

Title "WHAT HAPPENS NEXT?"

You will need Lots of different apparatus, but mostly things that are around the house and laboratory



What to do Set up a series of situations in which an experiment can be demonstrated up to a critical point. Pupils (usually in teams) then have to predict the outcome. The experiments can be as simple or difficult in accord with the aim of the lesson. This has worked best as a one off activity, possibly at the end of term. Some items may be presented as challenges to add excitement, and the "what happens next ?" question becomes a matter of will (s)he or won't (s)he ?

What happens? With ALL ages students engage in scientific discussion and argument to come to a consensus. Both secondary and primary pupils in the UK have expressed real interest and enjoyment at this approach.

How it works Since the students are working in teams and need to arrive at an agreement, and since they are not being directly observed by the teacher , they will discuss issues more openly that in a normal question and answer session in class.

What next?
(further ideas for investigation etc.) Attached to this document is a page of almost 40 suggestions of possible experiments, which can be paused at a vital point.

It is the writer's hope that SOS participants will contribute many, many more.

Safety notes Each experiment presents its own safety issues and should be evaluated accordingly. Some experiments will be best demonstrated by the teacher.

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What Happens Next ?

Some ideas

Each scenario should be described and shown, and pupils in teams asked to

- A) Indicate what they expect to see happen next
- B) Explain why what happens does

The difficulty of these various scenarios obviously varies considerably, and you should grade them according to the class's ability and the amount of fun you want to have. ***Some of the simpler ones are described first***

Red print are additions to previous lists.

Some problems can be directly linked to your syllabuses... others need not be! Remember that if these are part of a series, to include some very easy "what happens next" or students will always expect the unusual. Not all experiments need have discrepant outcomes.

Adapt this list to your own school. Maybe put it on powerpoint with a few pictures - before and after.

- 1) Two conical beakers are both filled exactly $\frac{2}{3}$ full of water (*that is $\frac{2}{3}$ depth*) (or any other liquid). What will happen when one is emptied into the other?
(The easiest way to set this up is the fill one beaker and the pour half into the second.
If the beakers are perfectly conical the liquid will fill each to approx 0.72 height)
- 2) **Take a selection of bottles and/or beakers. Fill one of them. Ask whether the liquid will fill or spill from the others**
- 3) Float an orange in water. Ask what will happen once it is peeled
- 4) **Try floating other fruits, and ask whether they will float or not, with or without skin**
- 5) **Float an egg in a container of water. What will happen when a considerable amount of salt is dissolved in the water ?**
- 6) A new unopened can of coke and a can of diet coke are to be floated in a large tank of cold water. What will happen? (Can also be done with plastic bottles)
- 7) An individual sauce packet is balanced (with paperclips fixed to its bottom) so that it just floats in a 2 litre pop bottle which is almost full of water. What will happen if the top is screwed into the bottle and the bottle is squeezed? (**Cartesian Diver**)
- 8) Sultanas in Lemonade. Get a bottle of cheap lemonade, the cheaper the better as long as it is still fizzy. What will happen to some sultanas placed in the bottle ?

- 9) What will happen when a peeled and unpeeled grape are dropped into some lemonade?
- 10) Tea bag (cylindrical type) Unfold bag , remove staple and empty contents (tea sweepings) Stand the bag on its end as a square based cylinder, on a £10 note if you are brave. What happens when ...I set fire to the tea bag cylinder?
- 11) 3 Candles. Arrange 3 candles of different lengths so that they can fit inside an inverted glass jar. Light the candles, (from the longest one downwards), and place the inverted jar over them. Which candle will go out first?
- 12) Arrange for a toy truck with some object on the top (maybe a teddy bear) to be pushed against a barrier so that it will come to a sudden stop. What will happen to the object on the top?
- 13) A hardboiled egg and a raw egg are spun horizontally on a table. They will be touched to stop each one. Does anything happen next?
- 14) Arrange some (heavy) crockery and maybe a teapot on a smooth cloth without a hem. When the cloth is pulled away and off the table, (pull it downwards sharply) will the teapot and crockery stay on the table ?
(There are several similar inertia tricks, which are easily adapted as a will it /won't it experiment. They can be repeated with students attempting the "trick".)
- 15) A 1 kg mass is connected to some thick string and the rope wrapped around a wooden cylinder (rolling pin, or even a wine bottle will do as substitute).
When the rod is lifted what will happen?
- 16) About 1m of string is placed over a pencil with a china cup at one end dangling over the pencil and close to it and the other longer end tied to a cork with the string held just below the horizontal. Will the cup reach the ground when released?
- 17) Drop a table tennis ball and a golf ball. Which reaches the ground first?
- 18) You are going to drop a small piece of paper and a coin.
a) Separately
b) With the paper on top of the coin
c) With the paper below the coin but close to it
Describe what happens
- 19) Throw into the air a plastic bottle with water issuing from a hole in the bottle. What happens to the jet?

- 20) Arrange a plastic bottle with a screw top with plastic straw coming out vertically. Everything must be airtight. Blow air into the bottle so that the liquid rises in the straw.
What happens to the liquid in the straw when you jump off a chair holding the bottle?
- 21) A groan tube is dropped vertically and caught. What happens to the groan?
- 22) A slinky spring is held vertically and then dropped.
Looking carefully at the lowest part of the spring what will happen to the spring there?
- 23) Place a table tennis ball on top of a basket ball (use a tiny piece of folded sticky tape to help keep in position), and drop both together. What happens to the table tennis ball?
(This is the same principle as the "Astroblaster" toy)
- 24) Arrange two metre rules, one with a heavy weight fixed at its upper end, one in the centre. Hold the metre rules at the same angle and drop the upper end. Which will reach the ground first?
- 25) Using the same two rules as in 24, one with a weight at its centre and the other with no extra weight. Again let the two rods fall together from the same angle. Now which will reach the ground first?
(Discuss how this compares with number 17)
- 26) A broom handle is rested horizontally on your fingers, one about $\frac{1}{4}$ way along and the other at the opposite end. The fingers are moved towards the centre. What happens?
- 27) Repeat number 8 with a weight equal to the weight of the broom handle tied to the end of the broom handle
- 28) A raw egg is to be thrown hard at a vertical sheet which is held by two people, (with a lip of the sheet at the bottom to catch any bits). Will the egg break?
- 29) Spin a Cadbury's cream egg as quickly as possible horizontally on a slightly rough surface.
Will it keep on spinning?
Try this with « minstrels » sweets too!
- 30) Place a single sheet of newspaper on a table over a half metre length of thin wood, one end of which protrudes. The protruding end of the wood is to be struck sharply. (Hint: hardboard works best)
- 31) What happens when you blow between two vertical strips of paper held at the top and bottom?

- 32) Newton's Cradle - What will happen to the masses in Newton's cradle when a piece of metal is placed in between stationary masses? What will happen if the mass at one end is struck with a small hammer?
- 33) Waddling Animal on Slope - What will happen to the speed of the animal if an additional mass is added to the animal. Does it matter where the mass is fixed?
- 34) Wine glass with (half a) cork in side. What happens when I blow sharply over the top of the glass?
- 35) Shape half a lolly stick into the shape of the hull of a boat. Place in bowl of clean still water, (or better still some old (or new) guttering.) What happens when I drop a few grains of soap powder on the stern of the stick?
- 36) Place 5 or 6 cocktail sticks in a circle (as radii) around a central point; Touch the central area with some absorbent material (blotting paper) and then with the edge of a bar of soap. What happens to the sticks?
- 37) Knees Bend. What happens when you stand with your heels against a vertical wall and try and bend down to pick something on the floor?
- 38) Tie some thread round a tin of beans (or similar large object) (one thread above, one below) so that the tin can be suspended from above, and the string below pulled. Which string breaks when you pull fast and hard?
- 39) Both ends! Put a needle through the centre of a long candle and shave both ends. Balance the candle at its centre and light both ends, what happens?
- 40) Mirror writing. Place a mirror above some names, so that you see the image. What is special about what you see when you write TOM DICK and HARRY?
- 41) The Big Circuit. Arrange a circuit such that the wires go from the power pack all the way to the back of the room to a bulb and back again. What will happen when you switch on? Does the bulb come on immediately? *(The heating of the bulb does take a moment, but you could substitute a motor)*
- 42) Using an empty milk bottle and hard boiled egg, drop a lighted match into the bottle and then seal the top with the egg. What happens?
- 43) Suspend a broom handle horizontally by two thin threads from its ends. Take another broom handle and whack the centre of the suspended one. What breaks, one thread, two threads, or the broom handle?
- 44) Two blocks of ice, (identical) are going to be placed on a plastic box, which feels warm, and an upturned thick bottomed frying pan which feels cold.

Will either of the blocks melt?

45) Place a medium size (2cm diameter by 1 cm depth) neodymium magnet on top of a pile of Japanese yen, (8 or 9).

What happens when you lift the magnet quickly?

46) Suspend a yen on a thread (use adhesive to stick the thread to the yen).

Move a medium sized neodymium magnet towards the yen . What will happen?

47) “Float” a yen on some still water utilizing the surface tension.

(This can easily be done by lowering the yen on tissue paper, and then removing the paper)

Hold a charged rod beside the yen. What happens?

(This could be done after showing attraction of a yen held by a thread as in 46)

48) Obtain two test tubes such that the second just fits inside the first.

Fill the first with water and float the second inside the tube.

Turn the two tubes upside down. What will happen?

49) Arrange two suspensions on thread. One a small glass rod (3 cm long) and the other

a rolled up rod of aluminium foil. How will the rods line up when held beside a strong neodymium magnet. ?

50) What happens when a small but strong cylindrical magnet is rolled down a gentle slope at

In a N-S direction?

51) Eclipse of Mars. Stare at a red disc for 20+ seconds ,

(Can be shown using a data projector)

What will you see when you move away from the red disc or arrange for it to become smaller?

52) Barbeque Skewers.

Fill a polythene bag with water.

What happens when you push barbeque skewers through the bag?

(Most effective when the bag is held above someone’s head)

* PLEASE SEND ME ANY OTHER INTERESTING IDEAS.

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If you need further explanations of any of these ideas contact me at the email address above.

D Featonby April 2008