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Enriching Primary STEAM teaching – Dubai

Agenda

Time	Title	Speaker
08:30 – 09:00	REGISTRATION & COFFEE	
09:00 – 10:30	Integrating STEAM into the 21st Century classroom	Mona Al Rimawi
10:30 – 10:45	COFFEE BREAK	
10:45 – 12:15	Continued session – Integrating STEAM into the 21st Century classroom	Mona Al Rimawi
12:15 – 12:45	Pearson International Primary Science launch – An introduction to PIPS	Kevin Hiatt
1:00 – 2:00	LUNCH	

Integrating STEAM into the 21st Century Classroom

Mona Al Rimawi

Let's grow together

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The ALCHEMIST Lab

The Agenda

Time Estimated	Topic
12:10	Do we need to improve STEM education in the Middle East? Why?
12:15	STEAM Learning Strategies
12:20	Let's Design it together-Unit Planning
1:20	Let us do a STEAM activity
1:50	Trends in STEM Learning
2.05	Resources supporting STEAM implementation
2:10	What are the challenges in STEAM education?
2.15	Key Learnings from The Alchemist Lab work in the region
2:20	Take away Conclusions

"The future belongs to the curious”

The ones who are not afraid to try it, explore it, poke at it, question it and turn it inside out".

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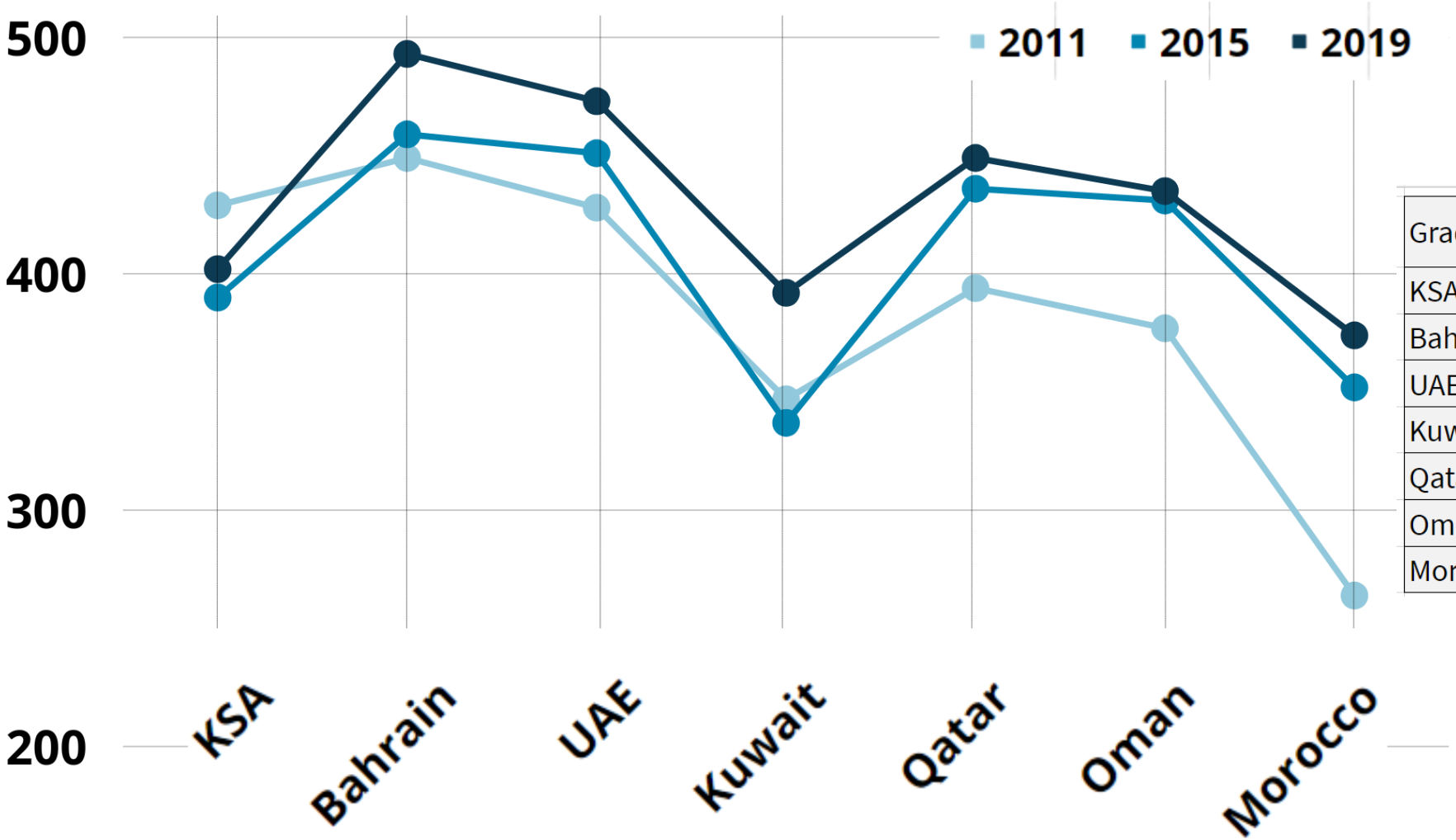
Do we need to improve STEAM Education in the Middle East? Why?

Why STEAM Education is important in the Middle East?

1. Improve the quality of students experience in STEM and achievements in these subjects.
   - 1.1 Low performance in International exams TIMSS/PISA.
   - 1.2 Relatively small number of students in STEM fields
   - 1.3 High level of scientific illiteracy.
   - 1.4 Low levels of access the internet
   - 1.5 Low number of internationally registered patents and scientific publications.
2. "What are we, and we want to become"
3. Identifying long-term goals that has great emphasis on STEM

https://scholarworks.aub.edu.lb/bitstream/handle/10938/23489/STEM%20Education%20in%20Arab%20Countries%20%202021.pdf?sequence=1

Grade 4 Science TIMSS Scores - Middle East



Grade 4	2011	2015	2019	(2019-2011)/ 2011 %
KSA	429	390	402	-6.3%
Bahrain	449	459	493	9.8%
UAE	428	451	473	10.5%
Kuwait	347	337	392	13.0%
Qatar	394	436	449	14.0%
Oman	377	431	435	15.4%
Morocco	264	352	374	41.7%

https://timssandpirls.bc.edu/timss2019/

Women in STEM in the Middle East have inspiring stories

According to UNESCO, **34-57** % of STEM graduates in Arab countries are women

"**Jordan, Qatar, and the United Arab Emirates** are the only countries where women test better and feel more comfortable in mathematics than men, according to the OECD"."

Research shows that women in the Middle East and North Africa region earn science and engineering degrees at the same or higher rates than their male peers

https://www.studyinternational.com/news/the-rise-of-women-in-stem-in-the-arab-world/
https://classroomscience.org/articles/fyi/global-perspectives-dei-women-stem-higher-education

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Top Jobs Skills of 2025

WORLD ECONOMIC FORUM

Source: Future of Jobs Report 2020, World Economic Forum.

STEM – Employability Skills Prospect

World Economic Forum

Future of Jobs report

Oct 2020

Top Jobs Skills of 2025

The ALCHEMIST Lab

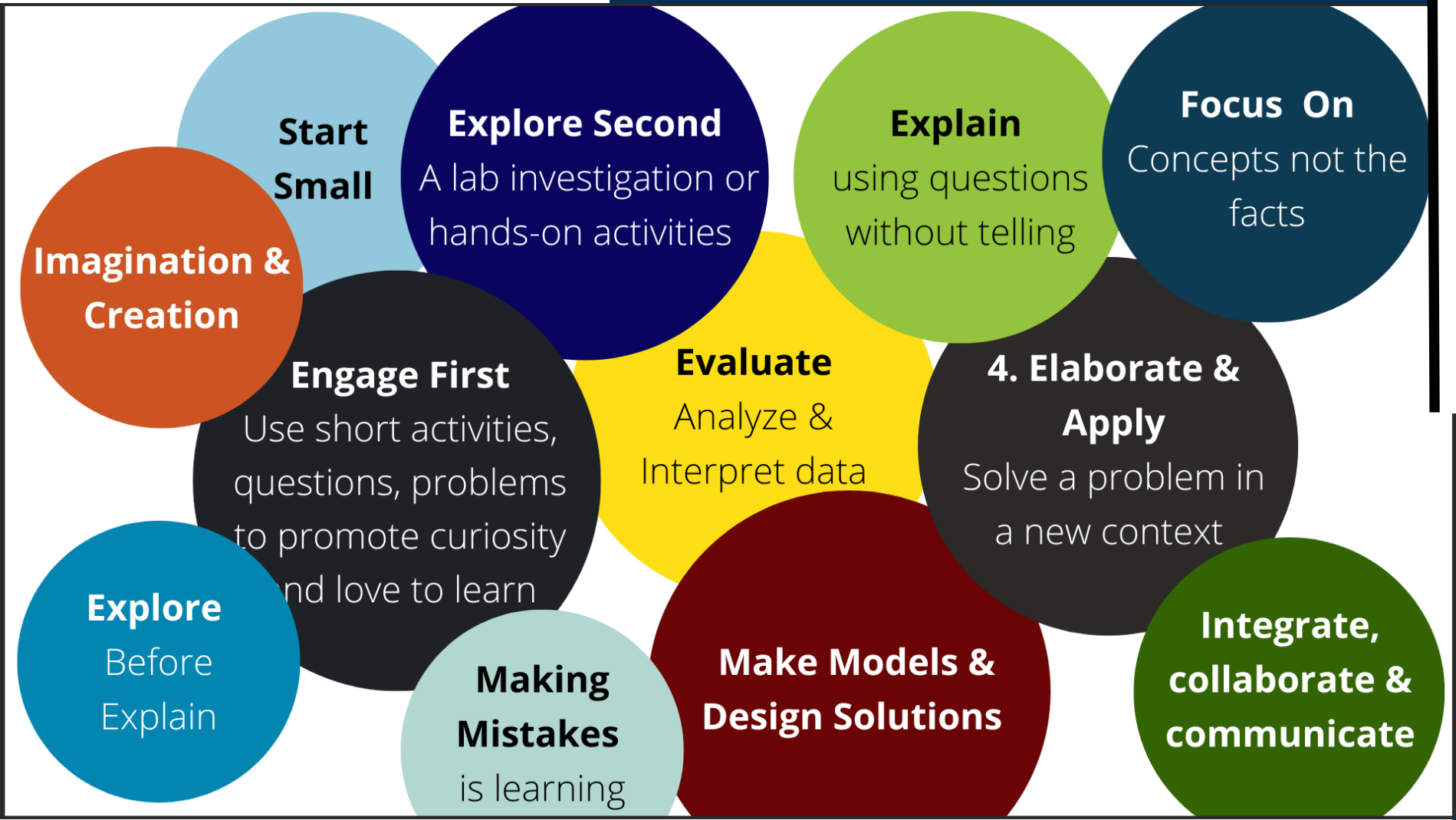
Our Focal Point is

Students' Skills & Mindset

Focus on STEAM SKILLS

- **Questioning**
- **Observing**
- **Creative Thinking**
- **Critical Thinking**
- **Problem Solving**
- **Learn from mistakes**
- **Learning how to learn**
- **Love to learn**

STEAM Learning Strategies



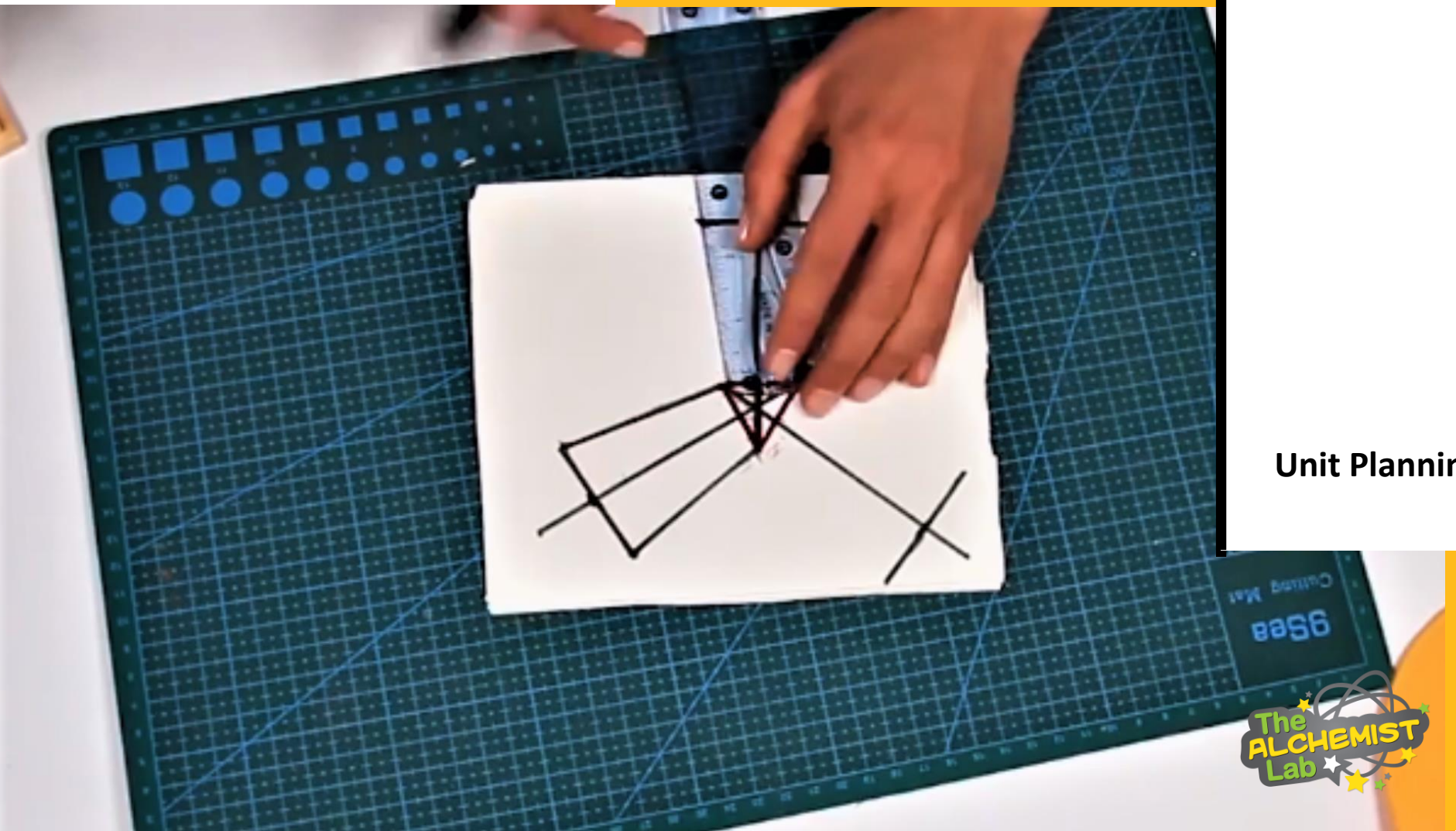
Let's Apply STEAM Strategies

STEAM Engaging Strategies	How to apply it to:
• Adventure Learning • Connect to Real Life • Storytelling • Games • Technology Enabled • Arts Integration • Problem Solving • PBL • Experimental • Making • Process Guided • Collaborative	Physical Vs. Chemical Changes - Grade 5 Solar System - Grade 2 Know your senses - Garde 1 Light - Grade 1 States of Matter - Grade 3 Fit for life - Grade 5 Forces - Grade 4 Sharing the planet - Grade 3 Civilizations - Grade 4

Create STEAM Culture

- Inspire teams and build-up confidence, curiosity and interaction.
- Always encourage STEAM, Entrepreneurship, Growth mindset.
- Apply process experience: Scientific, Engineering, Design Thinking.
- Integrate STEAM with other core subjects and with real-life around.
- Boost STEAM culture and support collaboration.
- Encourage team-work, school, and community interconnections.
- Focus on skills always
- Create supporting system, resources and necessary PD.
- As a leader; support, facilitate, steer, coach and mentor.
- As a leader; develop a vision, sustainable goals, norms.

Let's design it together



Unit Planning

Unit Planning

1. **Parts of Plants**
2. **Leaf Shape**
3. **Flower Shape**
4. **Flower Families**
5. **Trees**
6. **Drawing Plants**
7. **Seeds**
8. **Blubs**
9. **Healthy Plants**
10. **Investigating Seeds**
11. **Growing food**

Let us do a STEAM activity

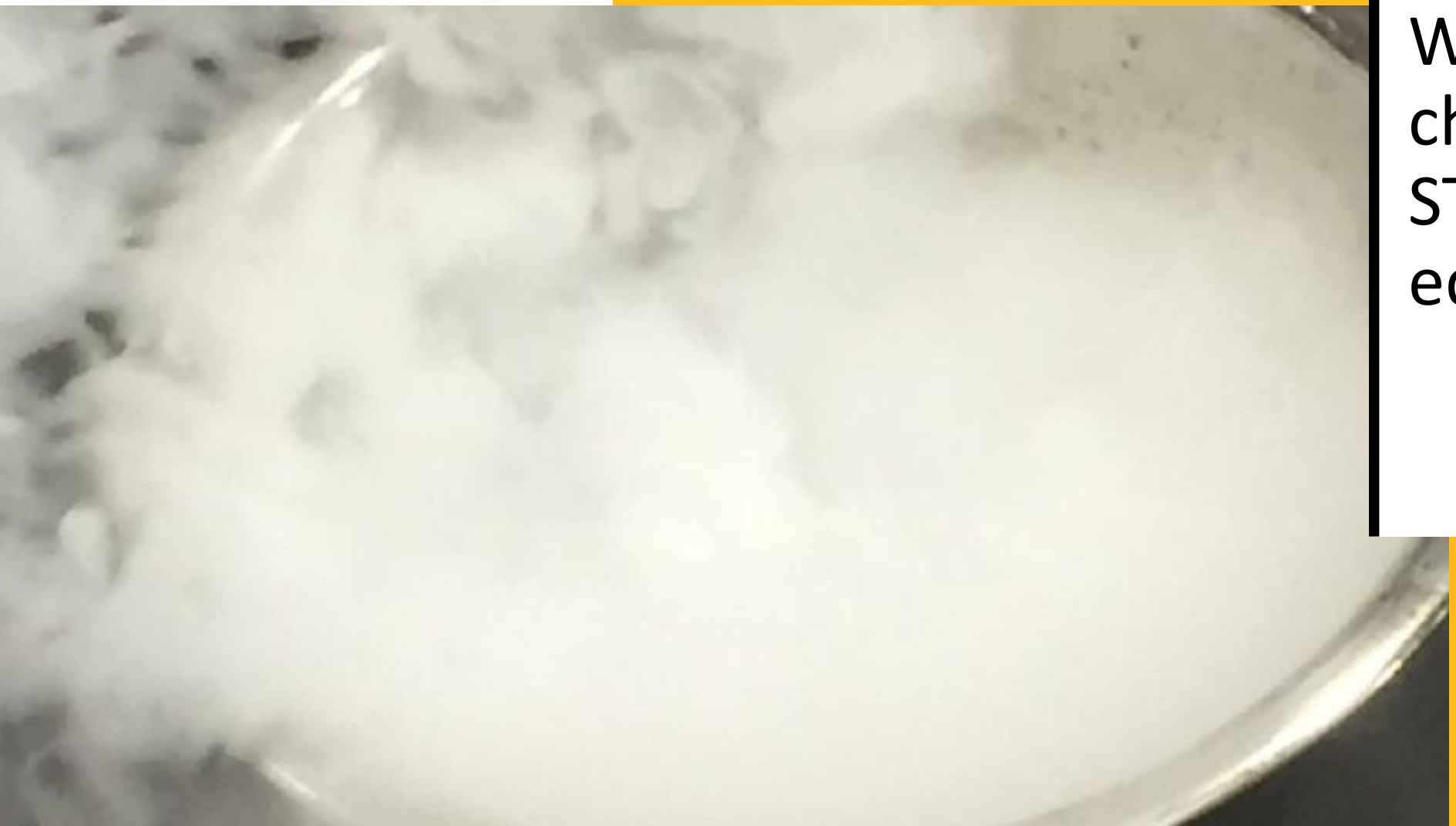
Future trends in STEAM Education

Panel Discussion

1. **The technology is a change maker in all aspects!**
   How do you think this will affect STEAM Education
2. **Do you think?**
   Coding is going to rule the education sector? Is it worldwide? Why?
3. Should we start STEAM Education before 5 years old? and Why?
4. Can you describe the journey of moving from STEM to STEAM?
5. **Please describe**
   How will project based learning look like in the future?
6. **Do you think?**
   there will be conversion between education and entertainment?

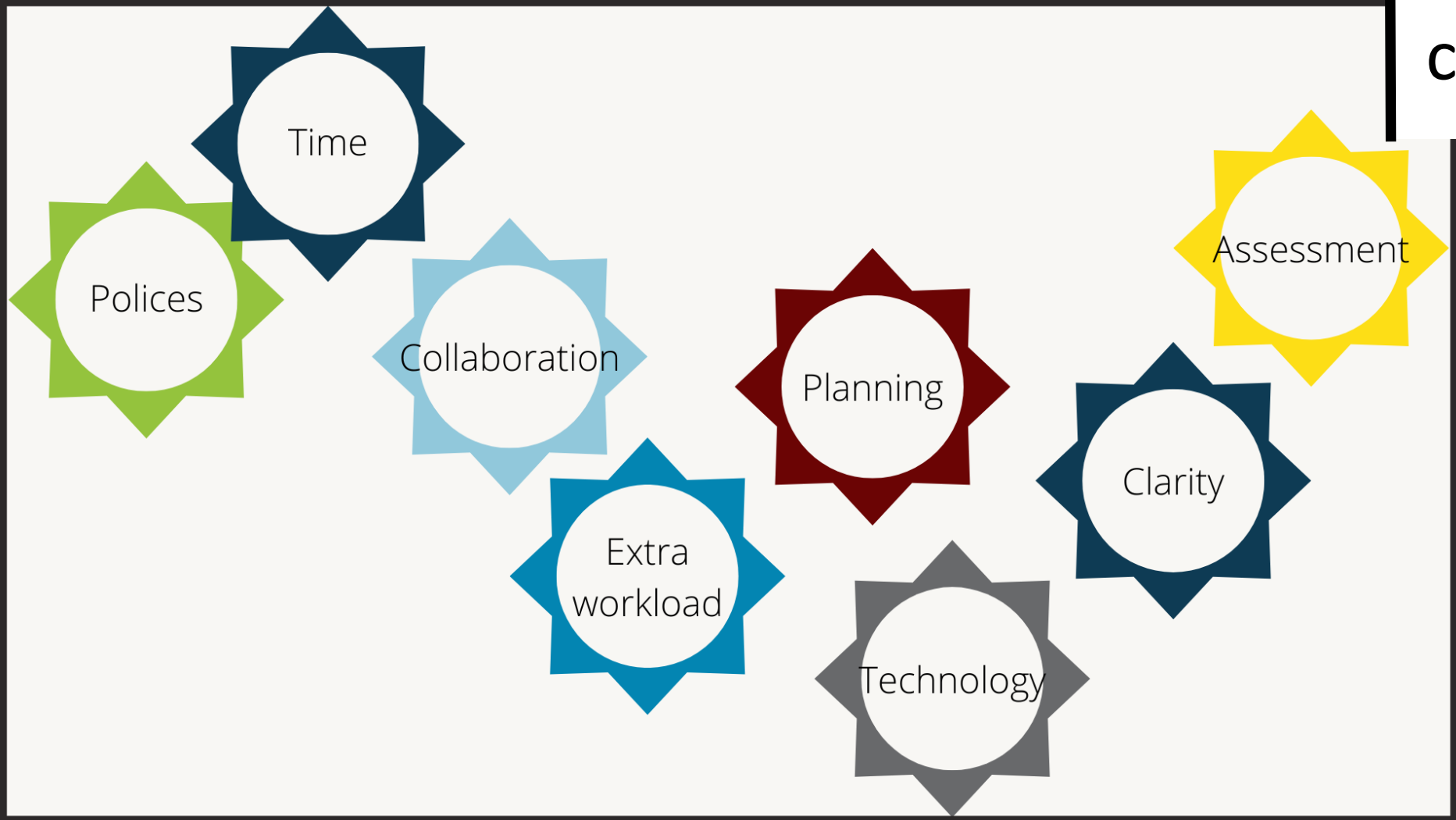
STEAM Resources for Educators

Tools Type	Examples https://blogs.umass.edu/onlinetools/
Assessment Tools	• Kahoot, Socrative, Google Forms, ePortfolios • Allow educators to conduct summative assessments.
Community Tools	• Social media, virtual games, and collaborative design spaces, • Encourage and foster social learning experiences.
Knowledge Tools	• Virtual timeline creators, mind mapping software, and study sites (flashcards, tutorials) • Help students acquire, construct, and organize information.
Learner-Centric	• Used to personalize, differentiate, and empower learning. • Graphic Design, Multimedia Production, Book or Web design
Activities	• Digital Library, Museums, Open Educational Resources, VR/AR trips • NASA , James Dyson Foundation, STEM Learning, TED-Ed, Mystery Science, kide Science, many more



What are the challenges in STEAM education?

Together let's try to solve expected challenges



Key Learnings from The Alchemist Lab work in the region

Asking questions is the key.

It sparks curiosity based on students background, helps students ask better questions, creates science dialogue that helps discovering the information themselves.

Follow a process always and make it structured

The Scientific Methodology, Engineering Design Process and Design Thinking

Make it fun to inspire students waiting for it

3H Engagements- Head (Mind), Hands and Heart!

Always connect the learning experience

Make the connection with real-life, families, school, communities,
Make the connection with other subjects, math, arts, languages, music, drama, social studies, research, imagination.

#STEAMEverywhere

Any opportunity is a learning one and all is part of our students life skills

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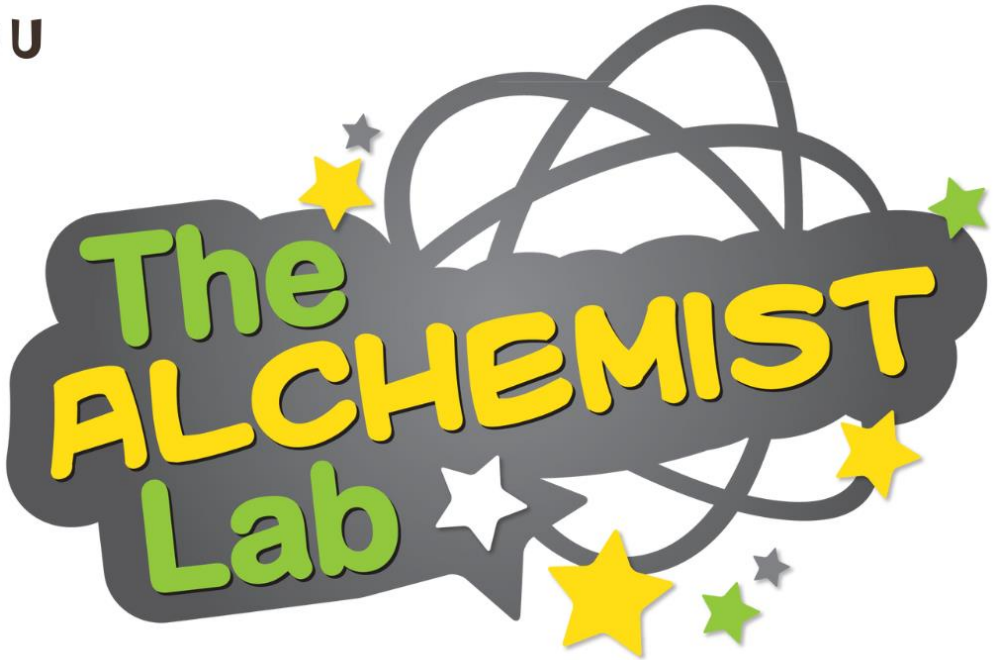
Take away Conclusions

Let's list them together!

THANK YOU



HTTPS://WWW.THEALCHEMISTLABACADEMY.COM/

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Let's create the Middle East STEAM Community!

Any questions?

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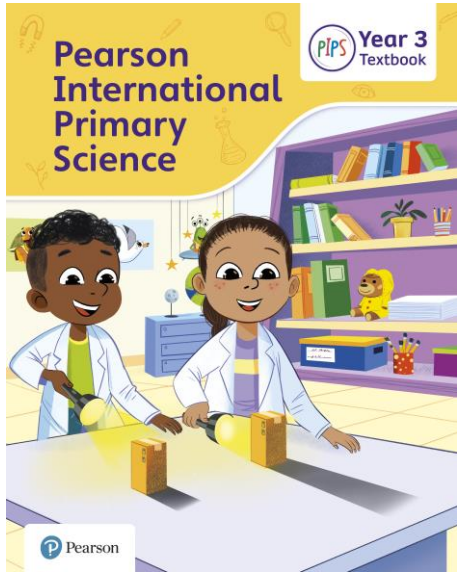
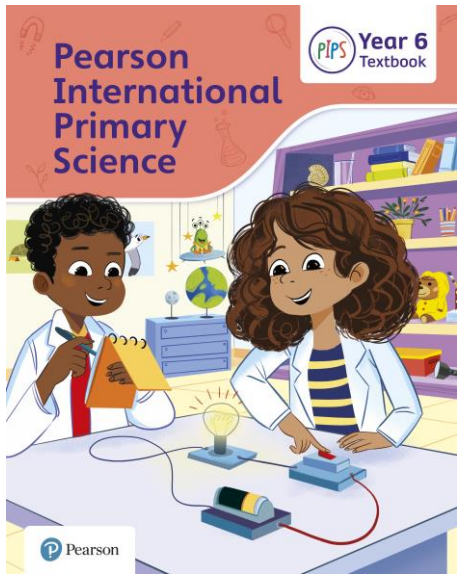
The importance of Primary Science

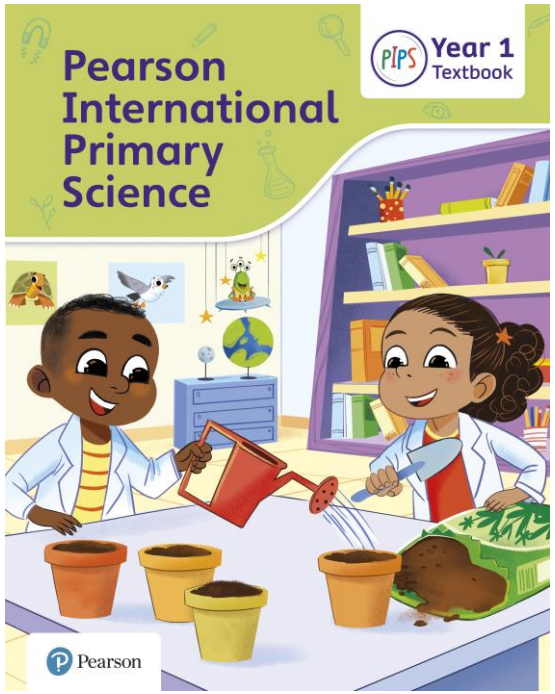
Kevin Hiatt

The importance of Primary Science

- Why is science important
- What is the goal of Science at Primary level
- What are some of the challenges teaching Science at this age?
- What is ‘best practice’?
- How can we best support teaching and learning?
- Pearson International Primary Science







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What *is* Science?

"Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence"

And what is a *Scientist?*

"A scientist is someone who systematically gathers and uses research and evidence, to make hypotheses and test them, to gain and share understanding and knowledge"

Science – why it matters

Science remains a key subject

It provides the foundations for understanding the world

It creates new technology and applications

It has measurably changed lives

It encourages a critical and curious engagement with the world

It directly supports the development of many of the transferable and soft skills

Primary Science – the challenge

What percentage of children name Science as their favourite subject?

17%

8%

Primary Science – the challenge

“It’s too hard”

Technical language can be off-putting	A lack of confidence	“It’s not ok to not know something!”	Not understanding how to find things out!
A belief intelligence is unchangeable – but we want students to be able to learn how to understand things	A lack of proper scaffolding – prior learning is not in place	“Why are we learning this? What’s the point?”	A lack of confidence that learning is at the correct level

Primary Science – ‘best’ practice

- Effective subject leadership
- Celebrate student’s curiosity
- Accurate and timely assessment
- A clear and rigorous structure across the whole school
- Well trained and supported staff
- Led by an investigative approach

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Scientific enquiry at its core

A celebration of curiosity

Clear, structured progression

OVERVIEW

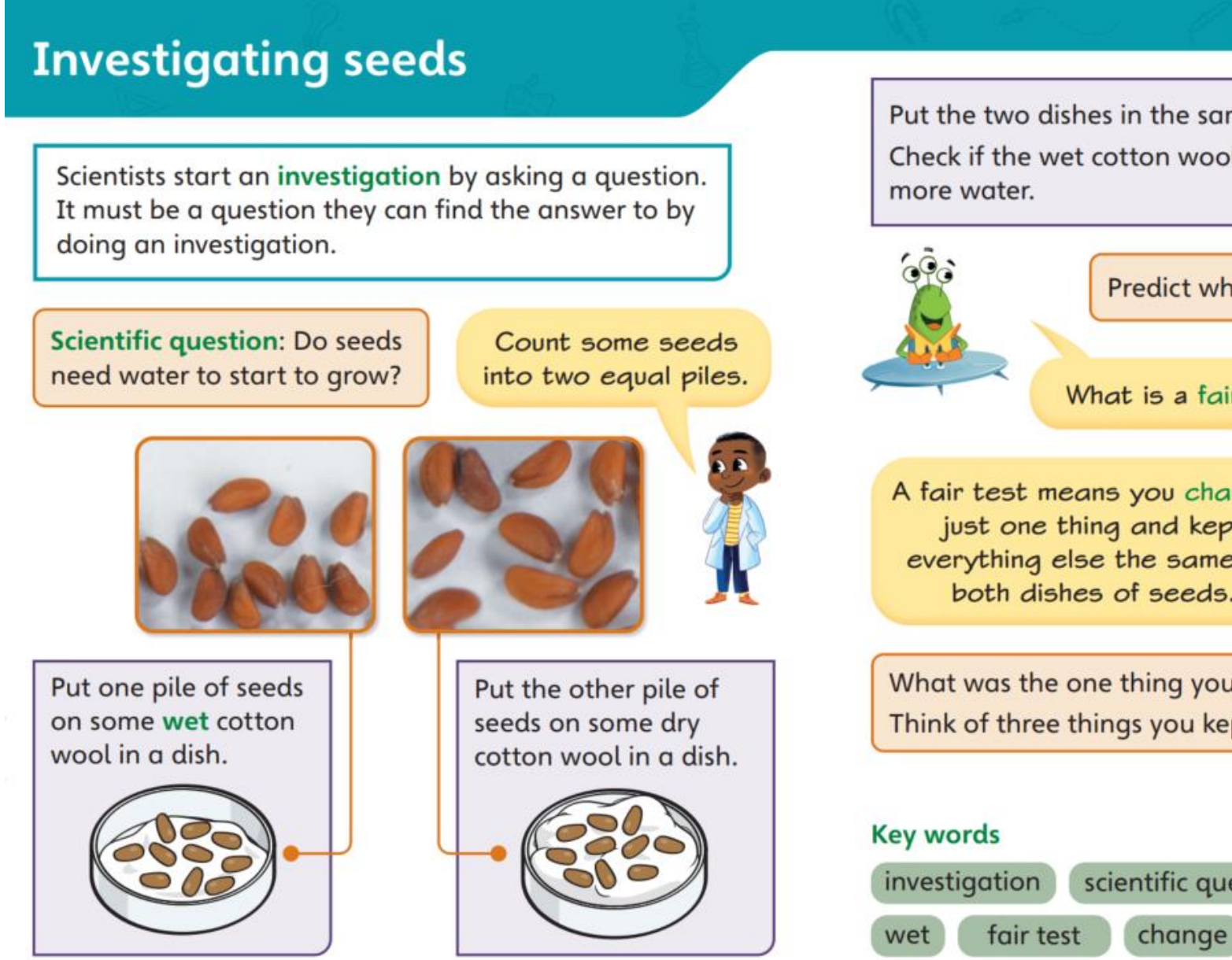
iPrimary Year 1	iPrimary Year 2	iPrimary Year 3	iPrimary Year 4	iPrimary Year 5	iPrimary Year 6
Early scientific enquiry	Early scientific enquiry	Early scientific enquiry	Later scientific enquiry	Later scientific enquiry	Later scientific enquiry
BIOLOGY					
Living things	Health and growth	Animal adaptations	Variation and classification	Plant adaptations	Micro-organisms
Myself	Living things in the environment	Teeth	Growing plants	Living things in danger	Plant life cycles
Animals	Invertebrates	Feeding relationships	Skeleton and muscles	Diet and digestion	Heart, lungs and circulation
Plants					
CHEMISTRY					
Sorting and grouping materials	Materials: properties and uses	Rocks and soils	Solids, liquids and gases	Mixing and separating materials	Reversible and irreversible change
		Using and changing materials			
PHYSICS					
Light and dark	Sound	Light	Making and changing sounds	Earth and space	Forces in air and water
Pushes and pulls	Space	Forces	Electricity: everyday uses and simple circuits	Seeing and reflecting	Electricity: changing circuits
		Friction			
		Magnets			

Textbooks

Supported, investigative approach

Application and embedding key skills and knowledge

A clear progression helps secure understanding



Workbooks

Further development of independent thinking

Supporting and checking understanding

Further reinforcement of key skills and knowledge

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Investigating seeds

Zola grows some cress from a packet of seeds. She wants to **investigate** if her cress seeds need to be warm to grow.

First she asks a **scientific question**.

1 Complete the scientific question:

Do _____ need to be _____ to _____?

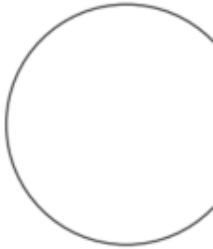
2 Suggest a warm place and a cold place where Zola could put her cress seeds to grow.

warm _____

cold _____

We are changing how warm it is, so we have to keep **everything** else the **same for both** dishes of seeds.

3 Draw some cre
in the two dish
go in each dish



Dish A: **warr**

4 Should Zola pu

_____

5 What will Zola

_____

_____

6 Predict what yo

Which seeds w

_____

Why do you thi

Teacher planning

Supported, investigative approach

Misconceptions, progress, and prerequisites all highlighted

Opportunities for linking across curricula highlighted and supported

Clear adaptable support for teaching

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PEARSON INTERNATIONAL PRIMARY SCIENCE

Year	Topic No.	Topic Name	Le
1	4	Plants	28
Curriculum objectives	**B1.4F – Understand that plants need water, air and light to grow well** **ESE1.1 – Scientific ideas: Use different types of simple enquiry to answer scie** **ESE1.2 – Investigating: Set up simple practical tests** **ESE1.2 – Investigating: Understand what is meant by a fair test**		
Learning focus	What do plants need?		
Key vocabulary	watered; wilted; bright; tomato; investigation; scientific question; wet		
Book references	**Student book pages 94-97**		**W**
Resources supplied	N/A		
Other resources needed	A display comprising items A, B and C set out as three groups, but in during the introductory discussion (A) Set of three plants: healthy plant, wilted plant and dead plant (B) Piece of pondweed in a beaker of water – with light shining on it (C) Seedlings growing towards window light set up around the time Per pair of learners: 20 cress seeds 2 small dishes and a piece of cotton wool to fit each Water 2 sticky labels or a thin permanent marker pen to label dishes Any type of seeds in unopened packet as visual aid for plenary		
Lesson Outline			
Before you teach: Conditions for growth will vary from species to species. The introduction gives the generic conditions f well. The investigations in the textbook and workbook focus on the conditions that seeds need to *start* until later in the course). It also introduces the idea of a fair test. Here and in the textbook, they look a for them to plan (warm/cold).			

Assessment

Formative assessment opportunities highlighted throughout

Regular informative summative assessment opportunities

End of topic questions

The pictures show different foods we get from plants.
Look at both sets of pictures.

What have I learned?

1 I know which living things are plants when I go outside or when I see pictures.

I know this because I can draw three different plants.

2 I know the names of some parts of a plant.

I know this because I can list six different

4 I understand that pla
and bulbs.

I know this because I
a bulb.

seeds

5 I know what plants n

I know this because I
plants need to grow v

1 _____ 2

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Course Structure –print and digital components

Textbooks

Workbooks

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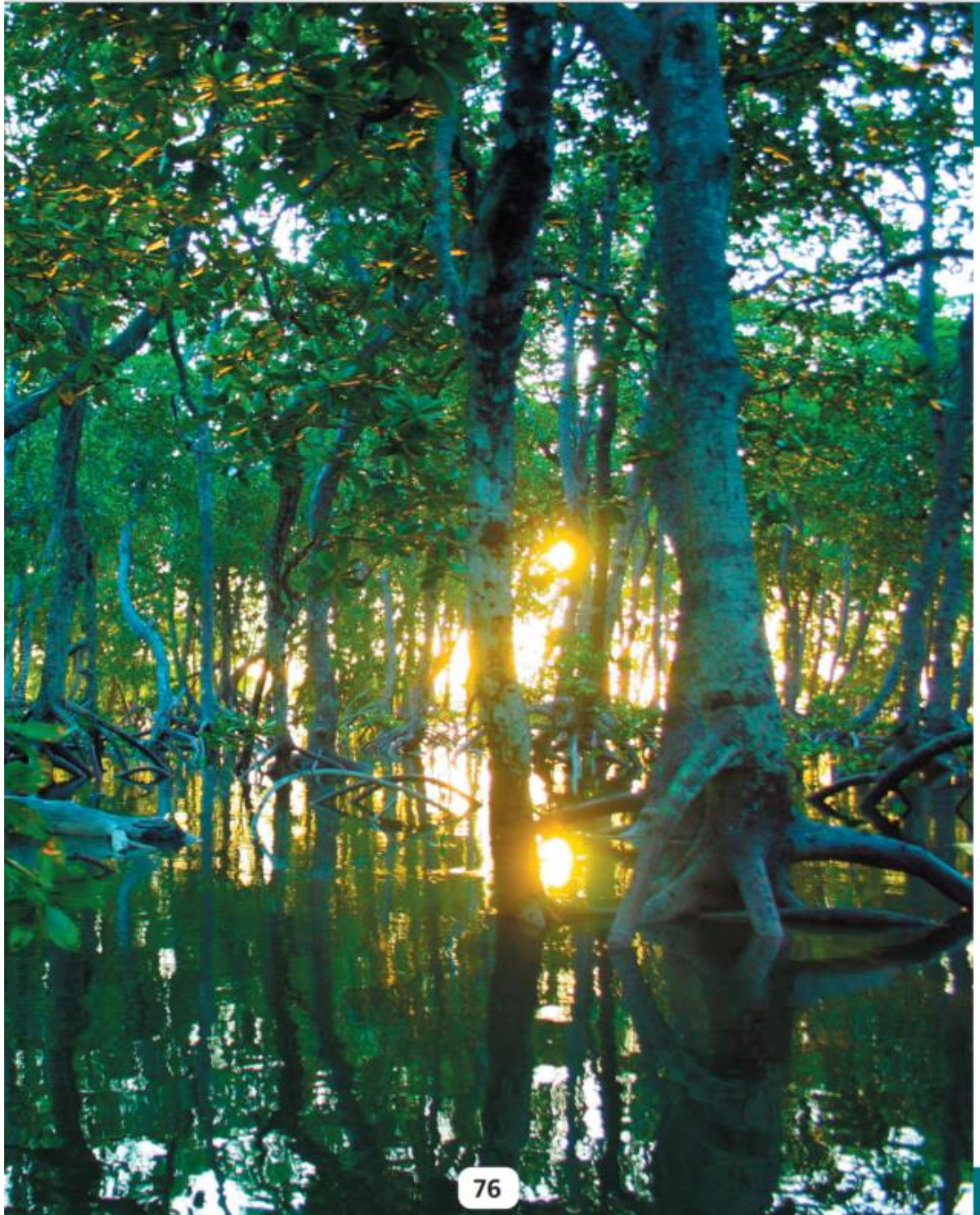


4 Plants

Plants can be very big or quite small. They can live for a year or for hundreds of years.

Let us find out more about the variety of plants in our world.

Most plants are green.

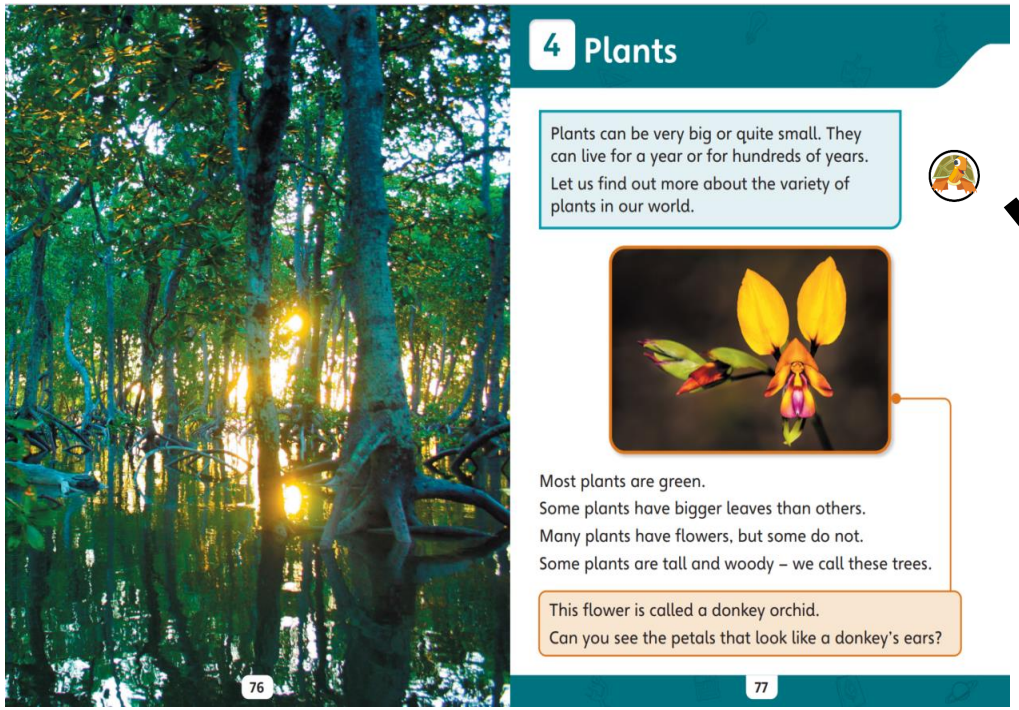
Some plants have bigger leaves than others.

Many plants have flowers, but some do not.

Some plants are tall and woody – we call these trees.

This flower is called a donkey orchid.

Can you see the petals that look like a donkey's ears?



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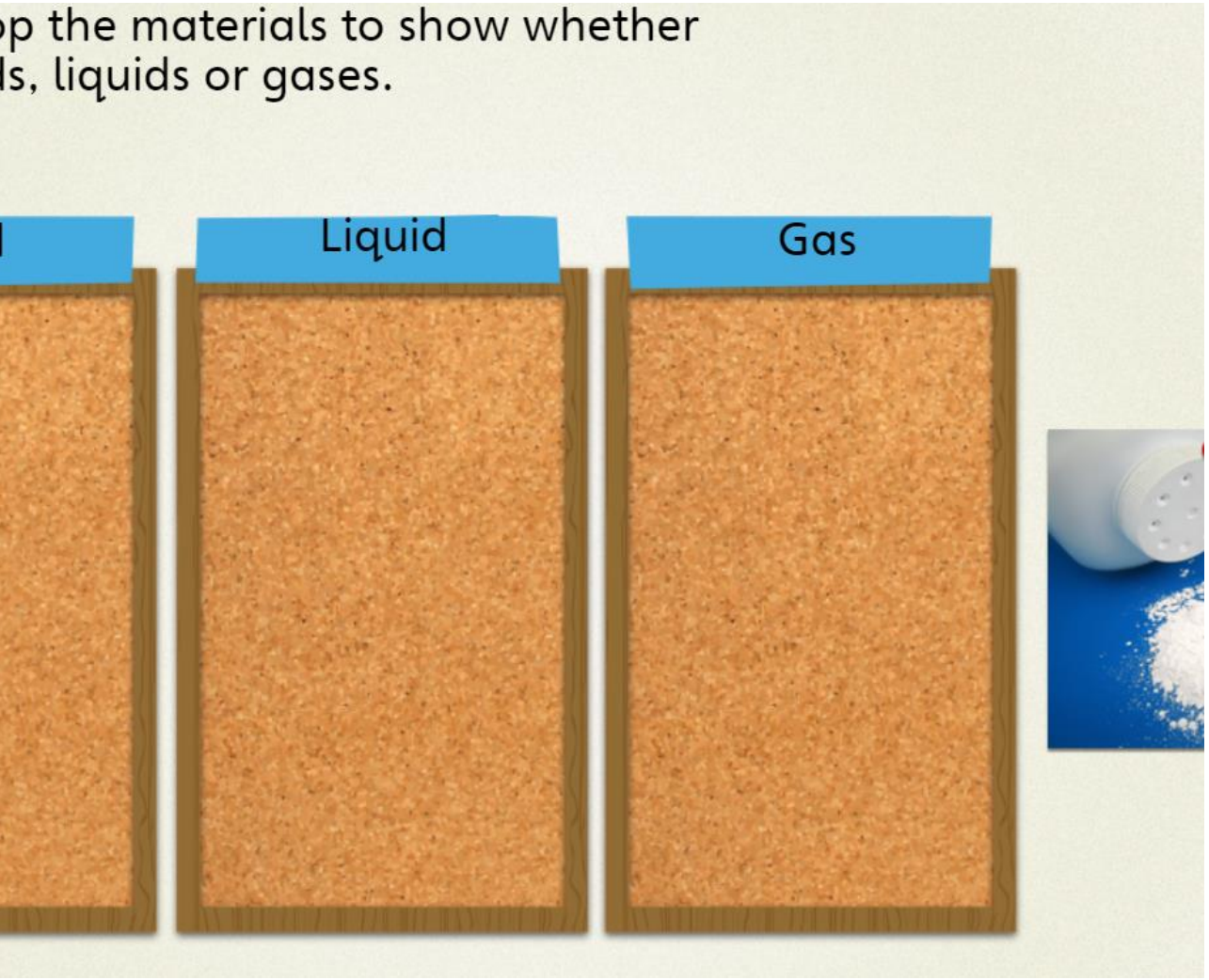
76

77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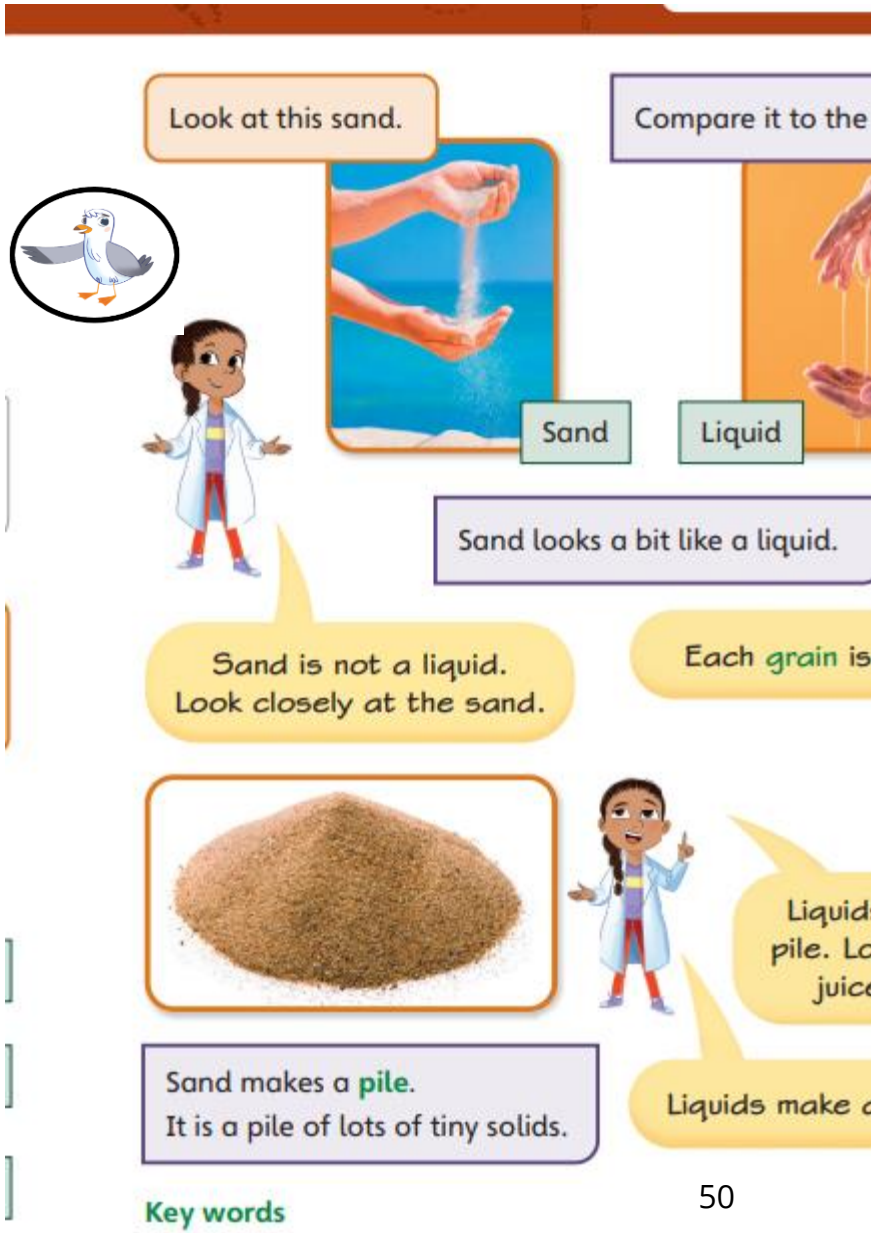
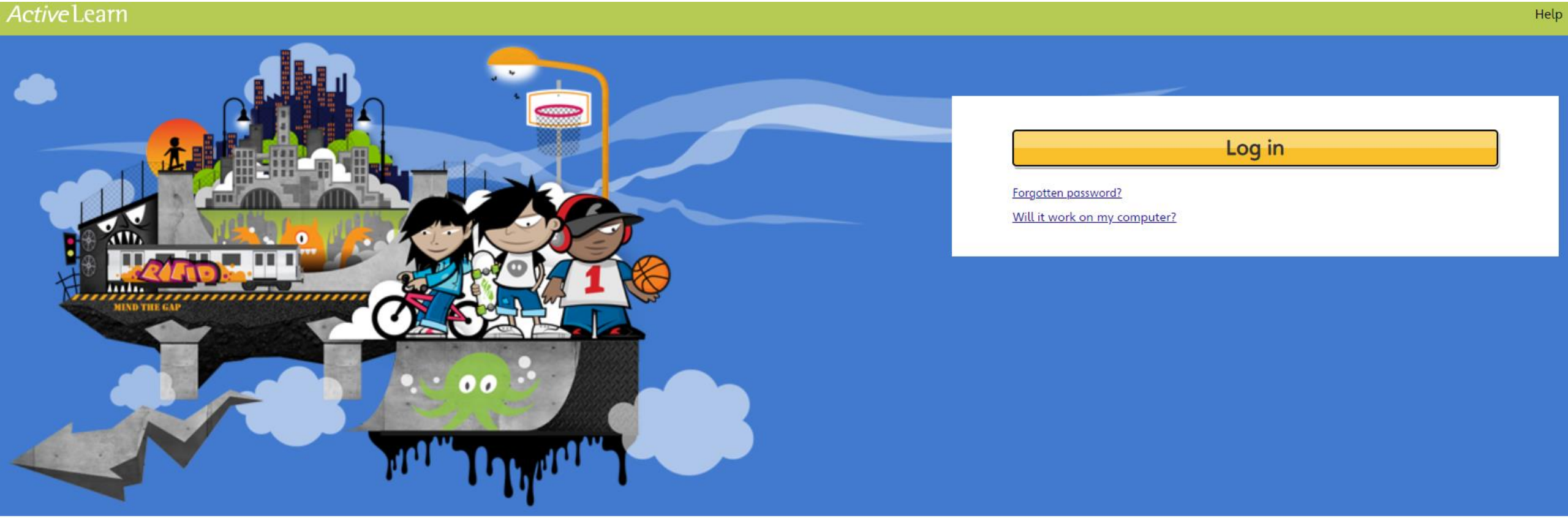
ds, liquids or gases.
Liquid
Gas


Look at this sand.
Compare it to the
Sand
Liquid
Sand looks a bit like a liquid.
Sand is not a liquid.
Look closely at the sand.
Each grain is
Liquid
pile. Lo
juice
Sand makes a pile.
It is a pile of lots of tiny solids.
Liquids make
Key words


Biology
Laboratory
Biology

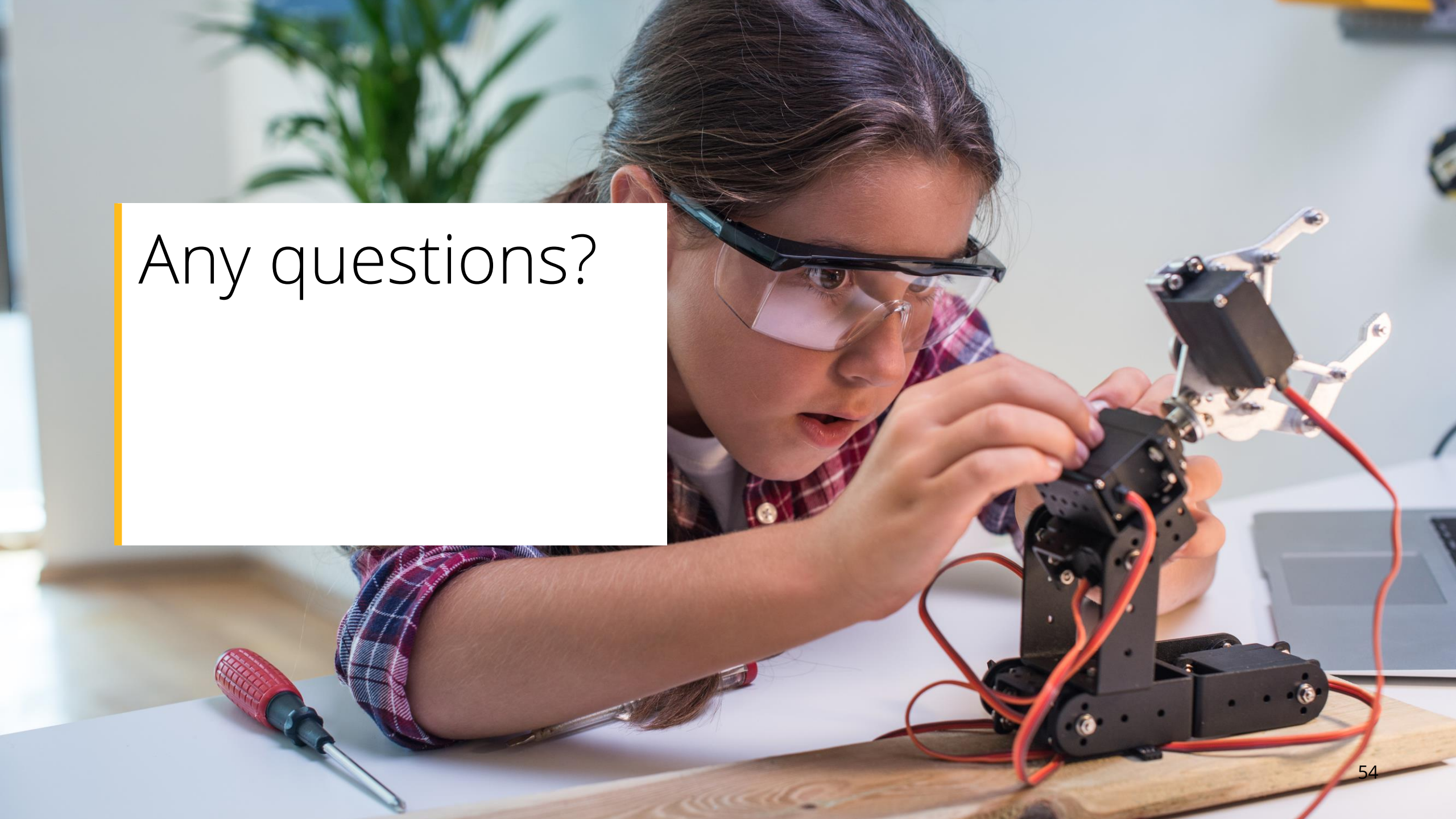
Course Structure –print and digital components



Pearson International Primary Science

Available from March 2023

Talk to your local Pearson representative for more detail



Any questions?

Thanks for listening
Please enjoy lunch

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