

# Concurrent Session: **AGILITY IN EDUCATION**

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**This session focuses on Agility in educational context dealing with the volatile, uncertain, complex and ambiguous world. How do educators build resilience, flexibility and nurture the joy of learning? Being agile encourages educators and learners to have an open mind set by learning from experiences and performing better in new situations – which helps put the learners' 21st century skills into practice.**

# Why do we need to emphasize 'Agility in Education'?

1. The VUCA world today demands agility.
2. Employers place value on agility.
3. High agility allows learners to make full use of their experiences.



“Success today requires the agility and drive to constantly rethink, reinvigorate, react, and reinvent.”

Bill Gates (1955 – present)



# What does 'Agility' mean?





**Fast  
Adaptable  
Nimble**





**F**ast

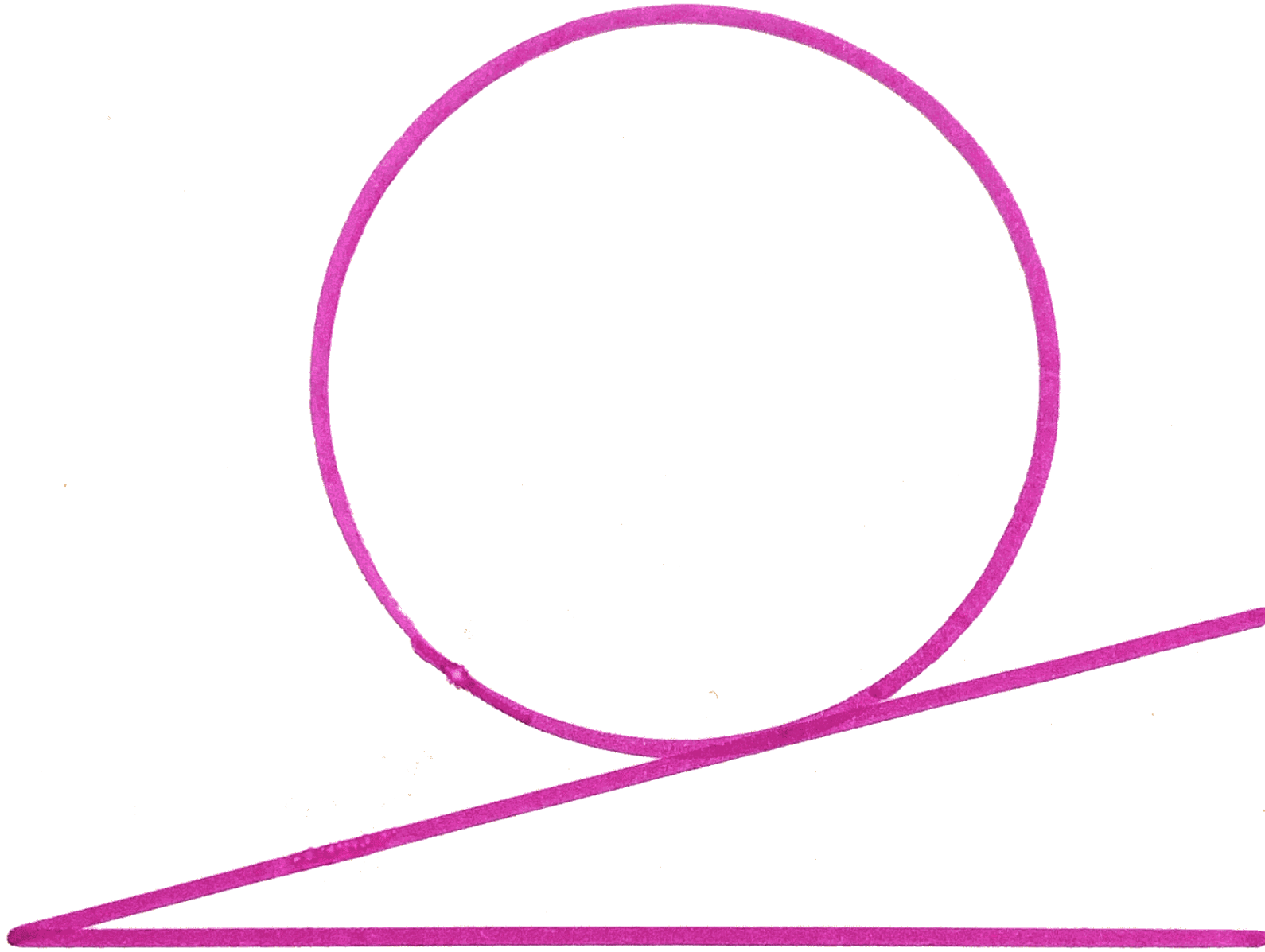
**A**daptable

**N**imble



# 'Fast' in Education

**Focused** – the ability to quickly size up (think through) problems and know how to proceed to solve them.



A round  
cardboard box  
on a paper  
incline



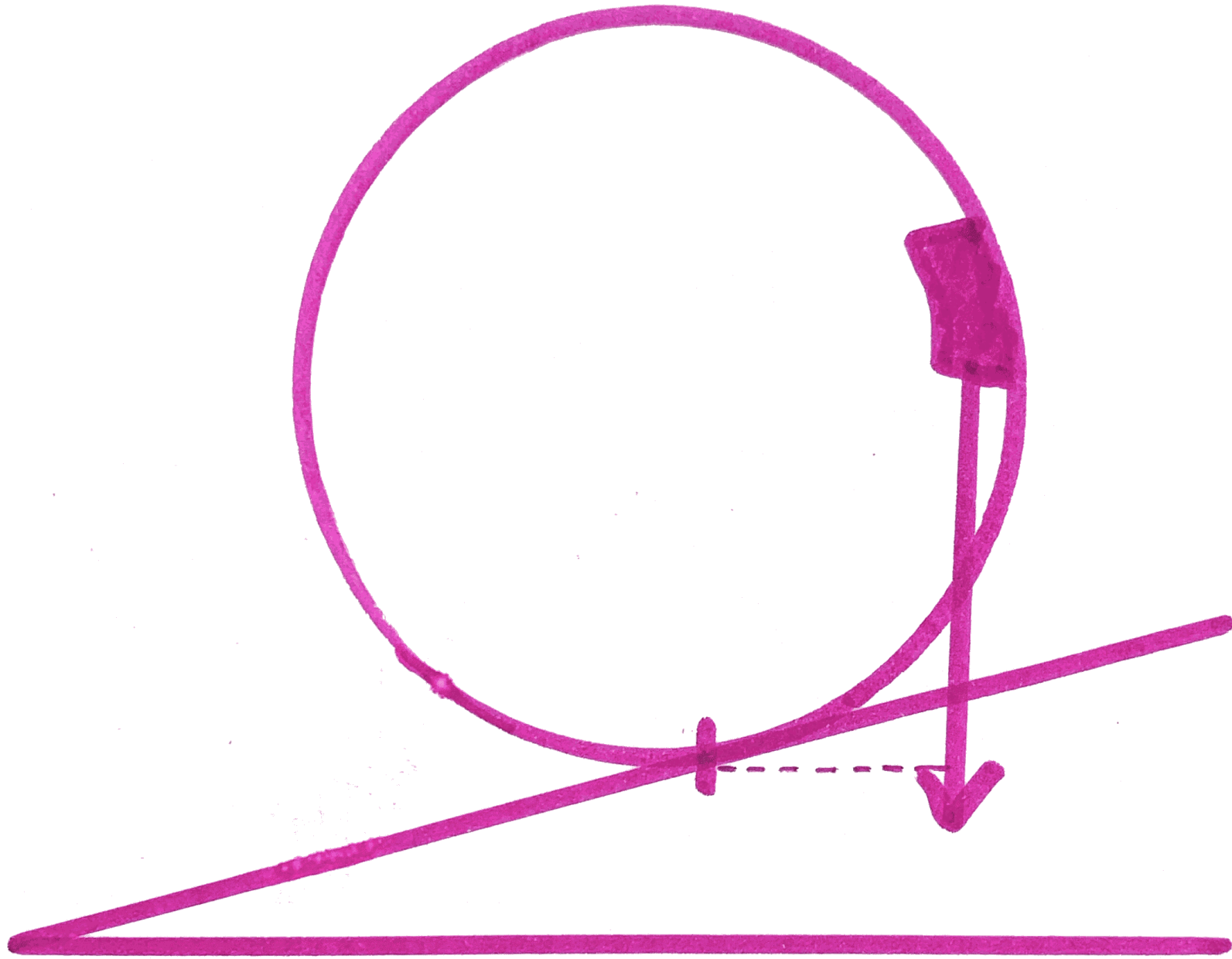
Thinking Routine: Purpose

## See-Think-Wonder (STW)

1. What do you see?
2. What do you think is going on?
3. What does it make you wonder?

### Purpose:

To emphasize the importance of observation as a basis for the thinking and interpretation step that follows the close looking.



**MOMENTS**

# 'Adaptable' in Education

Having the mindset of openness  
and the ability to explore  
**alternative** pedagogies/possible  
solutions

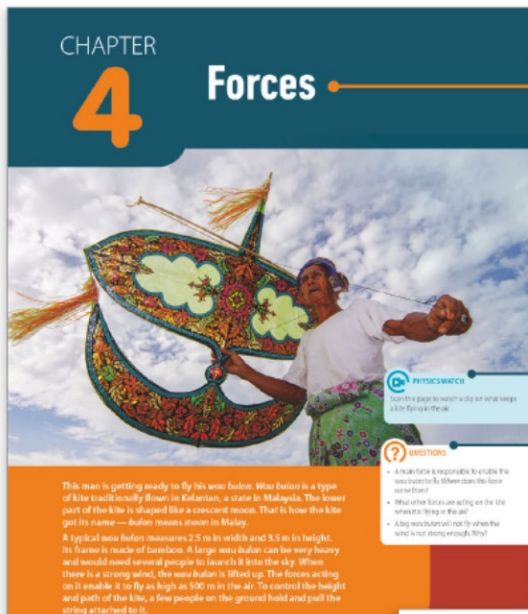
# Cambridge IGCSE™ Physics

Dr Charles Chew  
Dr Ho Boon Tiong  
Wendy Brown  
Dr Mark Venables



STUDENT'S  
BOOK





**Chapter opener page [Option]**  
introduces the topic and links concepts to real-life examples.

**PHYSICS WATCH [Option]**  
provides multimedia resources, such as videos, animations and simulations, making learning 'come alive'. The resources can be launched from a smartphone or a tablet by scanning a page using the **MCE Cambridge IGCSE App**. Please refer to [www.mceapps.com](http://www.mceapps.com) for user guide and further information.

**QUESTIONS [Option]**  
assesses your prior knowledge on the topic.

**Let's Practise**  
provides formative assessment questions at the end of sections to test your ability to recall and apply concepts learnt.

**Learning aims** help you identify areas of focus and serve as a checklist.

**QUICK CHECK**  
serves as a checkpoint to check your understanding of concepts by posing a true or false question. Rate your confidence level in your answer by drawing a pointer on the confidence meter. Relating your answer and confidence level to the correct answer helps you to detect any lack of knowledge or potential misconception. For example, "High confidence in a correct answer could suggest a misconception" and "low

**18.5** In a d.c. motor, the function of the split-ring commutator is to reverse the direction of the current in the coil every half a revolution. This occurs whenever the commutator changes contact from one brush to the other. This ensures that the coil will always turn in one direction.

The turning effect on a current-carrying coil in a d.c. motor can be increased by:

- inserting a soft iron core into the coil,
- increasing the number of turns in the coil,
- increasing the current in the coil.

**Let's Practise 18.5**

- 1 The coil in a particular d.c. motor rotates in an anticlockwise direction. State the changes that must be made in order for the coil to rotate in a clockwise direction.
- 2 Explain the purpose of the rheostat in the d.c. motor.
- 3 State the energy transfer that takes place in the d.c. motor.
- 4 **Mind Map** Construct your own mind map for the concepts that you have learnt in this section.

**18.6 The Transformer**

In this section, you will learn the following:

- Describe the construction of a simple transformer with a soft iron core, as used for voltage transformations.
- Explain the principle of operation of a simple iron-cored transformer.
- Use the terms primary, secondary, step-up and step-down.
- Recall and use the equation  $\frac{V_p}{V_s} = \frac{N_p}{N_s}$  where p and s refer to primary and secondary.
- Describe the use of transformers in high-voltage transmission of electricity.
- State the advantages of high-voltage transmission.
- Recall and use the equations for 100% efficiency in a transformer,  $Q_p = EI_s$ .
- Recall and use the equations  $P_p = EI_s$  to explain why power losses in cables are smaller when the voltage is greater.

In 1820, Faraday discovered that when two coils of wire were wrapped around a soft iron ring (Figure 18.40), the magnetic field produced by one coil could induce a current in the other. A compass was placed above coil B to detect any changes in the magnetic field there. If the needle of the compass was deflected, it meant there was an induced field present. This indicated that there was a current flowing in the wire PQ.

**Figure 18.40** Faraday's experiment

**EM** Electromagnetic Effects 321



**Figure 18.39** Radial d.c. motor. All the poles (shown above) have hundreds of turns of wire with a soft iron core at the centre.

**ENRICHMENT THINK**  
**ENRICHMENT THINK**  
poses challenging questions that encourage you to apply the concepts learnt to various contexts and prompts higher-level critical thinking.

**LINK**  
**TWB LINK**  
leads you to the revision exercises in the Theory Workbook.

**LINK**  
**LINK**  
helps you make connections between sections or chapters.



# Measurement of Physical Quantities



## PHYSICS WATCH

Scan this page to watch a clip about physical measurements of a baby.

## QUESTIONS

- What do you understand by the term *average*?
- Other than head circumference, what are two other important measurements taken to monitor a baby's growth pattern?
- What are some other physical quantities that are commonly used as measurements in daily life?

From the day you were born, you were being measured. You wouldn't remember, but your parents probably took you to the clinic several times to have you measured. The measurements taken were then plotted to monitor your growth pattern.

Head circumference is an important measurement to monitor during the first two years of a baby's life. The average head circumference of a newborn is about 33 cm. By monitoring the baby's head circumference, we can detect if the baby's head and the brain inside it are growing normally.



# Physics Watch



**PHYSICS WATCH\***

Scan this page to read an article on how unit errors can cause a disaster.

**PHYSICS WATCH**



Scan this page to explore a simulation on distance-time graph.



**PHYSICS WATCH**

Scan this page to watch a clip of the feather and hammer experiment.



## Chapter Journal

- 1** Rate your confidence level for your understanding of this chapter.  
Draw a pointer on the confidence meter to show your confidence level.



→ If you are *not confident* or only *somewhat confident*, go back to the Student's Book and revise this chapter.

- 2** What questions do you still have about the concepts taught in this chapter? Write them, if any, in the space provided.

1.1 Physical Quantities	
1.2 Scalars and Vectors	

→ If you have written any questions, show them to someone such as your teacher who can help you.

# Teacher's Guide – Lesson Plan

<p>Stop motion videos</p>	<p>Consolidation task —group work</p> <p>(suitable for blended lessons)</p>	<p>This strategy provides an opportunity for students to be creative in explaining a topic by creating a video. It helps students consolidate their knowledge on a process such as transfer of thermal energy.</p> <p>This strategy allows students to explore the process in 3D and helps them gain a better picture of the process.</p> <p>Conducting a peer-assessment at the end of the task ensures that the videos are checked for content and students are encouraged to be reflective on the scientific explanations as well as the quality of the videos.</p>	<ol style="list-style-type: none"> <li>1) Outline the objectives of the video. Highlight the key words and concepts you want to portray in the video.</li> <li>2) Divide students into groups to create their videos.</li> <li>3) Ask each group to showcase</li> <li>4) Encourage each group to comment on the another group's video.</li> </ol> <p>Students can work online together to produce their own video.</p>	<p>Ensure each group has access to the equipment to make a video.</p> <p>Prepare modeling materials such as string, beads, modelling clay, coloured paper and coloured pencils that students may need in their videos.</p>
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# www.mceduhub.com

The screenshot shows the homepage of Marshall Cavendish Education's EduHub. At the top, there is a navigation bar with the Marshall Cavendish Education logo and a list of links including iCloud, Gmail, Yahoo!, BMC, NIE BB, NIE, MOE, NUS, NUS WebMail, GeBIZ, YouTube, Wikipedia, Apple, The Different ...re Classified, Frayer Model ...acher Toolkit, James Comme...ept Austin, and Home - Prece...nternational. A language dropdown menu is set to 'English'. The main banner features a photograph of diverse children working together at a table. A green speech bubble on the right contains the text: 'Welcome to a world where learning is truly enjoyable'. Below the banner, there is a login section with the text 'Sign in to discover the joy of learning'. It includes a 'Username' field with a dropdown arrow, a 'demo' field, a 'Password' field with a dropdown arrow, and a 'Forgot Password?' link. A 'Login' button is positioned at the bottom right of the login form. To the left of the login form, there is a button that says 'I have an Access Code!' and a link that says 'Get access code to create an account.' An 'OR' separator is placed between the login form and the access code section.





# 'Nimble' in Education

**New** 21<sup>st</sup> century mindsets  
and competencies

# 21<sup>st</sup> Century Competencies & Student Outcomes

Student Outcomes



↑  
Competencies for a globalised world



# 21<sup>st</sup> Century Core Values

**Respect:** Our students demonstrate respect when they believe in their own self-worth and the intrinsic worth of people.

**Responsibility:** Our students are responsible when they recognise they have a duty to themselves, their families, community, nation and the world, and fulfil their responsibilities with love and commitment.

**Resilience:** Our students are resilient when they demonstrate emotional strength and persevere in the face of challenges. They show courage, optimism, adaptability and resourcefulness.

# 21<sup>st</sup> Century Core Values

**Integrity:** Our students demonstrate integrity when they uphold ethical principles and have the moral courage to stand up for what is right.

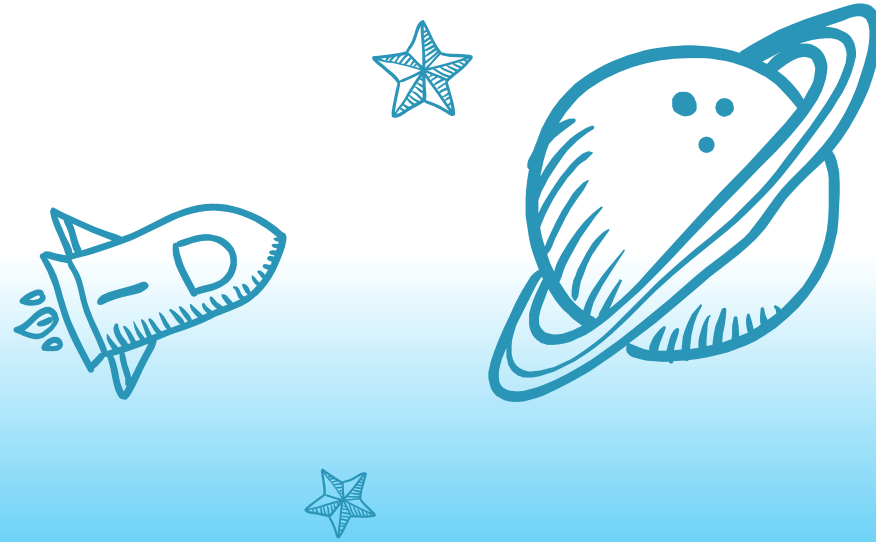
**Care:** Our students are caring when they act with kindness and compassion and contribute to the betterment of the community and the world.

**Harmony:** Our students uphold harmony when they promote social cohesion and appreciate the unity and diversity of a multicultural society.

# Cambridge Learner Attributes

**Confident**  
**Responsible**  
**Reflective**  
**Innovative**  
**Engaged**





**V. U. C. A.**

**Volatile, Uncertain, Complex & Ambiguous**

# VUCA of the Future

## Volatility

- Nature and dynamic of change
- Nature and speed of change forces
- Change catalysts

## Uncertainty

- Lack of predictability
- Prospects of surprise
- Sense of awareness and understanding of issues and events

# VUCA of the Future

## Complexity

- Multiplicity of forces
- Confounding of issues
- Chaos and confusion

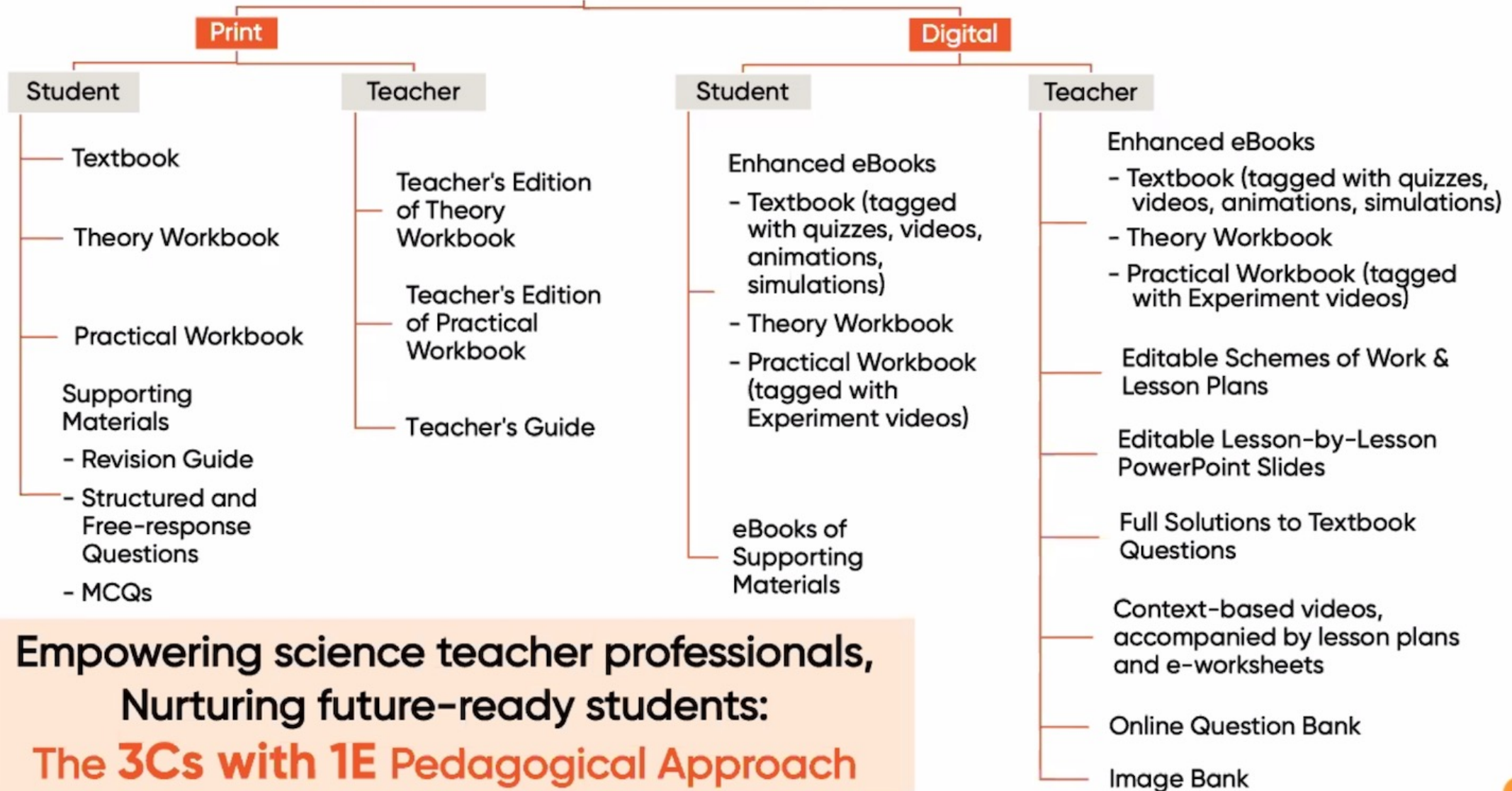
## Ambiguity

- Haziness of reality
- Potential for misreads
- Mixed meaning of conditions
- Cause-and-Effect confusion

# Failures/mistakes

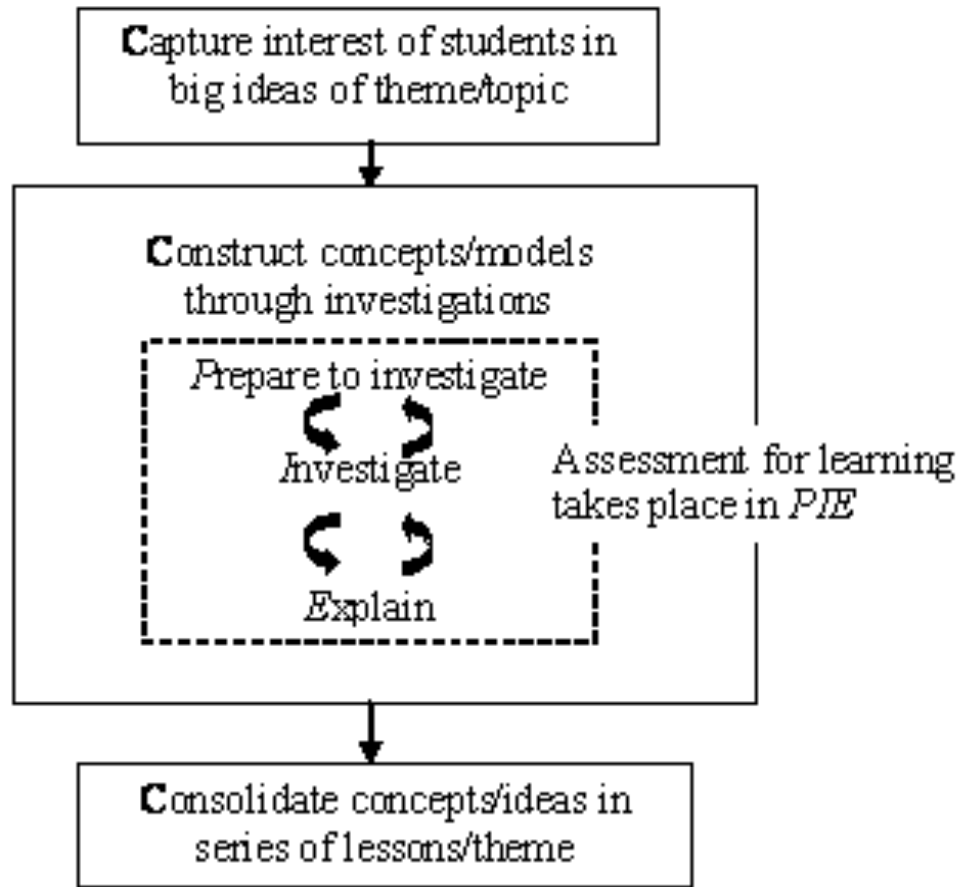
**Failure in itself is not a catastrophe; but failure to learn from failures definitely is!**

# Educational Resources



**Empowering science teacher professionals,  
Nurturing future-ready students:  
The 3Cs with 1E Pedagogical Approach**





**3Cs Inquiry Framework:**  
**Capture Interest,**  
**Construct Understanding**  
**& Consolidate Learning**

Refined pedagogical framework after phase two study.

**Enrichment: Providing differentiated learning for students of high readiness**



# SIX TRIBES...

Blockers, Blinkers, Bonkers, Blabbers, Builders & Blazers

# Six Tribes

**Blockers**

**Blinkers**

**Bonkers**

**Blabbers**

**Builders**

**Blazers**

# Forces that shape Culture

**Expectation**

**Opportunities**

**Time**

**Modeling**

**Language**

**Environment**

**Interactions**

**Routines**



**“Children grow into the intellectual life of those around them”  
(Vygotsky, 1978)**

# CULTURE Building

**R** – Routines

**O** - Opportunities

**L** - Language

**E** - Expectations

**M** – Modeling

**I** - Interactions

**T** - Time

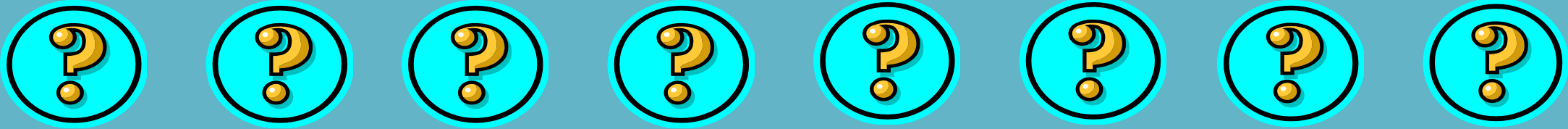
**E** - Environment



**Fast – focused**  
**Adaptable - alternatives**  
**Nimble - new**



# Questions & Answers



Contact Dr Ho at...

Email: [hoboontiong@gmail.com](mailto:hoboontiong@gmail.com)

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**Thank You**



**Email: [hoboontiong@gmail.com](mailto:hoboontiong@gmail.com)**

**Website: [www.classpointconsulting.com](http://www.classpointconsulting.com)**

# End of Session

