

EGG DROP INVESTIGATION

Science Swap Shop

ages 3-5

A four-page pull-out to copy or keep

This is a great activity for encouraging children to think about properties of materials and choosing the best materials for a task, as well as starting to **think scientifically** by only changing one test condition (the landing pad) and keeping everything else constant, such

as the height the egg is dropped from. For a nursery rhyme theme you could turn your eggs into Humpty Dumpty and drop them from a wall.

The challenge

Build a landing pad that an egg can be dropped onto from above head height without breaking.



You will need:

- eggs
- a large variety of materials (boxes, bottles, cups, rubber bands, bubble wrap, etc.)
- sticky tape

Instructions

- 1 Ask the children what will happen to an egg if it is dropped from above their head onto the ground.
- 2 Build a landing pad using

only the materials available. Encourage the children to think about how big the platform needs to be and which materials will cushion the egg landing most successfully.

3 Once the landing pad is built, hold the egg as far above head height as possible and drop onto the landing pad.

4 Check the egg for damage.

5 If the egg is not broken, can it be dropped from a greater height?

Extension ideas

- Instead of building a landing pad for an egg, children could build a structure for the egg to sit inside, and drop the structure with the egg inside onto the ground.
- Try filling sandwich bags with couscous, cotton wool and other materials, place an egg inside each bag, and drop from different heights to investigate which material protects the egg the best.
- Ask children to create the smallest container possible that



will hold the egg and stop it breaking when it hits the ground.

Top tips

- Use hard-boiled eggs for a less messy experience; this also allows for damage to the egg to be assessed at each stage.
- Water balloons are a great alternative if you don't want to use eggs.

ROLLING EGGS

This fun activity encourages children to think about properties of materials as they consider which materials will protect an egg from breaking, and it is a simple introduction to friction

and changing speeds with different inclines as they observe eggs rolling down a ramp. It is also a great opportunity for starting to think how to set up an investigation correctly.



You will need:

- hard-boiled eggs
- timer/stopwatch
- materials to wrap around the egg
- ramp

Instructions

1 Mark two lines on your ramp; you can then time how long each egg takes to roll between the two points.

2 Place an egg on the top line and let it roll down the ramp. Record the time it takes for the egg to travel between the two lines.

3 Repeat 3 times, recording each time.

4 Wrap bubble wrap or another material around your egg and

repeat steps 2 and 3.

5 Wrap another material around your egg and repeat steps 2 and 3 again.

6 Which rolls the fastest?

7 Try changing the incline of the ramp, are your results the same?

Extension ideas

- Are the results the same if you use a longer ramp?
- Is there a material that will make the egg roll faster?
- Could you roll eggs down different surfaces instead of wrapping them in different materials?



KEEPING TEETH HEALTHY: EXPERIMENTING WITH EGGS



This easy activity is a great demonstration of how food affects teeth and why it is important to clean them properly. Tea, coffee or a coloured fizzy drink can be used to show how teeth become stained. This can be extended by covering part of an egg with toothpaste to investigate whether toothpaste reduces the staining effect of the drinks. Vinegar dissolves the shell of an egg showing how acidic foods can damage teeth. Sugary, sticky food

sticks to the surface of teeth where bacteria break down the sugar to make acid, which can cause damage.

We can't experiment on our own teeth, but as the shell of an egg is made of a similar substance to tooth enamel we can use eggs instead.



You will need:

- eggs
- jars/containers
- water
- tea/coffee
- fizzy flavoured drink
- vinegar
- toothpaste

Instructions

- 1 Measure the same amount of fizzy drink, vinegar, water and tea or coffee into each jar.
- 2 Add a whole egg still in its shell to each jar.
- 3 After three days remove the eggs and compare and contrast the colour of each.
- 4 Carefully rinse the egg from the vinegar jar and rub gently



until the shell comes away. You should be left with an egg with no shell, but the membrane still intact.



Extension ideas

- Cover one egg with toothpaste and add to a separate container containing the drink which stained your eggs the most. Leave for 3 days and check whether the toothpaste reduced staining.
- Try soaking an egg in orange juice or other fruit juice, what do you think might happen?

Why does this happen?

Vinegar (which is acidic) dissolves the calcium carbonate in the eggshell, leaving just the membrane behind.

Tea is rich in tannins, which stain teeth if they're not cleaned properly, while cola and fizzy drinks are acidic as well as containing staining products.

REMOVE THE SHELL FROM AN EGG



This easy activity is a simple introduction to the movement of liquids through a semi-permeable membrane. Vinegar is used to remove the shell from an egg, which can then be placed into water to make it increase in size or placed in a concentrated

sugar solution to make it shrink. Eggs with no shell are also great for bouncing from different heights and on different surfaces.



You will need:

- eggs
- jars/containers
- vinegar
- scales

Instructions

- 1 Place an egg into a container of vinegar, making sure it is completely covered.
- 2 Leave for 24 hours and carefully rinse the egg. You should be able to gently rub away the shell, leaving behind the membrane. If you can't rub away all the shell, place the egg in fresh vinegar for another few hours.
- 3 Weigh the egg.
- 4 Place the egg in clean water

and leave for 12 hours.

5 Weigh the egg again. You should find that the egg is heavier. This is because some of the water has passed through the membrane into the egg.

6 Use a pin to carefully pierce the membrane. You should see a fine jet of water shoot out; this is because of the increased pressure inside the egg due to the extra water.

Extension ideas

● Place an egg with no shell into a concentrated sugar solution. You should find the egg shrinks over time. This is because water moves from the inside of the egg (where there is a higher concentration of water) to the sugar solution (where there is a lower concentration of water).

● Place an egg with no shell into coloured water. The coloured water will pass through to the inside of the egg, making the inside of the egg the same colour as the water.



● Can you bounce the egg with no shell? Try dropping it from different heights or onto different surfaces. Remember to only change one variable at a time.

Why does this happen?

Vinegar (which is acidic) dissolves the calcium carbonate in the eggshell, leaving just the membrane intact. The egg swells



up when placed in water, because the water passes through the membrane to the inside of the egg via osmosis. The egg shrinks when placed in a concentrated sugar solution because water moves from the inside of the egg to the sugar solution.