



Mathematical Applications Day 4

Overview of the Seminar

Session 1

Introduction
Review our CPD Journey so far
Module 3: Mathematics and Life Skills
Transdisciplinary Links and Prior Knowledge

Tea/Coffee Break

Session 2

Effective use of Questioning
Unit 1: Personal Finance
Applying MCS in Unit 2: Healthy Life Choices

Lunch

Session 3

Planning a Unit of Learning
Seminar Reflection and Evaluation

Key Messages

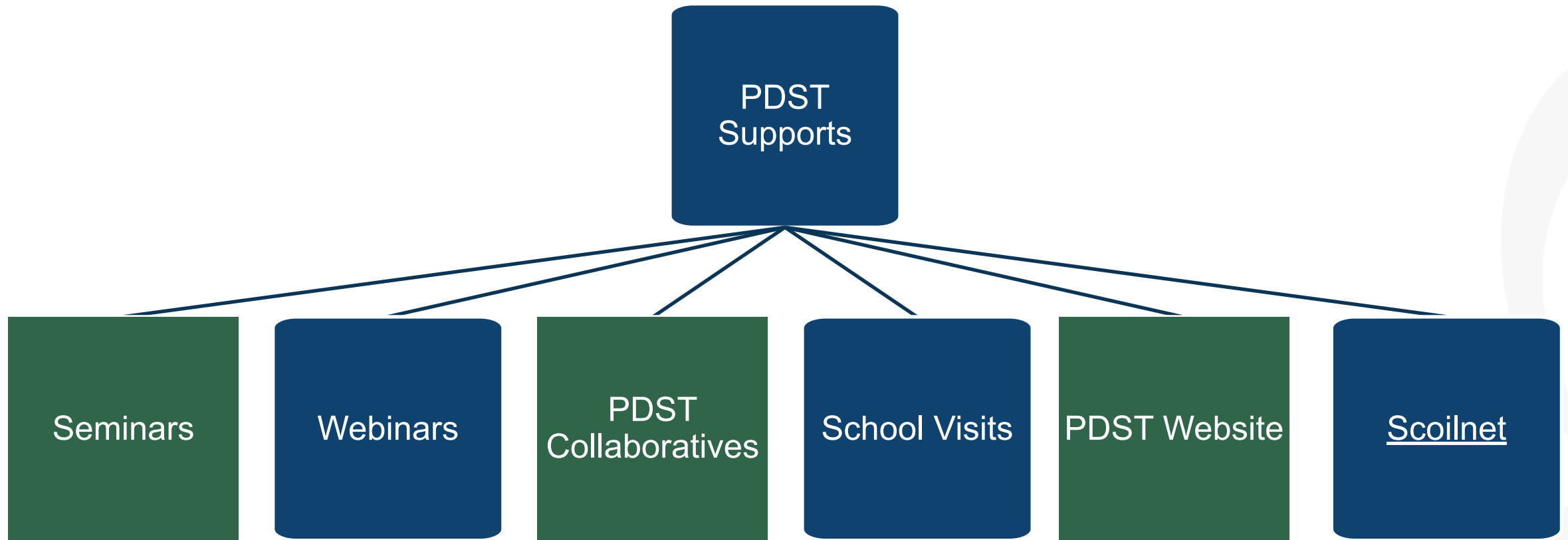
Courses in LCA are inherently transdisciplinary, authentic and relevant to the current and future needs of all students

The Mathematical Applications module descriptor supports the use of a wide range of inclusive, differentiated, experiential teaching and learning approaches

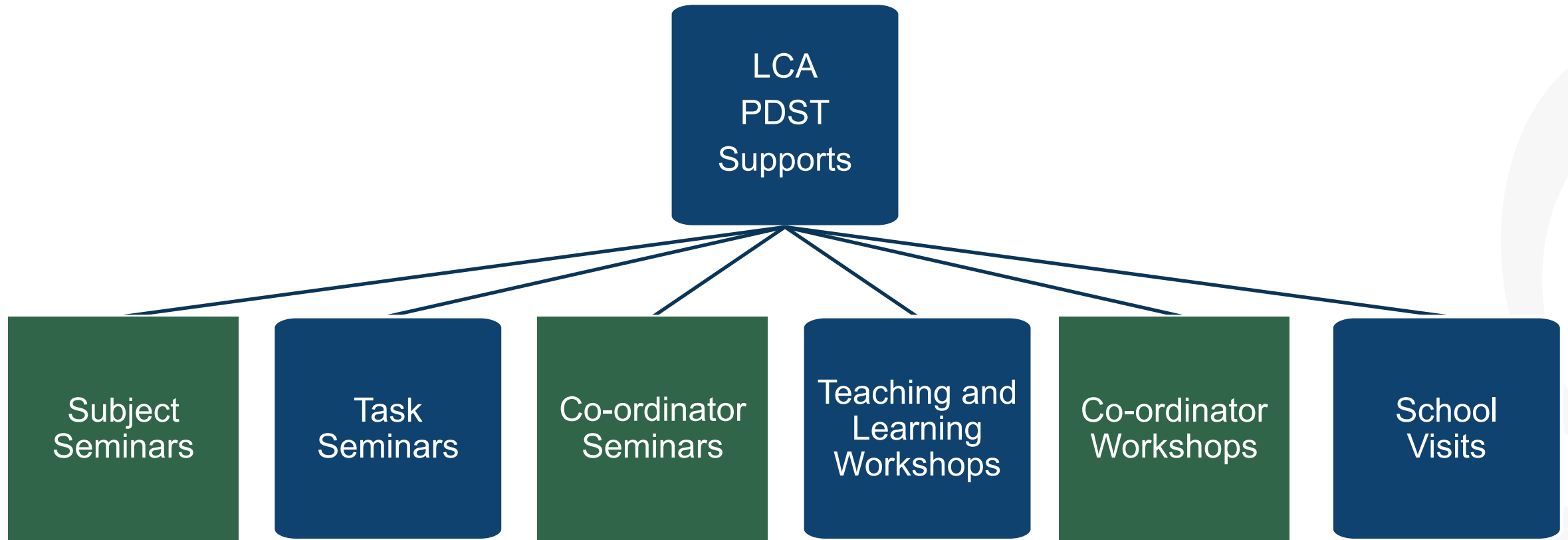
Student-centred and real life activities should be used to develop the Mathematical Concepts and Skills while engaging with the learning outcomes

LCA Mathematical Applications, ICT and English and Communications modules are strategically designed to support one another providing opportunities for rich and integrated learning experiences

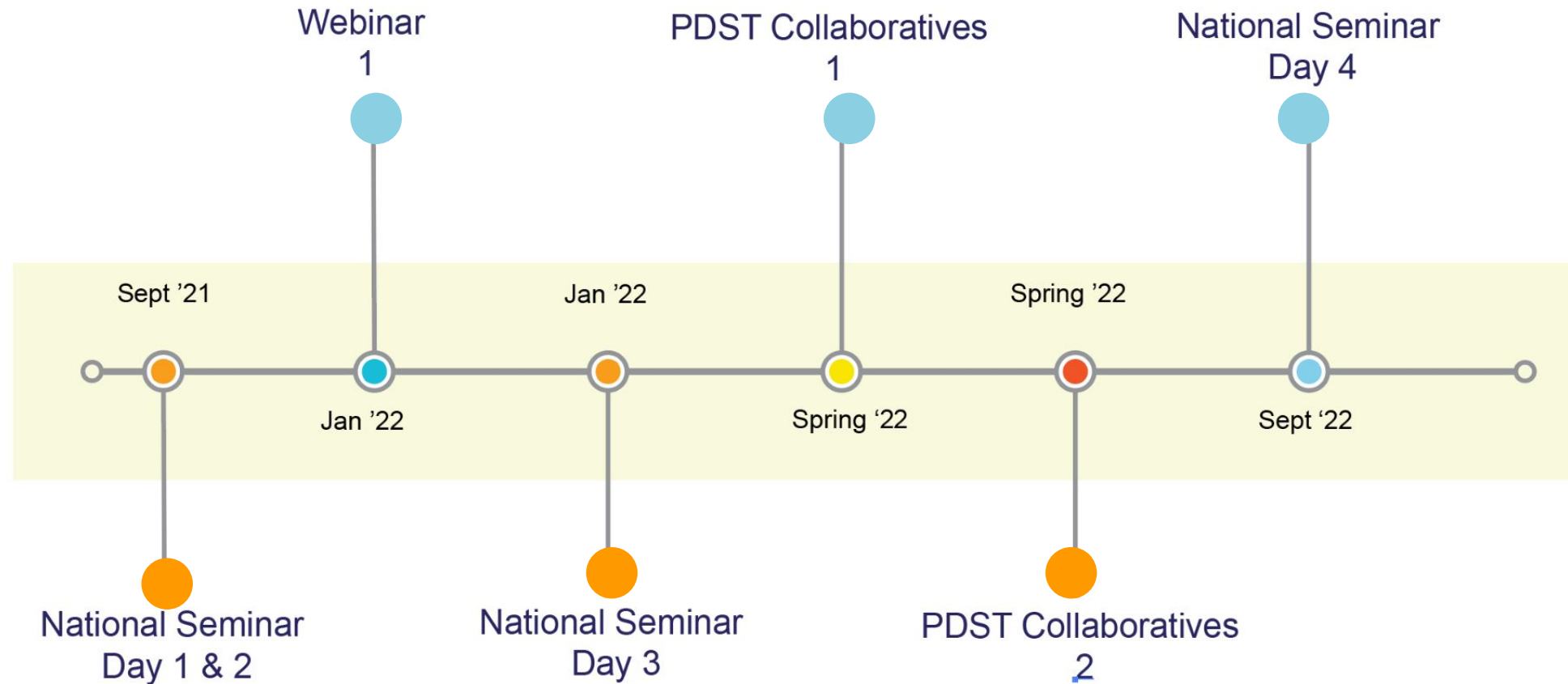
Supports provided by PDST



LCA Supports provided by PDST

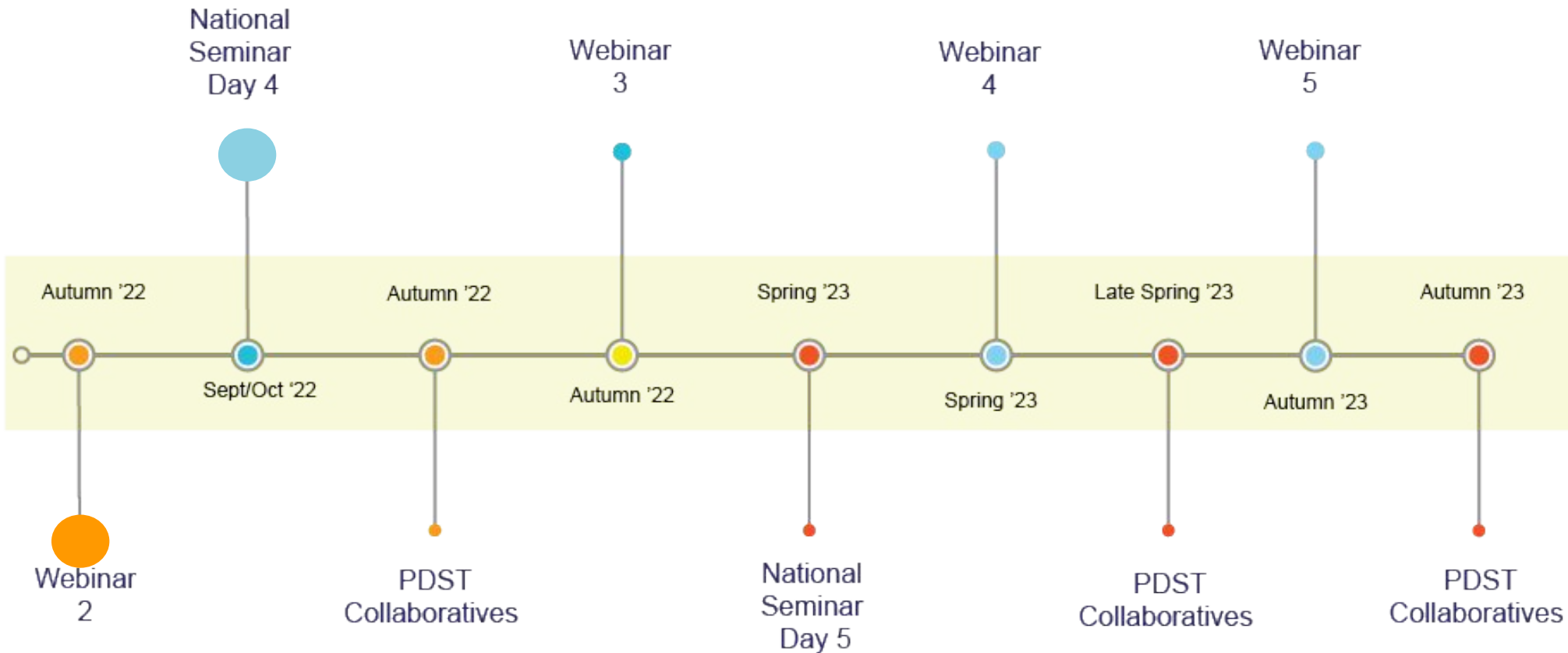


CPD for the revised module descriptors



Leaving Certificate Applied Subject Specification CPD

CPD for the revised module descriptors



Leaving Certificate Applied Subject Specification CPD

Session 1

By the end of this session participants will have:

Reflected on their experiences so far with the new module descriptor

Explored Module 3 of the Mathematical Applications module descriptor

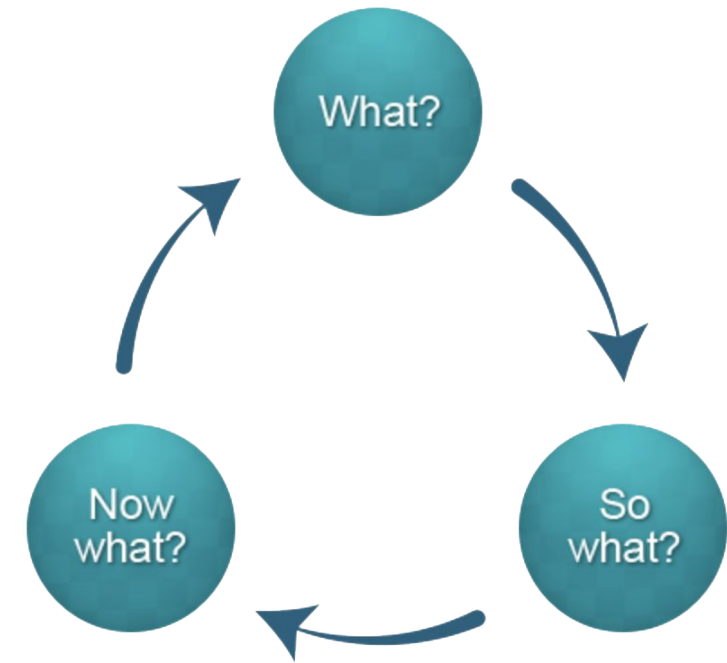
Investigated transdisciplinary links and prior knowledge.

Reflecting on the journey so far

What element(s) of the specification have you enjoyed teaching or engaging with most of all?

What element(s) of the specification did your students enjoy engaging with most of all?

What challenges have you experienced with the new specification?



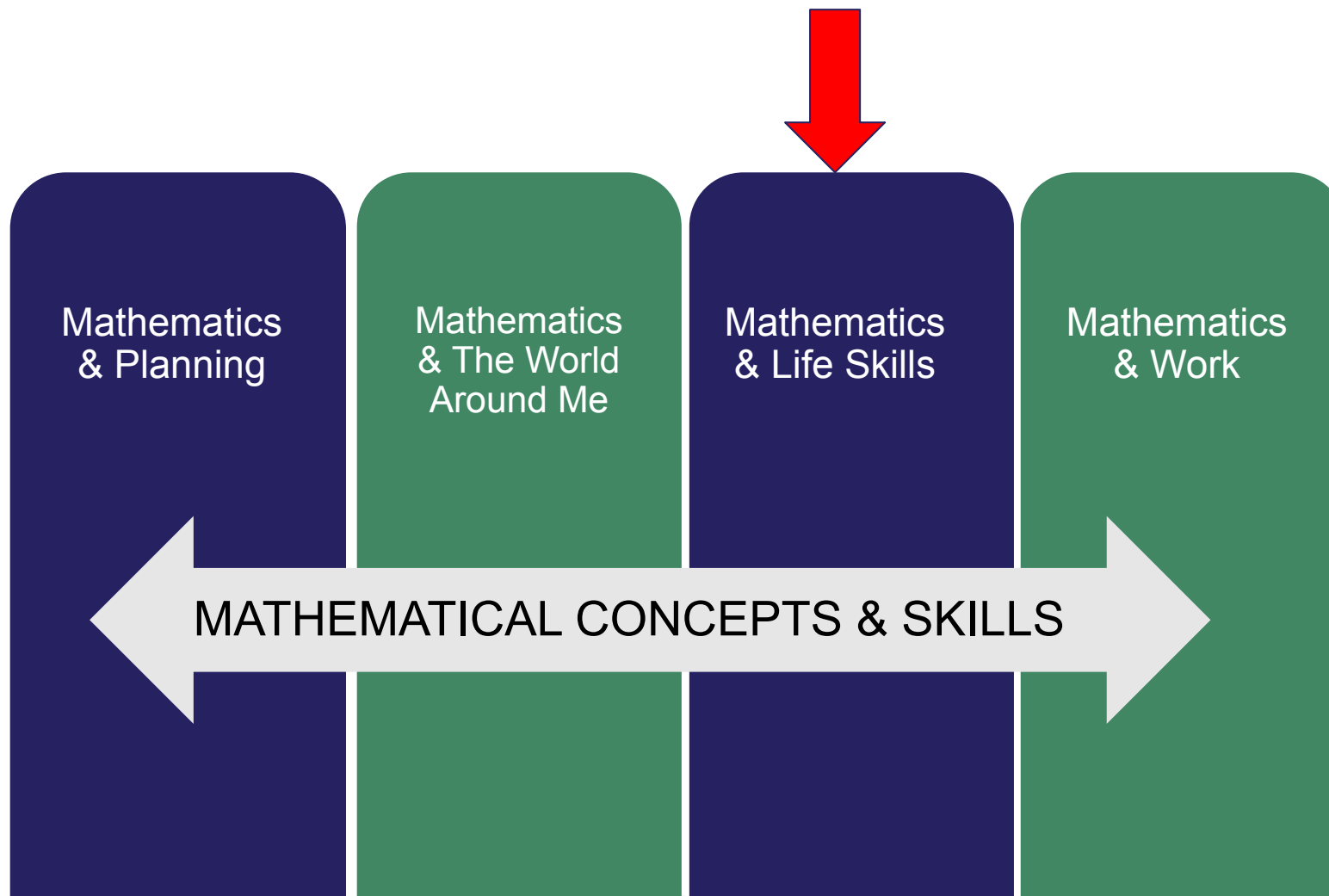
Rolfe et al. 2001

Question Board

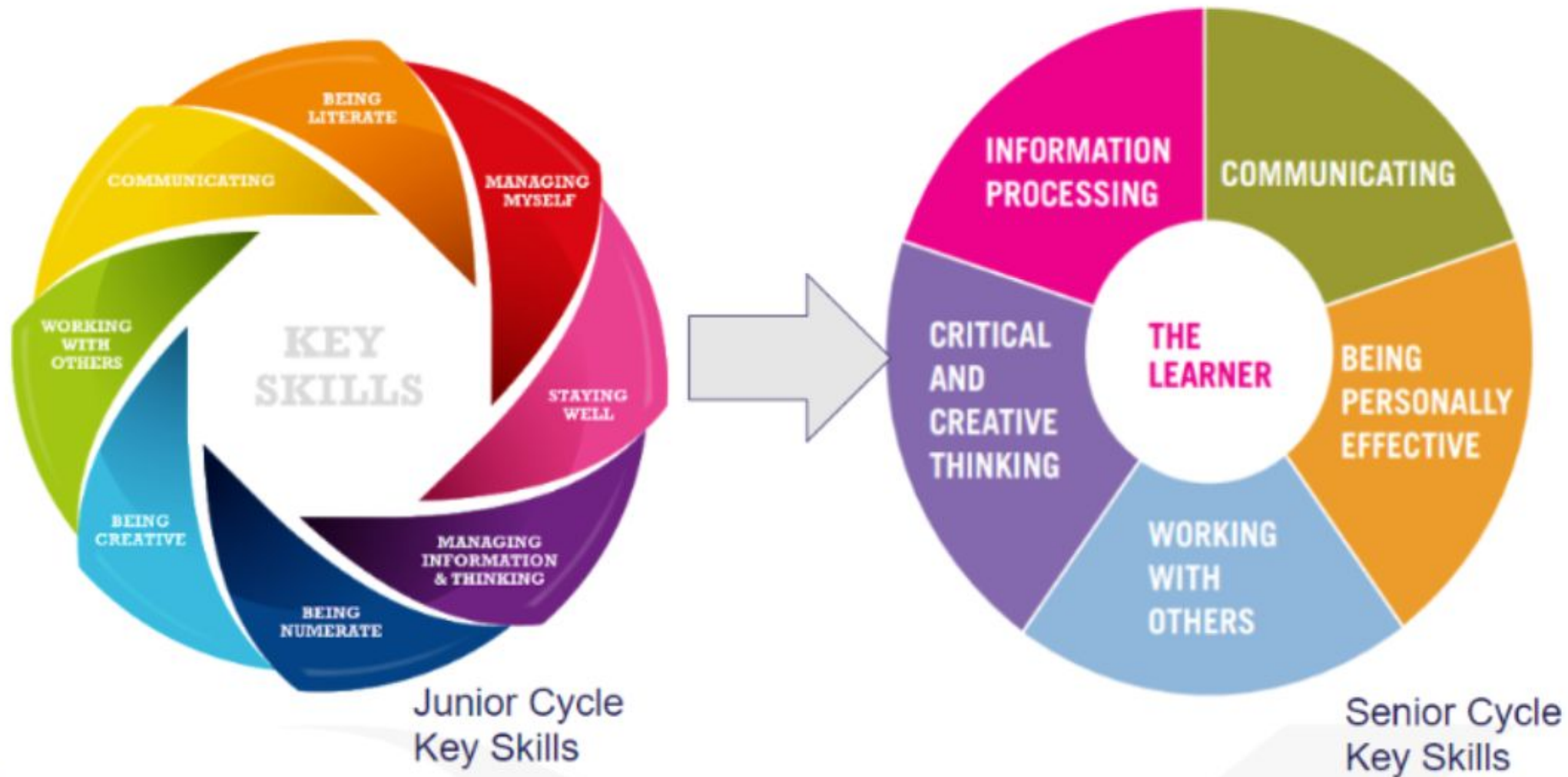
Menti for participant questions



Module Progression



Building upon Junior Cycle Key Skills



A Student-Centred Approach to Mathematics

The Experience of Senior Cycle

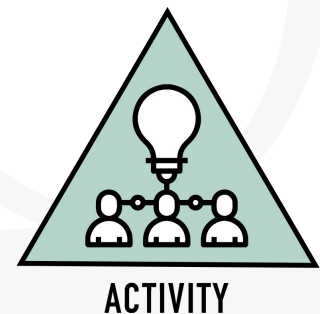
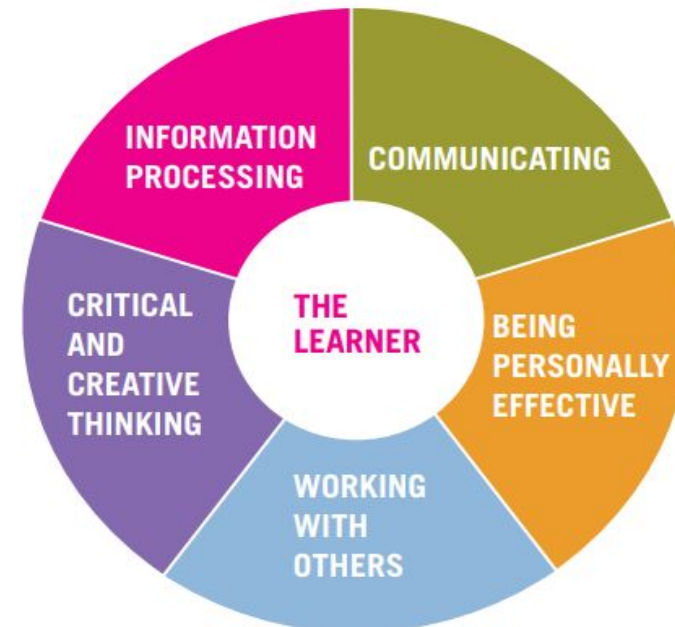
“enable students to be resourceful, to be confident, to participate actively in society...”

(Module Descriptor pg. 5)

What life skills might your students need in terms of Mathematical applications?

How do students apply Maths skills in their own lives?

Short-Term	Medium-Term	Long-Term



UNIT 1: PERSONAL FINANCE

Learning outcomes

The learning in this unit is underpinned by the mathematics specified in MCS1-5

The student will be able to:

1. Prepare a personal budget.
2. Investigate the financial impact of a large financial commitment.
3. Analyse and interpret data which impacts on personal finance presented in a variety of ways.
4. Communicate findings in words/tables/charts or graphs.

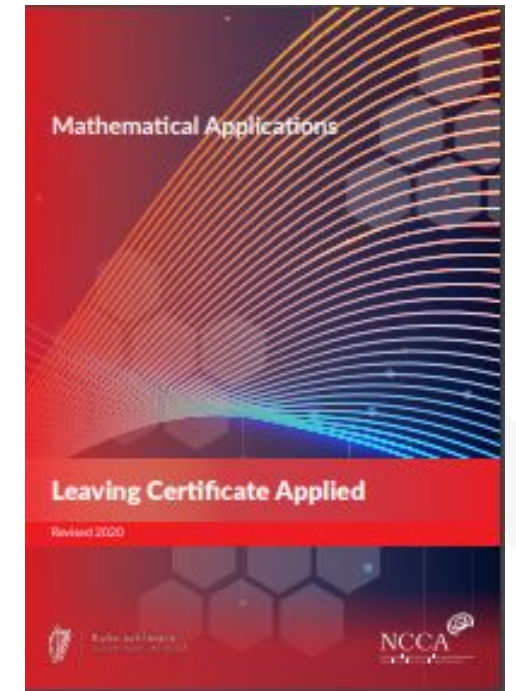
UNIT 2: HEALTHY LIFE CHOICES

Learning outcomes

The learning in this unit is underpinned by the mathematics specified in MCS1-5

The student will be able to:

1. Research and plan a healthy lifestyle choice.
2. Interpret relevant information communicated in tables/charts or graphs.
3. Compare and contrast different options and justify decisions made with mathematics.
4. Use simple formula related to health and fitness.
5. Communicate mathematics in words/calculations /graphs or charts.



**Teacher
Guidelines
Page 32**

A Student-Centred Approach to Mathematics

Teaching and learning approaches that motivate and interest students, that enable them to progress, that deepen and apply their learning, and that develop their capacity to reflect on their Learning (Module Descriptor Page 6)

Relevant



Active learning methodologies

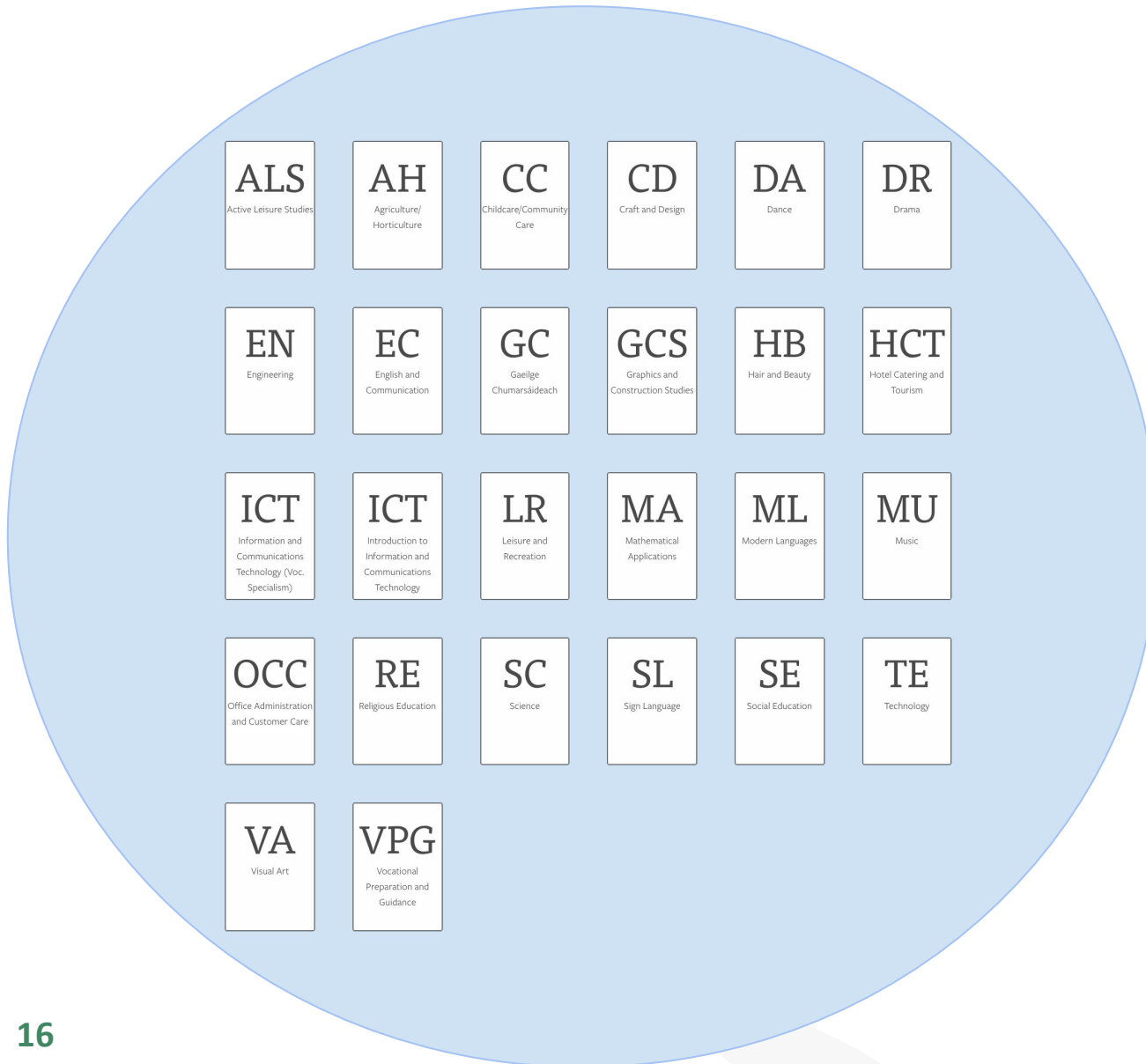
Authentic

Varied assessment strategies



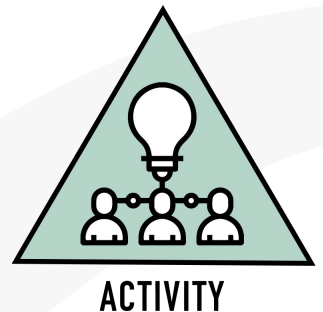
Formative Assessment

Transdisciplinary Links: Mathematics and Life Skills



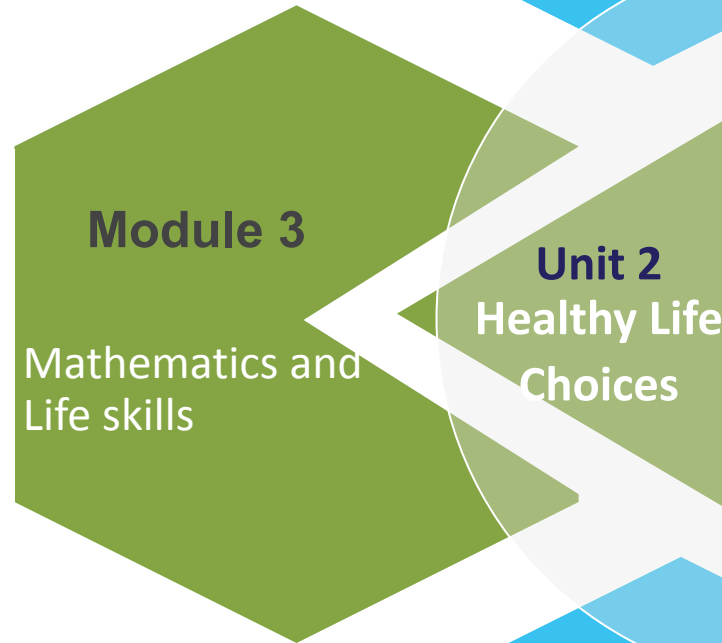
- Which of these subjects are your students doing at the moment?
- Which subjects provide real life opportunities for students to apply Mathematical Concepts and Skills?

The topics covered may provide an opportunity to link with the tasks in Leisure and Recreation, Social Education or Vocational Education.

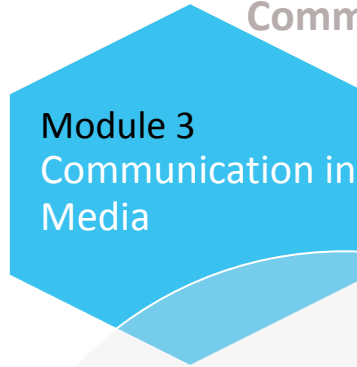


Transdisciplinary Links: Healthy Life Choices

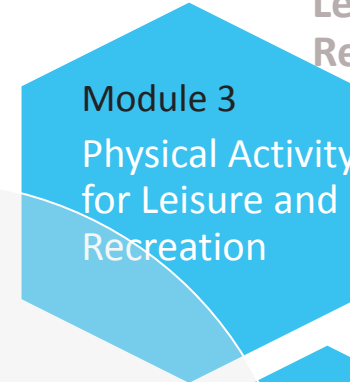
**MATHEMATICAL
APPLICATIONS**



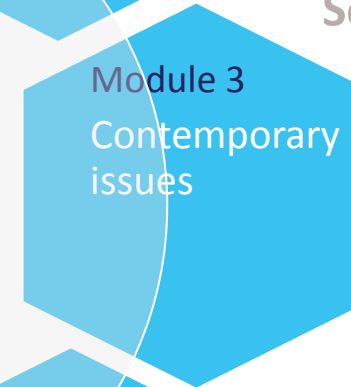
English and
Communications



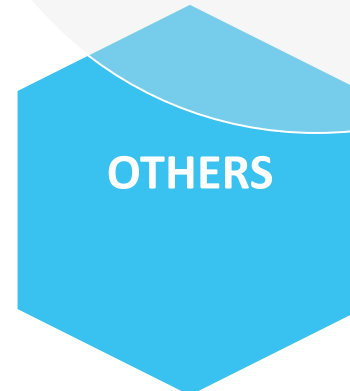
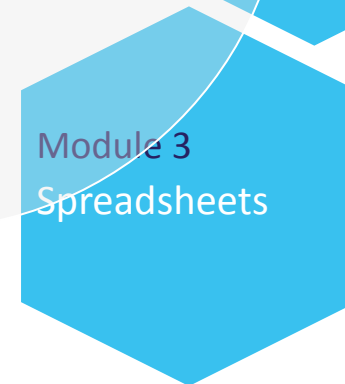
Leisure and
Recreation



Social Education

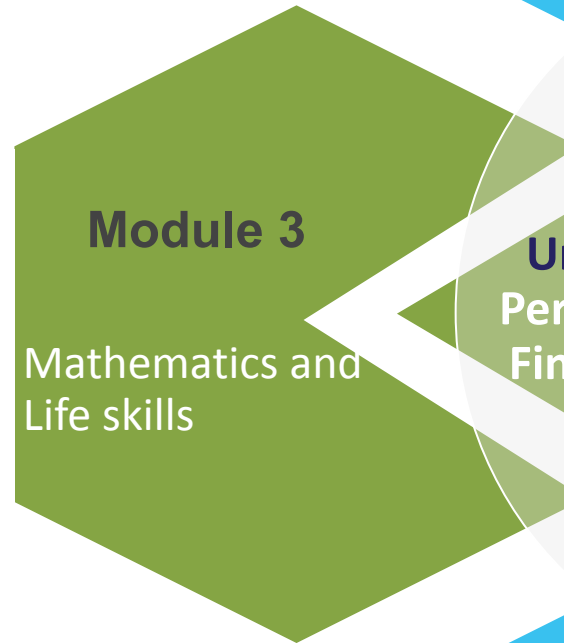


ICT



Transdisciplinary Links: Personal Finance

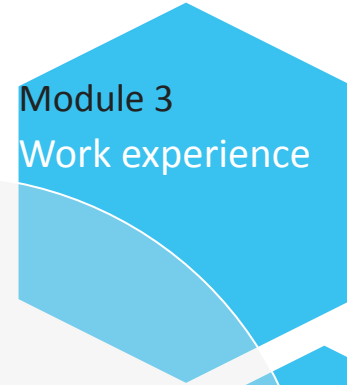
MATHEMATICAL APPLICATIONS



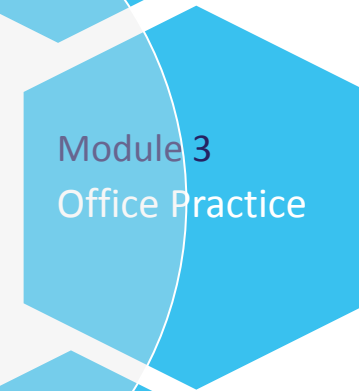
Unit 1 Personal Finance



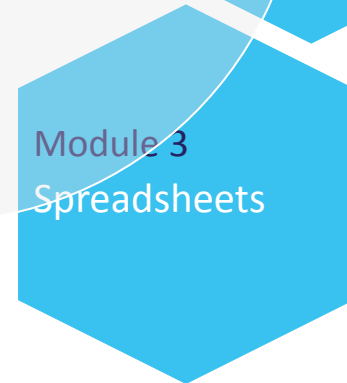
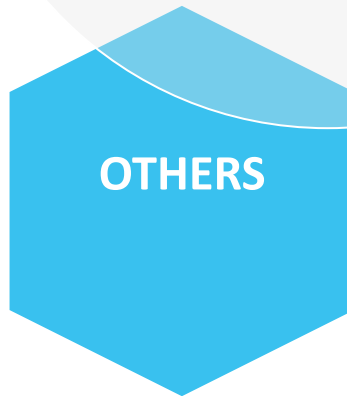
English and Communications



Vocational and Preparation Guidance



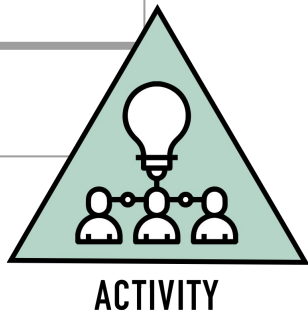
Office Administration and Customer Care



ICT

Prior Knowledge and Mathematical Concepts & Skills MCS

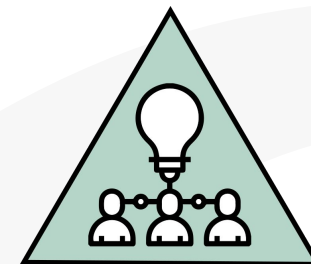
	Unit 1: Personal Finance	Unit 2: Healthy Life Choices
Primary School		
JC Maths		
Module 1 & 2 Maths Applications		
Other school work		
Other Life Skills		
MCS (1-5)		



ACTIVITY

Reflection: Connecting with Prior Knowledge

How could we support students to be more personally effective in making connections between their learning?



ACTIVITY

Session 1

By the end of this session participants will have:

Reflected on their experiences so far with the new module descriptor

Explored Module 3 of the Mathematical Applications module descriptor

Investigated transdisciplinary links and prior knowledge.



An Roinn Oideachais
Department of Education

Day 4

End of session 1



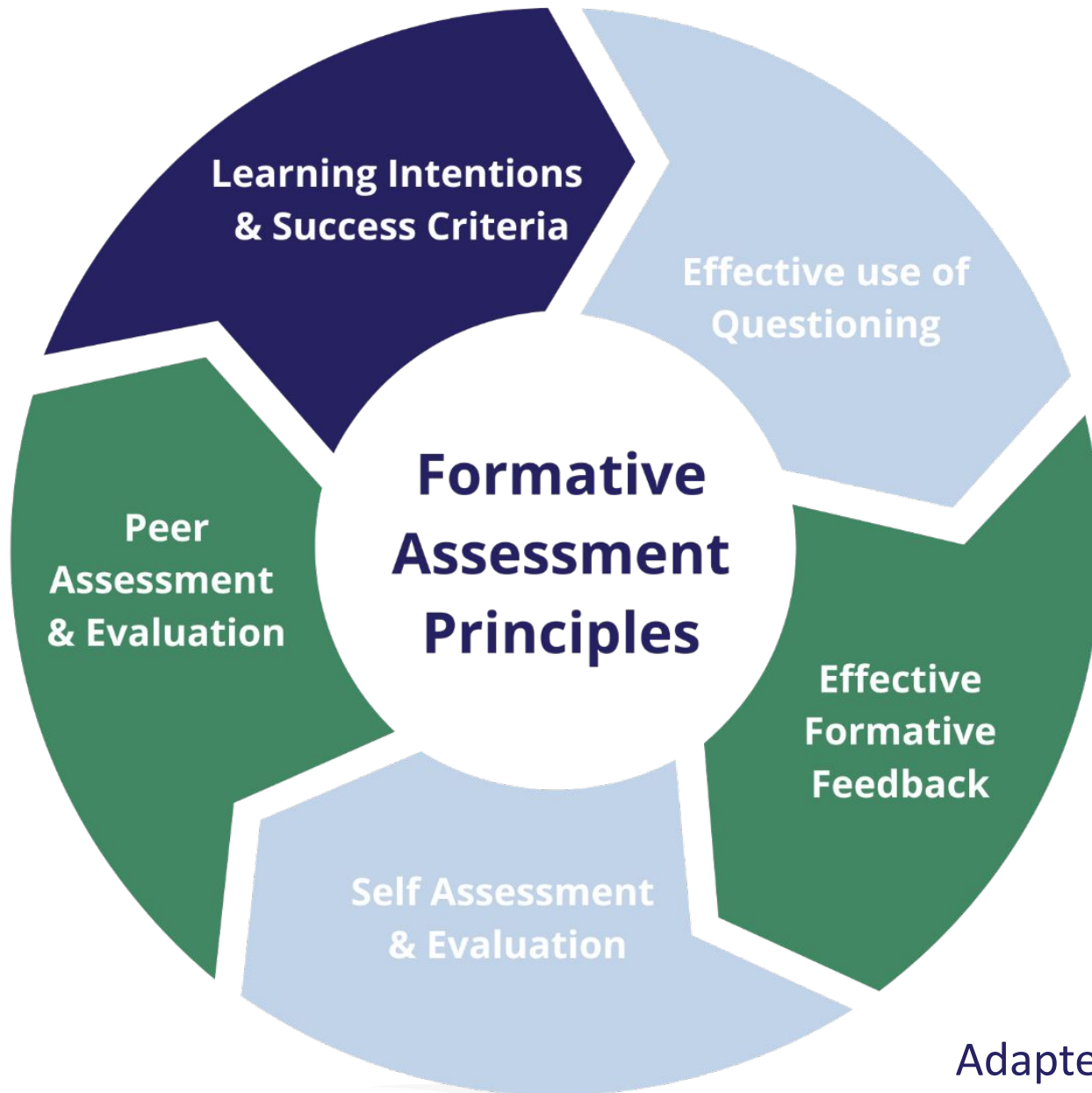
Day 4 Session 2

Session 2

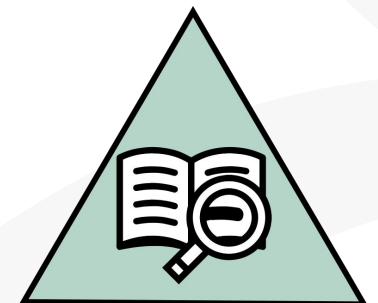
By the end of this session participants will have:

Considered the use of effective questioning in the Mathematical Applications classroom

Explored teaching and learning strategies for Personal Finance and Healthy Life Choices incorporating MCS to support the range of abilities using the student profiles identified.



Adapted from Wiliam & Leahy,
(2015) and Wylie et al (2008)



RESEARCH

What is Effective Questioning?

“It is the framing, delivering, timing, soliciting and responding to questions in order to provide information about student knowledge, understanding and skills. It informs teacher's planning and teaching strategies to move students from where they are to where they need to go.”

NCCA Focus on Learning (2015, pg.1)

“Quality questioning is not possible without quality questions;”

Walsh and Sattes (2011, pg.4)



What are Effective Questions?

Effective questions are

- planned and related to the lesson learning intentions
- mainly open
- accompanied by wait time
- one where the teacher allows collaboration before answering
- carefully graded in difficulty
- where the teacher encourages learners to explain and justify answers
- where all students participate e.g. using mini white boards, or questioning each other
- where both correct and incorrect answers are followed up
- asked by students too



Activity 1

How are we doing?

Reflect on how you use questions in your classroom using the table below.

Traffic light your responses to the questions below using this code:



I think about the questions I am going to ask in class and plan one or two really good questions per lesson.

I ask questions that challenge and engage the students.

Before teaching a new topic I use questions to assess the students' prior knowledge and understanding.

I ask questions that force students to use existing knowledge or understanding to create new understanding.

I ask questions to encourage creative and critical thinking.

I try to avoid asking too many closed questions.

I allow time for thinking after a question is asked in class.

Take a few minutes to share your reflections with a colleague.



Authentic Problem: Personal Finance

Sean's Case Study-

Prepare a personal budget

What do your students need to consider in identifying budgeting goals ?

What support might students need to address this question?

Spending Diary

Pennywise Diary MABs

Authentic Problem: Personal Finance

LO 1. Prepare a personal budget.

LO 3. Analyse and interpret data which impacts on personal finance presented in a variety of ways.

- MCS.1. reason mathematically about problems so that they can:

a. make sense

What happens if the cost of the debts goes up?

b. apply to manage

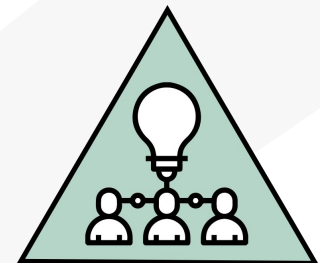
What will happen if your hours of work change?

c. interpret and communicate their findings

What will happen if you get sick and have to take two weeks off?

- MCS.2. reason mathematically about problems so that they can:

a. perform calculations on positive and negative numbers involving addition, subtraction, multiplication, division, square roots (positive numbers only), and positive whole number



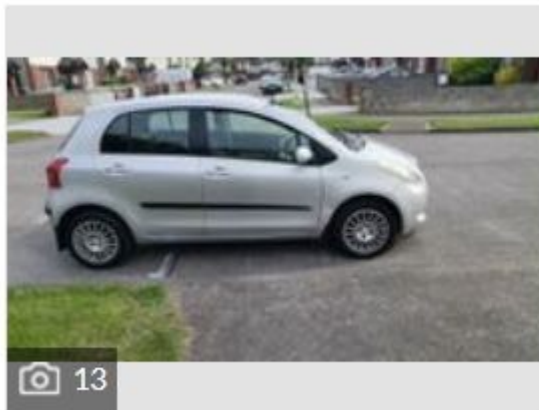
ACTIVITY

Authentic Problem: Personal Finance



Sean has finished college, got a job and would like to buy a car.

What factors will Sean need to consider?



Toyota Yaris 1.0 Terra Hatchback Petrol...

Extremely low mileage, great first car. Kept in good...

2006 • 154,497km / 96,000m • 1.0 Petrol

Private
Dublin

Authentic Problem: Personal Finance

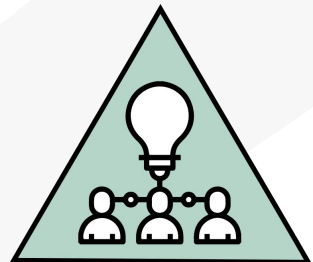
Comparing 3 year borrowing options

What are some of the different borrowing options?



What are the pros and cons of the borrowing options?

Individual teacher reflection



ACTIVITY

Engaging in MCS through Contextual Experiences

- MCS.4. explore certain types of relationships and expressions so that they can:
 - a. evaluate expressions given the value of variables
 - b. represent linear relationships in tables, graphs, and generalised expressions (expressed in words)
 - c. select and use suitable strategies (including graphic, numeric, trial and improvement, and working backwards) for finding solutions to problems involving linear relationships.

(Module Descriptor pg. 21)



MCS.4 and Unit 2: Healthy Life Choices

a. evaluate expressions given the value of variables

Formula	Example	Calculation
Estimated maximum heart rate = $220 - \text{age}$	Age = 16	Estimated max. HR =
Karvonen formula: Target HR = $[(\text{max HR} - \text{resting HR}) \times \% \text{Intensity}] + \text{resting HR}$	Max HR = 204 Resting HR = 64 %Intensity = 70%	Target HR =
RM-1 muscle strength formula: $\text{RM-1} = (0.033 \times \text{RTF} \times \text{load}) + \text{load}$ RTF=Repetitions To Fatigue	Load = RTF =	RM-1 =

MCS.4 and Module 3: Mathematics and Life Skills

- b. represent linear relationships in tables, graphs, and generalised expressions (expressed in words)
- c. select and use suitable strategies (including graphic, numeric, trial and improvement, and working backwards) for finding solutions to problems involving linear relationships.

Ava used her fitbit to track her heart rate while she used the treadmill in the school gym for leisure and rec. Class.

Before she started on the treadmill she noted her heart rate while she was sitting : 70 b.p.m.

She walked on the treadmill at 2km/hr for 2 mins and then noted her heart rate was 90 b.p.m.

Then she walked on the treadmill at 4km/hr for 2 mins and then noted her heart rate was 110 b.p.m.

Then she walked on the treadmill at 6km/hr for 2 mins and then noted her heart rate was 130 b.p.m.

On the 1st of September Brian deposited €140 that he saved over the Summer into a savings box. He plans to deposit €60 a month for the rest of the school year to save for a Summer holiday next June.

Estimated maximum heart rate = $220 - \text{age}$

Debbie sold her debs dress for €110 and put this in a (no fees, no interest) bank account to pay for her netflix account for as long as possible.

Maths Tracker

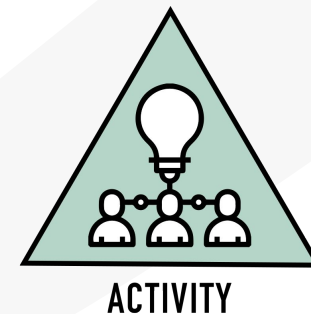
Students should engage in the learning outcomes outlined in MCS 1-5 through the contextual experiences offered by Mathematics and Life Skills (p. 20-21).

Can we identify other **relevant** opportunities to work on MCS.4 in unit 1 (and other modules)?



Reflection on Teaching and Learning: Session 2

Consider how the teaching and learning strategies used in this session support students' learning in Module 3: Mathematics and Life Skills.



Session 2

By the end of this session participants will have:

Considered the use of effective questioning in the Mathematical Applications classroom

Explored teaching and learning strategies for Personal Finance and Healthy Life Choices incorporating MCS to support the range of abilities using the student profiles identified.



An Roinn Oideachais
Department of Education

Day 4

End of session 2



An Roinn Oideachais
Department of Education

Day 4

Session 3

Session 3

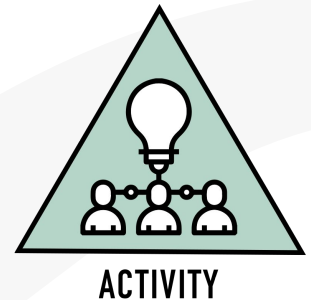
By the end of this session participants will have:

Planned a student-centered unit of learning for Personal Finance or Healthy Life Choices

Investigated the next steps in enacting your vision in your LCA Mathematical Applications class.

Planning a unit of learning

1. Choose your learning outcome(s).
2. Identify the Mathematical Concepts and Skills underpinning the learning outcome(s) and the prior knowledge of students.
3. Design a student learning activity (activities) and associated learning intentions and success criteria that achieve learning outcome(s) and develop key skills. Consider your three LCA Students.
4. Identify links to other LCA subjects.
5. Identify opportunities for effective use of questioning.



Sharing of Ideas: Gallery Walk



Next Steps

Consider the following reflective questions:

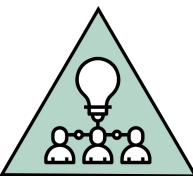
What new learning have I come to?

What will I do differently to maximise learning for students in my class?

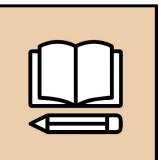
What are the next steps required to enact my vision?



Photo by [Riccardo Annandale](#) on [Unsplash](#)



ACTIVITY



WORKBOOK

Session 3

By the end of this session participants will have:

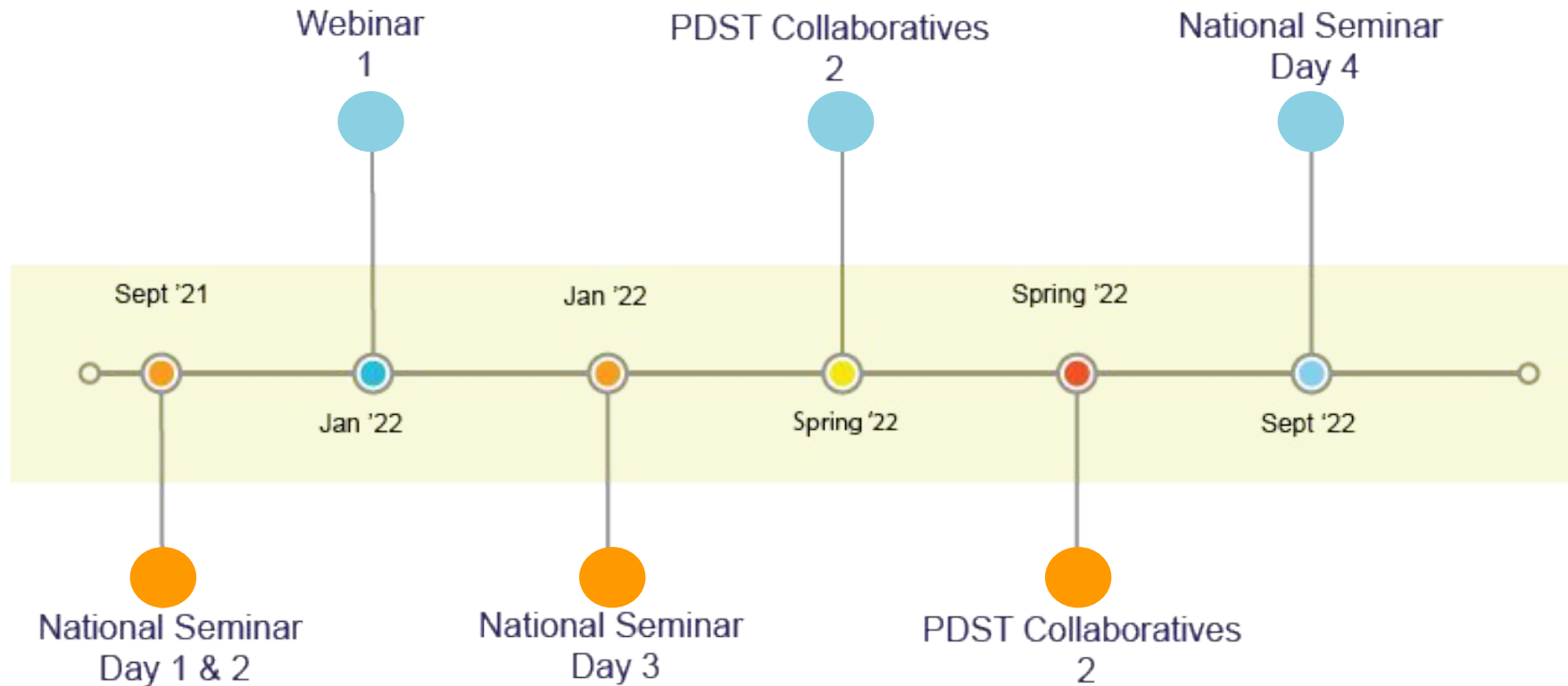
Planned a student-centered unit of learning for Personal Finance or Healthy Life Choices

Investigated the next steps in enacting your vision in your LCA Mathematical Applications class.

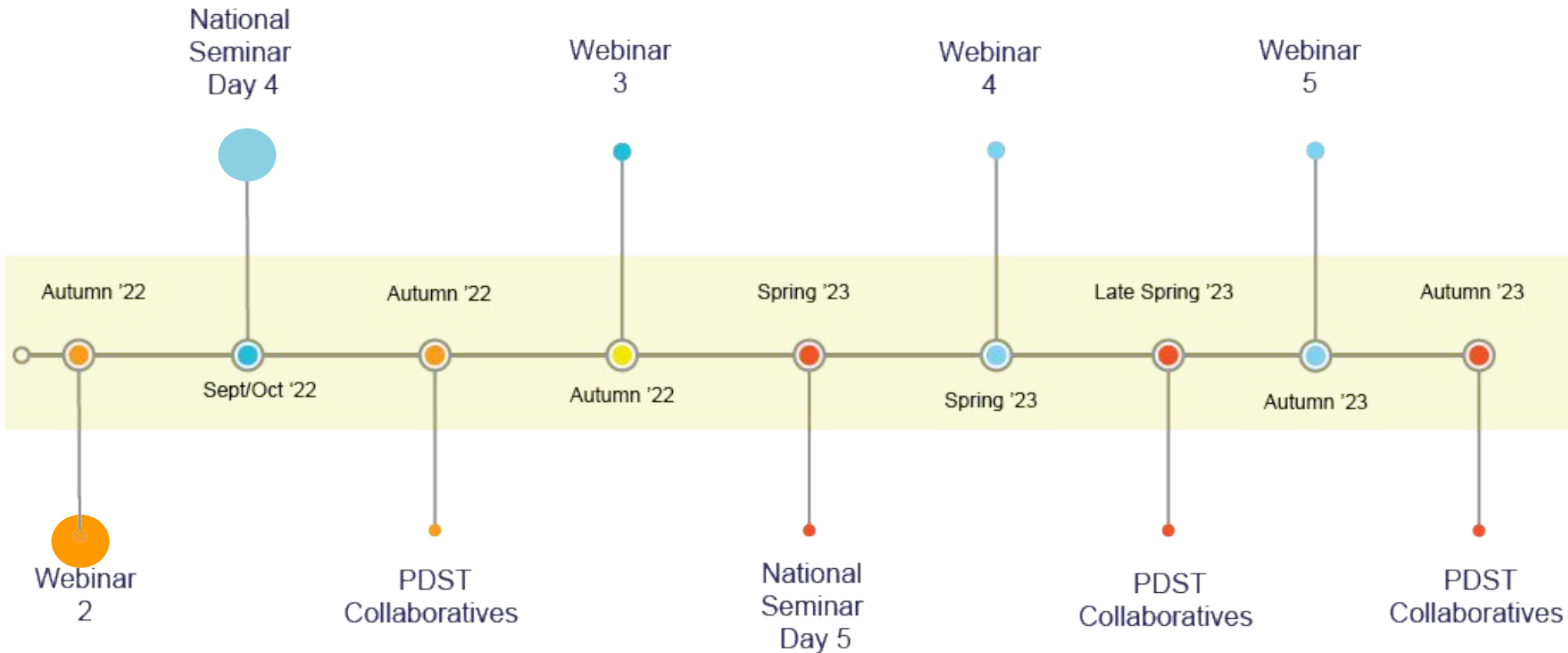
Question Board Revisited



CPD for the revised module descriptors



CPD for the revised module descriptors



Leaving Certificate Applied Subject Specification CPD



An Roinn Oideachais
Department of Education

End of Seminar