



The Epistemic Insight Initiative

**CPD Webinar 5:
Essential Experience of Science:
How do we make sense of music?**



Who is in the room?



1

EYFS/KS1 teacher or practitioner

0

KS2 teacher



1

Primary leadership

0

Teaching assistant

0

HE lecturer/researcher



3

ITE student (UG, PG, Schools direct)

0

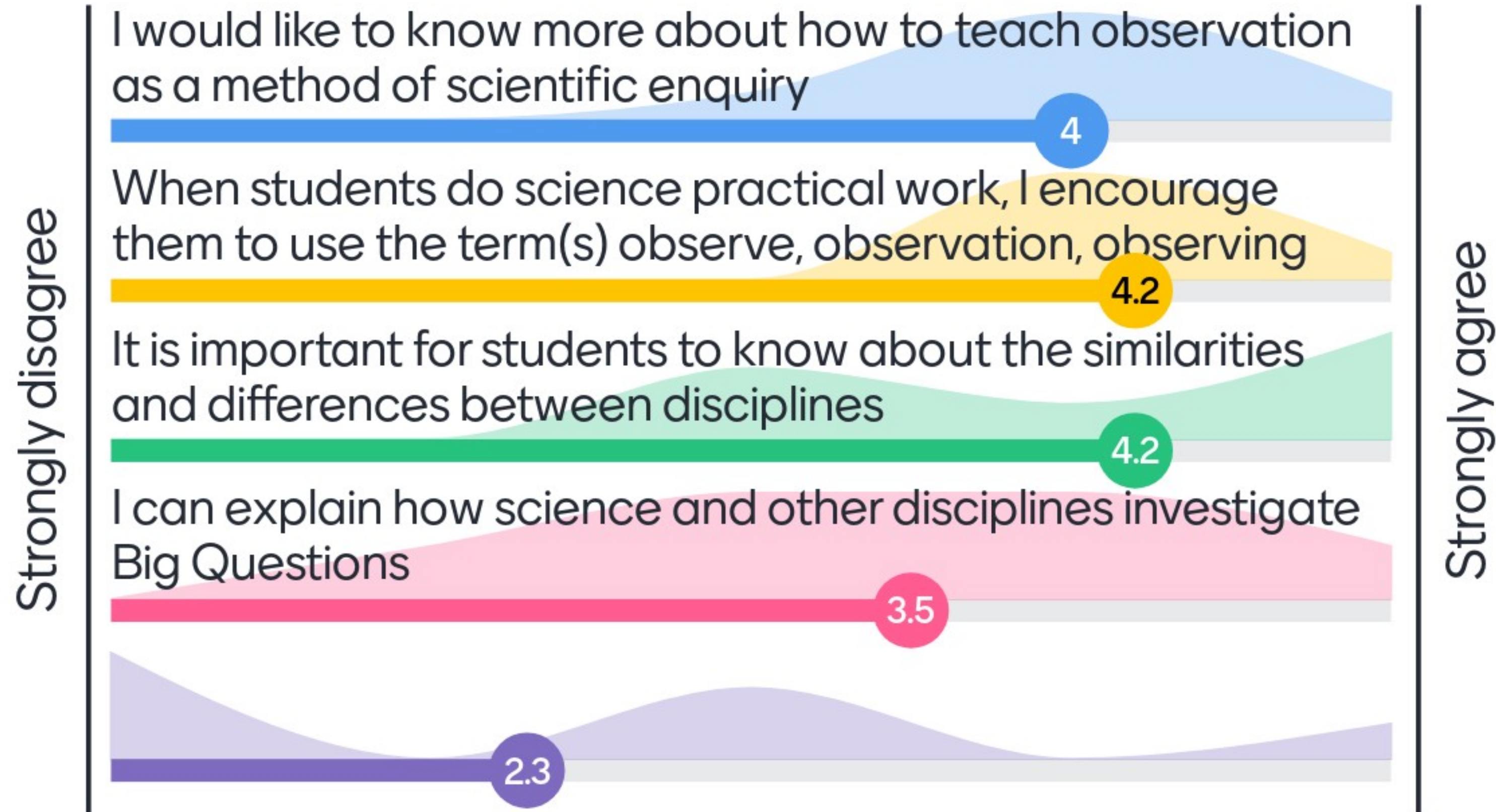
Too unique for labels :)



I would be really interested in your responses



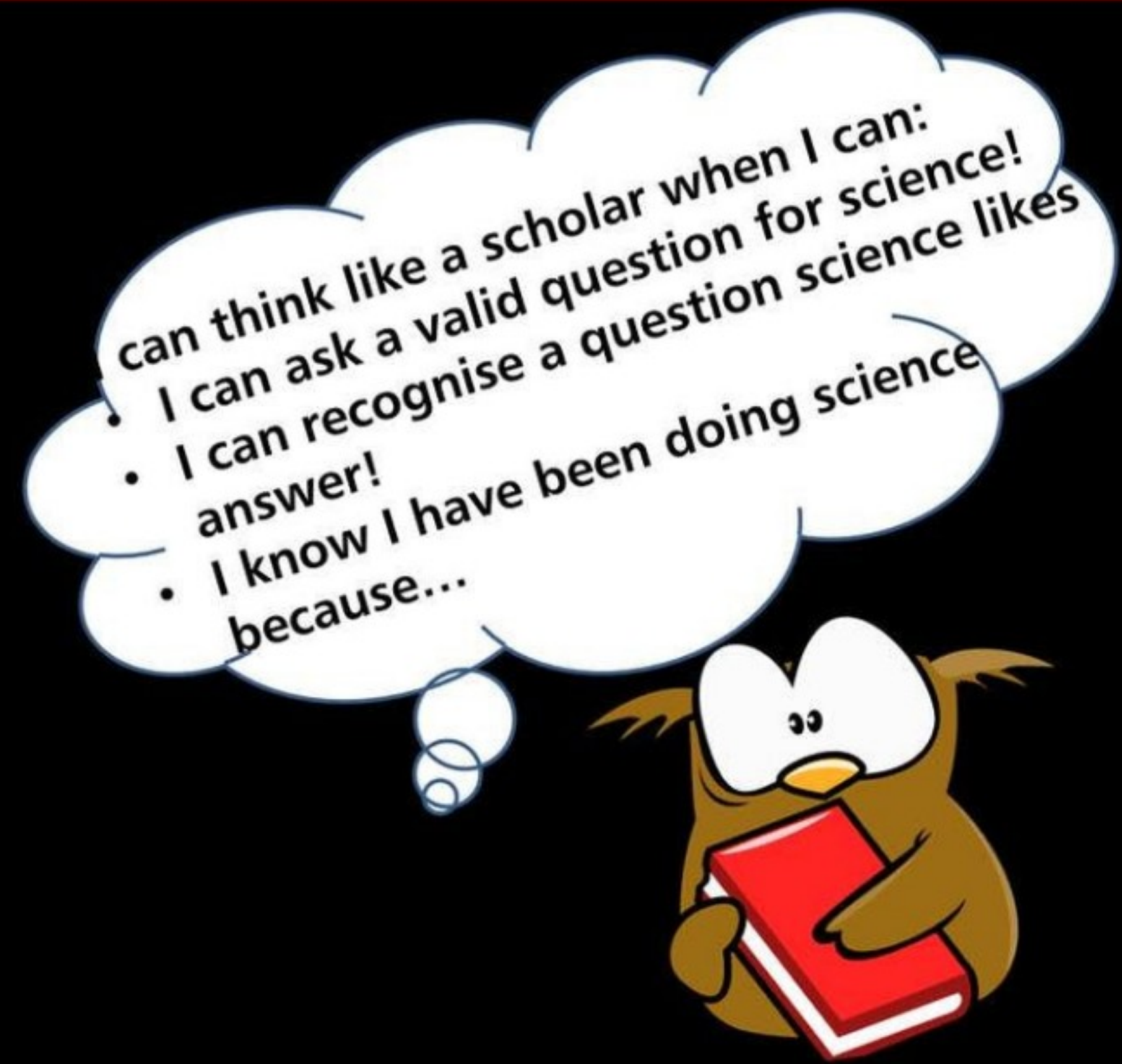
to:



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?)

Science



Lets look at a science question. **Can you make music with elastic bands?**
But what makes this question, a good question for science to answer?

Can you make music with elastic bands? Why is this a good question for science to answer?



Open-ended

accessible for all

It allows you to investigate how sound is created, but also allows you to think about what 'music' is.

You can observe what happens to the elastic bands and record different results

Smaller questions formed from this question

Leads on to what is music? It's something that can be tested



Epistemic Insight

Can you make music with elastic bands?

Essential Experiences in Science

Explore, observe, design

Put three or four elastic bands around a tub, box or jar. Now explore ways to make different sounds. You could compare wide bands and thin bands – which produces a higher pitched note? What happens to the note when you stretch a band?

Organise your selection of elastic bands into order – from high pitched to low to create a musical instrument.

Hint – a tub often works better than a box because a box crumples.

Draw a diagram and write instructions so that someone else can make an instrument that produces the same notes.

Dogs can hear sounds that humans can't. A dog whistle produces a whistling sound that is too high pitched for human ears.

Elephants communicate with each other using 'rumbles'. These are sounds that are too low pitched for our ears to pick up!

Canterbury Christ Church University

Research question in school

Can children identify 'observe' and 'observations' as key to investigating scientifically? Observation in science means data gathered with our senses including hearing.

National curriculum content

Sound – Vibration, pitch, volume

Support & Free Materials

1 Investigation card, experiment materials, Teacher notes, Student worksheets plus CPD webinars



National Curriculum KS2 Links

Main investigation

Working scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings

Children record what they observed

Children predict what they will observe

Sound

Pupils should be taught to:

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases



Hook Questions

1. How is the human ear designed to hear sound?
2. Why do people listen to music?
3. What makes some sounds louder than others?

Can Science give us answers to all these questions?

Can you make music with elastic bands investigation
observe what happens!

Making a musical instrument – make different sounds
Record predictions
Observing the vibrations (feeling the vibrations, not always seeing)

Children can predict the sound and test their instruments
to **observe vibrations**

The Observation game

“Science is all about making **observations**.”

Let’s see who can be a good scientist in ‘The Observation Game’.

Developing and testing observation skills

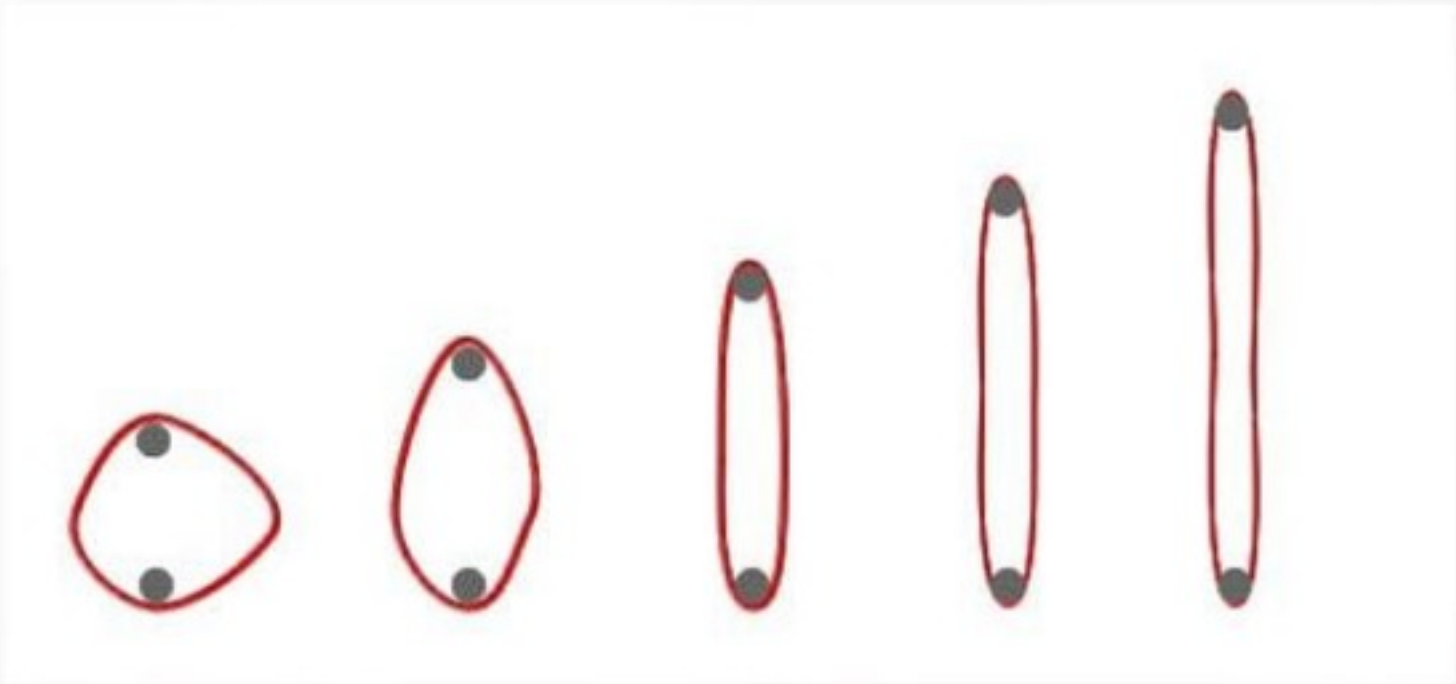
Plenary

Revisit the questions:

1. How is the human ear designed to hear sound?
2. Why do people listen to music?
3. What makes some sounds louder than others?

Which of these questions can be answered by science?

A question that requires observations to find an answer!



Stretch the elastic bands around the plastic tub.
Observe what happens when you pluck each of the elastic bands?
Does the size or thickness affect the sound?

	Observations
Thickest band	
Thinnest band	
Largest band	
Smallest band	





Epistemic Insight

How do we talk to astronauts in space - if there's no air?

Essential Experiences in Science

Sounds are made when objects vibrate. This causes the air around to vibrate and these air vibrations travel to your ear.

Try knocking on a desk or table. You hear the sound when the vibrations of air reach your ears.

Now put your ear to the surface and knock again. You can hear the vibrations travel through the wood.

If you block your ears, you prevent air vibrations from reaching your ear drums - and keep out the sound!

In space, there is no air and nothing for the vibrations to travel through.

Sound can't travel in space. In order to communicate with an astronaut, we convert sound vibrations into radio waves. Radio waves are like light - they can travel through space.

There's air inside the helmet!

Once the radio waves arrive at the astronaut's headset, they are changed back into sound. The sound vibrations travel into the astronaut's ears.

Science prefers to ask questions which investigate the nature of the world around us?

Can you make music with elastic bands?

Science preferred methods:

Investigate through observation.

Undertake measurement to test hypothesis

Science norms of thought (what science values):

A consensus about the results

Results allow accurate predictions

Results are objective

How do we make sense of music?

- Bridging question
- Different disciplinary perspectives
- Similarities and differences
- Preferred questions
- Methods
- Norms of thought



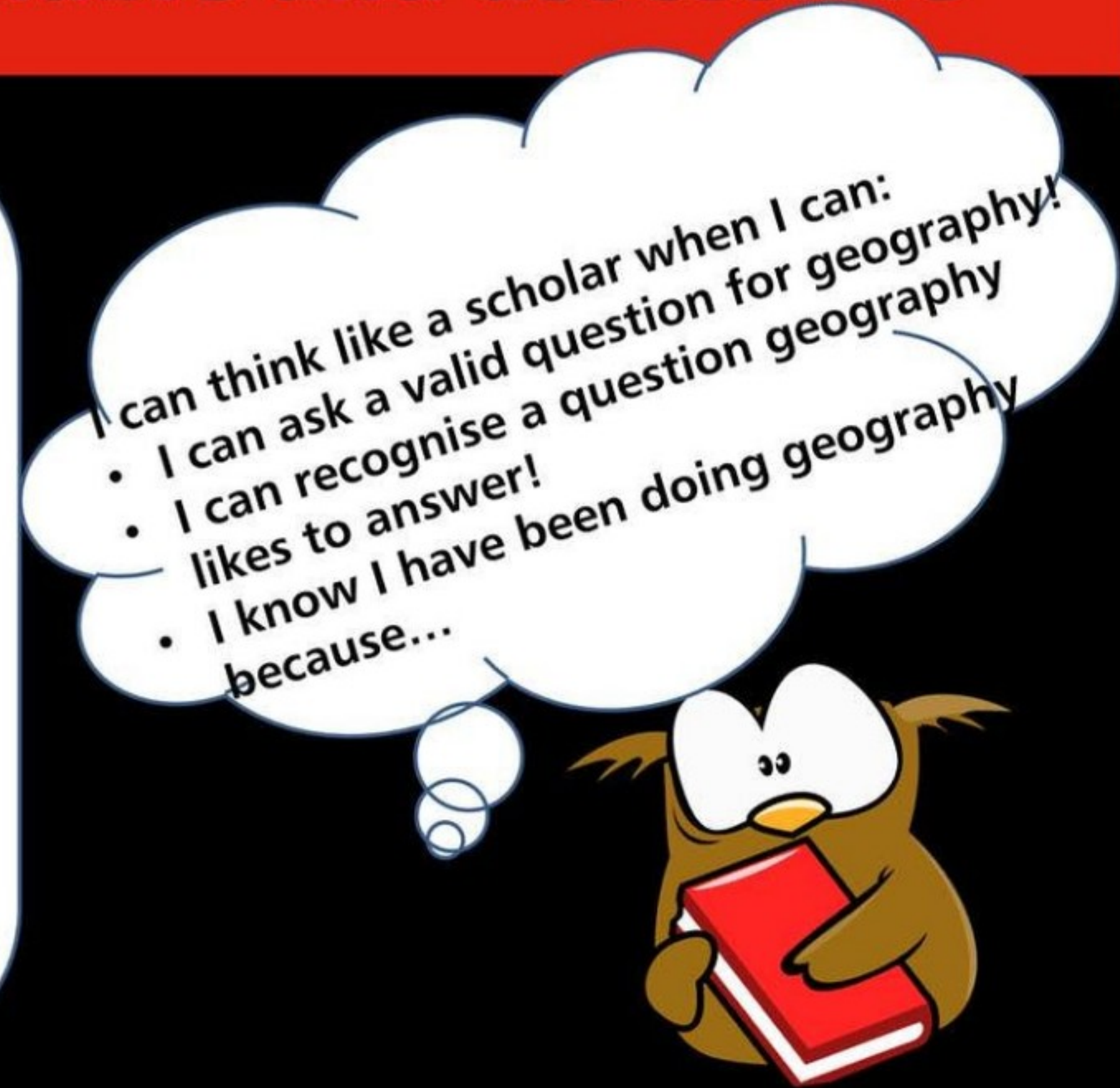
What is the session about?	To support teachers to explain how science investigates a question and how another discipline is different to science.
Research question in school	<ul style="list-style-type: none"> • I have learnt that science and geography are disciplines. • Some questions can be answered by science and geography together. • I can explain how science and geography are similar and how they are different.
National Curriculum content	<p><u>Science</u>: Y4 – Sound – vibrations, pitch</p> <p><u>Geography</u>: The diverse nature of the world we inhabit, its natural or human environments and the characteristics of a location, its people and resources</p>
Support and free materials	Free CPD and supporting materials

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?)

Geography



Let us look at a geography question. Does location shape our music?
What makes this question, a good question for geography to answer?

Does location shape our music? Why is this a good question for geography to answer?



exploring of different cultures

Look at culture and language around the world and locally

Because it is considering how music is different based on geographical location.

Good question for geography as it links to history, culture, religion, resources, wealth





Listen to the music



Choose the instrument(s) that goes with the music



Place on the Map of the world



Music and culture from around the world



Similarities and differences



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<https://creativecommons.org/licenses/by-sa/4.0/deed.en>

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Geography prefers questions about
Does location shape your music?

Geography's preferred methods:
Investigate through observing, measuring, mapping, recording and analysing the world

Geography's norms of thought (what Geography values):

Observing, measuring and generalising upon the real world

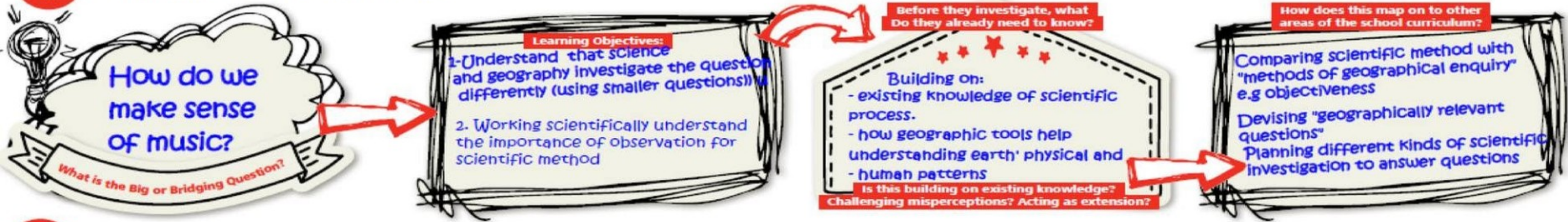
Roles of places, spaces and environments

Interrogating results to understand our present/future

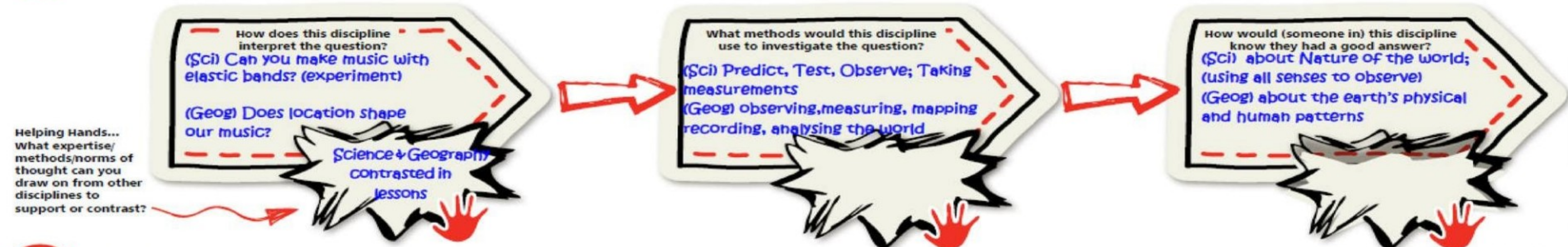
Results are subject to interpretation and reinterpretation



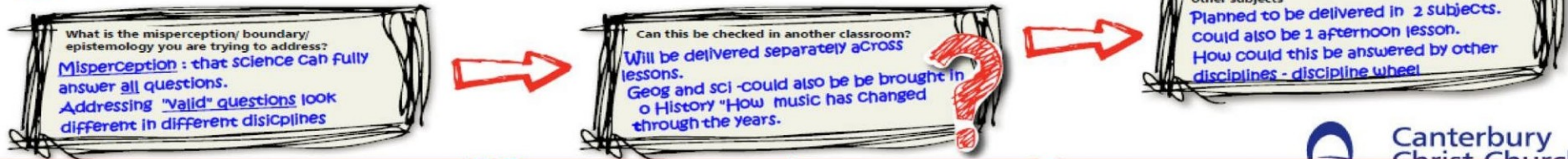
1 Building on Current Practice



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

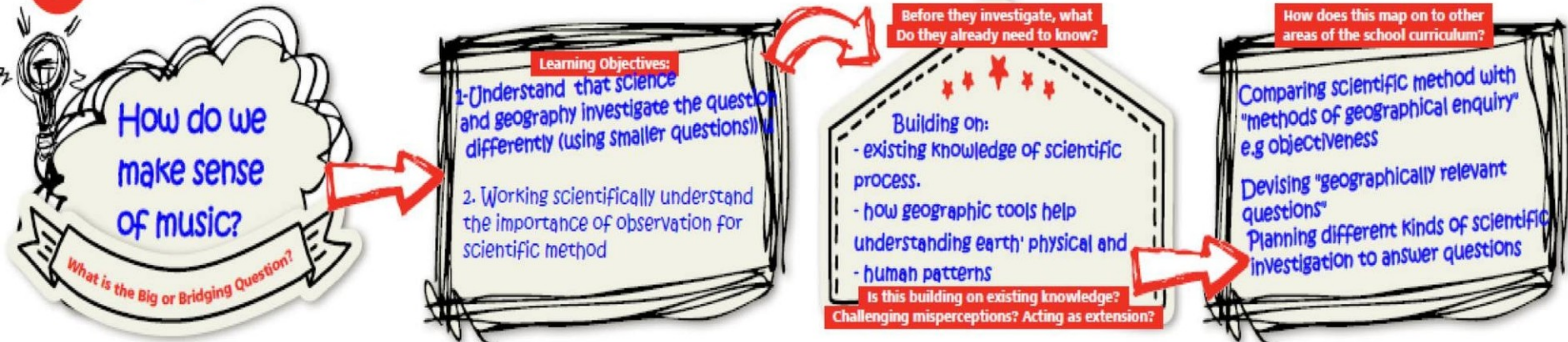


3 Building Permeable Classroom Walls: Forming links across the curriculum



5 minute lesson plan – bridging subject boundaries

1 Building on Current Practice



2

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

How does this discipline interpret the question?

(Sci) Can you make music with elastic bands? (experiment)

(Geog) Does location shape our music?

Science & Geography contrasted in lessons

What methods would this discipline use to investigate the question?

(Sci) Predict, Test, Observe; Taking measurements

(Geog) observing, measuring, mapping recording, analysing the world

How would (someone in) this discipline know they had a good answer?

(Sci) about Nature of the world; (using all senses to observe)

(Geog) about the earth's physical and human patterns

Helping Hands...
What expertise/
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?
Misperception: that science can fully answer all questions.
Addressing "valid" questions look different in different disciplines



Can this be checked in another classroom?
Will be delivered separately across lessons.
Geog and sci Could also be brought in to History "How music has changed through the years."

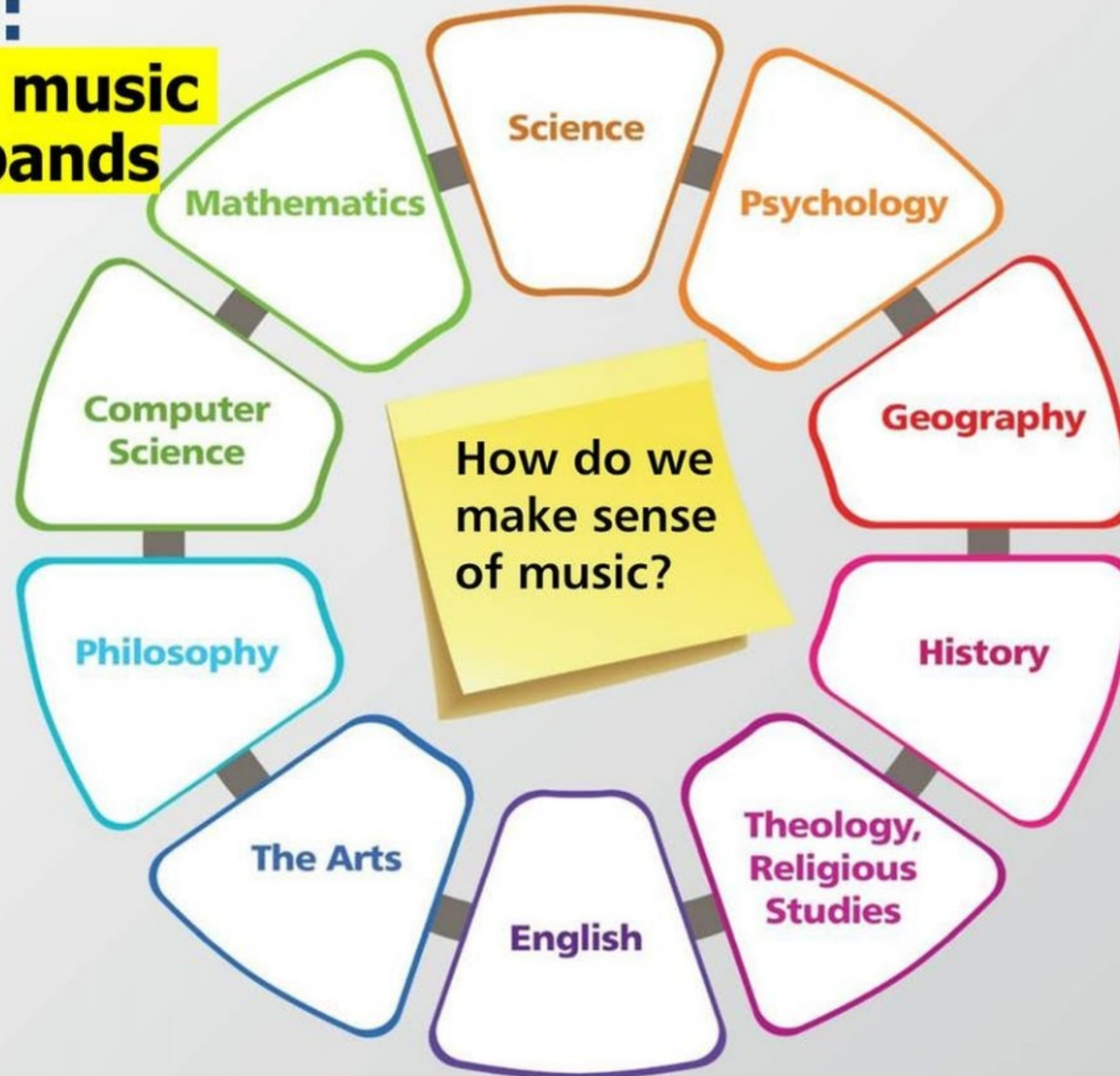


Will the session(s) be co-taught? Taught separately across subjects? Draw on knowledge from other subjects
Planned to be delivered in 2 subjects. could also be 1 afternoon lesson.
How could this be answered by other disciplines - discipline wheel

Science:

Can you make music with elastic bands

- Observation
- Experiments
- Testing
- Prediction
- Measure
- Compare
- Repeat
- Data



Geography:

Does location shape our music?

- Observing, measuring, recording and analysing the physical and human world
- Characteristics of a location and Culture
- Natural patterns, features and resources
- People and human environments

Maps, diagrams, globes, fieldwork, photos, numerical data

Conclusions

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

How are the methods similar or different?

How will you respond?



Strongly disagree

I know more about how to teach observation as a method of scientific enquiry

4.6

When students do science practical work, I will encourage them to use the term(s) observe, observation, observing

4.4

I understand better how to teach about the similarities and differences between disciplines

4.2

I can explain how science and other disciplines investigate Big Questions

3.8

Strongly agree





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. Plus some opportunities for teacher bursaries.

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.



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



Bridging questions: How do we make sense of music?	https://tinyurl.com/Make-sense-of-music	16 th November
Essential Experiences in Science: Why plants matter	https://tinyurl.com/Why-plants-matter	23 rd November
Bridging questions: Reaching the South Pole	https://tinyurl.com/Reach-South-Pole	30 th November
Essential Experiences in Science: Grip or Slip	https://tinyurl.com/Grip-or-Slip	7 th December
Bridging questions: What do maps tell us?	https://tinyurl.com/What-do-maps	14 th December





Why do plants matter?

This session will explore the essential science enquiry of **Why do plants matter?** This big question is explored initially through the lens of science to observe life-cycle changes when growing a new plant from a seed. But does science answer this question fully or can we turn to other disciplines to provide a different perspective? When we investigate the past through a range of sources it will reveal the importance of seeds to life throughout history.

- Preferred questions
- Methods
- Norms of thought



Free investigation cards, materials and teacher notes available – help us research this question in your classroom!

