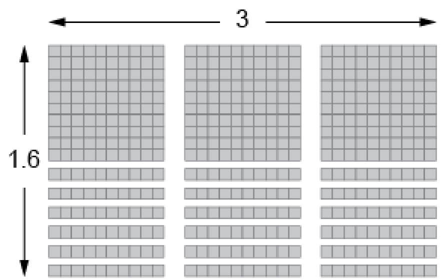
Number

Activity 22 Assessment
Multiplying Decimals by 1-Digit Numbers

Multiplying and Dividing Decimals by 1-Digit Numbers

Models multiplication and division situations concretely and pictorially.

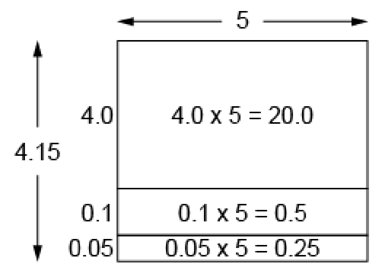
$1.6 \times 3 = ?$



"I used Base Ten Blocks to make an array with length 3 and width 1.6.
I then counted the blocks to get 4.8".

Uses models and strategies to solve multiplication and division situations.

$4.15 \times 5 = ?$



"I used an area model:
$4 \times 5 = 20$;
1 tenth × 5 = 5 tenths, or 0.5;
5 hundredths × 5
= 25 hundredths, or 0.25;
$20.0 + 0.5 + 0.25 = 20.75$."

Decomposes numbers to use distributive property and partial products to multiply.

$4.15 \times 5 = ?$

$$\begin{aligned} 4.15 \times 5 &= (4.0 + 0.1 + 0.05) \times 5 \\ &= 4.0 \times 5 + 0.1 \times 5 + 0.05 \times 5 \\ &= 20.0 + 0.5 + 0.25 \\ &= 20.75 \end{aligned}$$

Observations/Documentation

Number

Activity 22 Assessment
Multiplying Decimals by 1-Digit Numbers

Multiplying and Dividing Decimals by 1-Digit Numbers (cont'd)		
Decomposes numbers to use partial quotients to divide. 21.25 ÷ 5 = ? $5\overline{)2125}$ − 2000 400 groups of 5 125 − 100 20 groups of 5 25 − 25 5 groups of 5 0 425 "I used partial quotients to divide as whole numbers, then estimated to place the decimal point. 21.25 is about 20. 20 ÷ 5 = 4 So, I placed the decimal point so 425 is close to 4: 4.25."	Estimates to determine if answer to multiplication or division problem is reasonable. 38.22 ÷ 3 = 12.74 "I used estimation to check. 38 is close to 39 and 39 ÷ 3 = 13. Since 12.74 is close to 13, my answer is reasonable."	Solves multiplication and division problems flexibly using a variety of strategies. A bus travelled 446.5 km in 5 h, with no stops. On average, how far did the bus travel in 1 h? "I divided as I would whole numbers, then used estimation to place the decimal point. 446.5 is about 450, and 450 ÷ 5 = 90. I placed the decimal point so that 893 is close to 90: 89.3." $\begin{array}{r} 893 \\ 5\overline{)4465} \end{array}$
Observations/Documentation		

Number

Activity 23 Assessment

Multiplying 3-Digit Whole Numbers by Decimal Tenths

<table>
<tr><th colspan="4">Multiplying and Dividing Whole Numbers by Decimal Tenths</th></tr>
<tr>
<td>Explores and generalizes patterns using place-value relationships.

245 × 1 = 245
245 × 0.1 = 24.5
245 ÷ 0.1 = 2450

“When I multiply by 0.1, the digits shift one place to the right. When I divide by 0.1, the digits shift one place to the left.”</td>
<td>Uses patterns, number relationships, and properties of operations to solve problems.

190 × 0.4 = ?

“I multiplied by 1 tenth first, then multiplied the product by 4.”
190 × 0.1 = 19.0
19.0 × 4 = 76.0
190 × 0.4 = 76.0</td>
<td>Uses algorithms and checks for reasonableness (e.g., partial products, standard algorithm).

355 × 0.5 = ?

I used partial products to multiply, then estimated to check the reasonableness of my answer.

3 5 5
× 0.5
2.5   0.5 × 5 = 2.5
2 5.0   0.5 × 50 = 25.0
1 5 0.0   0.5 × 300 = 150.0
1 7 7.5

355 is close to 350. 0.5 is the same as one half. One half of 350 is 175. Since 177.5 is close to 175, my answer is reasonable.”</td>
<td>Flexibly solves multiplication and division problems using a variety of strategies.

428 ÷ 0.4 = ?

“I multiplied both numbers by 10 so I could work with whole numbers, then used an algorithm.”
428 ÷ 0.4 = 4280 ÷ 4

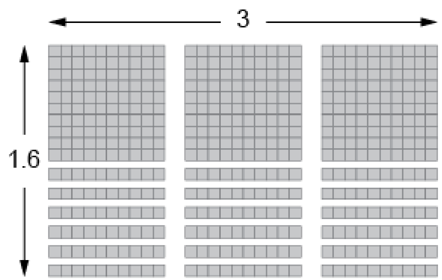
1070
4)4280
4↓↓
028
28↓
00</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Activity 24 Assessment
Dividing Decimals by 1-Digit Numbers

Multiplying and Dividing Decimals by 1-Digit Numbers

Models multiplication and division situations concretely and pictorially.

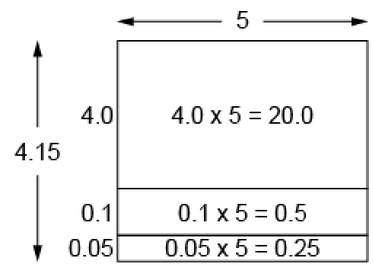
1.6 × 3 = ?



"I used Base Ten Blocks to make an array with length 3 and width 1.6. I then counted the blocks to get 4.8".

Uses models and strategies to solve multiplication and division situations.

4.15 × 5 = ?



"I used an area model:
4 × 5 = 20;
1 tenth × 5 = 5 tenths, or 0.5;
5 hundredths × 5
= 25 hundredths, or 0.25;
20.0 + 0.5 + 0.25 = 20.75."

Decomposes numbers to use distributive property and partial products to multiply.

4.15 × 5 = ?

$$\begin{aligned} 4.15 \times 5 &= (4.0 + 0.1 + 0.05) \times 5 \\ &= 4.0 \times 5 + 0.1 \times 5 + 0.05 \times 5 \\ &= 20.0 + 0.5 + 0.25 \\ &= 20.75 \end{aligned}$$

Observations/Documentation

Number

Activity 24 Assessment
Dividing Decimals by 1-Digit Numbers

Multiplying and Dividing Decimals by 1-Digit Numbers (cont'd)		
Decomposes numbers to use partial quotients to divide. 21.25 ÷ 5 = ? 5) 2125 – 2000 400 groups of 5 125 – 100 20 groups of 5 25 – 25 5 groups of 5 0 425 "I used partial quotients to divide as whole numbers, then estimated to place the decimal point. 21.25 is about 20. 20 ÷ 5 = 4 So, I placed the decimal point so 425 is close to 4: 4.25."	Estimates to determine if answer to multiplication or division problem is reasonable. 38.22 ÷ 3 = 12.74 "I used estimation to check. 38 is close to 39 and 39 ÷ 3 = 13. Since 12.74 is close to 13, my answer is reasonable."	Solves multiplication and division problems flexibly using a variety of strategies. A bus travelled 446.5 km in 5 h, with no stops. On average, how far did the bus travel in 1 h? "I divided as I would whole numbers, then used estimation to place the decimal point. 446.5 is about 450, and 450 ÷ 5 = 90. I placed the decimal point so that 893 is close to 90: 89.3." 893 5) 4465
Observations/Documentation		

Number

Activity 25 Assessment

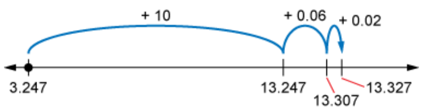
Dividing 3-Digit Whole Numbers by Decimal Tenths

Multiplying and Dividing Whole Numbers by Decimal Tenths			
Explores and generalizes patterns using place-value relationships. 245 × 1 = 245 245 × 0.1 = 24.5 245 ÷ 0.1 = 2450 “When I multiply by 0.1, the digits shift one place to the right. When I divide by 0.1, the digits shift one place to the left.”	Uses patterns, number relationships, and properties of operations to solve problems. 190 × 0.4 = ? “I multiplied by 1 tenth first, then multiplied the product by 4.” 190 × 0.1 = 19.0 19.0 × 4 = 76.0 190 × 0.4 = 76.0	Uses algorithms and checks for reasonableness (e.g., partial products, standard algorithm). 355 × 0.5 = ? I used partial products to multiply, then estimated to check the reasonableness of my answer. $\begin{array}{rl} 3\ 5\ 5 & \\ \times\ \ \ 0.5 & \\ \hline 2.5 & 0.5 \times 5 = 2.5 \\ 2\ 5.0 & 0.5 \times 50 = 25.0 \\ 1\ 5\ 0.0 & 0.5 \times 300 = 150.0 \\ \hline 1\ 7\ 7.5 & \end{array}$ 355 is close to 350. 0.5 is the same as one half. One half of 350 is 175. Since 177.5 is close to 175, my answer is reasonable.”	Flexibly solves multiplication and division problems using a variety of strategies. 428 ÷ 0.4 = ? “I multiplied both numbers by 10 so I could work with whole numbers, then used an algorithm.” 428 ÷ 0.4 = 4280 ÷ 4 $\begin{array}{r} 1070 \\ 4\overline{)4280} \\ 4\downarrow\downarrow \\ \hline 028 \\ 28\downarrow \\ \hline 00 \end{array}$
Observations/Documentation			

Number

Activity 26 Assessment

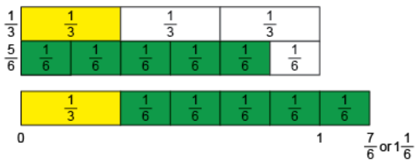
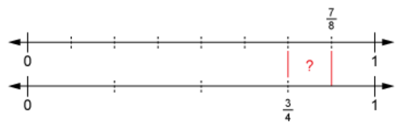
Adding and Subtracting Decimals

Addition and Subtraction of Decimals (to Thousandths)			
Models and symbolizes ways to solve problems.  3.247 + 10.08 = ? “I decomposed 10.08 and used a number line to add. 3.247 + 10.08 = 13.327.”	Uses an understanding of place value to add or subtract decimals. 43.6 – 1.345 = ? “First, I subtracted the whole number, then I subtracted the parts. 43 – 1 = 42 600 thousandths – 345 thousandths = 255 thousandths. So, 43.6 – 1.345 = 42.255.”	Uses estimation and mental math strategies to check reasonableness of solutions. 137.008 + 1.5 + 4.23 = 142.738 “I used rounding to check. 137.008 is close to 137. 1.5 is close to 2. 4.23 is close to 4. 137 + 2 + 4 = 143 Since 142.738 is close to 143, my solution is reasonable.”	Solves addition and subtraction problems flexibly, using a variety of strategies. Ricardo has room for 5 kg of supplies in his suitcase. Ricardo puts in a box of crayons (1.2 kg), a box of toothbrushes (1.25 kg), and a backpack (0.78 kg). How much room does Ricardo have left? 5 kg - (1.2 kg + 1.25 kg + 0.78 kg) = 5 kg - 3.23 kg = 1.77 kg “Ricard has 1.77 kg of room left.”
Observations/Documentation			

Number

Activity 27 Assessment
Adding and Subtracting Fractions

Addition and Subtraction of Fractions with Unlike Denominators

Concretely solves problems.	Models pictorially to solve problems.	Uses equivalent fractions to symbolically solve problems.	Fluently and flexibly solves problems.
$\frac{1}{3}+\frac{5}{6}=?$  "I used fraction strips. I can see that $\frac{1}{3}=\frac{2}{6}$ and that $\frac{1}{3}+\frac{5}{6}=\frac{7}{6}$, or $1\frac{1}{6}$."	$\frac{7}{8}-\frac{3}{4}=?$  "I used a double number line. I modelled $\frac{7}{8}$ on the top line and $\frac{3}{4}$ on the bottom line, then found the difference. From the double number lines, I see the difference is $\frac{1}{8}$."	$\frac{1}{6}+\frac{1}{3}+\frac{1}{2}=?$ "I wrote equivalent fractions with denominator 6. $\frac{1}{3}=\frac{2}{6}$ and $\frac{1}{2}=\frac{3}{6}$ $\frac{1}{6}+\frac{1}{3}+\frac{1}{2}=\frac{1}{6}+\frac{2}{6}+\frac{3}{6}=\frac{6}{6}$, or 1 whole."	$3\frac{1}{4}-2\frac{7}{8}=?$ "I know that $3\frac{1}{4}=3\frac{2}{8}$, so I counted on, in eighths, from $2\frac{7}{8}$ to $3\frac{2}{8}$. I counted on $\frac{3}{8}$."

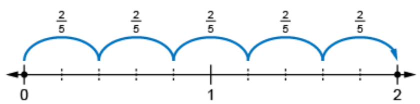
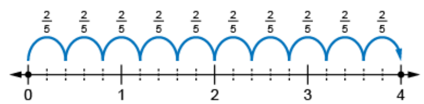
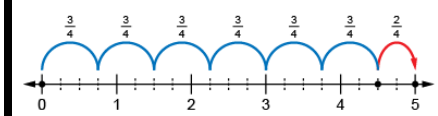
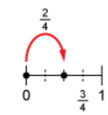
Observations/Documentation

Number

Activity 28 Assessment

Multiplying and Dividing Whole Numbers by Proper Fractions

Multiplication and Division with Proper Fractions

Models multiplication and division situations concretely and pictorially.	Uses models and think-addition strategies, to solve multiplication problems.	Uses models and think-addition strategies without leftovers, to solve division problems.	Flexibly solves multiplication and division problems (with and without leftovers).
$4 \times \frac{3}{5} = ?$  “I modelled the multiplication with fraction strips, then counted fifths: $4 \times \frac{3}{5} = \frac{12}{5}$, or $2\frac{2}{5}$”	$5 \times \frac{2}{5} = ?$  “I know that multiplication is like repeated addition, so I used a number with each whole partitioned into fifths, then took 5 jumps of two-fifths: $5 \times \frac{2}{5} = 2$”	$4 \div \frac{2}{5} = ?$  “I used a number line from 0 to 4 and partitioned each whole into fifths. I took jumps of two-fifths until I reached 4. I took 10 jumps. So, $4 \div \frac{2}{5} = 10$.”	$5 \div \frac{3}{4} = ?$  There are 6 groups of $\frac{3}{4}$, with $\frac{2}{4}$ left over.  $\frac{2}{4}$ is $\frac{2}{3}$ of $\frac{3}{4}$ So, the remainder is $\frac{2}{3}$. $5 \div \frac{3}{4} = 6\frac{2}{3}$

Observations/Documentation

Number

Activity 29 Assessment
Using Mental Math to Calculate Percents

Calculating Percents using Mental Math			
Explores number patterns and relationships. 100% of 360 = 360 50% of 360 = 180 25% of 360 = 90 12.5% of 360 = 45 What patterns do you see? “I see that the percent is halved each time and when this happens, the product is also halved.”	Uses number patterns and relationships to solve problems. 50% of 80 = ? 10% is the same as 0.1 and 50% is the same as 0.5. So, 50% of 80 = 5 × 0.1 × 80 = 5 × 8 = 40	Uses mental math strategies and checks for reasonableness. Find 14% of \$300 14% = 10% + 5% – 1% 10% of \$300 = \$30 5% of \$300 = \$15 1% of \$300 = \$3 So, 14% of \$300 = \$30 + \$15 – 3 = \$42	Fluently calculates percents using a variety of mental math strategies 8% of 260 = ? 8% of 260 = (10% – 2%) of 260 = 10% of 260 – 2% of 260 = 26 – 2(2.6) = 26 – 5.2 = 20.8
Observations/Documentation			

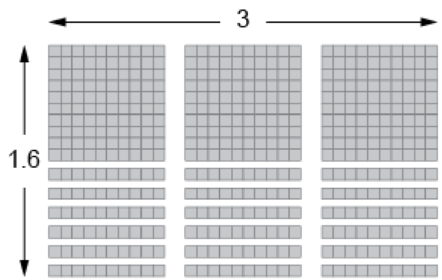
Number

Activity 30 Assessment
Operations with Fractions, Decimals, and Percents Consolidation

Multiplying and Dividing Decimals by 1-Digit Numbers

Models multiplication and division situations concretely and pictorially.

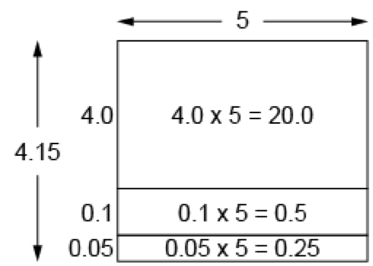
$1.6 \times 3 = ?$



"I used Base Ten Blocks to make an array with length 3 and width 1.6. I then counted the blocks to get 4.8".

Uses models and strategies to solve multiplication and division situations.

$4.15 \times 5 = ?$



"I used an area model:
$4 \times 5 = 20$;
1 tenth × 5 = 5 tenths, or 0.5;
5 hundredths × 5
= 25 hundredths, or 0.25;
$20.0 + 0.5 + 0.25 = 20.75$."

Decomposes numbers to use distributive property and partial products to multiply.

$4.15 \times 5 = ?$

$$\begin{aligned} 4.15 \times 5 &= (4.0 + 0.1 + 0.05) \times 5 \\ &= 4.0 \times 5 + 0.1 \times 5 + 0.05 \times 5 \\ &= 20.0 + 0.5 + 0.25 \\ &= 20.75 \end{aligned}$$

Observations/Documentation

Activity 30 Assessment

Operations with Fractions, Decimals, and Percents Consolidation

Multiplying and Dividing Decimals by 1-Digit Numbers (cont'd)

<table>
<tr>
<td>Decomposes numbers to use partial quotients to divide.

21.25 ÷ 5 = ?

5)2125
– 2000   400 groups of 5
125
– 100   20 groups of 5
25
– 25   5 groups of 5
0   425

"I used partial quotients to divide as whole numbers, then estimated to place the decimal point. 21.25 is about 20.
20 ÷ 5 = 4
So, I placed the decimal point so 425 is close to 4: 4.25."</td>
<td>Estimates to determine if answer to multiplication or division problem is reasonable.

38.22 ÷ 3 = 12.74

"I used estimation to check.
38 is close to 39 and 39 ÷ 3 = 13.
Since 12.74 is close to 13,
my answer is reasonable."</td>
<td>Solves multiplication and division problems flexibly using a variety of strategies.

A bus travelled 446.5 km in 5 h, with no stops.
On average, how far did the bus travel in 1 h?

"I divided as I would whole numbers, then used estimation to place the decimal point.
446.5 is about 450, and 450 ÷ 5 = 90.
I placed the decimal point
so that 893 is close to 90: 89.3."

893
5)4465</td>
</tr>
<tr>
<td colspan="3">Observations/Documentation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</table>

Number

Activity 30 Assessment

Operations with Fractions, Decimals, and Percents Consolidation

Multiplying and Dividing Whole Numbers by Decimal Tenths			
Explores and generalizes patterns using place-value relationships. 245 × 1 = 245 245 × 0.1 = 24.5 245 ÷ 0.1 = 2450 "When I multiply by 0.1, the digits shift one place to the right. When I divide by 0.1, the digits shift one place to the left."	Uses patterns, number relationships, and properties of operations to solve problems. 190 × 0.4 = ? "I multiplied by 1 tenth first, then multiplied the product by 4." 190 × 0.1 = 19.0 19.0 × 4 = 76.0 190 × 0.4 = 76.0	Uses algorithms and checks for reasonableness (e.g., partial products, standard algorithm). 355 × 0.5 = ? I used partial products to multiply, then estimated to check the reasonableness of my answer. 3 5 5 × 0.5 2.5 0.5 × 5 = 2.5 2 5.0 0.5 × 50 = 25.0 1 5 0.0 0.5 × 300 = 150.0 1 7 7.5 355 is close to 350. 0.5 is the same as one half. One half of 350 is 175. Since 177.5 is close to 175, my answer is reasonable."	Flexibly solves multiplication and division problems using a variety of strategies. 428 ÷ 0.4 = ? "I multiplied both numbers by 10 so I could work with whole numbers, then used an algorithm." 428 ÷ 0.4 = 4280 ÷ 4 1070 4)4280 4↓↓ 028 28↓ 00
Observations/Documentation			

Name_________________________________ Date______________________

Number
Unit 5 Line Master 1a

Check and Save!

	Banks		
Name of Bank	1.	2.	3.
Savings Account			
Fees			
Sign-up promotion			
Number of monthly transactions			
Number of e-Transfers©			
Interest rate			
Minimum balance			

Name______________________________ Date____________________

Number
Unit 5 Line Master 1b

Check and Save! (cont'd)

	Banks		
Name of Bank	1.	2.	3.
Chequing Account			
Fees			
Sign-up promotion			
Number of monthly transactions			
Number of e-Transfers©			

Name________________________________ Date_____________________

Number
Unit 5 Line Master 2a

Our Financial Plan

1. Our goal is ____.

2. Explain why you chose to support your charity.

3. Is your goal immediate, short-term, or long-term?

4. What steps will you take to reach your goal?

Name_________________________________ Date______________________

Number
Unit 5 Line Master 2b

Our Financial Plan (cont'd)

5. Create a budget and a savings plan to reach your goal.

6. What factors might help you reach your goal?

7. What factors might prevent you from reaching your goal?

Name_______________________________ Date____________________

Number
Unit 5 Line Master 3a

Which Would You Choose?

Choose a situation.
Research information that would help you make an informed decision.

• Identify the advantages and disadvantages of each option.
• Consider interest rates and fees when making your choice.
• Identify whether you could trade, lend, borrow, or donate for what you need.
• Determine the cost, then explain how you might earn, save, or pay for the chosen option.

Situation 1: Movie Night
You and your friends want to have a movie night.

Consider the following options.

- pay to watch it on demand
- use your streaming service
- take from the library
- go to the movies
- other

Name_______________________________ Date____________________

Number
Unit 5 Line Master 3b

Which Would You Choose? (cont’d)

Situation 2: Car Repairs

Your family has a 10-year-old car. It needs $1000 worth of repairs. It is worth $500 if you trade it into a car dealership.

Consider the following options.

- buy a new car
- lease a new car
- buy a used car
- repair your existing car
- rent a car
- use public transit
- other

Name_______________________________ Date____________________

Number
Unit 5 Line Master 3c

Which Would You Choose? (cont'd)

Situation 3: Phone a Friend
You need a new cell phone.

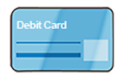
Consider the following options.

- buy a new phone outright
- pay for a new phone on a 2-yr plan
- trade in your old phone for a $50 credit
- buy a refurbished phone
- other

Number

Activity 31 Assessment

Advantages and Disadvantages of Payment Methods

Exploring Advantages and Disadvantages of Payment Methods			
Identifies different payment methods that can be used to buy goods and service.	Describes different payment methods and identifies advantages and disadvantages of each.	Compares two different payment methods and determines the more suitable for a given scenario.	Determines the most appropriate payment method and considers the short- and long-term impact.
	 “Advantage: money comes out of the bank account instantly Disadvantage: people tend to spend more money than they would using cash.”	 “To send money to a friend in another province, I would use an e-Transfer as it is much safer than sending cash in the mail.”	
Observations/Documentation			

Number

Activity 32 Assessment
Interest Rates and Fees

<table>
<tr><th colspan="4">Comparing Interest Rates and Fees</th></tr>
<tr>
<td>Identifies factors to consider when choosing an account or loan.

"It is important to compare interest rates and fees."</td>
<td>Describes the pros and cons of fees and interest rates to borrowing and saving money.

<table><tr><th></th><th>Bank A</th><th>Bank B</th><th>Bank C</th></tr><tr><td>Number of Interac e-Transfers©</td><td>2 free</td><td>unlimited</td><td>$0.50 each</td></tr></table>
"Each bank offers a different number of e-Transfers. It is important to think about how many a person makes a month."</td>
<td>Compares how fees and interest rates support making choices about better deals.

<table><tr><th></th><th>Bank A</th><th>Bank B</th></tr><tr><td>Fees</td><td>none</td><td>none</td></tr><tr><td>Sign-up promotion</td><td>none</td><td>$25</td></tr><tr><td>Number of monthly transactions</td><td>unlimited</td><td>unlimited</td></tr><tr><td>Number of Interac e-Transfers©</td><td>2 free</td><td>unlimited</td></tr><tr><td>Interest rate</td><td>0.05%</td><td>0.05%</td></tr><tr><td>Minimum balance</td><td>n/a</td><td>n/a</td></tr></table>
"I choose Bank B because the interest rates are the same, but I get unlimited e-Transfers and $25 for signing up."</td>
<td>Fluently makes informed financial decisions related to borrowing and saving money.

"When saving money, I look for the higher interest rate, but when borrowing money, I look for the lowest interest rate. It is important to take all factors into account."</td>
</tr>
<tr><th colspan="4">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Number

Activity 33 Assessment
Planning for Financial Goals

Planning for Financial Goals			
Identifies different types of financial goals, including earning and savings goals. "I want to save $5 for the pizza lunch next Friday. I want to save $50 for new skates next Winter."	Outlines key steps needed to make a plan to achieve a financial goal. "I earn $10 a week cutting grass. I will save $5 each week in my bank account."	Recognizes and explains various factors that may help or interfere with reaching a financial goal. "I will have to find another job as I can't cut grass in the Winter. To save money, I will borrow books from the library."	Makes informed decisions about planning for a financial goal, considering all possible factors "If I lose a job or I have an unexpected expense, I need to be able to adjust my plan so that I can still achieve my goal."
Observations/Documentation			

Numbers

Activity 34 Assessment

Financial Literacy Consolidation

Comparing Interest Rates and Fees

Identifies factors to consider when choosing an account or loan.

"It is important to compare interest rates and fees."

Describes the pros and cons of fees and interest rates to borrowing and saving money.

	Bank A	Bank B	Bank C
Number of Interac e-Transfers©	2 free	unlimited	$0.50 each

"Each bank offers a different number of e-Transfers. It is important to think about how many a person makes a month."

Compares how fees and interest rates support making choices about better deals.

	Bank A	Bank B
Fees	none	none
Sign-up promotion	none	$25
Number of monthly transactions	unlimited	unlimited
Number of Interac e-Transfers©	2 free	unlimited
Interest rate	0.05%	0.05%
Minimum balance	n/a	n/a

"I choose Bank B because the interest rates are the same, but I get unlimited e-Transfers and $25 for signing up."

Fluently makes informed financial decisions related to borrowing and saving money.

"When saving money, I look for the higher interest rate, but when borrowing money, I look for the lowest interest rate. It is important to take all factors into account."

Observations/Documentation

Numbers

Activity 34 Assessment
Financial Literacy Consolidation

Planning for Financial Goals			
Identifies different types of financial goals, including earning and savings goals. "I want to save $5 for the pizza lunch next Friday. I want to save $50 for new skates next Winter."	Outlines key steps needed to make a plan to achieve a financial goal. "I earn $10 a week cutting grass. I will save $5 each week in my bank account."	Recognizes and explains various factors that may help or interfere with reaching a financial goal. "I will have to find another job as I can't cut grass in the Winter. To save money, I will borrow books from the library."	Makes informed decisions about planning for a financial goal, considering all possible factors "If I lose a job or I have an unexpected expense, I need to be able to adjust my plan so that I can still achieve my goal."
Observations/Documentation			

Name________________________________ Date_____________________

Patterning and Algebra
Unit 1 Line Master 1a

Buying Video Games

In 14 weeks, Zac earned $504 to buy some video games for a children's hospital. Each game costs $64.

Complete the table to show how many games Zac can buy.

Number of Games Bought	Total Money Spent ($)	Money Left Over ($)

Write a pattern rule and an algebraic expression for the total money spent.

Is it an increasing or a decreasing pattern?

Name________________________________ Date_____________________

Patterning and Algebra
Unit 1 Line Master 1b

Buying Video Games (cont’d)

Write a pattern rule and an algebraic expression for the money left over.

Is it an increasing or a decreasing pattern?

How many video games can Zac buy?
Is there money left over? Explain.

Name________________________________ Date_____________________

Patterning and Algebra
Unit 1 Line Master 2a

Growing Patterns

Linear Growing Pattern

Term Number	1	2	3	4		
Term Value						

Pattern rule for the term values in words:

Pattern rule for term values as an algebraic expression:

Equation for the pattern in the term values:

Is it an increasing or a decreasing pattern?

Name________________________________ Date_____________________

Patterning and Algebra
Unit 1 Line Master 2b

Growing Patterns (cont'd)

Non-Linear Growing Pattern

Term Number	1	2	3	4		
Term Value						

Pattern rule for the term values in words:

How are linear and non-linear patterns alike?

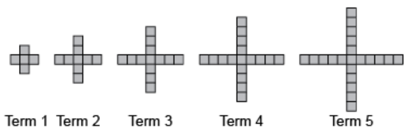
How are they different?

Activity 1 Assessment

Investigating Patterns and Relationships in Tables and Graphs

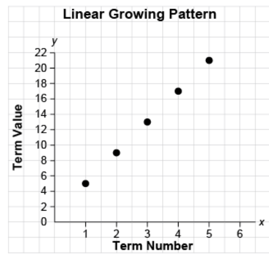
Generalizing and Representing Patterns

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.



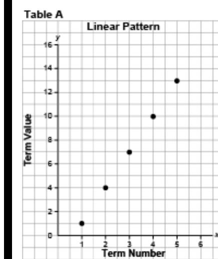
"The graph represents a growing pattern. The pattern rule is: Multiply the term number by 4 and add 1."

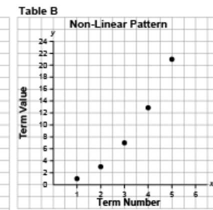
Represents patterns symbolically, using algebraic expressions and equations.

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

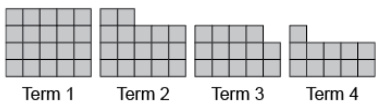
Patterning and Algebra

Activity 1 Assessment

Investigating Patterns and Relationships in Tables and Graphs

Generalizing and Representing Patterns (cont'd)

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 – 3*n*, 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 km ÷ 2 = 35 km. In 3 h, the bus travels 210 km. So, in 3 h 30 min, the bus travels 210 km + 35 km = 245 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 × $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 × $0.50 + $3 = $3 + $3, or $6."

Observations/Documentation

Patterning and Algebra

Activity 2 Assessment

Solving Problems

Extending Patterns to Solve Problems

Determines the pattern rule.

5, 10, 15, 20, 25, 30, 35, 40

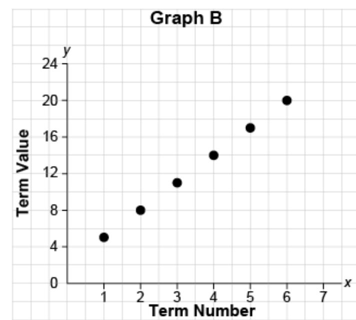
“The term numbers are consecutive multiples of 5.”

Uses pattern rule to determine missing values.

Term Number	5	10	15		25	30
Term Value	16	31		61	76	

“The pattern rule for the term numbers is: Skip count by 5s. So, the missing term is 20. The pattern rule for the term values is: Multiply the term number by 3, then add 1. The missing term values are: $15 \times 3 + 1 = 46$ and $30 \times 3 + 1 = 91$.”

Extends patterns using mathematical expressions.



“I can use the expression $3n + 2$ to extend the pattern, where n represents the term number. The seventh and eighth terms would be $3 \times 7 + 2 = 23$ and $3 \times 8 + 2 = 26$.”

Flexibly describes and solves problems using mathematical expressions and properties.

Zac earned $504 to buy games for a children’s hospital.
Each game costs $64.
How many games can Zac buy?

Number of Games Bought	Total Money Spent ($)	Money Left Over ($)
1	64	440
2	128	376
3	192	312
4	256	248
5	320	184
6	384	120
7	448	56

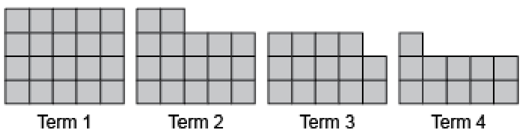
“Expression for money spent ($) is $64v$, where v is the number of games bought. The money left over, in dollars, is: 504 – (the money spent) = $504 - 64v$. Zac can buy 7 games and have $56 left over.”

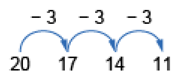
Observations/Documentation

Activity 2 Assessment
Solving Problems

Number Pattern Relationships

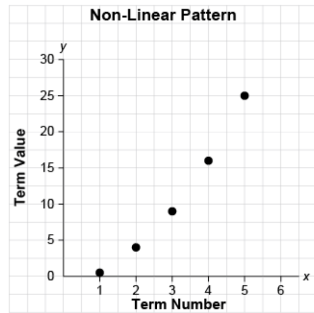
Recognizes pattern relationships in repeating, increasing, and decreasing patterns.





"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."

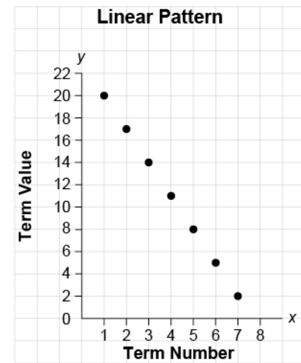
Identifies and describes linear and non-linear patterns in tables, charts, and graphs.



"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



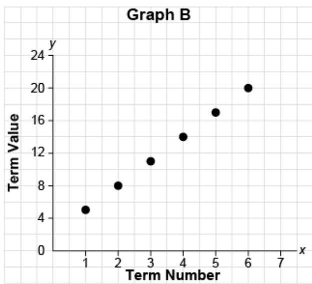
"Each of these representations shows a linear pattern that follows the pattern rule: Start at 20 and subtract 3 each time."

Observations/Documentation

Activity 2 Assessment
Solving Problems

Number Pattern Relationships (cont'd)

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: $3n + 2$, where 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

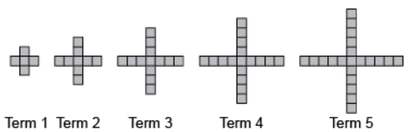
Patterning and Algebra

Activity 3 Assessment

Representing Patterns in Different Ways

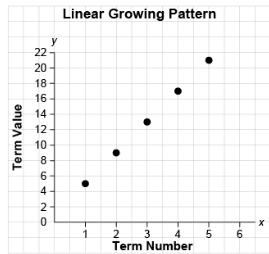
Generalizing and Representing Patterns

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."

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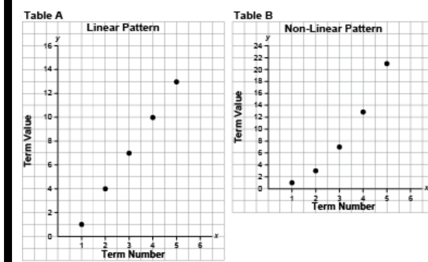

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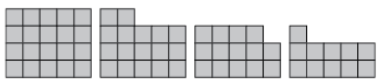
Observations/Documentation

Patterning and Algebra

Activity 3 Assessment
Representing Patterns in Different Ways

Generalizing and Representing Patterns (cont'd)

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



Term Number	1	2	3	4	5	6	7
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"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 – 3*n*, 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
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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.

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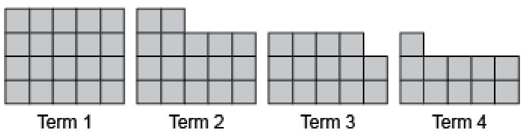
Observations/Documentation

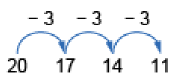
Patterning and Algebra

Activity 3 Assessment
Representing Patterns in Different Ways

Number Pattern Relationships

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





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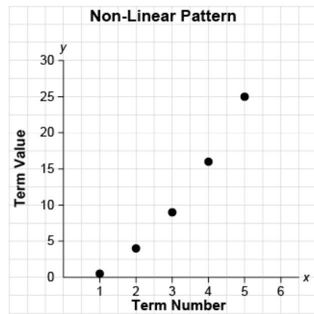

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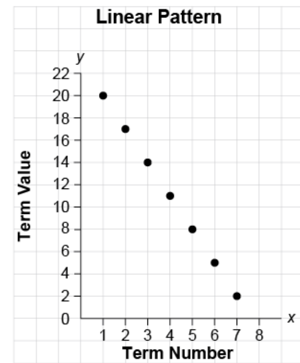


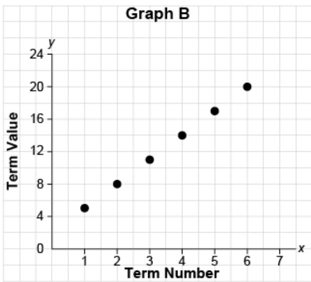
"Each of these representations shows a linear pattern that follows the pattern rule: Start at 20 and subtract 3 each time."

Observations/Documentation

Activity 3 Assessment
Representing Patterns in Different Ways

Number Pattern Relationships (cont'd)

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



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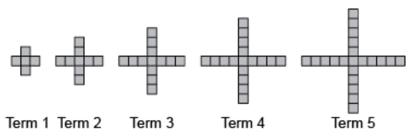
Observations/Documentation

Activity 4 Assessment

Patterning Consolidation

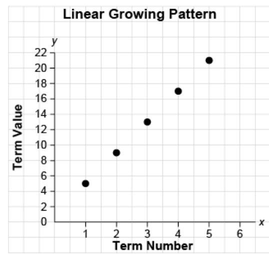
Generalizing and Representing Patterns

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.



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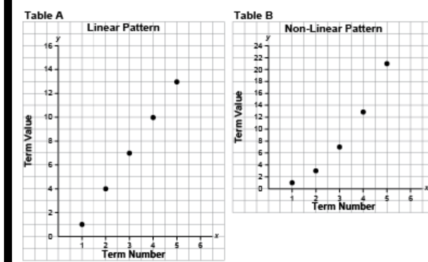

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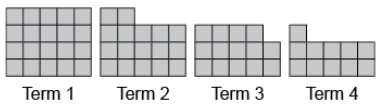
Observations/Documentation

Patterning and Algebra

Activity 4 Assessment
Patterning Consolidation

Generalizing and Representing Patterns

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



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Observations/Documentation

Activity 4 Assessment

Patterning Consolidation

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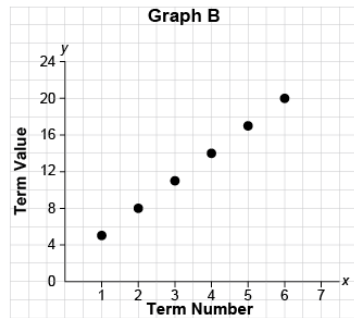
Extends patterns using mathematical expressions.



"I can use the expression 3*n* + 2 to extend the pattern, where *n* represents the term number. The seventh and eighth terms would be 3 × 7 + 2 = 23 and 3 × 8 + 2 = 26."

Flexibly describes and solves problems using mathematical expressions and properties.

Zac earned $504 to buy games for a children's hospital.
Each game costs $64.
How many games can Zac buy?

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3	192	312
4	256	248
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6	384	120
7	448	56

"Expression for money spent ($) is 64*v*, where *v* is the number of games bought. The money left over, in dollars, is: 504 – (the money spent) = 504 – 64*v*. Zac can buy 7 games and have $56 left over."

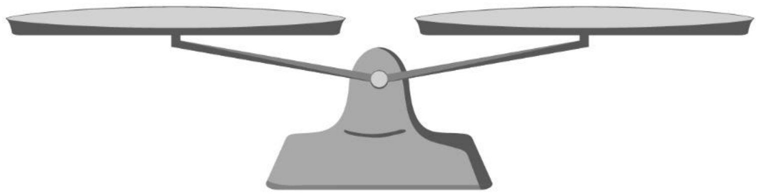
Observations/Documentation

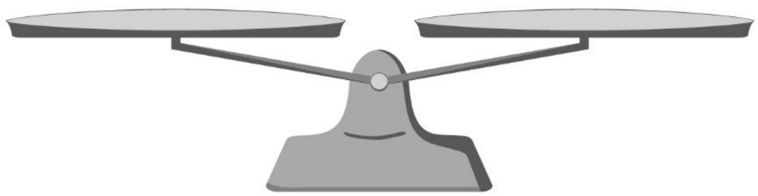
Name________________________________ Date_____________________

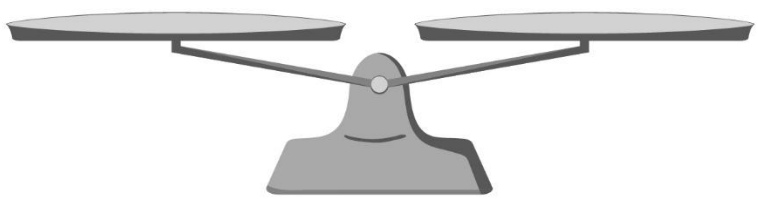
Patterning and Algebra
Unit 2 Line Master 1a

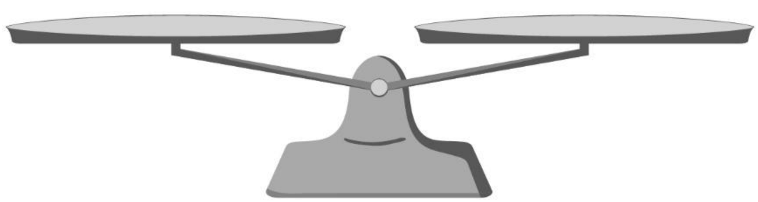
Equation Balance

Part A







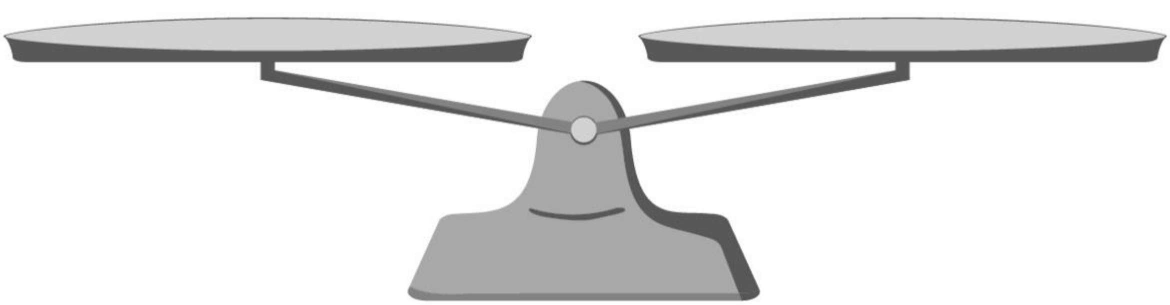


Name_________________________________ Date______________________

Patterning and Algebra
Unit 2 Line Master 1b

Equation Balance

Part B



Name________________________________ Date_____________________

Patterning and Algebra
Unit 2 Line Master 2

What's the Pattern?

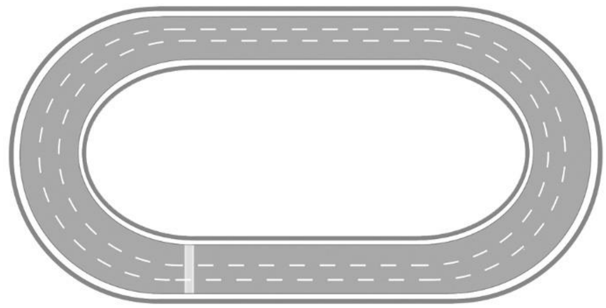
Day	Number of Members
1	8
2	11
3	14
4	
5	

Name________________________________ Date_____________________

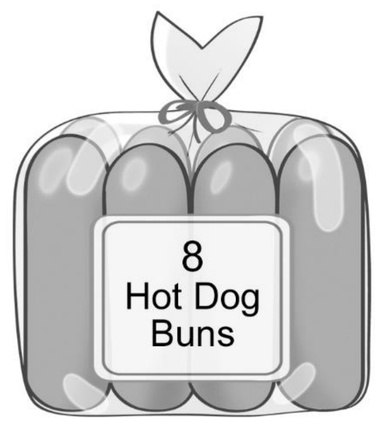
Patterning and Algebra
Unit 2 Line Master 3

Story Problems

1. In one week, Jess ran 4 times as many laps of the track as Tyson.
   Jess ran 24 laps.
   How many laps did Tyson run?



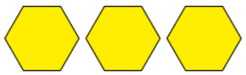
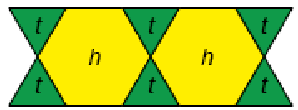
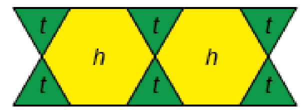
2. For a fundraising barbecue, Trenton bought 64 hotdog buns.
   How many packages did Trenton buy?



3. Alex is 5 years younger than her brother Liam.
   How old is Alex?

Liam — 14 years old

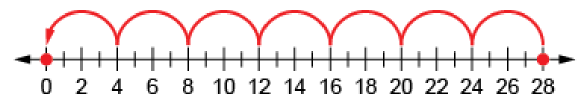
Activity 5 Assessment
Investigating Algebraic Expressions

Investigating Algebraic Expressions			
Identifies the monomial represented by a model  $3h + 3 = 9$ "The hexagon represents h. So, the model represents $3h$."	Identifies the algebraic expression represented by a model.  "There are 2 hexagons and 6 triangles, so the design represents $2h + 6t$."	Evaluates expressions, given the value of each variable.  $h = 5$ and $t = 2$ $2h + 6t = 2 \times 5 + 6 \times 2$ $= 10 + 12$ $= 22$ "The value of the expression is 22."	Adds like terms to simplify an expression, then evaluates it when variables have decimal values. Evaluate $3q + 2r + 4r + q$ when $q = 1.5$ and $r = 2.2$ $3q + 2r + 4r + q = 3q + q + 2r + 4r$ $= 4q + 6r$ $= 4 \times 1.5 + 6 \times 2.2$ $= 6 + 13.2$ $= 19.2$ "The value of the expression is 19.2."
Observations/Documentation			

Patterning and Algebra

Activity 6 Assessment

Investigating Equality in Equations

Solving for an Unknown in Multi-Step Equations		
Uses 'guess and check.' $28 - t = 12$ "I know 28 – 8 = 20. So, t must be more than 8. 28 – 10 = 18 (too high) 28 – 15 = 13 (too high, but close) So, n = 16 because 28 – 16 = 12."	Uses the balance model. $18 = d + 7$ $18 - 7 = d + 7 - 7$ $11 = d$ "I subtracted 7 from each side to keep the balance and to make the equation easier to solve."	Uses relationships among operations (inverse operations, associative property).  $28 = 4x$ ■ $+ 4$ "I rewrote it as a subtraction equation, then divided both sides by 4." $28 - 4 = 4x \rightarrow 24 = 4x \rightarrow 6 = x$
Observations/Documentation		

Activity 6 Assessment
Investigating Equality in Equations

Solving for an Unknown in Multi-Step Equations (cont'd)

Uses a flow chart and inverse operations.

$3d + 5 = 65$

d → Multiply by 3 → Add 5 → 65

20 ← Divide by 3 ← Subtract 5 ← 65

"I decomposed the equation into parts, then reversed the flow using inverse operations."

Writes an equation with an unknown to solve a problem.

Chico works for a dog-walking company. Chico earns $25 a day, plus $5 for every dog he walks. On Thursday, Chico earned $70. How many dogs did Chico walk?

"I let *d* represent the number of dogs Chico walked.
I wrote the equation: $70 = 25 + 5d$."

Flexibly uses multiple strategies to solve equations.

$$70 = 25 + 5d$$
$$25 + 45 = 25 + 5d$$
$$25 + 45 - 25 = 25 + 5d - 25$$
$$45 = 5d$$
$$\frac{45}{5} = \frac{5d}{5}$$
$$9 = d$$

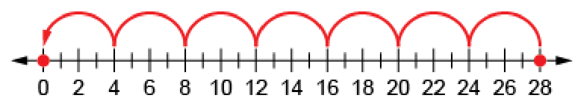
"I made the equation easier to solve by decomposing 70, subtracting 25 from each side, then dividing both sides by 5."

Observations/Documentation

Patterning and Algebra

Activity 7 Assessment

Representing Generalizations in Patterns

Solving for an Unknown in Multi-Step Equations		
Uses ‘guess and check.’ $28 - t = 12$ “I know 28 – 8 = 20. So, t must be more than 8. 28 – 10 = 18 (too high) 28 – 15 = 13 (too high, but close) So, n = 16 because 28 – 16 = 12.”	Uses the balance model. $18 = d + 7$ $18 - 7 = d + 7 - 7$ $11 = d$ “I subtracted 7 from each side to keep the balance and to make the equation easier to solve.	Uses relationships among operations (inverse operations, associative property).  28 = 4x ■ + 4 “I rewrote it as a subtraction equation, then divided both sides by 4.” $28 - 4 = 4x \rightarrow 24 = 4x \rightarrow 6 = x$
Observations/Documentation		

Activity 7 Assessment

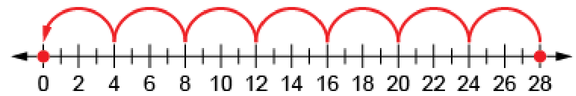
Representing Generalizations in Patterns

Solving for an Unknown in Multi-Step Equations (cont’d)

Uses a flow chart and inverse operations.	Writes an equation with an unknown to solve a problem.	Flexibly uses multiple strategies to solve equations.
$3d + 5 = 65$ d → Multiply by 3 → Add 5 → 65 20 ← Divide by 3 ← Subtract 5 ← 65 “I decomposed the equation into parts, then reversed the flow using inverse operations.”	Chico works for a dog-walking company. Chico earns $25 a day, plus $5 for every dog he walks. On Thursday, Chico earned $70. How many dogs did Chico walk? “I let *d* represent the number of dogs Chico walked. I wrote the equation: $70 = 25 + 5d$.”	$70 = 25 + 5d$ $25 + 45 = 25 + 5d$ $25 + 45 - 25 = 25 + 5d - 25$ $45 = 5d$ $\frac{45}{5} = \frac{5d}{5}$ $9 = d$ “I made the equation easier to solve by decomposing 70, subtracting 25 from each side, then dividing both sides by 5.”

Observations/Documentation

Activity 8 Assessment
Writing and Solving Equations

Solving for an Unknown in Multi-Step Equations		
Uses 'guess and check.' $28 - t = 12$ "I know 28 – 8 = 20. So, t must be more than 8. 28 – 10 = 18 (too high) 28 – 15 = 13 (too high, but close) So, n = 16 because 28 – 16 = 12."	Uses the balance model. $18 = d + 7$ $18 - 7 = d + 7 - 7$ $11 = d$ "I subtracted 7 from each side to keep the balance and to make the equation easier to solve."	Uses relationships among operations (inverse operations, associative property).  28 = 4x ■ + 4 "I rewrote it as a subtraction equation, then divided both sides by 4." $28 - 4 = 4x \rightarrow 24 = 4x \rightarrow 6 = x$
Observations/Documentation		

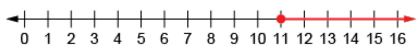
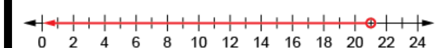
Patterning and Algebra

Activity 8 Assessment
Writing and Solving Equations

Solving for an Unknown in Multi-Step Equations (cont’d)		
Uses a flow chart and inverse operations. $3d + 5 = 65$ d → Multiply by 3 → Add 5 → 65 20 ← Divide by 3 ← Subtract 5 ← 65 “I decomposed the equation into parts, then reversed the flow using inverse operations.”	Writes an equation with an unknown to solve a problem. Chico works for a dog-walking company. Chico earns $25 a day, plus $5 for every dog he walks. On Thursday, Chico earned $70. How many dogs did Chico walk? “I let *d* represent the number of dogs Chico walked. I wrote the equation: $70 = 25 + 5d$.”	Flexibly uses multiple strategies to solve equations. $70 = 25 + 5d$ $25 + 45 = 25 + 5d$ $25 + 45 - 25 = 25 + 5d - 25$ $45 = 5d$ $\frac{45}{5} = \frac{5d}{5}$ $9 = d$ “I made the equation easier to solve by decomposing 70, subtracting 25 from each side, then dividing both sides by 5.”
Observations/Documentation		

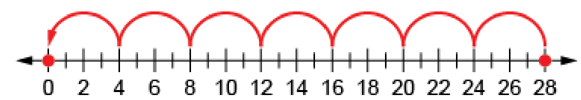
Patterning and Algebra

Activity 9 Assessment
Solving and Graphing Inequalities

Solving and Graphing Inequalities			
Identifies range of numbers in solution to inequalities. $45 + 5n \geq 100$ $45 + 5n > 100$ “Each time, the unknown can be any number greater than 11. In the second equation, it could also be 11. There are many quantities that would work.”	Represents solutions to simple inequalities by graphing on a number line. $45 + 5n \geq 100$ $45 + 5n = 45 + 55$ $5n = 55$ $n = 11$ At least 11 cars need to be washed.  “Since 11 is part of the solution, I drew a closed circle at 11. Since n must be greater than or equal to 11, the arrow goes to the right.”	Verifies the solution to an inequality. $45 + 5n \geq 100$ $n \geq 11$ “To check, I substituted a number greater than 11 into the left side. $45 + 5(20) = 145$. Since $145 > 100$, the solution is correct.”	Flexibly solves inequalities using various strategies, then verifies and graphs the solutions. $13 > 6 + \frac{d}{3}$ $13 = 6 + \frac{d}{3}$ $6 + 7 = 6 + \frac{d}{3}$ $7 = \frac{d}{3}$ $d = 21$ So, $d < 21$ To check, substitute $d = 15$. $6 + \frac{d}{3} = 6 + \frac{15}{3}$, or 11 $13 > 11$, so the solution is correct. 
Observations/Documentation			

Patterning and Algebra

Activity 10 Assessment
Variables and Equations Consolidation

Solving for an Unknown in Multi-Step Equations		
Uses ‘guess and check.’ $28 - t = 12$ “I know 28 – 8 = 20. So, t must be more than 8. 28 – 10 = 18 (too high) 28 – 15 = 13 (too high, but close) So, n = 16 because 28 – 16 = 12.”	Uses the balance model. $18 = d + 7$ $18 - 7 = d + 7 - 7$ $11 = d$ “I subtracted 7 from each side to keep the balance and to make the equation easier to solve.	Uses relationships among operations (inverse operations, associative property).  $28 = 4x \blacksquare + 4$ “I rewrote it as a subtraction equation, then divided both sides by 4.” $28 - 4 = 4x \rightarrow 24 = 4x \rightarrow 6 = x$
Observations/Documentation		

Activity 10 Assessment
Variables and Equations Consolidation

<table>
<tr><th colspan="3">Solving for an Unknown in Multi-Step Equations (con’t)</th></tr>
<tr>
<td>Uses a flow chart and inverse operations.

$3d + 5 = 65$

d → Multiply by 3 → Add 5 → 65
20 ← Divide by 3 ← Subtract 5 ← 65

“I decomposed the equation into parts, then reversed the flow using inverse operations.”</td>
<td>Writes an equation with an unknown to solve a problem.

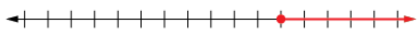
Chico works for a dog-walking company. Chico earns $25 a day, plus $5 for every dog he walks. On Thursday, Chico earned $70. How many dogs did Chico walk?

“I let d represent the number of dogs Chico walked.
I wrote the equation: $70 = 25 + 5d$.”</td>
<td>Flexibly uses multiple strategies to solve equations.

$70 = 25 + 5d$
$25 + 45 = 25 + 5d$
$25 + 45 - 25 = 25 + 5d - 25$
$45 = 5d$
$\frac{45}{5} = \frac{5d}{5}$
$9 = d$

“I made the equation easier to solve by decomposing 70, subtracting 25 from each side, then dividing both sides by 5.”</td>
</tr>
<tr><th colspan="3">Observations/Documentation</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Activity 10 Assessment
Variables and Equations Consolidation

Solving and Graphing Inequalities			
Identifies range of numbers in solution to inequalities. $45 + 5n \geq 100$ $45 + 5n > 100$ "Each time, the unknown can be any number greater than 11. In the second equation, it could also be 11. There are many quantities that would work."	Represents solutions to simple inequalities by graphing on a number line. $45 + 5n \geq 100$ $45 + 5n = 45 + 55$ $5n = 55$ $n = 11$ At least 11 cars need to be washed.  "Since 11 is part of the solution, I drew a closed circle at 11. Since n must be greater than or equal to 11, the arrow goes to the right."	Verifies the solution to an inequality. $45 + 5n \geq 100$ $n \geq 11$ "To check, I substituted a number greater than 11 into the left side. $45 + 5(20) = 145$. Since $145 > 100$, the solution is correct."	Flexibly solves inequalities using various strategies, then verifies and graphs the solutions. $13 > 6 + \frac{d}{3}$ $13 = 6 + \frac{d}{3}$ $6 + 7 = 6 + \frac{d}{3}$ $7 = \frac{d}{3}$ $d = 21$ So, $d < 21$ To check, substitute $d = 15$. $6 + \frac{d}{3} = 6 + \frac{15}{3}$, or 11 $13 > 11$, so the solution is correct. 
Observations/Documentation			

Name________________________________ Date_____________________

Patterning and Algebra
Unit 3 Line Master 1a

Coding Routines

What is this code sequence for?

Code
Brush teeth
Go out the door
Get dressed
Eat breakfast
Pack school bag
Turn off alarm

If this code was for your getting ready for school routine, would it be in the correct order?

How might you reorganize the steps in the 'code' so that it was accurate? Is more than one sequence possible? Explain.

When we are looking for mistakes/errors in code, we are **debugging**.

Do Part A of the activity.
Use the coding templates on the next page.

Name________________________________ Date_____________________

Patterning and Algebra
Unit 3 Line Master 1a

Coding Routines (cont’d)

Code: Brushing your teeth

Code:

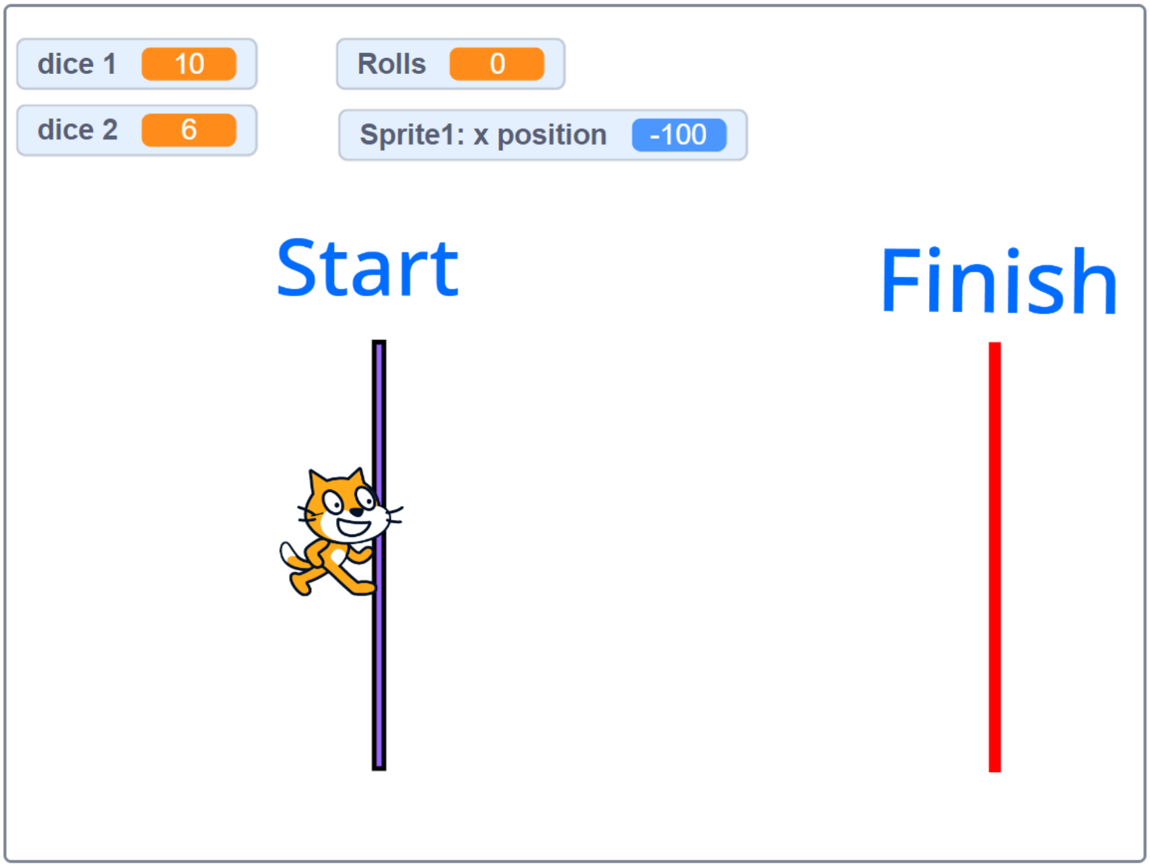
Name______________________________ Date____________________

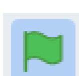
Patterning and Algebra
Unit 3 Line Master 2a

Probability Game

Block Coding Program

Click the link to access Scratch: Dice Game – Doubles:
https://scratch.mit.edu/projects/484777128/



The  starts the game, and the space bar rolls the dice.
Play until you win. Play again.
Compare your results with the class results when students rolled number cubes.

Name________________________________ Date_____________________

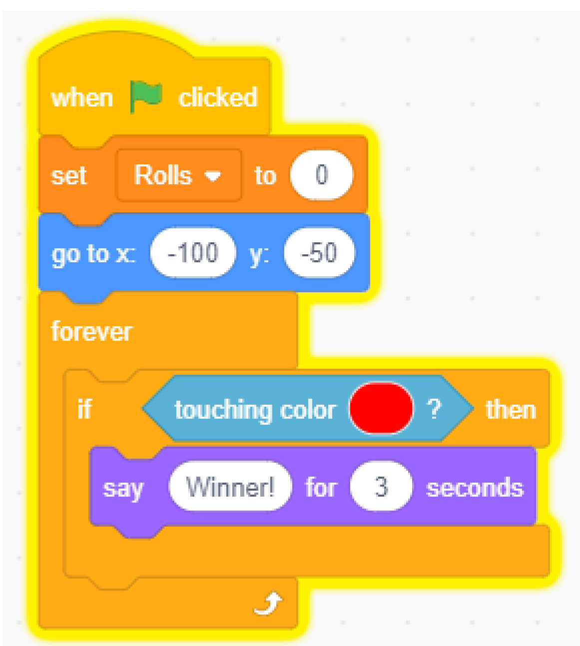
Patterning and Algebra
Unit 3 Line Master 2b

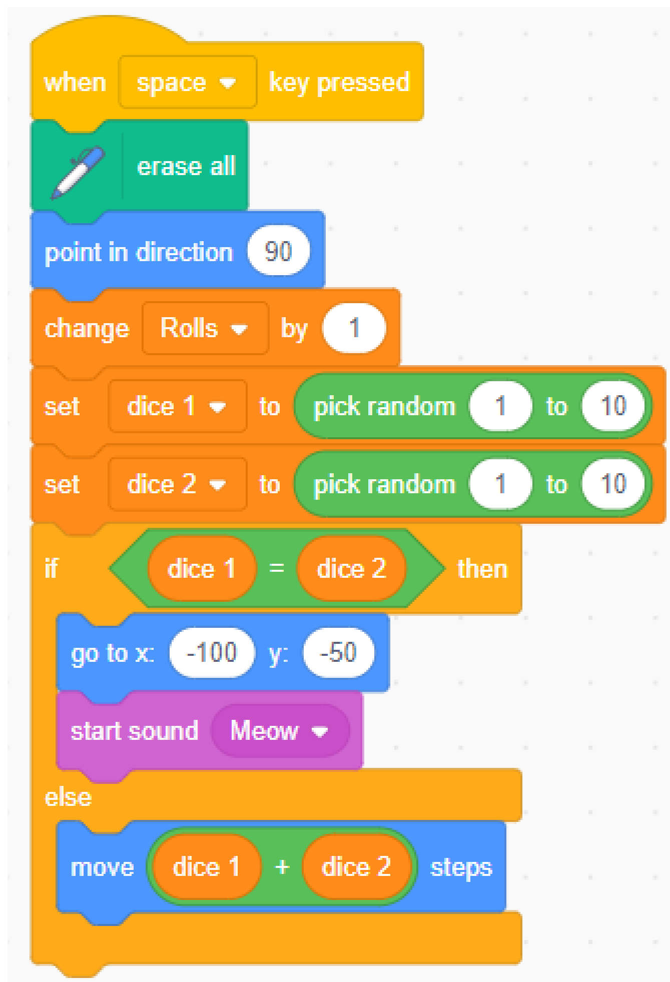
Probability Game (cont'd)

Block Coding Program

Examine the Code

- Click **See Inside**. Look at the code.
  What do you think the different blocks mean?
  How do they relate to the probability experiment?





Name_______________________________ Date____________________

Patterning and Algebra
Unit 3 Line Master 2c

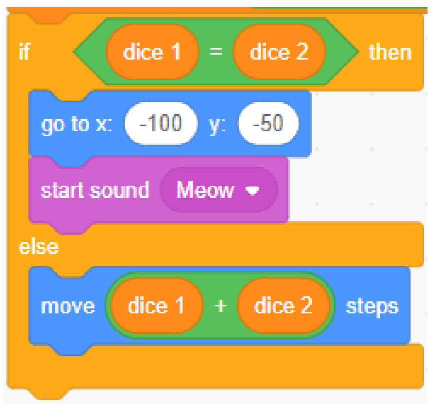
Probability Game (cont’d)

Block Coding Program

- Connect the blocks to what happened during the experiment.
  For example,

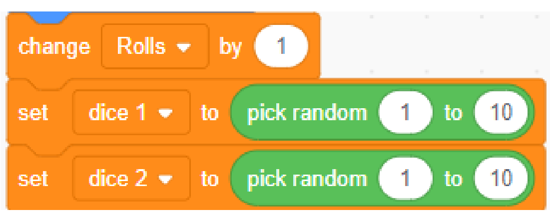
has Cat facing right (looking from Start to Finish).

has Cat starting at (–100,50).

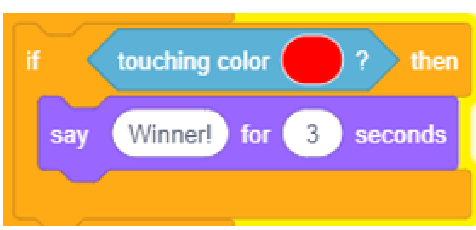


has Cat go back to Start if the dice match.

If the dice don’t match, the numbers rolled are added.
Then Cat takes that many steps.



has the roll tracked each time, and random numbers are chosen from 1 to 10.



has the Cat being declared the Winner!
When the Cat touches the red Finish Line.

Note:
Cat starts at –100 and ends up at 150.
Thinking about the distance on each side of 0,
100 pixels + 150 pixels = 250 pixels.

Name________________________________ Date_____________________

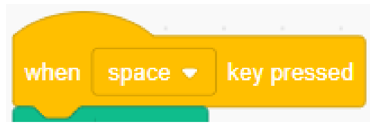
Patterning and Algebra
Unit 3 Line Master 3a

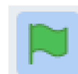
Making Shapes

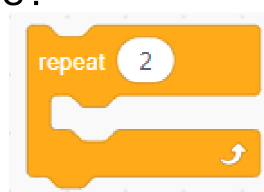
Using a Block-Coding Program

What to Do

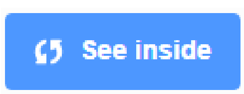
Click the link to access Scratch: Cat and Dinosaur – Making Shapes: https://scratch.mit.edu/projects/494179883/

- To execute Cat's code, press 

.
- To execute Dinosaur's code, press .
- Alter the code so that Cat makes a triangle and Dinosaur makes a parallelogram.
- Try changing some of the numbers.
How do the changes impact the outcome?
- Try to include a Repeat Block to make the code more efficient.

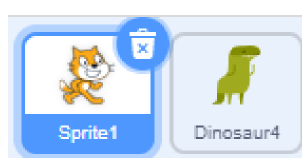


Tips

- Change one thing at a time. Talk about what you are changing and why.
- When you press 

, you will see the code.

- You can click the values in the code and change them.
- To see the code for Dinosaur, you need to click the Dinosaur icon.



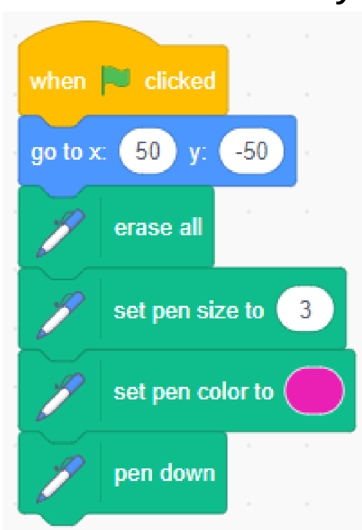
Name_______________________________ Date____________________

Making Shapes (cont'd)

Using a Block-Coding Program

- You can move blocks in the code 

to different spots to change when that outcome occurs (Cat or Dinosaur).
- You can click and drag any of the blocks of code out of the code to remove them or change their order.
- At the start of the code, there are other blocks that help to achieve the outcome. They are part of what makes the code work.



Self-check in

What have you learned about block coding so far?

Did you get stuck? If so, what did you do?

Did you turn to your classmates for help? If so, how did they help?

What are you doing to help the learning of others?

This is "hard fun." What do you think we mean by "hard fun"?

What other activities do you do that are "hard fun"?

Name______________________________ Date____________________

Patterning and Algebra
Unit 3 Line Master 4a

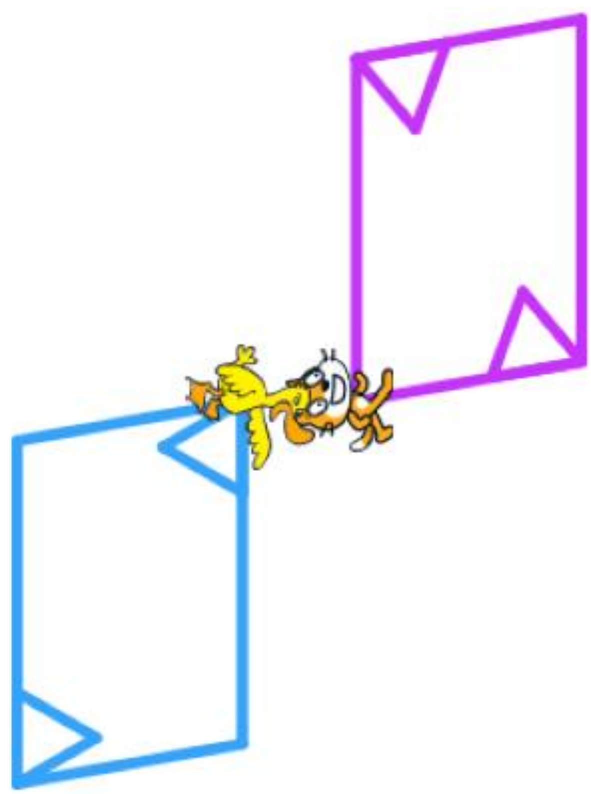
Making a Design with Rotational Symmetry

Using a Block-Coding Program

What to Do

Click the link to access Scratch: Cat, Duck, and the Balloon: Rotationally Symmetrical Designs (Shapes & Conditional Statements):
https://scratch.mit.edu/projects/484712758/

- Select **See Inside** to access the code.
- Alter the code so that the design has rotational symmetry.
- Look at your code. Do you see any repeated events? Nested events? If so, what do they create?



Name_______________________________ Date____________________

Patterning and Algebra
Unit 3 Line Master 4b

Making a Design with Rotational Symmetry (cont'd)

Using a Block-Coding Program

Tips

- To begin, Duck's design is slightly off the screen.
  Can you alter the code to account for that?
  Consider altering the **Go to** block's values so Duck's design begins higher up on the Cartesian plane.
- Change one thing at a time. Talk about what you are changing and why.
- Make sure the design has rotational symmetry.
- A balloon is part of this program. The balloon is there to help you think about different aspects of this block coding program.
  The balloon's code is based on Conditional Statements ("If … then" or If … then … else"). Try altering the conditions.
  What happens when the balloon contacts the other sprites?

Name________________________________ Date_____________________

Patterning and Algebra Unit 3 Line Master 5a

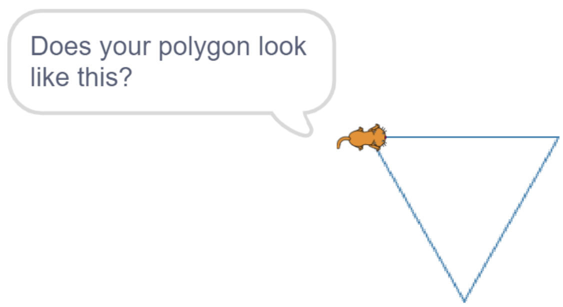
Creating and Classifying Polygons

Using a Block-Coding Program

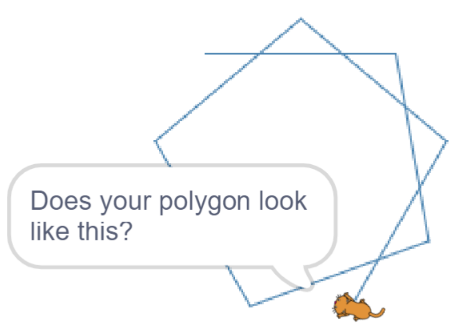
Follow the link to access the file: What type of polygon?
https://scratch.mit.edu/projects/546910232/editor

Let's explore.

Enter 3 for the number of sides. What polygon did you make?



Try again. This time enter 5.
It seems as like the program isn't quite right.
We need to alter the code so that the words and drawings are accurate.



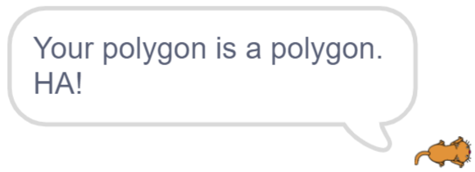
Name________________________________ Date_____________________

Patterning and Algebra
Unit 3 Line Master 5b

Creating and Classifying Polygons (cont'd)

Using a Block-Coding Program

Try one more time. Enter 8.



Ha! I guess it would take forever to code this for
ALL possible polygons.
But maybe we can code a few more polygons.

Let's look inside the code.

This program uses a conditional statement where something is either true or false. We are going to use these to classify different polygons.

It either has 3 sides or it doesn't.

- If it does, a triangle is named and drawn.
- If it doesn't, nothing happens.

Notice that the code for 3 sides is working for our program.

You might use this code as you determine how to make the other polygons work properly.

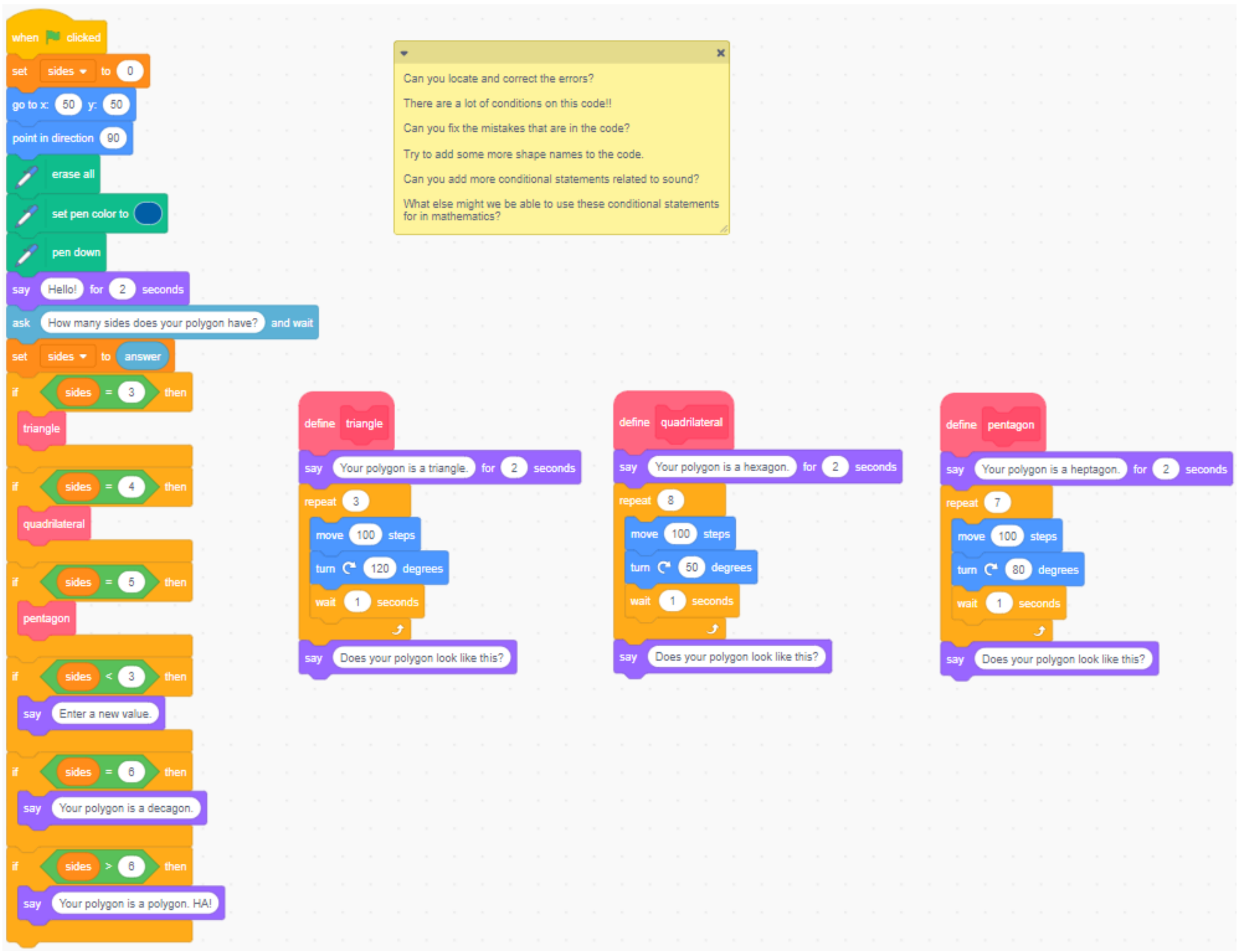
You will see that some Blocks have already been created and labelled by their polygon name. These are part of the conditional statements that this program runs on, but there are mistakes.

Name________________________________ Date_____________________

Patterning and Algebra
Unit 3 Line Master 5c

Creating and Classifying Polygons (cont'd)

Using a Block-Coding Program



What are some of the blocks you recognize? Any new ones?

Notice for the triangle code, we used a "repeat 3" block. If we wrote this without a repeat block, it would require more blocks. We'd have to use the "move" and "turn" blocks three times! Repeats help our code to be more efficient.

When we are coding, we try to make our code as efficient as possible. The more experience we have with coding, the more efficient we are to make our applications!

Name________________________________ Date_____________________

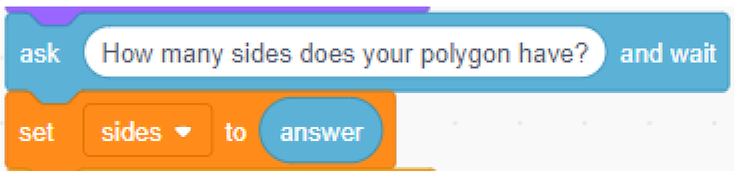
Patterning and Algebra
Unit 3 Line Master 5d

Creating and Classifying Polygons (cont’d)

Using a Block-Coding Program

Tips

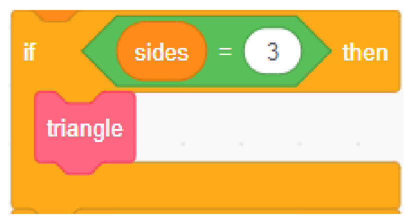
This code allows the “answer” to be used in the rest of the code, since the classification is based on the answer that is given.



We’ve stored the user’s answer in a variable called “sides.”

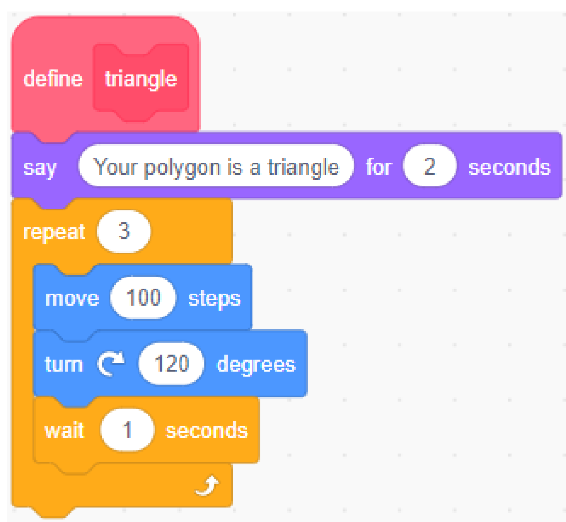
You might notice that you can use this variable block (found under Variables) to make your code even more *efficient* by incorporating it in your repeat values. There’s that word again – “efficient”. Variables are another great way to help us make our code more efficient.

This code incorporates a conditional statement that means:
“If the answer entered by the user is 3, then the triangle code will be executed.”



This is the resulting code.

This defines the code to create a triangle.
When you click the green flag, the main program begins.
The main program “calls” the triangle code (or subprogram).
The code for the triangle is executed if the user typed 3 for number of sides.



Name________________________________ Date_____________________

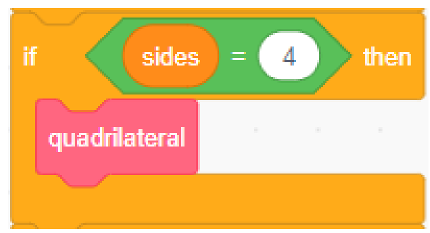
Patterning and Algebra
Unit 3 Line Master 5e

Creating and Classifying Polygons (cont'd)

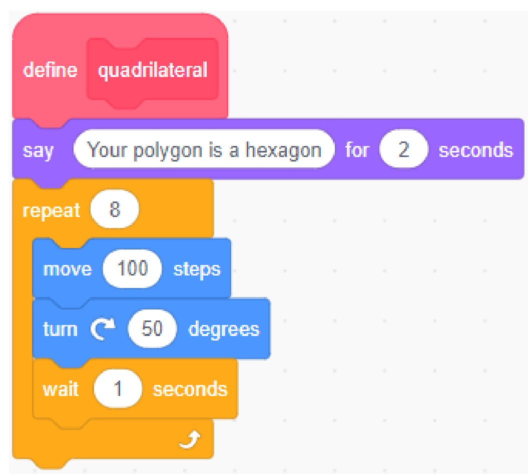
Using a Block-Coding Program

For this conditional statement, the user is told to enter a new value if they enter a number less than 3. This is because we cannot create a polygon with fewer than 3 sides! Why is that?

For the other conditional statements, you will need to ensure the proper polygon is named and drawn according to the number of sides. For example, if the user enters 4 for number of sides, a quadrilateral should be named and drawn:



But what happens when the user types in 4 now? Look at the quadrilateral code as it is currently written:



What a mess! We can see several mistakes:

- The polygon is named incorrectly.
- The repeat value is incorrect.
- The angle turn is incorrect.

Make the required changes for the quadrilateral.

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Patterning and Algebra
Unit 3 Line Master 5f

Creating and Classifying Polygons (cont'd)

Using a Block-Coding Program

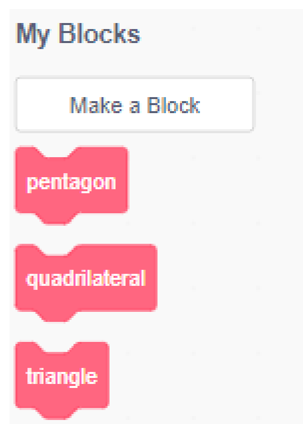
What to Do

Alter all the code so it is accurate.

Remember to change only one value at a time,
so that you can reflect on the impact of your change.

After you fix the broken parts of the code, try to add more blocks to make this program define and draw more polygons.

You will find these in the My Blocks Tab 



You can see that the block for triangle, quadrilateral and pentagon have already been created.

Alter the code for each of the blocks that are there so they are accurate with naming, classifying, and drawing.

Try to add more blocks (My Blocks, Make a Block) for other polygons, so that more polygons are included in the classification.

Name________________________________ Date_____________________

Patterning and Algebra
Unit 3 Line Master 5g

Creating and Classifying Polygons (cont'd)

Using a Block-Coding Program

Self-check in

What have you learned about block coding so far?

What is one way to make your code more efficient?

Did you get stuck? If so, what did you do?

Did you turn to your classmates for help? If so, how did they help?

What are you doing to help the learning of others?

This is "hard fun." What do you think we mean by "hard fun"?
What other activities do you do that are "hard fun"?

Go on "spy walks" to see what your classmates have done.

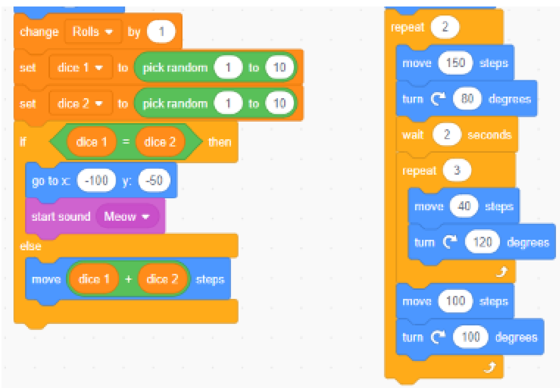
Patterning and Algebra

Activity 11 Assessment

Altering Code for a Game

Classifying 2-D Shapes, Using Algebraic Thinking, and Conditional Statements

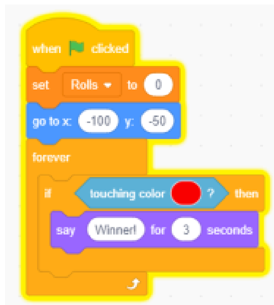
Reads and alters code by testing out various values or blocks until desired outcome is attained.

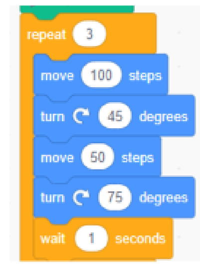


Or "In this game, if the dice are the same you go back to the start or else you add the dice."

Or "I'm going to move the repeat 3 times block to the end and see if that works."

Reads and alters code by visualizing and explaining the impact of changes until desired outcome is achieved.

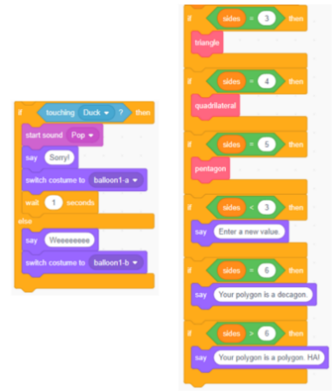




Or "This starts Cat at (–100, –50) but if the game takes too long, we could start Cat at (0, –50) instead."

Or "I'm going to change the degrees to 25 and 95, so they add up to 120, then it will make a hexagon. I'm also going to delete the wait because it doesn't impact the final image."

Flexibly alters code and makes sense of conditional statements related to outcomes and polygon classification.



Or "I'm going to make the condition that if the Balloon is touching the Duck, it 'pops,' but if it's touching the edge, it gets bigger."

Or "I've created conditions for the 3- to 6-sided polygons. I will also do 7- and 8-sided polygons. Then I'll need to change the last block to answer > 8."

Observations/Documentation

Patterning and Algebra

Activity 11 Assessment
Altering Code for a Game

Classifying 2-D Shapes, Using Algebraic Thinking, and Conditional Statements (cont'd)		
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Observations/Documentation		

Patterning and Algebra

Activity 12 Assessment
Making Shapes

Classifying 2-D Shapes, Using Algebraic Thinking, and Conditional Statements

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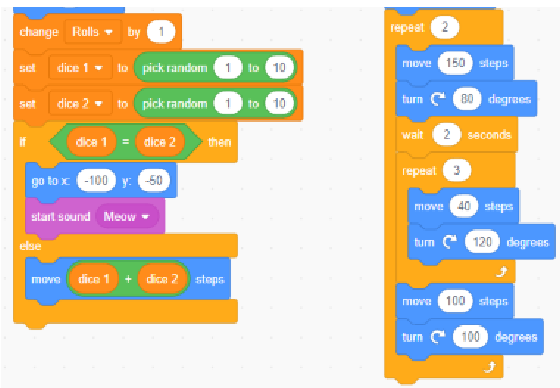

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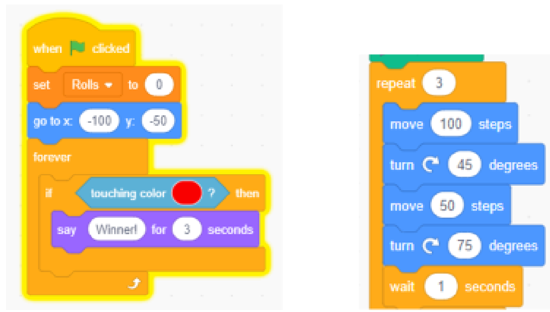

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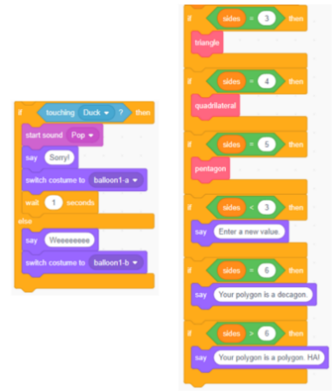

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Observations/Documentation

Patterning and Algebra

Activity 12 Assessment

Making Shapes

Classifying 2-D Shapes, Using Algebraic Thinking, and Conditional Statements (cont'd)		
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Observations/Documentation		

Activity 13 Assessment

Classifying Polygons

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<tr><th colspan="3">Classifying 2-D Shapes, Using Algebraic Thinking, and Conditional Statements</th></tr>
<tr>
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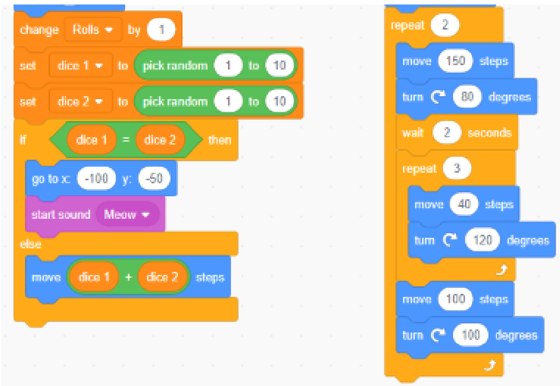

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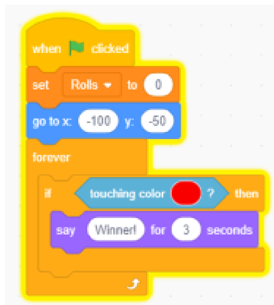

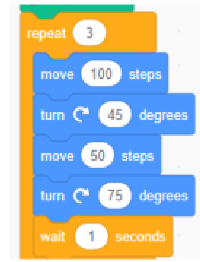

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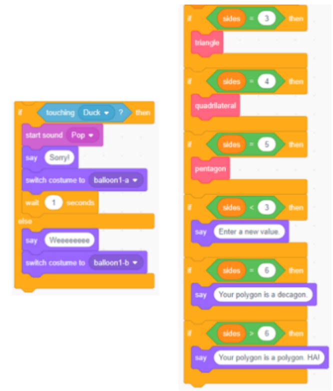

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Patterning and Algebra

Activity 13 Assessment

Classifying Polygons

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Observations/Documentation		

Patterning and Algebra

Activity 14 Assessment

Coding Consolidation

Classifying 2-D Shapes, Using Algebraic Thinking, and Conditional Statements

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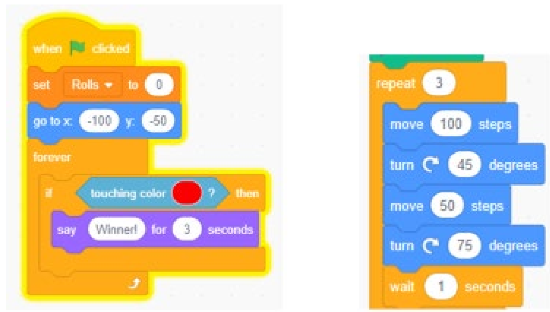

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Observations/Documentation

Patterning and Algebra

Activity 14 Assessment

Coding Consolidation

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