# Module 4: Focus on Inquiry-based science- link with creativity

## Task 5: Practical activities: Guidance and resources

## What is meant by scientific inquiry? What are its key features?

### Ear Gongs

#### *Materials list*

- 1 coat hanger and other metal objects, e.g. cutlery
- 1 metre of string or thread
- A hard surface to bang it against, e.g. a desk

#### *Practicalities*

As you are asking students to put their string-wrapped fingers in their ears it may be wise to warn them against pushing them too far in or sticking other objects into their ears.

#### *Discussion*

- What does it sound like before you put the string in your ears compared with after? Why?
- Where is the sound coming from? How can we hear it?
- Why do we need the string? What would happen if you try to put the hanger directly against your ear (don't try with any sharp bits!).

#### *Extensions*

- Try different types of string or thread.
- Try with different objects made of metal and other materials.
- What happens if every member of the group ties a piece of string onto the object? Does the sound get louder, softer or stay the same? Can everyone hear it?
- What if your friend ties a thread onto one of your strings? Will he/she be able to hear the sound too? Can you still hear it? How has the vibration travelled?
- Bring in a triangle from the school's music room. When this is struck it makes a clear sound that we can hear through the air. Why do we need to hold it by the string?
- What does it sound like if we hold the metal directly? How is that relevant to the coat hanger experiment?

#### *Links to everyday life*

If a wooden telegraph pole or railway sleeper in good condition is tapped with a hammer, it produces a clear, crisp sound. If the wood is rotten, the sound will be more of a dull thud. This technique is used to help ensure that railway lines and telegraph poles are safe, either as routine maintenance or after a natural disaster such as an earthquake.
Look out for new mobile phone and music headphone designs that allow you to listen to sounds through your skull. The phone or headphone touches your cheek or just behind your ear and sound vibrations are carried through the bones in your skull to the small bones in your inner ear without the sound going through your ear. This technology is also used by the military, whose helmets allow the user to hear normally but make almost no sound.

The project CREATIVITY IN EARLY YEARS SCIENCE EDUCATION has received funding from the European Union Erasmus+ Programme (2014-2017) under Grant Agreement n0 2014-1-EL01-KA201-001644.

## Rocket Mice

### *Materials needed*

- 1 mouse template
- 1 plastic milk bottle (2-litre or 3-litre bottles work best)
- Tape
- Scissors
- Pink rubber-glove material or paper and pens (optional)

### *Practicalities*

Flexible plastic bottles such as milk bottles work better than firmer fizzy-drink bottles. Making the cone-shaped body of the rocket mouse from the template can be fiddly for younger children to do single-handedly. Ask them to work in pairs with one person holding the template in shape while the other applies tape. Or consider pre-making the cones.

### *Health and safety*

Advise children not to lean over the bottle when they are launching their rocket mice. Children should lean back and squeeze or 'clap' the milk bottle with their arms extended. This will ensure their faces are away from the rocket mouse when it is propelled upwards.

### *Discussion*

- What is making the mouse move?
- Which direction are you applying a force? Which direction is the mouse travelling?
- What difference do the size of the bottle and the force of the push make?
- Can you think of any other ways to make the mouse move?

### *Extensions*

- Can you direct the mouse to hit a target?
- What can you do to make the mouse travel further or faster?
- What is the heaviest mouse you can launch?

Try adding measured quantities of modelling clay inside the mouse's nose cone and make a graph of weight and height/distance travelled.

### *Links to everyday life*

A pneumatic drill uses compressed air to move the drill bill into the concrete or rock that it needs to break. Not only is the force strong enough to break very hard materials, but also the air explodes producing noise up to 100 decibels and vibrations that can cause a condition known as 'white finger'.

Air bags are used to raise delicate artefacts from shipwrecks, e.g. the Titanic. The pressure of the air inside is powerful enough to lift the huge weight of objects, or even pieces of the ship, through the water pressing down on them.

**These resources can be downloaded from the Science Museum websiter at https://learning-resources.sciencemuseum.org.uk/resources/**

The project CREATIVITY IN EARLY YEARS SCIENCE EDUCATION has received funding from the European Union Erasmus+ Programme (2014-2017) under Grant Agreement n0 2014-1-EL01-KA201-001644.