

Science: Skill Focus - Observation

Question



National Competition: The Great Bug Hunt



Bugs are everywhere - you just have to look carefully. Find a habitat (eg. hedgerow, grass, stones, trees, flower bed) and search for some bugs. Maybe you'll find a spider under a bed or go on an indoor bug hunt. Can you count how many you find? Can you identify (name) them? Can you observe carefully to find out how many legs it has? Make sure you are careful to not disturb the bugs or their habitat and make sure to wash your hands after exploring.

This is a competition for the whole country and your entries can be submitted online:

<http://www.schoolscience.co.uk/bughunt> or emailed to school to enter for you. If you want to enter the competition the deadline for entries is the 11th June. The national winner will win a microscope.

Question

Predict

Observe

Record

Analyse

Report

Younger Children

Look carefully at a bug that you have found. Create a drawing or model of a bug that you have found. Think carefully about the different parts of the bug. Eg. How many legs does it have?

Older Children

Create a graph showing the number of different bugs you could find. Can you see any patterns in the number or location of the bugs found?

Challenge

Create a fact-file about a bug that you find. You could answer: What does it look like? How does it move? Where does it live? What does it eat? Your fact-file could be a poster, a story, a poem or even a video.

About this type of Science

The study of bugs (insects) is called entomology. Farmers need to know which bugs are good for their crops. Doctors learn about which insects carry diseases and which help cure diseases. Engineers are inspired by bugs to make smaller flying objects. Some scientists are finding out if insects could be a protein source for the future - could insect burgers replace beef burgers?

<https://www.nationalinsectweek.co.uk/>

Science: Skill Focus - Fair Test

Question



Which material makes the strongest boat?

Carry out a fair test to find out which material makes the strongest boat.
 You could use paper, card, tin foil, or any other material you find.
 Fold material to create a boat - it doesn't have to look like a boat!
 Carefully place your boat in a large bowl of water or sink.
 How many coins / legos / marbles can you put in your boat before it sinks?
 Repeat with a different material.



Question

Predict

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Younger Children

Older Children

Draw your boats and write how many objects you could fit in each boat before it sank.

Create a report of your experiment. What was your hypothesis? Record your results in a table. Analyse your results - Why do you think the boats sank/floated? How could you improve your boats? Was it a fair test?

Challenge

About this type of Science

Take part in the Great Science Share on Tuesday 16th June.
<https://www.greatscienceshare.org/getinvolved2020#greatscienceshare>
 Share your science or watch others carry out experiments online. Along with opportunities to ask real scientists questions.

Depending on the amount of water displaced (push out the way) by the boat, will depend on how heavy the boat can be. This is how there can be huge shipping containers that are longer than 4 football fields!

Marine Engineers design and build things that work in water. That could include boats, submarines or making electricity using hydroelectric dams.

Science: Skill Focus - Analysing

Question



Do your reactions get better the more you exercise?

1. Test your reaction time by holding a ruler (or stick) just above your other hand.
 2. Drop the ruler and try to catch it.
 3. Measure how far the ruler dropped before catching it.
- (If you don't have a ruler, use a long thin object, lay object on paper and draw length)
4. Record the distance dropped.
 5. Do 10 star jumps or sit ups.
 6. Repeat steps 1-5.
 7. Do another 10 star jumps or sit ups.
 8. Continue repeating to see if your reaction time changes. (The shorter the distance the quicker your reaction).

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Younger Children

Older Children

Create a diagram to show how you set up your experiment. What did you find? Did your reaction time speed up or slow down?

Record your results using a bar chart or graph. Analyse your results. Did carrying out star jumps affect your reaction time? Why do you think that is? How could you improve the experiment? What else could you test? Eg. Reaction time versus age or time of day?

Challenge

About this type of Science

Close your eyes and get somebody else to drop the ruler. Make sure they say 'Go' when they drop it. Is your reaction time quicker or slower with your eyes closed?
How about if they tapped you on the shoulder instead of saying 'Go'. Do you respond quicker to sound or touch?

*Reactions are how long it takes to respond to a stimulus. Some reactions are automatic, meaning you act before you think about it. Eg. removing your hand if you touch something too hot or closing your eyes if something flies towards them.
Astronauts, pilots, sports people and surgeons all need to be able to react quickly.*

Science: Skill Focus - Predicting

Question



Which shape is the strongest shape?

Fold a piece of paper into different shapes eg: Cuboid, Cylinder, Triangular
Carefully place a flat object eg. paper or book on top of each shape.
Slowly, increase the mass of the objects balancing.
Which Shape is the strongest?



Question

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Younger Children

Create a table with your predictions of which shape would be strongest. Then record what you found out. Eg:

Shape	Prediction	Result
	Strongest	3rd strongest - 5 books balanced.

Older Children

Record your prediction and results in a table and a bar chart. Then investigate if the length of the shape makes a difference. Eg. 5cm tall or 10cm tall?

Challenge

Create a bridge out of newspaper (or spaghetti and marshmallows) between 2 chairs. How long can your bridge go? How strong is your bridge? Can a toy car drive smoothly across it?

About this type of Science

*Civil Engineers are people who design and build bridges and other large structures. They carefully investigate which shapes and materials will be strongest and not collapse.
Isambard Brunel is famous for building the first iron bridge, the first tunnel under a river and lots more.
The longest bridge in the world is 165 km long!*

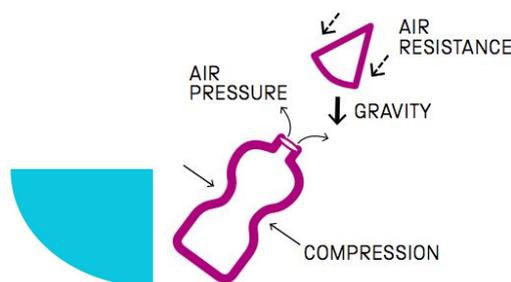
Science: Skill Focus - Making Improvements

Question



How far can you make a rocket fly?

Cut a piece of paper into a curve (blue shape):
 Fold and tape to make a cone
 Decorate the cone
 Fit on top of an empty milk bottle
 Squeeze the bottle
 Watch the rocket fly.



<https://learning.sciencemuseumgroup.org.uk/resources/rocket-mice/>

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Older Children

How far can you make the rocket go?
 Decorate the rocket. Does adding wings or decorations change how far the rocket flies?

Can you change the rocket or launcher to improve the rocket flight?
 Repeat each design 3 times to improve the reliability of your results. Create a labelled diagram of your rocket and measure the distance flown.

Challenge

About this type of Science

Investigate the forces used to allow a rocket to fly. You might consider:
 Which forces must be overcome?
 How are rockets designed to reduce air resistance?
 How do rockets land safely?

Using your results to try and make improvements to your results is a crucial part of science. By continually questioning why scientists got their results and what happens when it is changed a bit, some incredible technology and advancements of our understanding of the world has occurred. James Dyson, bagless vacuum inventor made 5271 vacuums before he finally made one that worked.

Science: Skill Focus - Recording

Question



Which type of paper is the most absorbent?

1. Get 3 different types of paper eg. Writing paper, loo roll, kitchen roll.
2. Place a sheet of paper resting over a cup.
3. Drop water onto the paper using a pencil as a dropper.
4. Count how many drops before water appears in the cup.



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Record the properties of each paper. Eg. Rough, smooth, thick, bumpy.
Record your prediction of the number of drops.
Record your results and observation of what happened.

Write a report showing your scientific process. Include your predictions, a step by step method, equipment, observations, results and analysis of your results. Eg. Was your prediction correct? Why did you observe what you occurred? How could you change or improve the experiment?

Challenge

About this type of Science

Plastic can have lots of different properties: however, this can make it difficult to recycle. Investigate the plastic in your house to find out what type of plastic it is. Then research how (or if) each of the 7 types of plastic can be recycled.

<https://www.recyclenow.com/recycling-knowledge/how-is-it-recycled/plastics>

Materials have lots of different properties. Understanding these properties is important to be able to use materials effectively.
Charles Macintosh invented the waterproof jacket by exploring properties to make a comfortable and waterproof material.
John Dunlop invented the air-filled rubber car tyre to make driving a more comfortable ride.

Science: Skill Focus - Making Conclusions

Question



How is water recycled?

1. ¼ fill a glass of warm water
 2. Cover glass with clingfilm
 3. Place ice cube on top of clingfilm
 4. Leave in place to observe
 5. Observe water movements
- OR: ¼ fill a ziplock with water. Then, sellotape to a sunny window and observe over a day.



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Older Children

Create a poster of the water cycle. Can you include what you observed?

What does the above experiment show us about How water is recycled? Create an informative poster to answer the question:
How is water recycled?

Challenge

About this type of Science

Leave a bowl of water in the sun - How long does it take to evaporate. Or create a water filter using a funnel (or half a cut bottle), soil and gravel.

It is thought all the water on earth arrived by meteorite 4 billion years ago. So the water you drink could have been drunk by a dinosaur! The water cycle is crucial to life on earth. Scientists who study water are called Hydrologists. They work on creating electricity from water, prevent homes from flooding and help clean our drinking water.

Science: Skill Focus - Observing

Question



Can you separate colours?

Cut kitchen paper into long thin strips.
 Wrap one end around a pencil and hang over a cup
 2 cm from the bottom of the paper draw a line.
 Place a dot from a colouring pen on the line.
 OR wet a smartie and make a dot
 Place water in the cup so that it covers 1cm of the paper (not the dot).
 Wait and observe what happens.



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Younger Children

Record your observations on a labelled diagram of your experiment. What equipment did you use? Which colours appeared?

Older Children

Take accurate measurements of the distance travelled by each colour. Record your results and compare. Write a list of questions that you could ask about what is happening and why? Have a go at answering some of them.

Challenge

Which colours split into the most colours? Is this the same for every type of coloured pen? Eg. Does a black biro split the same amount as a black felt-tip?

About this type of Science

This method of separating colours is called Chromatography. Scientists use chromatography to investigate what a substance is made from or to identify what a mystery substance is - Just like how police use fingerprints. The inventor of chromatography, Mikhail Tsvet, used it to find out why leaves are green.

Science: Skill Focus - Sorting and Classifying

Question



How do plant leaves differ?

Look closely at different leaves? Think about how they differ and how they are similar.

Place a leaf in a bowl of water. Put a small stone on the leaf so that the leaf sinks. Leave the bowl in a sunny place for an hour. Observe how there are tiny bubbles on the leaf. This is the leaf letting oxygen out of it.



Question

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Younger Children

Sort the leaves into different groups. Eg. size, number of points or lobes. Can you spot any patterns as to which leaf belongs to which plant? Do the largest leaves belong to the largest plants?

Older Children

Sort the leaves into different groups. Eg. size, number of points or lobes. Can you spot any patterns as to which leaf belongs to which plant? Do the largest leaves belong to the largest plants?

Challenge

Research why some plants' leaves change colour in autumn? Can you spot any patterns in the leaf shape for plants that drop their leaves?

About this type of Science

The main role of leaves is to produce food for plants through a process called photosynthesis. This takes in carbon dioxide from the air and releases oxygen back into the air. This is why increasing the number of plants and protecting forests is so important to help clean the air we breathe.