

# Supporting child-led science investigations

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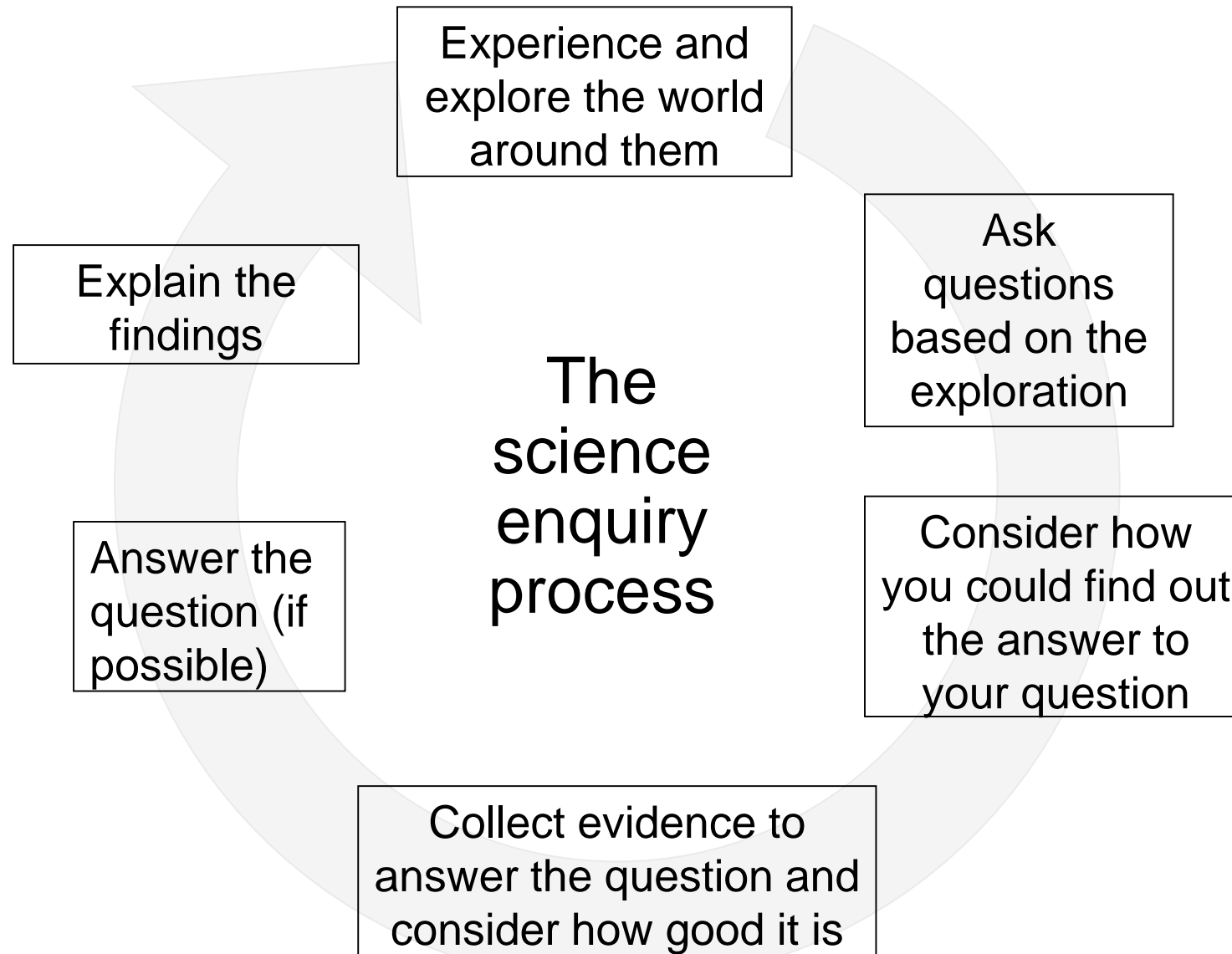
# Aims

During this session you will:

- consider reasons for children engaging in child-led science
- explore the challenge of supporting children to ask and answer their own questions
- hear from a school about their project work
- be informed about what the Great Science Share for Schools is

# What is child-led science?

- Science enquiry led by young people, about questions that interest them.



# Why do child-led science?

- Child centred
- Working like a scientist
- Develops transferable skills

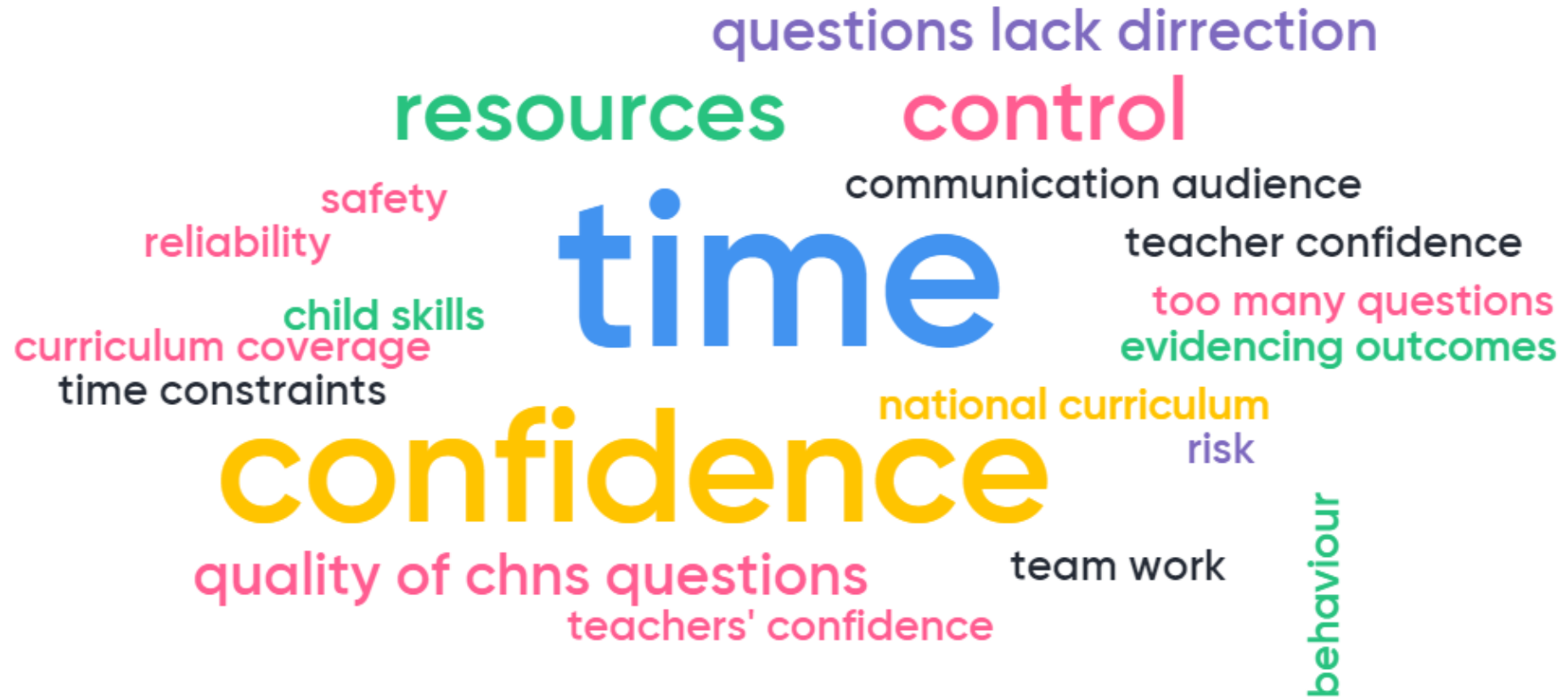
# Transferable skills



# Barriers

- What are the barriers to child-led science?

# What are the barriers to child-led science?





# Experience and explore the world



[CREST resources](#)



# Brilliant Bubbles

## Organiser's Card



### About the activity

This activity is designed to get children thinking about liquids, gases and bubbles. Cosmic has a new bubble machine. All the bubbles are the same. He would like different bubbles.

Through this activity you will support children to:

- Carry out their own tests to try and make different shaped bubbles
- Carry out their own tests to try and make different sized bubbles
- Carry out their own tests to try and make different colour bubbles

### Kit list

- Plastic trays or bowls
- Clean drinking straws – 1 per child
- Bubble wands
- Soft wire (e.g. florist's wire or pipe cleaners)
- Bubble mixture
- Food colouring

### What to do

1. Introduce the activity using the story. Ask the children if they have blown bubbles before, were they all the same?
2. Give out activity cards and equipment to the children.
3. Explain that they will be using the equipment provided to test if they can make different shape, size and colour bubbles.
4. Encourage children to discuss their ideas and how to carry out their investigations. Prompt questions:
  - How will they make sure their test is fair?
  - How will they record their results?
5. Support children to conduct their tests and make their own records of their results. They could also take photographs or make drawings.
6. Ask the children to present their findings to the rest of the group, they can be as creative in their presentation as they want - the activity card suggests a bubble competition.

### Things to think about

Children will get better bubbles if they blow slowly and gently through a straw.

They will usually get bigger bubbles from a wand or a wire frame.

A bubble is a pocket of air, surrounded by a very thin film of liquid.

Water acts as though it has a stretchy skin. It is this that helps to make a round bubble shape. Scientists call this surface tension.

The colour of bubbles is due to the light reflecting off the bubble surface and creating what scientists call interference patterns. The pattern and colour changes according to the direction of the light and the thickness of the bubble's 'skin'.

### Keywords

- Bubbles
- Surfaces
- Gases

### Watch out!

Children will create a lot of mess with their bubbles, so be prepared for this.

You can colour the mixture with food colouring, but when the bubbles burst the children get sprayed with drops of food colouring, so this is VERY messy.

# Brilliant Bubbles

## Activity Card

Cosmic is very excited. Today is his birthday!

His present is a big, bright purple bubble machine. When he turns the handle, dozens and dozens of bubbles float out into the air.

Gem arrives to wish him happy birthday. Cosmic shows her how his new bubble machine works.

"What lovely bubbles!" Gem shouts, as she jumps about trying to catch them.

"They are OK," says Cosmic. "But they are all the same shape... And they are all the same size... And they are all the same colour. I wanted lots of different bubbles, but these are all the same."

"You must be able to make different bubbles," says Gem, peering into the end of the machine. "Perhaps there's something wrong with it."

"I'm not sure," says Cosmic.

What do you think?

### Your challenge

Can you find a way to blow different bubbles for Cosmic?

Cosmic thinks you can make bubbles with different shapes

Gem thinks you can make different size bubbles

Aunt Stella thinks you can make different colour bubbles



### Discuss

Have you ever blown bubbles?  
Do you think that they were all the same?

### Getting started

Put some bubble liquid in a bowl or tray.  
Use a straw to blow some bubbles. **Don't share your straw with anyone else.**  
Dip the end of the straw in the liquid. Lift it out.  
Now blow down your straw to make a bubble.  
Try blowing gently and then blowing harder.  
How do the bubbles change?

### Test your ideas

Can you think of other ways to find out about bubbles?

### Share your ideas

You could have a bubble competition to see how many different types of bubbles you can blow.

### Extra things to do

Find out how long you can keep a bubble before it bursts.  
Find out whether bubbles float or fall to the ground.  
Find out how long you can keep a bubble in the air.



# CREST awards

## Star

Perfect for 5-7 year olds who are starting their STEM journey.

Typical age: 5-7

Time to complete: 8 x 1 hour challenges

Entry fee from £1 per student

## SuperStar

Most suitable for upper primary students who are looking for a challenge.

Typical age: 7-11

Time to complete: 8 x 1 hour challenges

Entry fee from £1 per student

# Mayor's London Scientist

- The Mayor is making CREST Awards free for up to 5,000 London students from backgrounds currently underrepresented in STEM. This is available for Awards at SuperStar and Discovery level.
- Any school that meets one or more of the following criteria can apply for funding:
  - Schools with 75 per cent+ black and minority ethnic pupils
  - Schools with 30 per cent+ Pupil Premium
  - Special Educational Needs schools
  - Alternative Providers and Pupil Referral Units
- **Note:** Fee-charging schools will not be eligible.
- Eligible schools have been sent voucher codes which will enable teachers to register students for free.
- If you believe your school is eligible and you haven't receive a code, email [educationprogramme@london.gov.uk](mailto:educationprogramme@london.gov.uk).

# Questions children ask

Questions	
Can we live on the moon?	Why does my granny forget things?
What is the best drink?	What would happen if there were no gravity?
How does the breed and size of dog affect how long it lives?	Where does my cat go at night?
Should smoking be banned?	What is better for you playing football or swimming?
Why does an ice cube melt?	How can we protect the planet?

# Does the question lead to science enquiry?

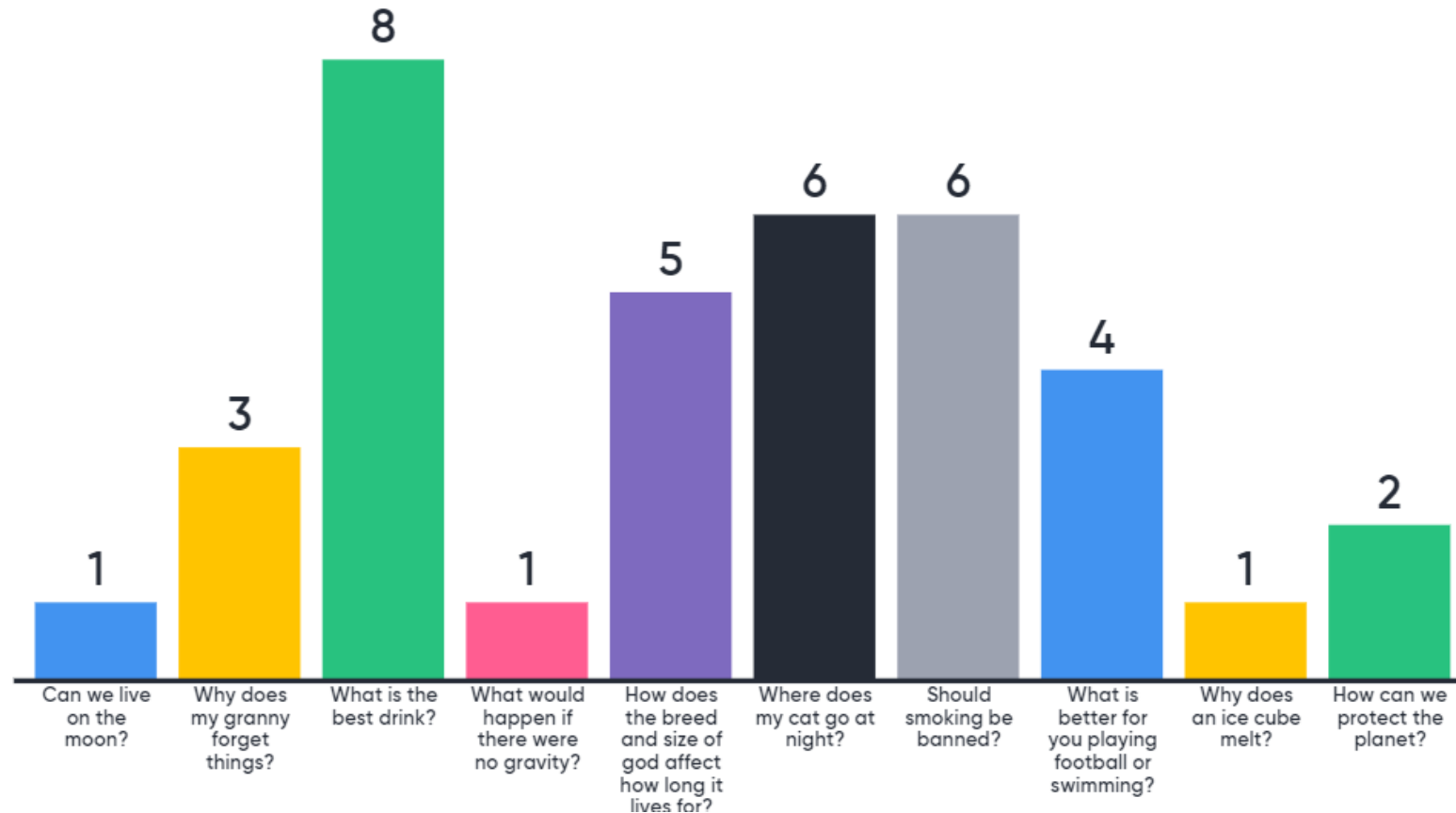
- Some questions are philosophical.
- Answers to some questions are based on opinions. Again they can be debated but not answered.

# Which questions do not lead to science enquiry?

Questions	
Can we live on the moon?	Why does my granny forget things?
What is the best drink?	What would happen if there were no gravity?
How does the breed and size of dog affect how long it lives?	Where does my cat go at night?
Should smoking be banned?	What is better for you playing football or swimming?
Why does an ice cube melt?	How can we protect the planet?



# Which questions do not lead to science enquiry?



Initial question	What's the problem?	An even better question would be...
What is static electricity?	This is a really complex question, which requires a high-level answer, which may be too complex for younger children to answer yet. However, they could still explore static electricity through practical observation. For example: How can you alter the amount of static electricity? Does everything produce static electricity?	Does the number of rubs on a balloon affect how many objects it can pick up?
Which is the best grass seed?	Best isn't very specific – So it would be preferable to refine the question and make it more specific. How could you define best? Try thinking about which variables you could investigate.	Which grass seed germinates the fastest?  Which grass seed produces the greenest grass?  Which grass seed grows into the strongest plants?
How does size and shape of a balloon rocket affect the time it takes to travel along the string?	This question has two independent variables – SIZE and SHAPE. It is better to choose one variable at a time to investigate, then you can really see what effect it has on the time it takes for the balloon rocket to travel along the string.	How does the size of the balloon rocket affect the time it takes to travel along the string?

# Questions children ask

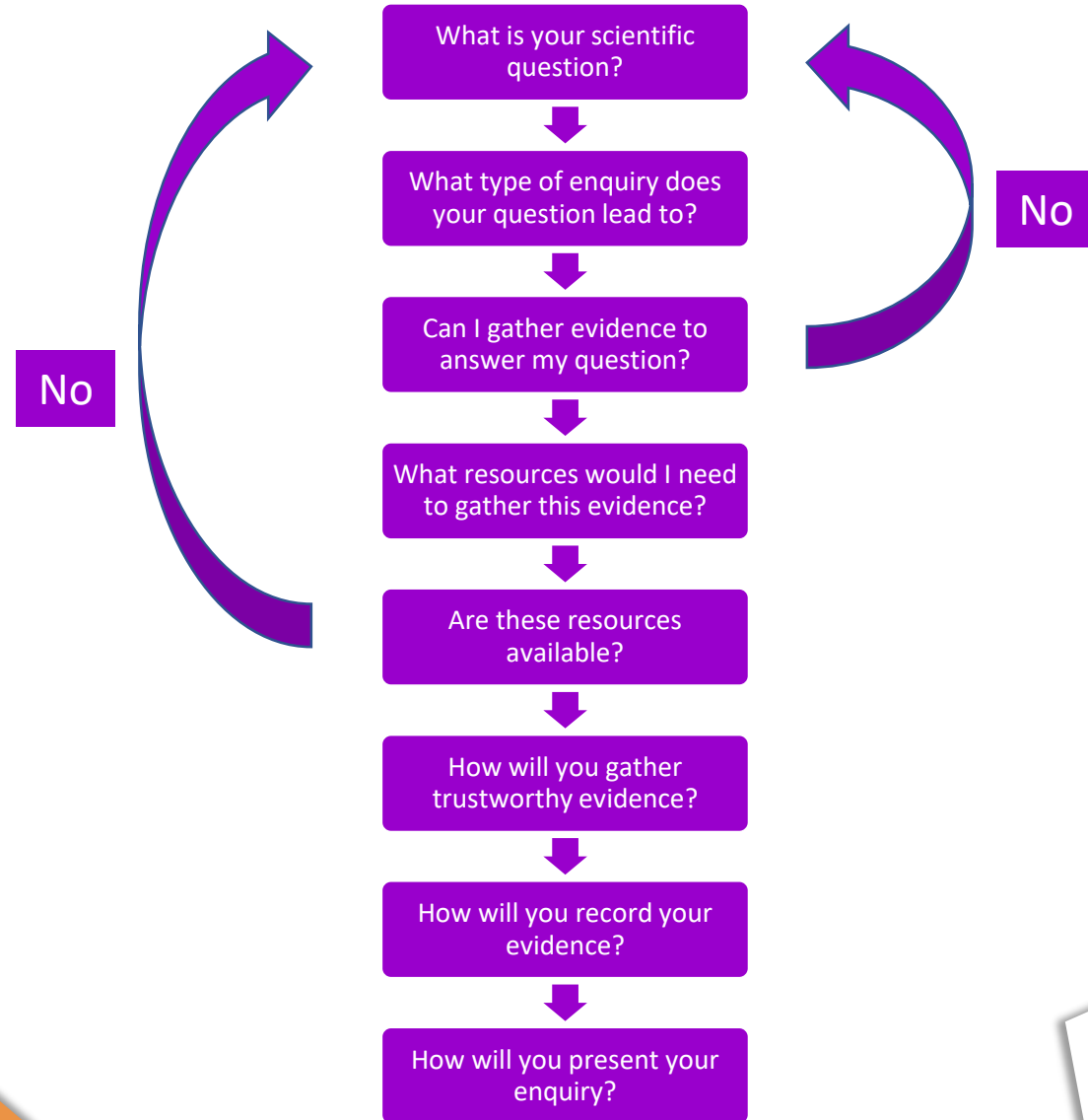
Questions	
Can we live on the moon? – Too big	Why does my granny forget things? – Too big
What is the best drink? – Too vague	<b>What would happen if there were no gravity?</b>
How does the breed and size of dog affect how long it lives? – Two questions	Where does my cat go at night? – Too vague
<b>Should smoking be banned?</b>	What is better for you playing football or swimming? - Too vague
Why does an ice cube melt? – Answer is based on knowledge, but can be turned into an enquiry question	How can we protect the planet? – Too big

# Types of enquiry



Images can be downloaded from <https://seerih-innovations.org/enquiringscience4all/downloads/>

# Process for refining children's questions



# CREST awards

## Discovery

A one-day STEM project perfect for challenging teams of 10-14 year old students.

Typical age: 10-14

Time to complete: 5 hours

Entry fee from £3 per student

# How to get a CREST award

- Register for the award – <http://www.crestawards.org/register-your-award/>
- Create a free account
- Register pupils when they have completed 8 activities for a Star or Superstar award or at the end of the project for a Discovery award
- For a discovery award you need to upload a couple of project samples

# Presenting findings

- Provide a genuine audience
  - Face-to-face
  - Virtually



# One school's science fair

## Aims and objectives of the science fair

- To promote science across the school
- To demonstrate how exciting science can be
- To develop an understanding of science enquiry across the school
- To promote enjoyment and fun when doing practical science
- To give year 6 the responsibility and ownership of a project

# Planning

- The teacher guided the children to come up with their enquiry questions.
- Children gathered evidence to answer their questions.
- The children were invited to see if they could group the enquiries into categories.
- Once the categories were established these were called the science fair zones.
- The fair had four zones – forces and friction, changing state, the nature zone and sound and electricity.

# Setting up the science fair

- All the projects were allocated to a zone.
- Each project was given an activity station.
- Each activity station required
  - A title
  - An explanation poster
  - A demonstration (if appropriate).

# Preparation

- The pupils each set up their activity station the day before in the hall.
- Half the class stayed at their stations whilst the rest of the class 'visited'.
- This gave the pupils an opportunity to hone their presenting skills and patter.

# Organising visitors

- The whole school visited in three slots of 30/40 minutes during the afternoon.
- The fair was open after school for families to attend.

Each session started with the Year 6 pupils giving a PowerPoint presentation to all the visitors and then they went to their activity station.

Visitors were able to visit the activity stations as they wished.

Time was built in between sessions to enable the activity stands to be replenished.

# Additional support

STEM Ambassadors can support pupils to

- refine their questions
- prepare their presentations

They may also attend events in school to provide a wider audience

How to find a [STEM Ambassador](#)

# What is the Great Science Share for Schools?

*The national campaign to inspire young people to **share their** science questions and investigations with new audiences*

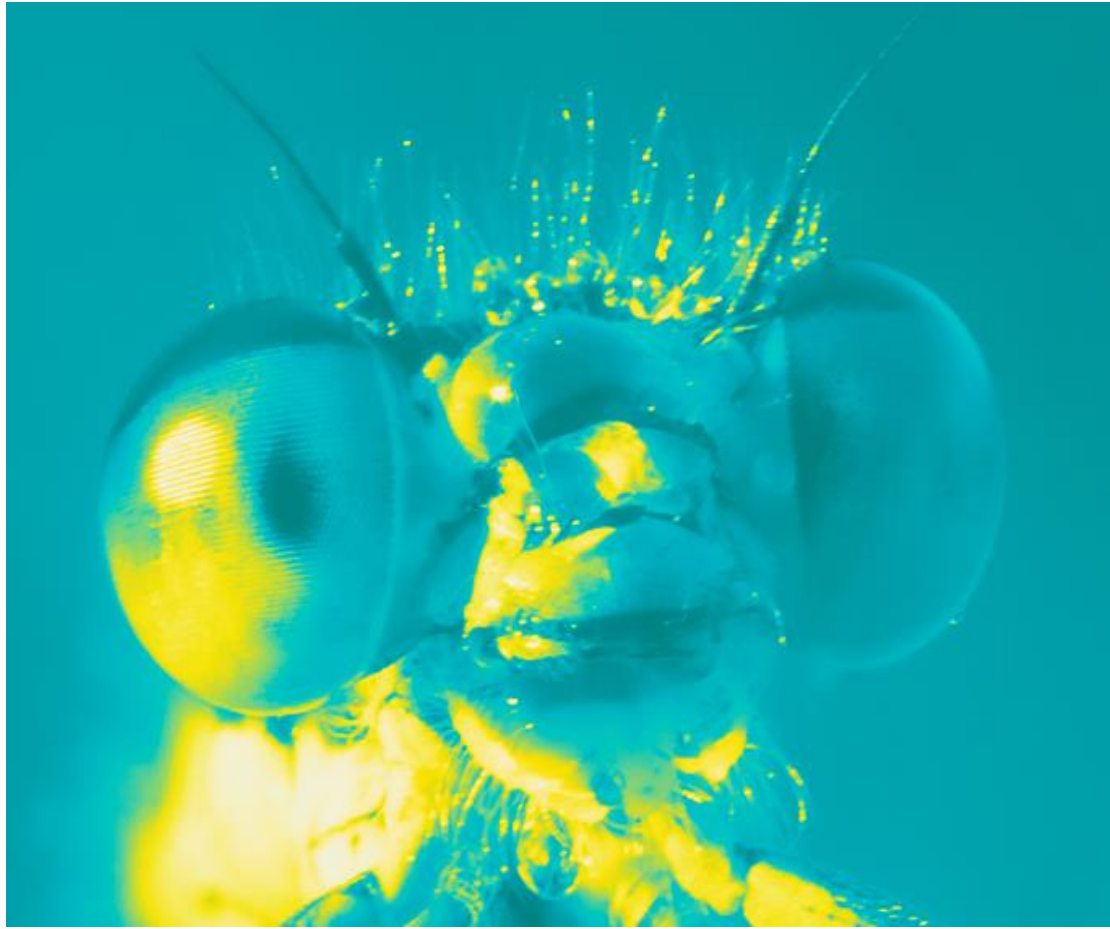


# What makes it great?

- Child-centred
- Inclusive and non-competitive
- Crosses boundaries and promotes collaboration



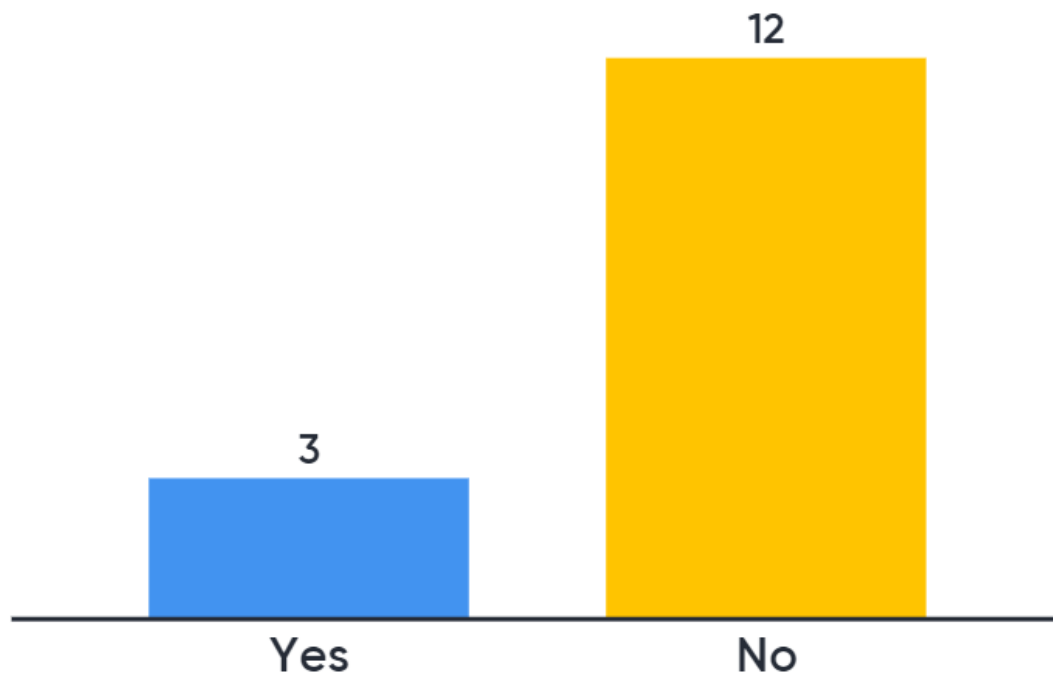
# Great Science Share



**16<sup>th</sup> June 2020**

[greatscienceshare.org](http://greatscienceshare.org)

# Have you been involved in the Great Science Share for Schools in the past?



# What do you think will be the impact of your school engaging in the Great Science Share?

