

BEAVERS



Beaver Experiment Activity Badge Resource Pack

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Bucks Beaver Scouts

January 2019



Scouts
Buckinghamshire
Beavers

Experiment Activity Badge

How to earn your badge

1. Do three experiments. Talk to your leader about trying these:
 - White light spinners
 - Magnet tricks
 - Making a ketchup packet sink
 - Sensory bottles
 - Volcano eruption
 - Making slime
 - Growing Cress
 - Rainbow flower

Before you try them, what do you think might happen?

2. After you do your experiments, tell other Beavers what you saw and discovered. Try to explain why it happened.



Rainbow Walking Water

Supplies Needed:

- Small plastic cups or glasses
- Paper towels (*read my tips below for picking the right ones)
- Food colouring in primary colours
- Water

* The pick-a-size paper towels are best because then you just use half sheets for each cup. If you only have full sheets, then cut them in half. I've also heard that more absorbent paper towels work better too. I buy the cheap store brand ones, and our water moved pretty quickly from cup to cup, so I am not sure how important that is. It may have went quicker with something more absorbent though.

What you need to do:

1. Place 7 cups in a row and pour water in the 1st, 3rd, 5th, and 7th cup. My cups were about 3/4 full. I have since heard that fuller is better.
2. Add 5 drops of red food colouring to the 1st cup and the 7th cup.
3. Add 5 drops of yellow food colouring to the 3rd cup.
4. Add 5 drops of blue food colouring to the 5th cup.
5. Take a half sheet of paper towel and fold it in half lengthwise and in half again lengthwise.
6. Trim off some of the length so that there isn't too much excess paper towel that will stick up in the air between each cup. This will make the water walk more quickly.
7. Place one half of a rolled paper towel in the 1st cup and place the other half in the cup next to it. Then another paper towel from 2nd cup and into the 3rd cup. This continues until you have placed the last paper towel that drapes over from the 6th cup to the 7th cup.
8. Stare at the cups and watch what starts happening. You should quickly be able to see the coloured water begin to crawl up the paper towel.



Elephant Toothpaste

You will need:

- A clean 16 ounce plastic soda bottle
- 1/2 cup 20-volume hydrogen peroxide liquid (20-volume is a 6% solution, ask an adult to get this from a beauty supply store or hair salon)
- 1 Tablespoon (one packet) of dry yeast
- 3 Tablespoons of warm water
- Liquid dish washing soap
- Food colouring
- Small cup



Safety goggles NOTE: The foam will overflow from the bottle, so be sure to do this experiment on a washable surface, or place the bottle on a tray.

What to do:

1. Hydrogen peroxide can irritate skin and eyes, so put on those safety goggles and ask an adult to carefully pour the hydrogen peroxide into the bottle.
2. Add 8 drops of your favourite food colouring into the bottle.
3. Add about 1 tablespoon of liquid dish soap into the bottle and swish the bottle around a bit to mix it.
4. In a separate small cup, combine the warm water and the yeast together and mix for about 30 seconds.
5. Now the adventure starts! Pour the yeast water mixture into the bottle (a funnel helps here) and watch the foaminess begin!

How does it work?

Foam is awesome! The foam you made is special because each tiny foam bubble is filled with oxygen. The yeast acted as a catalyst (a helper) to remove the oxygen from the hydrogen peroxide. Since it did this very fast, it created lots and lots of bubbles. Did you notice the bottle got warm. Your experiment created a reaction called an Exothermic Reaction – that means it not only created foam, it created heat! The foam produced is just water, soap, and oxygen so you can clean it up with a sponge and pour any extra liquid left in the bottle down the drain. This experiment is sometimes called “Elephant’s Toothpaste” because it looks like toothpaste coming out of a tube, but don’t get the foam in your mouth!

Make it an experiment:

The project above is a DEMONSTRATION. To make it a true experiment, you can try to answer these questions:

1. Does the amount of yeast change the amount of foam produced?
2. Does the experiment work as well if you add the dry yeast without mixing it with water?
3. Does the size of the bottle affect the amount of foam produced?

Skittles in Water

You will need

- 1 packet of Skittles
- 1/4 cup warm water
- white plate

Activity

1. Arrange the Skittles in a single row coloured pattern around the edge of the plate.
2. Pour over enough warm water to cover all the Skittles and the plate itself.
3. Watch and wait as a rainbow appears on the plate, the colours will move towards the middle and create a whirl of colour.



Soap Bubble Prints



Awe and Wonder Soap Bubble Prints



You will need:



Ready mix paint



Shallow tray



Water



Brushes



Washing-up liquid



Straws



White paper



Paint pots



Method:

1. Mix together, 1/3 ready mix paint, 1/3 water and 1/3 washing up liquid in a paint pot.
2. Pour into a shallow tray.
3. Take a straw, place into the liquid and begin to blow, make sure not to suck otherwise you'll end up with a mouth full of paint!
4. Move the straw around creating bubbles.
5. Once the tray is full of bubbles take a sheet of paper and lay it carefully on top of the tray pressing down gently.
6. Lift it off and see the print you have created of the bubbles.

The Science Bit

Because washing up liquid can hold air inside its bubbles when you blow air in to the mixture it stays there creating lots of coloured bubbles.

Because there is water in the mixture when you put paper on top of it the water is sucked into the paper, leaving a print.



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Lava Flow Volcanoes

Awe and Wonder Lava Flow Volcanoes



You will need:



Washing-up liquid



Vinegar



Plastic cup



Baking soda



Red food colouring



Method:

You can build a paper mache volcano and put the cup inside it if you want to

1. Fill your glass just over half full with water, add 3 tea spoons of baking soda and give it a good stir until most of the baking soda dissolves.
2. Add a good squirt of washing up liquid into the cup and once again give it a stir.
3. Make sure your volcano is in the kitchen or outside (or somewhere you don't mind making a mess).
4. Quickly pour in just under a quarter of a cup of vinegar and enjoy your very own volcanic eruption!

The Science Bit

You just made a chemical reaction! Mixing the acid (vinegar) and the alkali (bicarbonate of soda) releases bubbles of carbon dioxide CO_2 . The washing up liquid is just there to trap those bubbles so it flows over the 'volcano' like real lava!

Clean Pennies



Awe and Wonder Clean Pennies



You will need:



A few non-shiny pennies



White vinegar



Bowl or shallow tray made of glass



Spoon



Salt



Bowl of plain water



Nuts and bolts



Method:

1. Pour the white vinegar into the bowl.
2. Add the salt and stir, then add the pennies.
3. Count to 10.
4. Take the pennies out using the spoon. What has happened?
5. Rinse the pennies in plain water, what has happened now?
6. Put some nuts and bolts into the white vinegar and salt, wait for a few moments. What has happened?
7. Why do you think the nuts and bolts have gone copper in colour? Where has the copper colour come from?

The Science Bit

Vinegar is an acid, and the acid in the vinegar reacts with the salt to remove what is called copper oxide which was making the pennies dull and not shiny. When the pennies are taken out, the copper that was making the pennies dull is held in the vinegar. If you put metal nuts and bolts in the vinegar, the copper wants to be with metal and so sticks to the nuts and bolts.



Balloon Cars



Awe and Wonder Balloon Cars



You will need:



Balloon



Cardboard
circles for
wheels



Rubber band
or parcel tape



Toilet roll
tube



Straws



Flexible
straw



Sticky tape or
plasticine



Scissors



Method:

1. Make the car by pushing a hole low down on either side front and back of the toilet roll tube, push through the straws (bendy bits cut off) to make the wheel axles.
2. Make a small hole in the centre of all four cardboard circles using the scissors.
3. Push the circles onto the straws and tape or plasticine securely.
4. Use a rubber band or parcel tape across the neck of the balloon to fix the balloon to the back of the car. Make sure the open end of the balloon is pointing backwards, you are able to access enough of the end to blow it up, and it isn't so tight that air can't get out.
5. Alternatively cut a slit in the top of the tube and poke the balloon neck through there.
6. Blow up the balloon and see what happens!
7. Was it different to what you thought?

The Science Bit

The wheels move round pushing the car forward because the hot air inside the balloon is sent out of a small space creating pressure.



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Rocket Mice

Rocket Mice

Five... four... three... two... one... blastoff!
Launch your favourite rodent into space to
boldly go where no mouse has gone before.

www.sciencemuseum.org.uk/launchpadeucators

Grab this stuff...



1
Cut out the template. Roll and stick it into a cone shape, like this...



2
Decorate your mouse by giving it ears and a tail using pens, paper or rubber from a rubber glove.

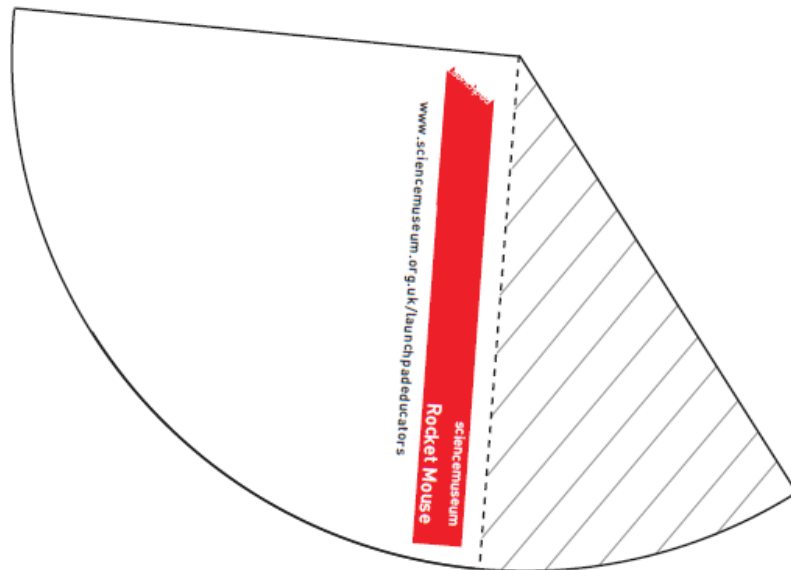


3
Put your mouse on the top of the bottle, then whack the bottle with both hands to rocket your mouse into the air!



To infinity and beyond!

Launchpad



Sinking Ketchup

You will need:

- A 1 litre plastic bottle or a water bottle
- Ketchup pack (like the ones you get from a fast food restaurant)
- Salt

What to do:

1. Remove any labels from the bottle and fill it all the way to the top with water.
2. Add a ketchup pack to the bottle.
3. If the ketchup floats, you're all set – go to step
4. If the ketchup sinks in the bottle, go to step 5.
5. For the floating ketchup pack simply screw the cap on the bottle and squeeze the sides of the bottle hard. If the ketchup sinks when you squeeze it, and floats when you release it, congratulations, you're ready to show it off. If it does not sink when you squeeze it, try a different kind of ketchup pack or try a mustard or soy sauce pack.
6. If the ketchup pack sinks, add about 3 tablespoons (45 ml) of salt to the bottle. Cap it and shake it up until the salt dissolves. (Kosher salt will keep the water from getting too cloudy, although it will usually clear up over time if using regular table salt.) Continue adding salt, a few tablespoons at a time until the ketchup is just barely floating to the top of the bottle. Once it is consistently floating, make sure the bottle is filled to the top with water, and then cap it tightly.
7. Now squeeze the bottle. The magic ketchup should sink when you squeeze the bottle and float up when you release it. With some practice you can get it to stop in the middle of the bottle.

To make it a true experiment, you can try to answer these questions:

1. Do different food packs (ketchup, mustard, soy sauce) have the same density?
2. Does the temperature of the water affect the density of the ketchup packet?
3. Does the size of the bottle affect how much you have to squeeze to get the packet to sink?



Blobs in a Bottle

What you need:

- A 1 litre clear bottle
- $\frac{3}{4}$ cup of water
- Vegetable oil
- Fizzing tablets (such as Alka Seltzer)
- Food colouring
- Measuring cup / funnel

Instructions:

1. Pour the water into the bottle
2. Use a measuring cup or funnel to slowly pour the vegetable oil into the bottle until it is almost full.
3. You may have to wait a few minutes for the oil and water to separate
4. Add 10 drops of food colouring to the bottle
5. The drops will pass through the oil and then mix with the water below
6. Break an alka seltzer tablet in half and drop half the tablet into the bottle
7. Watch it sink to the bottom and let the blobby greatness begin.
8. To keep it going add the other half of the tablet.
9. You could also shine a light through the bottom of the bottle



Making Gloop

You will need:

- 3 cups of cornflour
- 1 ½ cup of water
- Food Colouring
- A large container or bowl
- Glitter (optional)

What you need to do:

1. Place the cornflour into a large container
2. Place a few drops of colouring into the centre.
3. Mix the water into the cornflour and colouring.

- It will take some time to mix together but encourage your child to play with the gloop before it is mixed.
- What does it feel like?



Making Slime

What you need:

- PVA glue
- Paint
- Shaving foam (optional)
- Contact lens solution

Instructions

Step 1 – Pour 2 – 3 tablespoons PVA glue into a cup or bowl.

Step 2 – Add a few drops of paint to get desired colour and stir.

Step 3 – If you would like to make your slime ‘fluffy’ then add 1 tablespoon shaving foam and stir.

Step 4 – If you would like to make your slime ‘crunchy’ add 2 tablespoons polystyrene balls (from bean bags) and stir.

Step 5 – Gradually add your contact lens solution to your PVA solution, stirring throughout. The glue should start to stick to itself and become more solid and less sticky. Once your glue has stopped being sticky, pick it up and move it around in your hands. If it starts to get sticky again, add more contact lens solution.

Troubleshooting:

If your slime is too sticky add more contact lens solution. If your slime is too hard try again and this time add the contact lens solution more slowly.

Cress Elves

Term 1b November - December



Rainy Day Activity

Cress Elves

Make a festive gardening themed decoration! The children will love crafting their very own elf and watching his or her cress 'hair' grow.

What you need:

- Cress seeds
- Yoghurt pots
- Cardboard tubes
- Cotton wool
- Coloured paper and pens
- Glue
- Scissors



What to do:

- Decorate the cardboard tube to make it look like an elf. Wrap coloured paper around the cardboard tube to form the elf's trousers and shirt, then stick it in place.
- Cut some arms and gloves from coloured paper and glue them to the back of the tube.
- Use a black pen to add details such as a belt buckle or buttons.
- Add a face using coloured paper and pens, and stick it onto the tube.
- Fill the yoghurt pot with cotton wool, and wet it with some water.
- Sprinkle some cress seeds onto the cotton wool.
- Carefully put the yoghurt pot into the cardboard tube.



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twinkl.co.uk

Rainbow Flowers

You will need:

- Pale/white flowers. Carnations work well.
- Vases / glass jars (number depends on how many different colours you want)
- Food dye (colours are personal choice)
- Water

Method:

1. Put some water in the vases/jars.
2. Add the food dye of your choice, enough so the water is a bold colour.
3. Cut the stems of the flowers, enough so they fit in the jars comfortably (an adult may want to do this) and remove any leaves that would be submerged in the water.
4. Put the flowers in the water, you can separate them into different jars to get a range of colours or just stick with one colour!
5. Watch the flowers change colour over the next few hours – the longer you leave them in the stronger the colour will be.
6. When you are happy with the colour, remove the flowers from the coloured water and replace with clean water, then put the flowers back in the clean water.

The Science Bit:

- Just like drinking through a straw, the flowers are 'drinking' the water through the stem, this is called transpiration.
- What we can see when we add colour to the water is just what normally happens when you put flowers in water, the water moves up the stem and through the flower. Because the petals are white the food dye does exactly what it says, it dyes the petals, and this won't disappear when you put the flowers back in clean water.

Optional extras to try:

- What happens if you use warm water instead of cold water? Does it work better/quicker?
- What happens if you put the flowers from one food dye into another? Will blue and red make purple??



Rainbow Spinners

You will need:

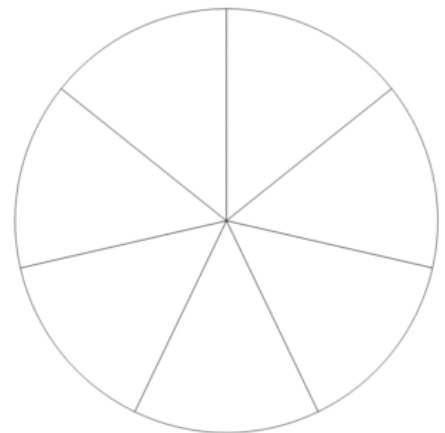
- Cardboard
- Felt tips
- Cocktail Sticks

Method:

1. Cut a circle out of the cardboard.
2. Using a black felt tip, split the circle into 7 segments.
3. Colour in each segment with a different colour of the rainbow – Red, Orange, Yellow, Green, Blue, Indigo, Violet.
4. Push the cocktail stick through the middle of the spinner.
5. Spin it round as quickly as you can and watch the colours merge into white!

The Science Bit:

- Rainbows are formed by white light from the sun being split into all its component colours by diffraction. The rainbow spinner reverses the process by taking all the colours of the rainbow and merging them back into white!
- Why not try mixing other colours to see what you can make?



Rainbow Milk

You need:

- Milk (whole milk works best)
- A dish (a shallow pyrex dish works best)
- Washing up liquid
- Food colouring
- Cotton buds

Method:

1. Pour some milk into the dish, enough to cover the bottom of the dish.
2. Add a few drops of food dye to the milk (mix and match the colours!)
3. Dab the end of the cotton bud into the washing up liquid
4. Finally, dip the cotton bud into the milk and watch!

The science behind it:

- Milk contains (amongst other things) fats and proteins. When the washing up liquid comes into contact with the milk it weakens the chemical bonds between the fats, proteins and the rest of the milk.
- The soap then attaches to the fat in the milk and this causes the cool patterns that we see! The soap molecules are moving round trying to find fat molecules to attach to. We can see this happening because of the food colouring; the soap and fat molecules bump into the food dye molecules causing them to move around. It will stop when all of the soap is mixed with the milk.



Sensory Wave Bottles

You will need:

- Empty plastic bottle
- Blue food colouring
- Vegetable or baby oil
- Jug

Method:

1. Fill the plastic bottle half way up with oil
2. In a separate jug, add a small amount of blue food colouring to water to create a light blue colour. This then needs to be added to the oil. Watch what happens when the liquids meet each other – they shouldn't mix.
3. Slowly tip the bottle from side to side to see what happens. You should be able to make waves!

The science bit:

- The first reason that water and oil don't mix is because their molecules are packed differently. The molecules of water are packed very densely. In one glass of water, there are more molecules than the number of known stars in the universe! Oil molecules are more spread out so oil is less dense and floats on top of the water. Also, oil is 'hydrophobic' which means it naturally repels water.



Dancing Raisins

You will need:

- A clear glass
- Raisins
- Bicarbonate of soda
- White vinegar
- Teaspoon

Method:

1. Fill the glass 3/4 up with vinegar
2. Add some raisins
3. Add 1-2 tbs of bicarbonate of soda
4. Watch your raisins dance!

The science bit:

Your acid (vinegar) and alkali (bicarbonate of soda) react to make carbon dioxide. Because the surface of raisins are rough, the tiny bubbles of carbon dioxide gas stick to it. The carbon dioxide bubbles travel upwards, taking the raisin with them, until the bubbles pop and the raisin sinks again!

Why not try?:

- Using a fizzy drink instead of bicarb and vinegar
- Trying some other acids and alkalis
- Seeing if you can get other foods to dance!



Lava Lamp

You will need:

- A jar
- Oil
- Fizzy tablet (Alka-Seltzer, vitamin tablet or similar)
- Food colouring (colour of your choice)

Method:

1. Half-fill the jar with water
2. Add a few drops of food colouring
3. Fill the rest of the jar with oil
4. Allow a few minutes for the oil and water to separate
5. Drop the fizzy tablet and watch the show begin!

The science bit:

- Oil is less dense than water, so the oil sits on top of the water.
- The fizzy tablet reacts with the water and creates bubbles of carbon dioxide. The carbon dioxide wants to escape so it travels upwards, taking the bubbles of water through the oil and creating a cool effect!

Why not try:

- Making a few that are different colours – a lava lamp disco!
- Trying some different liquids and seeing if it creates a different effect.



Floating Egg

How can you use salt to make an egg float?

You will need:

Pint size clear plastic cup

1 egg

Teaspoon

Salt

Water

Instructions:

Three quarters fill the cup with water.

Carefully place the egg into the bottom of the cup.

Ask the Beavers to predict how many teaspoons of salt they think it will take to make the egg float.

Beavers take it in turns to add teaspoons of salt, counting as they add.

In the name of a fair test the teaspoons of salt should always be the same e.g. a level teaspoon each time.

How many does it take before the egg starts to rise?

What's happening?

The egg will normally sink in tap water, but by adding salt you are changing the density of the water. By changing the water's density you can either make the egg float or submerge. When the egg floats, the water density is more than that of the egg (reason why it floats).



Tap Water



Salt Water

The Paralysed Finger

Instructions:

Bend your middle finger and place the centre section on a table or hard surface.

You will be able to lift your thumb, index, and little finger without moving your middle finger.

But it is impossible to lift your ring finger.

What is happening?

The tendons in your fingers are independent from one another apart from the ones in your middle and ring finger. These tendons are connected, so that when your middle finger is folded down you cannot move your ring finger. It feels like your ring finger is stuck!

