

FLUR WITH SCIENCE

Inspiring curiosity in your child



From the Director General



Having fun with science is a great way to show your child that science is everywhere and is a very important part of our lives.

As a parent/carer you can help your child get hooked on science by doing things together

and talking about what you see. You can also help them find out how and why things happen.

Science can be great fun for the whole family.

There are lots of ideas in this booklet that you can try, such as making green slime, a balloon rocket or a volcano. The booklet also lists some websites that offer lots of great experiments on all sorts of topics.

I hope this booklet helps you and your family have some fun together finding out about science in our world.

Sharyn O'Neill
Director General

WHAT WILL
HAPPEN?

WHY DID THAT
HAPPEN?

WHAT DID YOU
OBSERVE?

WHAT WOULD
HAPPEN IF WE
CHANGED...?

HOW CAN
WE FIND OUT
MORE?

Learn with your child and find out the answers.
This will develop their ability to think through
problems logically and carefully.

Visit det.wa.edu.au/schoolinginwa to download
a copy of this booklet.

Science is all around us

Science is part of our lives and learning about science helps us understand our amazing world. We depend on science in lots of ways every day, so it's important for children to learn about it.

This booklet has ideas about how to help your child become interested in science and how things happen. It also has some easy and fun experiments to spark the whole family's interest in science.

Supervising your child during all experiments is advised.

You don't need fancy equipment.

Many experiments use materials found around the house.

If we know about science it helps us to:

- make good decisions based on facts we can trust
 - understand the world around us
 - understand the language and nature of science
 - investigate and come to conclusions based on evidence
 - think about and question what people or companies say.
- (Goodrum, Hackling and Rennie 2001)



'Magic' milk

Pour full cream milk into a saucer. Add 1 drop of different food colouring near the edge of the milk.

Next, put a drop or two of detergent in the centre of the milk but, before you do that, talk about what might happen.

Change the temperature of the milk or try skim milk. Which works best?

(The surface tension of the milk is like an 'elastic skin' which holds it together in a puddle. The food colourings float on top of the milk. When you add the detergent it breaks the surface tension of the milk in that spot allowing the colours to mix. Patterns may continue for several minutes.)

Science is hands on and fun!

Science helps your child understand how our wonderful world works. Science discoveries are fun as well as educational.

Cornflour goop

Put 1 cup of cornflour in a bowl and add water to make a paste.

Add 3 drops of food colouring and stir slowly. It should be easy to stir. What happens if you hit it with your hand? Take a handful and see what happens.

Now roll it quickly between your hands. What happens? Stop rolling and let it sit on your hand again.

(The mixture can feel hard like a solid, runny and dripping like a liquid or hold its shape while you roll it quickly. This is because the molecules of the cornflour are bigger than those of water and, when you slap the surface quickly, they get 'tangled' in each other and don't splatter like a liquid. When moved slowly, they are able to run by each other smoothly and flow like liquid.)

Make a volcano

Try this on the lawn. Lay out a large rubbish bag and stand an empty 600ml plastic drink bottle in the middle of it.

Pack damp dirt/sand up around it to form a volcano shape, leaving the lid on the bottle so dirt doesn't fall in.

Pour ½ cup of white vinegar into the bottle and add a few drops of dishwashing detergent. Using a dry funnel, add 2 heaped tablespoons of bicarbonate of soda into the bottle and watch your volcano erupt! How could you change the amount of lava?



Become a science detective

Professor David Blair, 2007 Premier's Scientist of the Year, says science is fun, exciting and makes for a fabulous fulfilling life. He has earned a world wide reputation for his work on gravity waves.

His latest amazing project is the world's first purpose built leaning tower at the Gravity Discovery Centre in Gingin. It is based on the Leaning Tower of Pisa in Italy and is open for families to explore.

"Science is a bit like being a detective. You have to solve problems, explain puzzles, invent things and expand your mind," he says.

"You can help your children do things and make things; help them find answers to their questions. Instead of watching television or playing computer games, encourage them to go outside and explore. Above all let them use their imaginations. This way they will become smarter, more creative and healthier too."

Ballon rocket

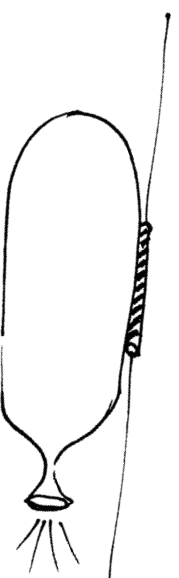
Make a balloon rocket with a long balloon, a straw, 3m of string and some tape.

Thread the string through the straw and tie each end of the string to objects like door knobs on either side of the room. Make sure the string is tight.

Ask your child to blow up the balloon and hold the end closed while you tape the balloon to the straw pointing in the same direction as the straw.

Back the balloon up to one end of the string and count down to lift off! Let go of the end and the air escaping from the balloon will give the rocket forward thrust along the string.

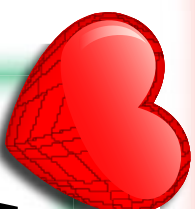
Try different shaped balloons, different string (fishing line or cotton) and different sized straws and talk about the results. Which makes the best rocket?



Science is about me!

Science explains how my body works.

- The body is amazing and science helps us understand the parts and systems of our body such as blood, our skeleton, our muscles and how we move.
- Science explains why I look like other people in my family. Science tells us about our hair and eye colour, our height and unique features and abilities.



Heart rate

Help your child find their pulse and count it for 30 seconds. Multiply by 2 to get the beats per minute.

Do some vigorous exercise, such as star jumps or running on the spot, for 1 minute then count your pulse again for 30 seconds and multiply by 2.

Compare the different rates and talk about why the heart beats faster during vigorous exercise.

(When our muscles work hard they need more oxygen so the heart beats faster to send oxygenated blood to the muscles.)

Consumer science

Which product is the best?

Test two or three different brands.

- **Paper towel:** Using a medicine measure, pour measured amounts of coloured water on to plates and see which type of paper towel absorbs most liquid.
- **Jelly crystals:** Make two jellies and see if the jelly crystals of one brand dissolve faster than the other.
- **Toothpaste:** Buy plaque disclosing tablets from a chemist to find out the most effective toothpaste. (Eat some plain biscuits then chew 1 tablet and note the amount of plaque on your teeth. Brush your teeth for 1 minute with toothpaste A, rinse and see how much plaque is left. Repeat the activity at the same time the next day, eating the same number of biscuits and brushing for 1 minute with toothpaste B.)
- **Fat in potato chips:** Crush 5 chips into a brown paper bag with a rolling pin. How much oil appears on the brown paper bag? Measure the size of the spot. How does the fat content compare between brands? Compare this to the information on the food label. Which brand has the least amount of fat?

Discuss the claims made by companies. Are they accurate? For example, some makers of chocolate chip biscuits claim a percentage of chocolate in each cookie. How can you work this out? Are their claims correct?

(Weigh one biscuit. Break it up and carefully remove the choc chips. Weigh the choc chips and work out the percentage with a calculator. Divide the weight of choc chips by the weight of biscuit then press = and x 100).

Use your results to guide what brands you buy.



Involve the family

Help your child think about and look carefully at things by trying some of these activities together.

- **Play Who/What am I?**

Choose an animal, plant or object in the garden. Your child asks questions that you answer only with 'yes' or 'no'. Encourage them to use descriptions based on the structures of the animal or plant. For example, *Does it have fur? Does it have four legs? Does it have leaves? Does it have fruit?*

- **Collect 10 objects and cover them with a towel.**

Give your child a quick peek for 20 seconds then cover them again. How many things can they name? Increase the number of objects and shorten the length of the peeks for added challenges.

- **Talk with your child about science.**

Use news stories as a source of conversation topics.

- **Discuss claims made by companies in TV, magazine and newspaper advertisements.**

Find out about the two 14 year old schoolgirls in New Zealand who forced Ribena to stop advertising high vitamin C content after they proved the claims were false. Be wary and question claims made in advertisements especially in the cosmetics industry. Discuss how you could test their claims.

- **Encourage your child to do their own investigations.**

An investigation is the scientific process used to find out things. Your child can perform investigations for family members as the audience. Ask the audience to predict what will happen. Do the experiment and encourage your child to explain what was observed. We call this process Predict, Observe, Explain (POE).

- **Ask questions such as:**

What do you predict will happen?
What did you observe or see?
Can you explain why that happened?

Did you know?

Observing often requires using all the senses of touching, seeing, hearing, tasting and smelling – although sometimes in science it can be dangerous to smell and taste.

Science in the home

When you are cooking talk about what could happen if you change an ingredient. Talk about the effect of heat on ingredients. Observe and talk about the changes you see.

When washing the dishes, talk about what detergent does to the fat when washing up plates or pans.

(Detergents increase the wetting ability of water by reducing the surface tension so it interacts more easily with the molecules of the fat and takes them off the plate.)

When putting away the shopping talk about how many forms of corn you could have in the pantry. Why do they look (and behave) so differently?

- Cornflakes (Each grain of corn is cooked, rolled and toasted.)
- Corn on the cob (It is cooked as the whole ear of corn.)
- Cornflour (It is cooked and ground very finely to form white powdery starch.)
- Popping corn (It is a special variety of flint corn grown especially for popping when heated.)
- Corn chips (It is steamed, soaked, ground, made into dough, cut into shapes and cooked.)

Layering liquids

Pour $\frac{1}{4}$ cup of golden syrup into a glass. Next, pour in $\frac{1}{4}$ cup of cooking oil. Finally add $\frac{1}{4}$ cup of water. Watch and talk about what happens.

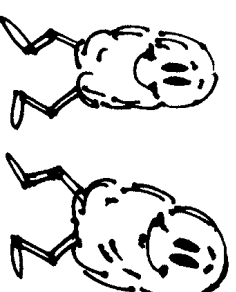
(The most dense liquid [golden syrup] sinks to the bottom. The least dense [oil] floats on the top of the water.)

Drop in a grape and a small cork. What happens? Try other objects.

'Dancing' currants

Put several currants into a glass of soda water or lemonade. What happens? How long do you think this will continue? Why?

(Being heavier than the liquid, the currants sink to the bottom but the little bubbles of carbon dioxide in the drink attach to the rough surface of the currants gradually lifting them to the surface. The bubbles pop when the currant reaches the surface and so it sinks again. The currants continue to 'dance' until the carbon dioxide has escaped and the drink goes flat. The currants also get soggy and become too heavy to rise to the surface.)



Science in the garden

Share, observe and talk about things around the garden with your child.

- Germinate seeds and plant them in the garden. Slide broad bean seeds down the inside of a glass jar of soil, so you can easily see the seeds. Water lightly and put the jar where it gets light and warmth from the sun. Check daily to see what happens.
- Compost vegetable scraps and breed worms. Conduct an experiment to see how worms help to improve soil. Fill a large, clean glass jar with layers of damp sand, compost and soil making each layer about 1 cm deep. Add some worms and put the jar in a dark place. Keep damp, not wet, and check every few days and see how the layers change. Talk about this with your child. Return the worms to your garden when you have finished.

The shed holds lots of interesting tools that you can talk about together such as:

- examples of levers such as the wheelbarrow, pliers, spade
- how the different tools in the shed make work easier for us, such as an axe. (It is a wedge that makes it easier to split wood.)



Science in our environment

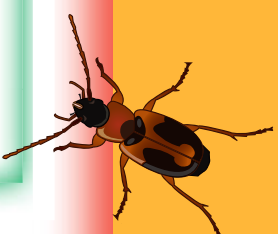
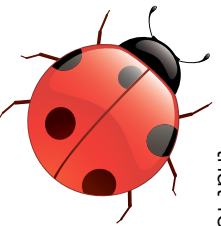
Roger Harris is a teacher and manages Herdsman Lake Wildlife Centre. He won the 2007 Premier's Prize for Excellence in Science Communication Outside the Classroom.

Roger is passionate about the environment thanks to his father. "My dad was a farmer and he used to get off the tractor so we could track down an echidna or carefully dissect a flower. I caught my love of the natural world from him," he says.

Roger says parents have an important role to play.

"You don't have to be a scientific expert. Your enthusiasm is what your child needs, as well as the opportunity to get up close with nature. Spark their interest and then they can go and look things up," he says.

"If we as parents don't influence the way our children think, facebook and myspace will do that for us."



Bugs in the backyard

You will need glass jars and a small brush. Help your child search the back garden and find a range of bugs. Brush one of each into separate jars.

Look carefully. Talk about what you can see, such as how many legs, body parts, wings and feelers. Find out more about each bug on the internet.

Once you have finished your observation return the bug to where you found it. Stinging insects and spiders are best left alone.



Help our world? Yes, we can!



Here are some ways to protect our environment and reduce the impact of climate change.

- Switch off (electrical appliances) before you take off.
- Reduce, re-use, recycle (in that order).
- Compost green waste to improve the soil in your garden and grow vegetables – you can't beat fresh, organic produce!
- Enjoy a 'water wise' garden full of native plants and the local fauna they attract.
- Walk or ride a bicycle where possible instead of using the car.
- Live more with less. Slow the impact we have on the environment, ecosystems and biodiversity by asking the question *Do I/we really need this?*

What we do today has a big impact on future generations, especially regarding climate change.

"Global warming is a reality! We, the Esperance Primary Energisers, are the generation who can do something about it and are keen to make a difference. Although the earth seems big to us, it is only a speck in the universe. Global warming affects the WHOLE WORLD: every nation, every human, every plant and every animal. No one can escape it! But we, humans, can save our planet."

Angus Paterson & Liam McGovern
Esperance school students

Did you know?

The natural environment provides the important life support systems for human beings. We cannot live without the 'ecosystems services' such as clean air, water, food and medicine.

Science is the way of the future

Science has made a huge difference to our lives through areas such as health (vaccinations to control diseases); environment (water recycling and desalination); work/school (electricity and computers); and transport (more efficient cars and aircraft).

Science also helps our economy grow through clever ideas and new products. Science can be trusted because it explains things that have been tested and proven.

Science will help solve our environmental problems, food shortages and the fuel crisis. Science is needed to invent, test and refine new and better ways of doing things that will benefit all of us and our world.

Allan Whittome is a teacher at Badgingarra Primary School who won the 2007 Premier's Science Award for Primary Teaching. Allan involves his students in projects that include permaculture, worm farms, astronomy and forensic science.

He believes in combining science and technology. His students have raced in competitions using carbon dioxide dragsters, hydrogen powered cars and are currently involved in model formula one racers.

In each case, students have constructed their model cars and then used science investigations to evaluate the effectiveness of these cars.

“Experiment with your child. Enjoy it! Learn with your child and find out the answers together. There are so many exciting things that you can do together,” he says.

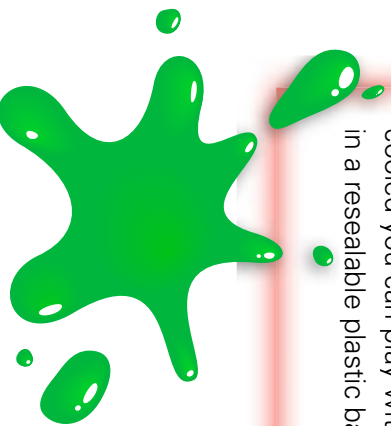


More experiments

Green slime

You will need 1 teaspoon Metamucil or psyllium husks (pronounced silly-um), 1 cup water, green food colouring, jar with lid and microwave safe container. Combine the Metamucil/psyllium husks and water in a jar. Tightly seal the jar and shake for several minutes. Pour the mixture into a microwave-safe container and stir in a few drops of green food colouring. Microwave on high for 3 to 5 minutes.

Watch the mixture carefully and press STOP if the liquid begins to ooze out of the container. Do not remove. Wait for 3 minutes then microwave again for 5 more minutes. Remove the container. When it has cooled you can play with it. Store the slime in a resealable plastic bag.



Don't stop once you have made the slime.

Investigate:

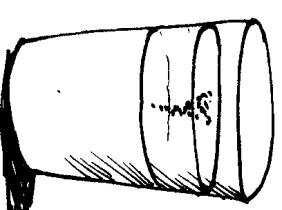
- the effect of temperature on slime (warm it by rubbing with your hands, cool it by placing it in the fridge)
- how far it can stretch before breaking
- what happens if we change the amount of water or psyllium husks used.

Salt volcano

Half fill a glass with water. Add about $\frac{1}{4}$ cup of cooking oil. When it settles, talk about where the oil is sitting and why. Shake some salt on top of the oil while you count to 5 and observe. Add more salt and discuss the results.

(Oil is lighter, or less dense, than water so sits on top. Salt is heavier than water so sinks to the bottom of the glass taking a glob of oil with it. As the salt dissolves in the water the oil is released and floats back up to the top.)

What would happen if you used sugar instead of salt?



More things to do together

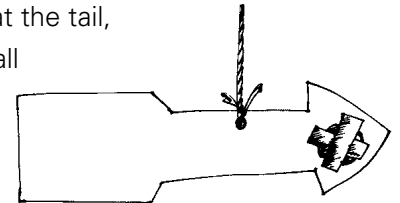
Look at the night sky at the same time each night for one month and track the position and shape of the moon. Note any changes you see. Note the direction the moon rises in each night. Talk about what causes the different shapes of the moon.

Set up your own weather station and compare your readings to the official results in the weather report after the news on television or in the newspaper. Include a:

- rain gauge
- wind vane – you can make one together
- thermometer to see how hot or cold it gets.

Wind vane

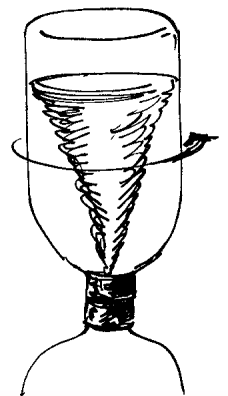
Using heavy card, cut out a big arrow with a broad tail. Sticky tape a washer to the front end. Washers are available from your local hardware store. Find the balance point by sticking in a pin until you get it right and then tie a piece of string through the hole. When you hang it up it will point in the direction the wind is coming from because the wind pushes against the larger area, which is at the tail, turning the small end to face the wind.



Plastic bottle tornado

Find 2 empty plastic bottles the same size and take off the lids. Glue these together and punch a hole through both lids using a large nail or a drill (a hole the size of a drinking straw is good). Fill one bottle with water and add some food colouring – and glitter for special effect. Screw the lids onto the full bottle and screw the empty bottle on top. Make sure the seal is tight and waterproof. Turn the bottles upside down (full bottle on top) and spin them so the water starts to rotate inside the bottle. Try turning the bottles over without spinning them. Does the water flow from top to bottom as quickly?

(When the water is spun it forms a vortex and air can move up through the hole in the vortex helping the water to flow smoothly.)



Resources

Science resources on the internet

- Good science books for children: www.science.org.au/pi/goodbooks such as:
 - 'Me and my family tree' by Paul Showers
 - 'A drop of water: a book of science and wonder' by Walter Wick
 - 'One Less Fish' by Kim Michelle Toft and Alan Sheather
- NASA website: www.nasa.gov/home/
- ABC surfing scientists: www.abc.net.au/science/surfingscientist
- Sustainable schools: www.sustainableschools.wa.edu.au
- National Science Week Activities: www.scienceweek.info.au
- Science Network WA: www.sciencewa.net.au

- CSIRO: Science experiments to do at home: www.csiro.au/resources/DIYScience.html
- Bureau of Meteorology (BOM): www.bom.gov.au
- Exploratorium: www.exploratorium.edu
- How Stuff Works: www.howstuffworks.com

Places to visit around Perth

- Scitech: www.scitech.org.au
- Zoo: www.perthzoo.wa.gov.au
- Gravity Discovery Centre: www.gdc.asn.au
- Museums: (Perth, WA Maritime Museum, Fremantle Prison, The Shipwreck Gallery) www.museum.wa.gov.au
- Perth Observatory: www.perthobservatory.wa.gov.au

- Herdsman Lake: www.wagouldleague.com.au/about.htm
- World of Energy: www.worldofenergy.com.au
- AQWA: www.aqwa.com.au
- Naturaliste Marine Discovery Centre: www.nmdc.com.au
- Kings Park: www.bgpa.wa.gov.au
- Yanchep National Park and Crystal Cave: www.naturebase.net
- Piney Lakes: www.melvillecity.com.au/environment/piney-lakes
- Naragebup Rockingham Regional Environment Centre: www.naragebup.org.au
- Landsdale Farm School: www.landsdale-farm-school.com.au
- Perth Hills National Parks Centre: www.naturebase.net/nearertonature
- Animal parks such as reptile parks: www.naturebase.net/nearertonature

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Reader survey continued...

7. I have used at least one of the ideas in this booklet. Yes No

8. In future I will use at least one of the ideas in this booklet. Yes No

Other comments

Name:

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Send your completed form to:

A: Reader Survey
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* 1. By entering the competition parents/carers agree to abide by these terms and conditions. 2. Entries must be received by 3 October 2008 at the Department of Education and Training, Corporate Communications and Marketing, Level 2, 151 Royal Street, East Perth WA 6004. 3. The reader survey must be completed. 4. There can only be one completed form per family. 5. One prize of an iPod will be drawn. 6. The winner will be notified by telephone. The draw is final and cannot be contested. No correspondence will be entered into. 7. The prize is not redeemable for cash and is non-transferable.