Epistemic Insight

The Epistemic Insight Initiative

CPD Webinar 3: Essential Experience of Science: Why do Spinners spin?

www.epistemicinsight.com
LASAR@canterbury.ac.uk

@LASARCentre
#EpistemicInsight

Canterbury Christ Church University

Who is in the room?

1

EYFS/KS1 teacher or practitioner

1

KS2 teacher

1

Primary leadership

0

Teaching assistant

1

HE lecturer/researcher

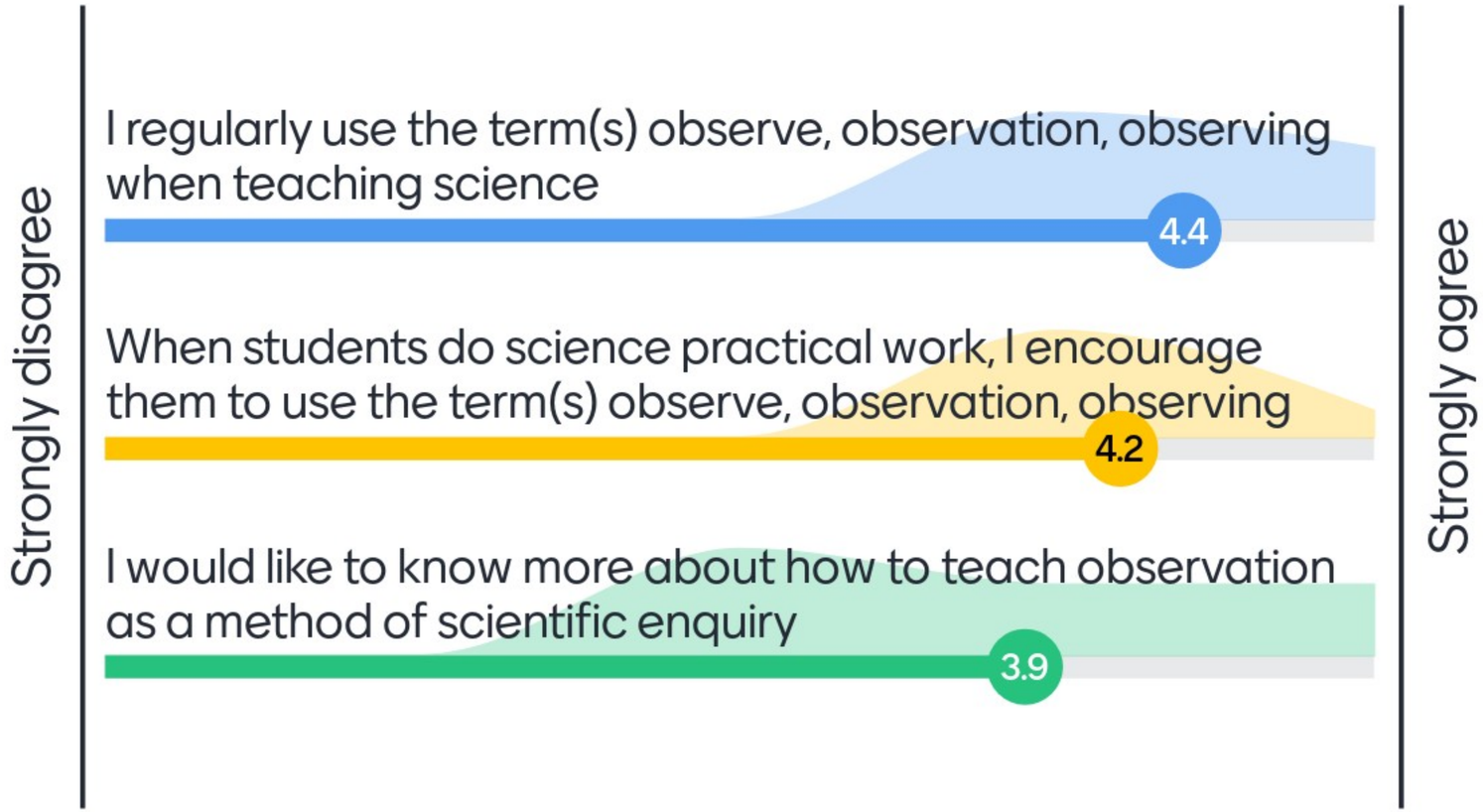
4

ITE student (UG, PG, Schools direct)

0

Too unique for labels :)

I would be really interested in your responses to:



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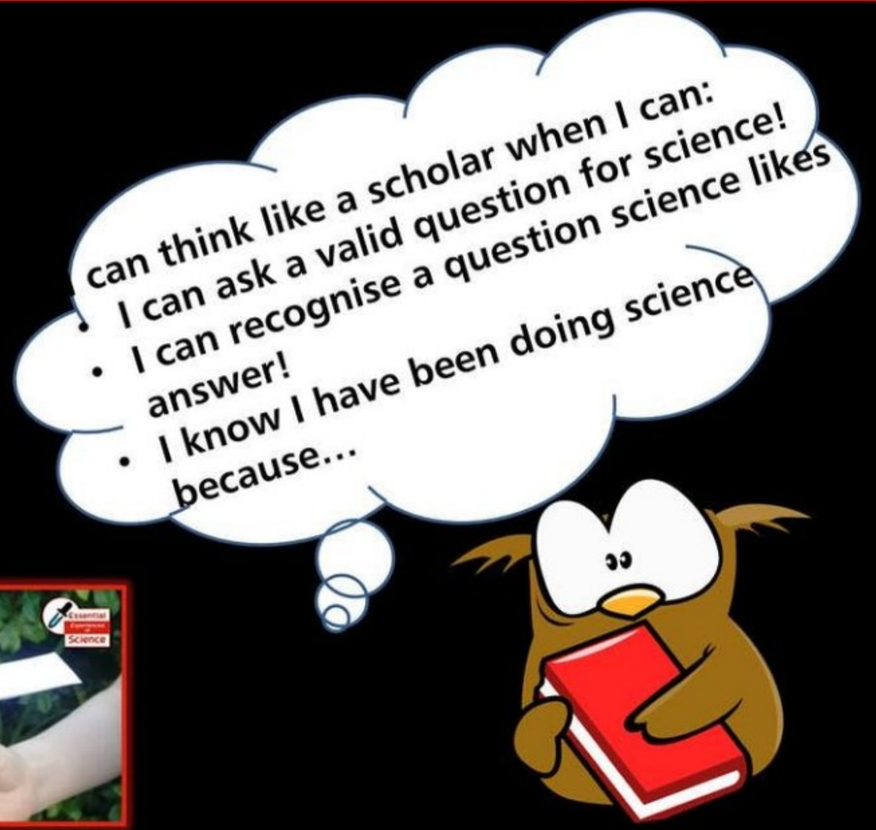
Epistemic insight: teachable and assessible

Teachers can support students to answer three questions:

1. **How does a discipline interpret the question?**
2. **What methods would this discipline use to investigate the question?**
3. **How would a scholar of this discipline know they had a good answer? (What does the discipline value?)**



Lets look at a science question. Why does a spinner spin?
But what makes this question, a good question for science to answer?

Why does a spinner spin? Why is this a good question for science to answer?

You can discuss gravity and forces

It doesn't give the answer in the question.

Links to science topics force and air resistance. Also links to real life examples- seeds or parachutes etc.

Because science can explain the forces acting on the spinner

It can be investigated

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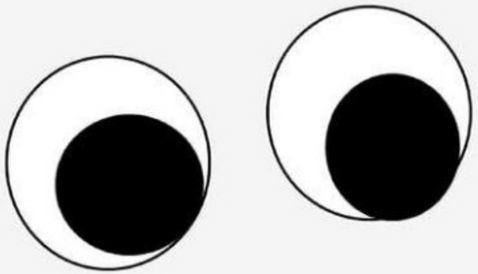
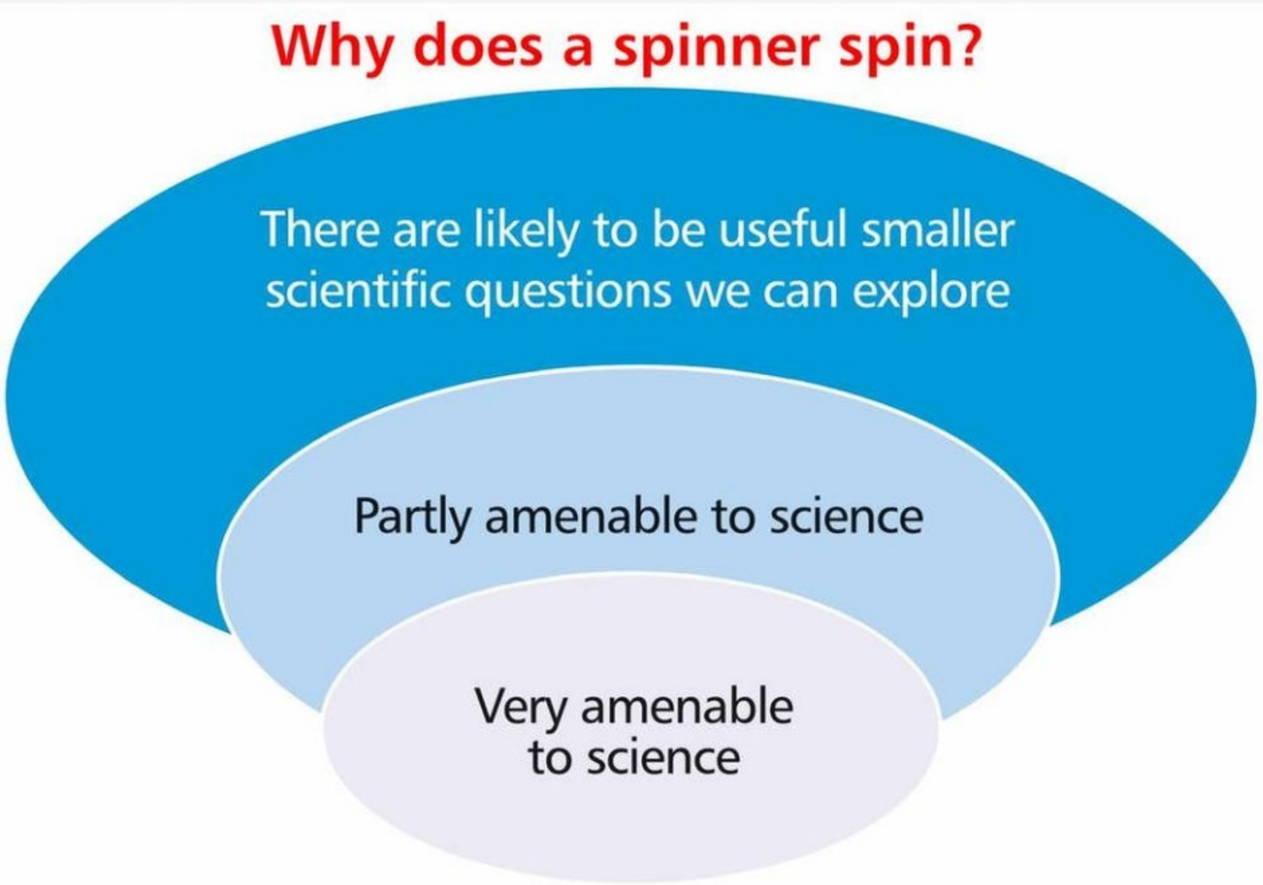
A good question for science!

Science answers question which investigate the nature of the world around us.

Observation





The bubble tool

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Essential Experiences in Science

Why do spinners spin?

What is the session about?	This session aims to support children and teachers in using the scientific language of '**observe**' and '**observations**' to help children to work scientifically.
Research question in school	Can children identify 'observe' and 'observations' as key to investigating scientifically?
National curriculum content	Forces – Air resistance, friction, gravity
Support & Free Materials	1 Investigation card, 2 Spinner templates, 1 set of teacher notes, student worksheet plus CPD webinars

- Teaches scientific enquiry
- Builds understanding of science as a discipline
- Follows EI pedagogy
- Hands-on
- Observations
- Distinctiveness of science
- Compare science to other disciplines

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National Curriculum KS2 Links

Working scientifically

During years 5 and 6, children should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

Forces: Children should be taught to:

- Children should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.

Observations from Activity

Children predict what they will observe

Children record what they observed

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Why do spinners spin?

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Gravity pulls the spinner downwards..

Air resistance is a kind of friction. As the spinner falls, it is slowed down by the air that pushes up on its wing.

More surface area, means more air resistance. And that means it falls more slowly

Astronauts dropped a hammer and a feather on the moon. Guess what! They hit the ground together! So no air= no air resistance!

Sycamore seeds with more wings or wider or longer wings have more surface area – and fall more slowly. Try folding the wings on your spinner

We saw this in the paper race!

On the moon, there's no air.

Can you make a paper spinner that spins the other way?

The wings of spinners are not symmetrical. Sometime they are at an angle. Sometimes they are not opposite the centre point. It means the forces are uneven and twist the spinner around.

But why does it spin?

You can also add weights to your spinner, what happens now?

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Teacher notes

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Hook Questions

1. What makes a good parachute?
2. Why do people fly kites?
3. How does air resistance affect Olympic cyclists?

Can Science give us answers to all these questions?

Spinner investigation – observe what happens!

Does the colour of the spinner affect how if falls?
Does the number of paper clips affect how it falls – does it change the spin, the speed that it falls or both?
"What else might affect how the spinner falls?

Children can infer patterns from their observations

The Paper Drop

Which of these will hit the ground first? The paper sheet or the paper ball?
Make your prediction and write it down
Record your observations – which did hit the ground first?

Plenary

Revisit the questions:

1. What makes a good parachute?
2. Why do people fly kites?
3. How does air resistance affect Olympic cyclists?

Which of these questions can be answered by science?

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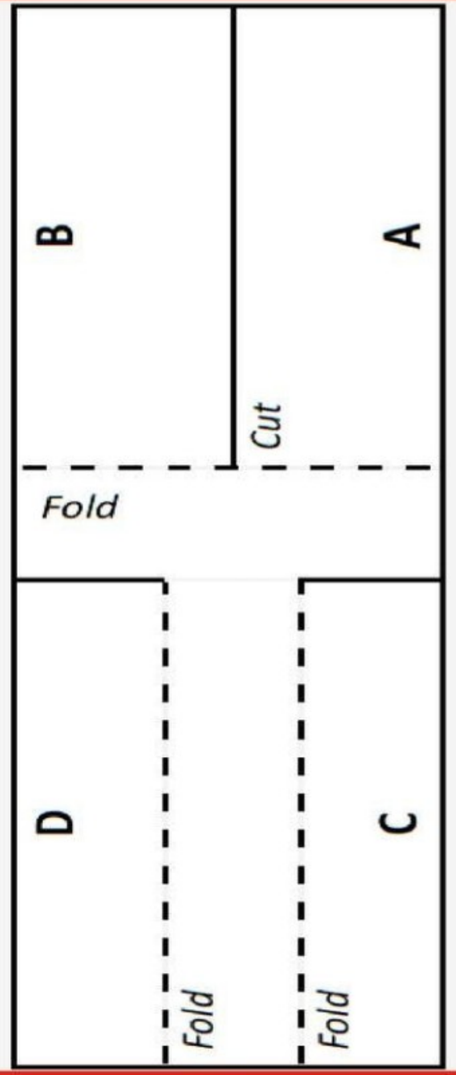
Student Activity



Investigate	General observations	Comparison – which hit the ground first, did one spin faster?
Two spinners Dropped from the same height		
Repeat		
Add a paperclip to one of them		
Repeat		
Add more paperclips		

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5 minute lesson plan – bridging subject boundaries

1 Building on Current Practice

Why do spinners spin?

What is the Big or Bridging Question?

Learning Objectives:
Working scientifically – understand the importance of observation for scientific method

Before they investigate, what Do they already need to know?
Building on:
Existing knowledge of scientific process
Is this building on existing knowledge? Challenging misperceptions? Acting as extension?

How does this map on to other areas of the school curriculum?
Planning different kinds of scientific investigation to answer questions
Studying plants – sycamore seeds
History – industrial revolution
PE - moveme

This question can be investigated through experiment, testing a hypothesis. Link to "observation of and about the nature of world" and "properties of materials and forces"How can you get student to

2 Developing Epistemic Insight: How can the students be supported to answer these three questions?

"what **causes** the spinner to spin?" e.g. because I dropped it. – How does it interpret? in terms of causes and forces, not the action of the dropper

How does this discipline interpret the question?
Science answers question which investigate the nature of the world around us.

What methods would this discipline use to investigate the question?
Predict, Test, Observe, Record, Observations

How would (someone in) th know they had a good
Science values an objective and repeatable answer (norms of thought).

methods/norms of thought can you draw on from other disciplines to support or contrast?

3 Building Permeable Classroom Walls: Forming links across the curriculum

What is the misperception/ boundary/ epistemology you are trying to address?
Understanding what a "valid" question looks like in science?
Clear account of the preferred methods

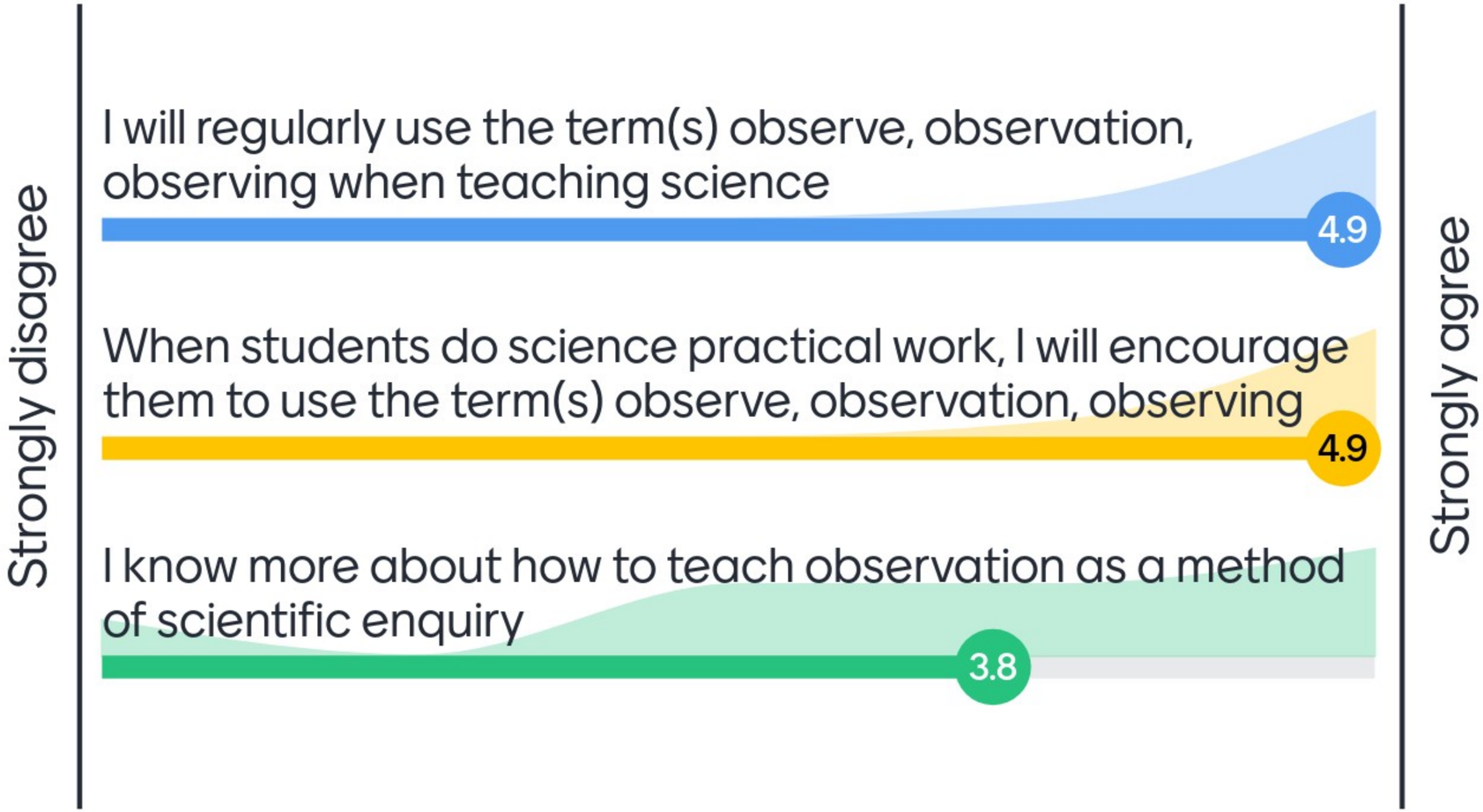
Can this be checked in another classroom?
perhaps how powered/ non powered flight developed through history?

What role does geography have to play re seeds being dispersed/altitude etc?

Will the session(s) be co-taught? Taught separately across subjects? Draw on knowledge from other subjects
1 session in class or take home

Might want to compare to how one would investigate the questions elsewhere/ or perhaps how we write about it – maybe they could do "spinning" poems in english

How will you respond now



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Essential Experiences in Science

Exciting new scheme for Years 4-7 which address National Curriculum topics.
Free resources and equipment to share with 30 schools.
Starting with these Free webinars and some downloadable resources.

When: The project will run from now until the end of the year - stay as long or not - as you like!

What's on offer: Free printed investigation cards, free resources and equipment with opportunity to attend free CPD webinars and to ask for support from local Epistemic Insight research lead

Why: By getting involved in the scheme, children in your class will be doing hands-on science enquiry - and the investigations can be taken home in the event of a local lockdown or quarantine.

What do teachers do: We are asking teachers to use these free resources and to give the children in their class a short before and after survey, with headteacher consent. (Also open to trainee teachers on placement with supervisor support)

What we will do: Support the teacher with the investigations through the CPD webinars and development of their own lesson plans. Contact Lasar@canterbury.ac.uk.

How do I get involved: Book onto as many of the webinars as you like through: https://www.eventbrite.co.uk/o/lasar-centre-at-cccu-30754621852 and contact Lasar@canterbury.ac.uk, if you are interested to be a teacher researcher in your school.

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Join our teacher researchers: Survey your class before/after a card investigation. Gain free resources and equipment (Headteacher consent required)

Name

Email address

School address or ITE tutor group

Essential Experiences in Science

Ways to teach Epistemic insight	https://tinyurl.com/Ways-to-teach-EI	5th October
Essential Experiences in Science: Why do spinners spin?	https://tinyurl.com/Why-do-spinners	12th October
Introduction to EI and EES repeat session	https://tinyurl.com/Intro-to-EI-Repeat	14th October
Essential Experiences in Science: Why did the Titanic sink?	https://tinyurl.com/Why-did-the-Titanic	9th November
Bridging questions: How do we make sense of music?	https://tinyurl.com/Make-sense-of-music	16th November
Essential Experiences in Science: Why plants matter	https://tinyurl.com/Why-plants-matter	23rd November
Bridging questions: Reaching the South Pole	https://tinyurl.com/Reach-South-Pole	30th November
Essential Experiences in Science: Grip or Slip	https://tinyurl.com/Grip-or-Slip	7th December
Bridging questions: What do maps tell us?	https://tinyurl.com/What-do-maps	14th December

Epistemic Insight

Introduction to Epistemic insight?
Weds 14th Oct at 4pm

Epistemic insight is knowledge about knowledge – particularly knowledge about disciplines and how they interact.

It is both a pedagogical approach which recognises the distinctiveness of disciplines and an intellectual virtue that is both teachable and assessible by highlighting a discipline's preferred questions, methods and norms of thought

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Next session: 9th November

Why did the Titanic sink?

This session will explore a bridging question which focuses on the disciplines of **science** and **history** to interpret or investigate the question. It will compare science and history and consider their similarities and differences to develop students' understanding of science in real-world contexts and multidisciplinary arenas.

- Preferred questions
- Methods
- Norms of thought

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