

# Discovery Challenge

Learn How Things Work



# Index

## **CRAFTS**

**'Finding' Oxygen**

**Balloon Rocket**

**Box Guitar / Tambourine**

**Humming Flute / Drum**

**Musical Bottles**

**Hot Air Balloons**

**Eye Glasses**

**3D Glasses**

**Bicycles**

**Magnets and Magnetism**

**Telephone**

**Batteries**

**Television**

**Kite**

**Pictures in a Camera**

**Scissors**

**Soap and Bubbles**

**Erasers**

**Glow-Sticks**

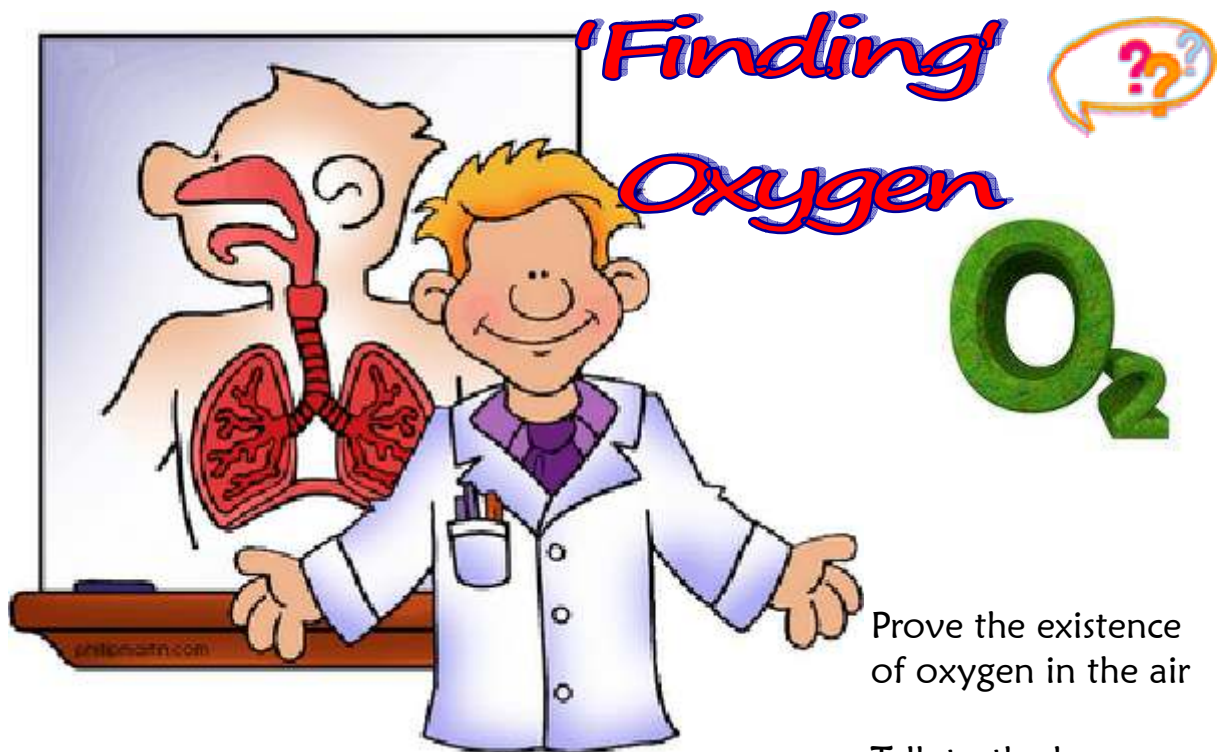
**Light Bulbs**

**Candy Crystals**

**A Simple Torch**

## **GAMES**

## **VISITS**



Prove the existence of oxygen in the air

Talk to the beavers about gas. Oxygen is a gas. We can't see it, taste it, feel it or smell it but it is all around us.

Light a candle, then place an upside down jar over the candle and see what happens, after a while the candle goes out because it has used up all the oxygen in the air

**REMINDE** the beavers about the dangers of playing with matches and candles.



## How do plants produce oxygen?

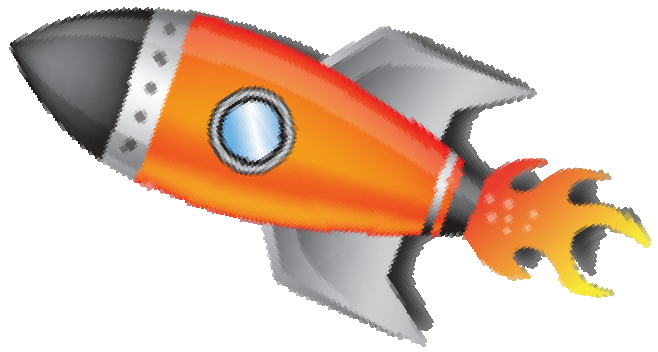
- Fill a wide mouthed jar with water and place a water plant in the water.
- Put a glass lid over the jar and put the jar near a light source.
- After a while the beavers will notice that the plant releases bubbles of oxygen.

(This is a demonstration of photosynthesis at work.)

# Balloon Rocket

## You will need:

- 1 balloon
- 1 3mtr long piece of kite string
- 1 plastic straw
- Tape

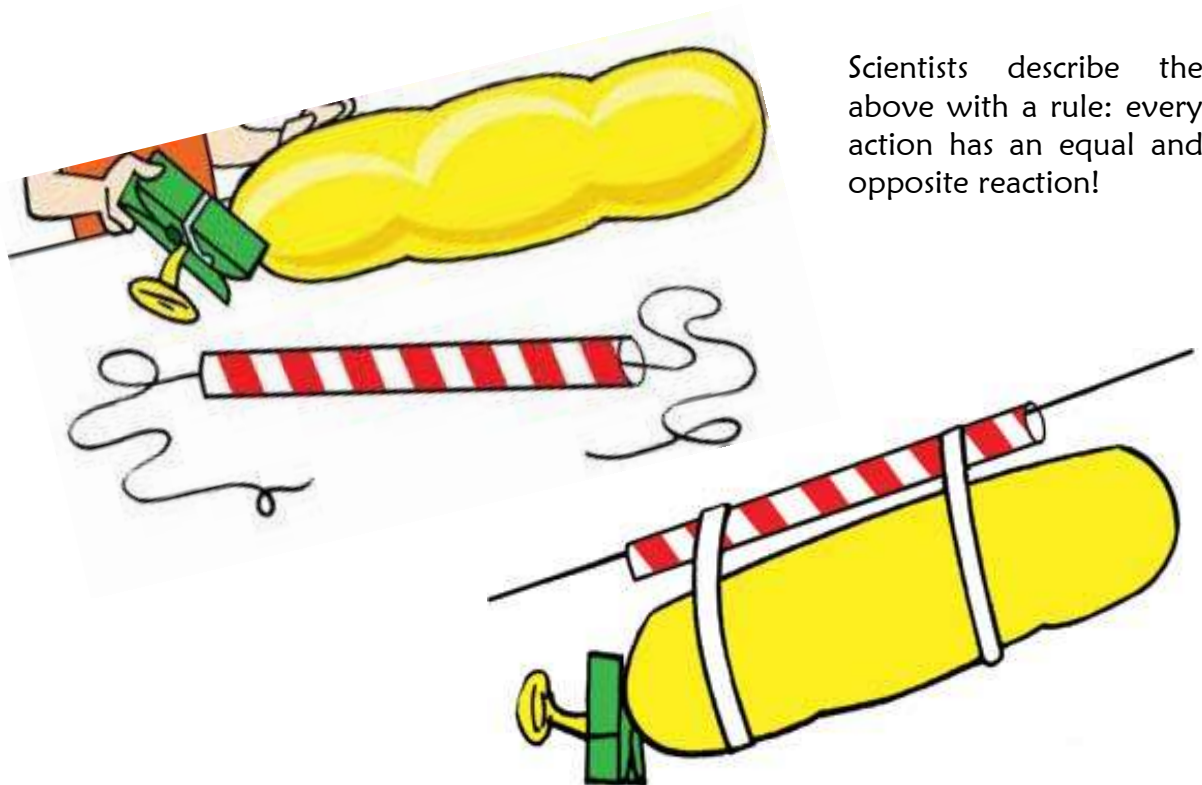


## What to do:

1. Tie one end of the string to a chair, door knob, or other support.
2. Put the other end of the string through the straw.
3. Pull the string tight and tie it to another support in the room.
4. Blow up the balloon (but don't tie it). Pinch the end of the balloon and tape the balloon to the straw as shown above. You're ready for launch.
5. Let go and watch the rocket fly!

## What's going on?

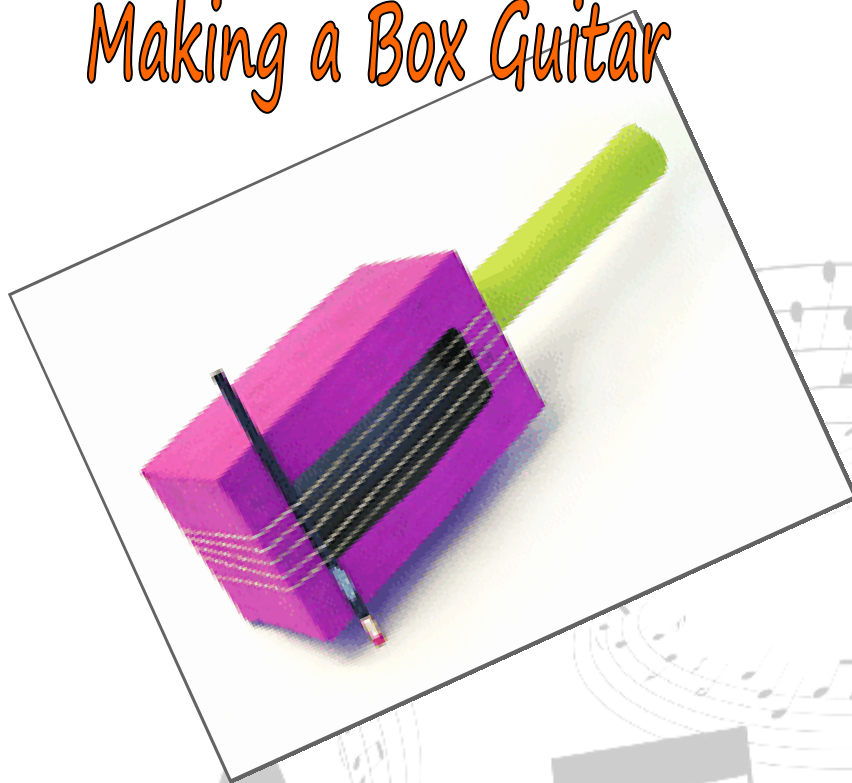
So how does it work? It's all about the air...and thrust. As the air rushes out of the balloon, it creates a forward motion called **THRUST**. Thrust is a pushing force created by energy. In the balloon experiment, our thrust comes from the energy of the balloon forcing the air out. Different sizes and shapes of balloon will create more or less thrust. In a real rocket, thrust is created by the force of burning rocket fuel as it blasts from the rockets engine - as the engines blast down, the rocket goes up!



Scientists describe the above with a rule: every action has an equal and opposite reaction!



# Making a Box Guitar



## What you will need:

- 1 Shoe box
- 5 Rubber Bands
- Colours or paints
- 1 Long Ruler
- Glitter Glue
- Apron
- Paint brushes

## How to do it:

- Each beaver gets his shoe box and decorates it with colours or paints.
- When decoration is finished the Beaver Scout Leader cuts a hole on the top of the box.
- Beavers put the 5 rubber bands around the box with a gap of 3cm between one rubber band and the other.
- The ruler is stuck at the back of the box [as shown in the picture].
- Beavers pluck the rubber bands to make the sounds

# Making a Tambourine

## What you will need:

- 2 paper plates
- Hole punch
- Ribbon
- Bells
- Tacky glue
- Chenille stems
- Pair of Googly Eyes

## How to do it:

- GLUE the paper plates together.
- PUNCH holes around the edge about 1" apart.
- THREAD a ribbon through the holes, threading on a bell at every other hole.
- GLUE on a face using chenille stems and movable eyes.



# Making a Humming Flute



## What you will need:

- Card board paper towel roll
- Greaseproof paper
- Rubber band
- Pencil

## How to do it:

- Poke 3 or 4 holes in the cardboard roll about 1 inch apart
- Decorate the tube as wanted
- Cut a 4 inch square of greaseproof paper
- Secure the greaseproof paper over one end of the cardboard roll using the rubber band
- Your flute is now ready to play!



# Making a Drum

## What you will need:

- An empty coffee can with a plastic lid
- Paper
- Glue
- Scissors
- Paint or markers
- Paintbrushes and Waters
- Dowels or wooden sticks
- Scrap Materials—string, leather, feathers, beads, etc

## How to do it:

- Paint the coffee can with paint or cover the can with paper.
- Leave the plastic lid on the coffee can as this will be your drum head.
- If you cover the coffee can with paper, you can paint or draw designs on the coffee can.
- After the paint is dry, you can glue all sorts of wonderful things to your drum to decorate.
- Using wooden dowels or simply wooden sticks, drum away on your new coffee can drum.



# Fun with Musical Bottles

## What you will need:

- 6 small glass bottles
- Plenty of water

## How to do it:

Fill a bottle with water. Tap it lightly with a spoon and listen to the sound.

Now pour some of the water out and tap the bottle again. Do you hear the change in the sound?

Pour different amounts of water into six bottles.

Line them up in row. Now tap each bottle lightly with the spoon. Can you play a song on the bottles?

Now blow across the top of each bottle. The one that had the lowest sound when you tapped it will be the highest sound now.



## Warning:

Extra care to be taken by Beaver Scout Leaders when allowing Beaver Scouts to handle glass bottles. Safety first....ALWAYS!!



# How do hot air balloons work?



Have you ever learned about how hot air rises above cold air?

Even if you don't know about it, you've probably experienced it without knowing! Wind, for example, is the result of hot air rising above colder air, creating a breeze or a gust during its movement!

Rising warm air has other uses besides changing in our weather: It can also be used to put a hot air balloon into motion!



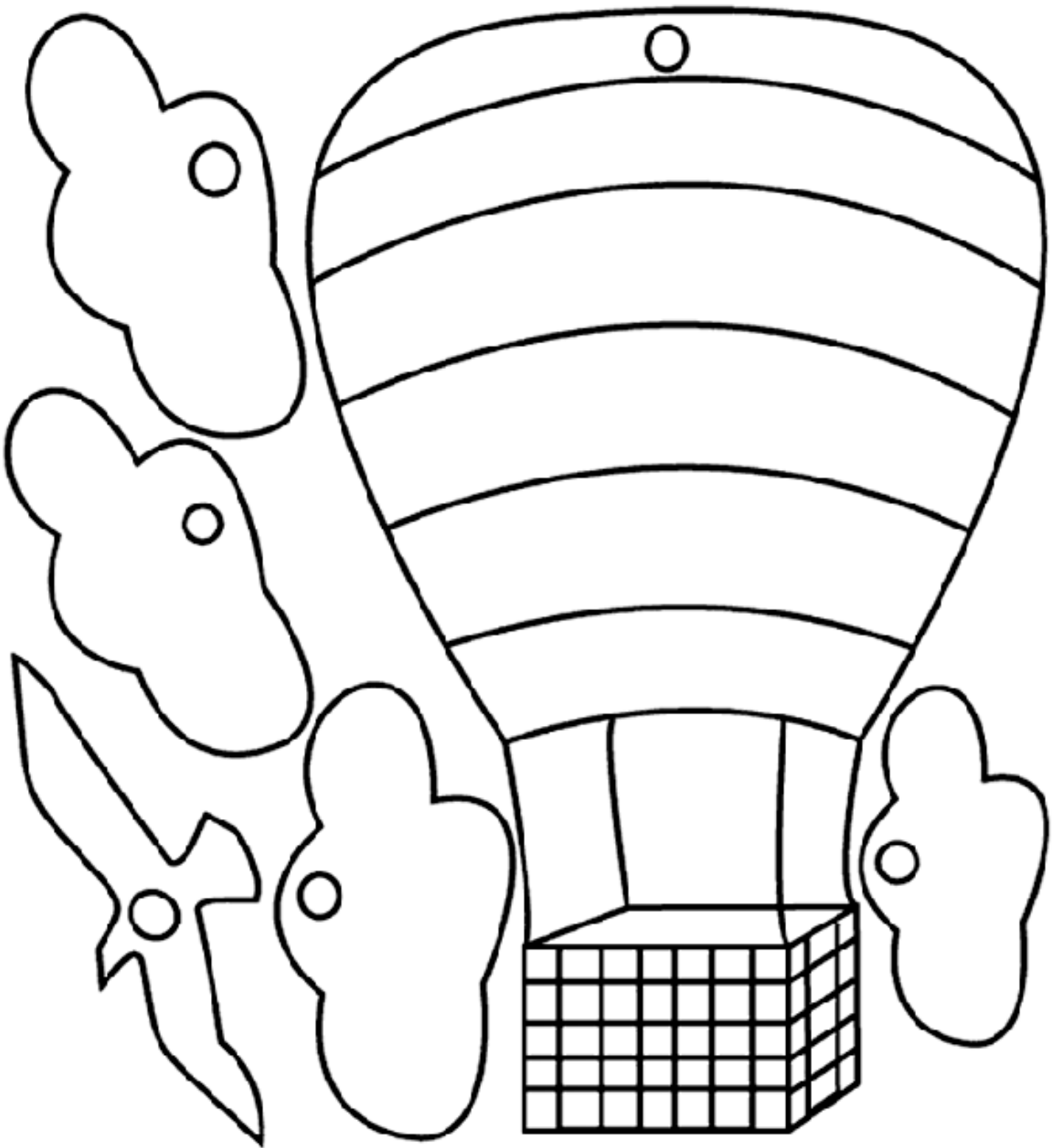
Just like its name implies, a hot air balloon is a special type of aircraft that runs on hot air! There are three main parts of a hot air balloon: The basket where the pilot and passengers sit (also called the "gondola"), the big balloon-like fabric that fills with air and lifts the basket (also called the "envelope"), and the burner, which heats the air in the envelope!

In order to take flight, the pilot of a hot air balloon first uses a fan to fill the balloon's envelope with cold air. Once all of the balloon's passengers are loaded and the pilot has checked that everything is ready, the balloon is released from the ground and the pilot heats the air in the envelope to warm it up! This makes the air in the envelope hotter than the air all around it, and it pulls the whole balloon and its attached basket up into the sky!

To land, a pilot can either let the air in the envelope cool down or release some of it through a special vent at the envelope's top. Because hot air balloons work on these basic principles of warm air rising above cool air, there isn't any exact method for steering them. A hot air balloon pilot has to guide the balloon according to the wind by moving the balloon up and down to catch certain breezes!



# Hot Air Balloon Mobile



- *Print a copy of this page and colour it in.*
- *Cut out the shapes and glue them onto a piece of thin cardboard.*
- *Punch a hole in the top using a hole punch.*
- *Tie pieces of ribbon or string to each mobile piece at different lengths.*



# How do eye glasses work?



Because everyone is different and unique, some people do not see as well as others. Our eyes work by bending and focusing an image, but sometimes a person's eyes might have more trouble with bending and focusing images in the right way. When this happens, it is usually caused by the length or shape of their eye, which can cause trouble seeing things far away, close up, or sometimes both.

To help people see better, eye glasses pull and bend shapes back into place! Have you ever looked up close at a pair of eye glasses? You might notice that the lenses themselves are slightly curved, or that when you look through them, objects appear curved and bent. For the person that wears those glasses, the lenses are pulling and bending in ways that their eyes cannot!

Eye doctors help people who don't see well to know which kind of glasses they need to fix their problem. For example, a nearsighted person (who has trouble seeing things far away) generally needs glasses that bend slightly inwards, while a farsighted person (who has trouble seeing things close up) generally needs glasses that bend slightly outwards! The special shapes of these lenses bend an image back into shape for the person who wears them!

# Fun Glasses



## What will you need:

- Glasses Pattern
- Cardboard
- Scissors
- Colours
- Glitters
- Glue

## How to do it:

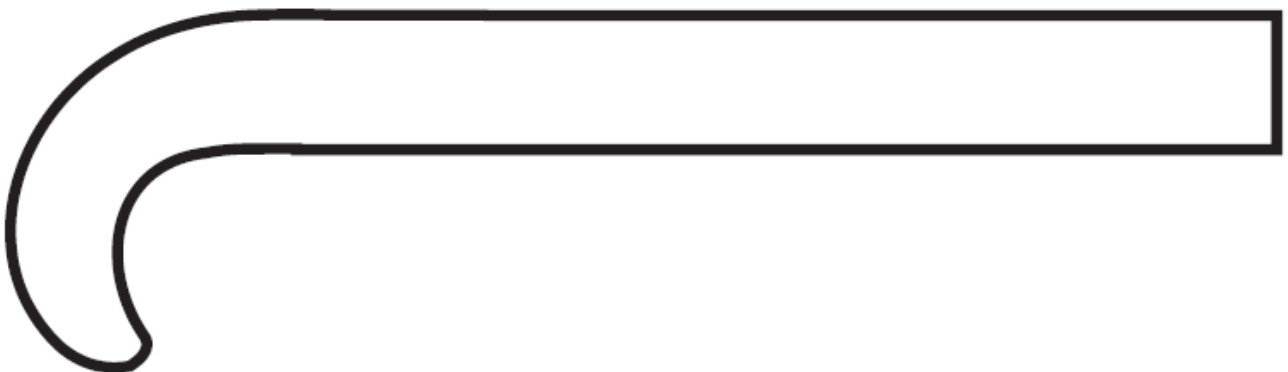
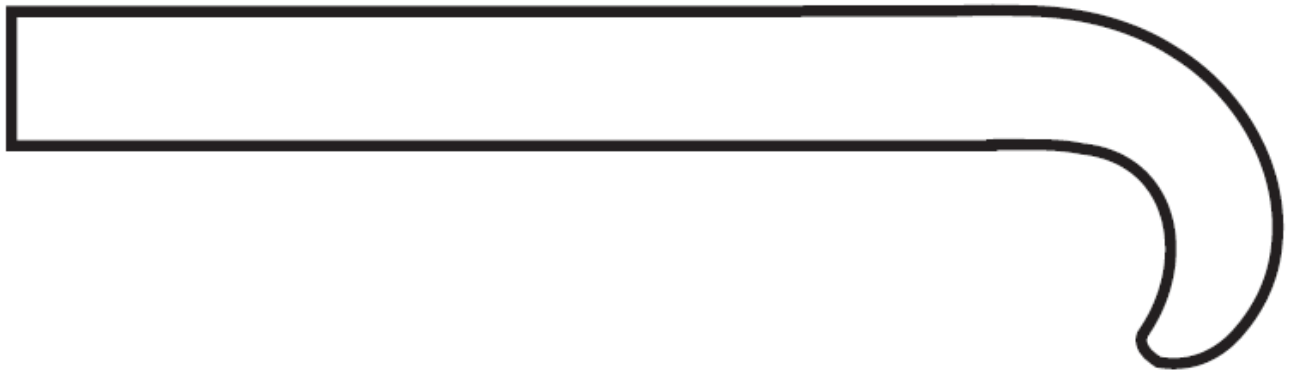
- Print out any of these eyeglasses templates and stick them on cardboard.
- Colour the template out.
- Crease the rim's side flaps by folding them towards the back. Unfold the flaps and glue each template piece.
- You can decorate the eyeglasses further with glitter glue, stickers or



other  
decorative  
material.

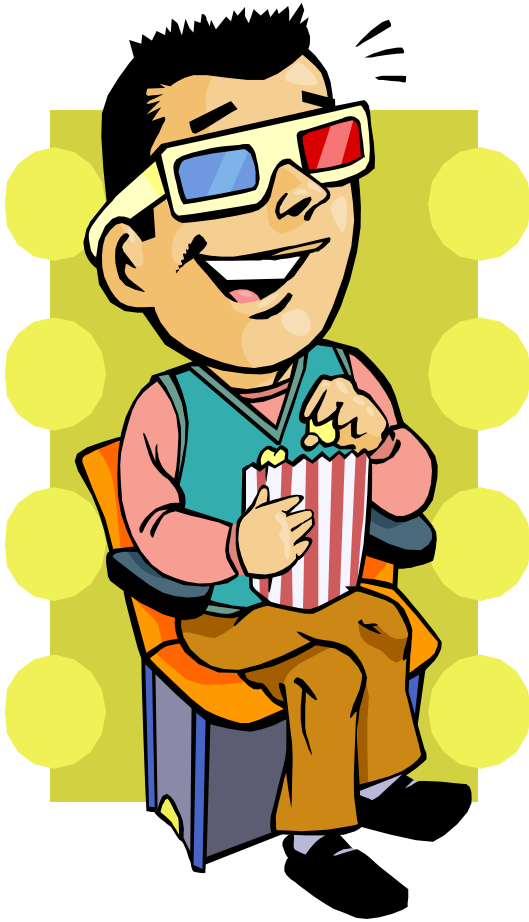


# Fun Glasses Templates





# 3D Glasses



## What you will need:

- 1 Cardboard Paper
- 1 Glossy Plastic Paper Red
- 1 Glossy Plastic Paper Green
- Glue
- Round tipped Scissors

## How to do it:

Cut out a pair of glasses out of the cardboard paper.

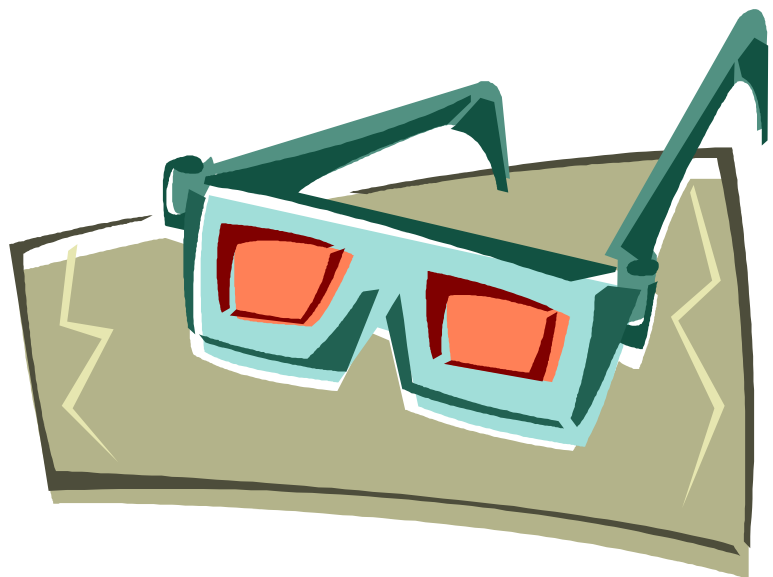
Cut out a square on each side of the glasses. These will be your lenses.

Cut out one square of red glossy paper and one square of green and glue them to the back of your glasses covering the square holes.

Beaver Scout Leader will now show the Beavers a 3D picture.

## LOG CHEW:

In a Log Chew discuss, with the Beavers the difference between seeing the picture with the glasses and without.





# How does a bicycle work?



Bikes are pretty cool vehicles. You might not think of them as vehicles, but just like cars and trucks and planes, they transport people from one place to another. The really cool thing is that they are entirely people-



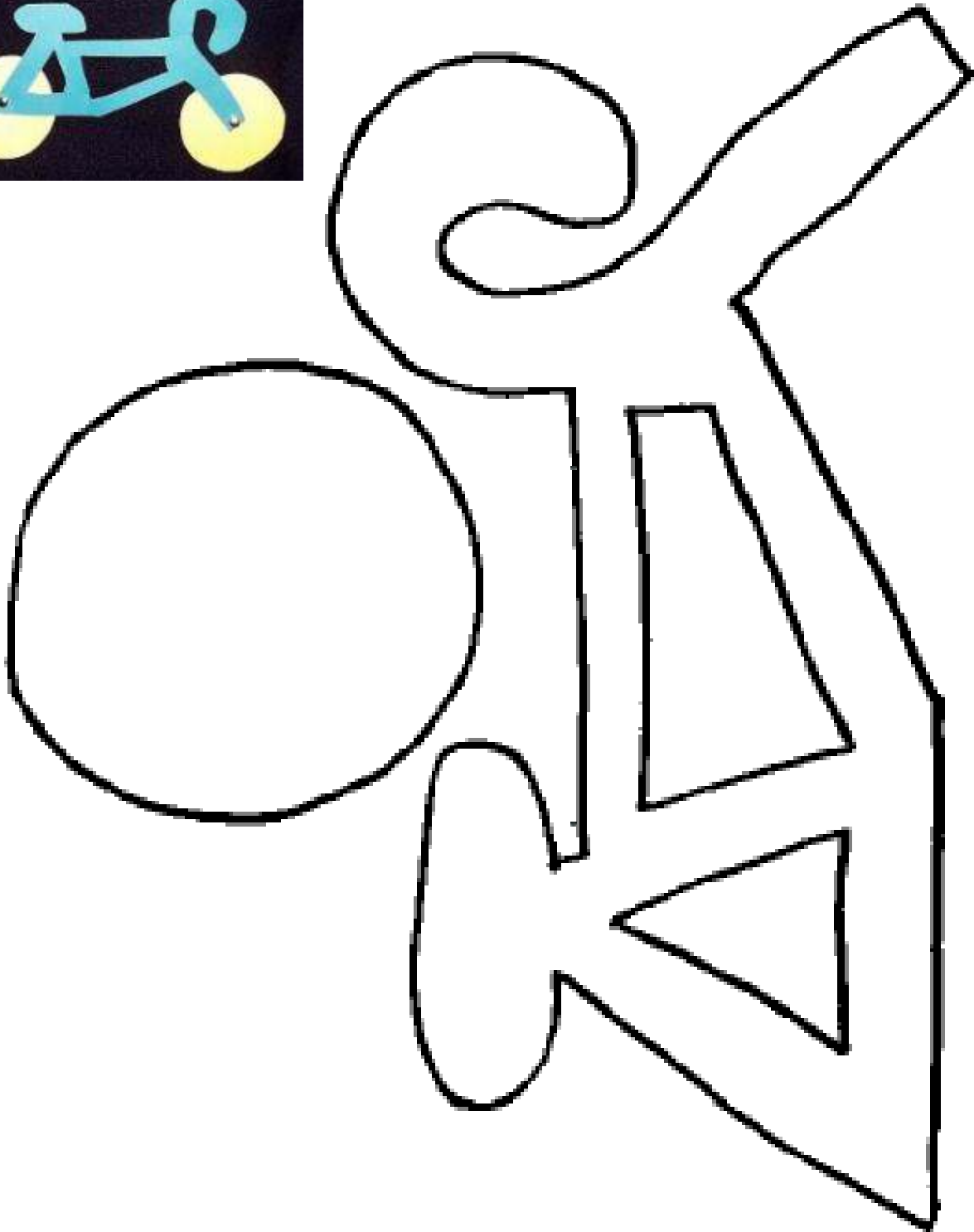
powered. They don't use gasoline or electricity. We make them work by pushing our feet. Since they don't use other fuel, they're really good for the environment, and they can easily move us about faster than walking!

Bikes are built on a metal frame. The handlebars are attached to the front wheel, so as they turn, the wheel turns too. That guides the direction of the bike.

The pedals are attached to a *sprocket*. It's a wheel with teeth that stick out of it around the edges. These teeth fit into a chain and the chain is attached to another sprocket on the back wheel. When your feet push the pedals, the sprocket turns the chain, which turns the back sprocket and the back wheel. It makes us move forward.

When it comes time to slow down and stop, bikes also have brakes! There are a few types. One is a kind you operate by squeezing a lever on the handlebars. Another is the kind you operate by pedaling backward. They both cause breaks to squeeze the rim of the wheel, which takes away energy from the wheel and causes it to slow down.

# Bicycle Paper Craft



*To make a bicycle you will need to cut out a bike frame and two wheels. Attach the wheels to the bike with butterfly pins so they spin and then decorate your bicycle. Add a rider if you have the time!*



# Bicycle Safety Tips

- Always wear a bike helmet! Make sure your bike helmet fits by shaking your head up and down and from side to side. If your helmet moves easily, your parents can add the padding provided with the helmet to make a tighter fit. If the helmet still moves easily after that, the helmet is not the right size for you and your parents need to replace it.
- Check with your parents to make sure that your bike is the right size for you.
- Ask an adult to help check your bike's tires and brakes to see if they work properly before riding.
- Wear brightly colored clothing when you are riding your bike and make sure that your bike has reflectors so drivers can easily see you.
- Never ride your bike in the early morning, in low light, or after dark.
- Ride your bike only in places that your parents tell you are safe for you to ride.
- Know the rules of the road and always obey them:
  - use proper hand signals for stops and turns
  - ride in the same direction as traffic
  - obey all signs and traffic lights
  - walk your bike across busy intersections
  - stop and look left-right-left and behind you before riding out into the street

## WHAT'S YOUR SIGN?

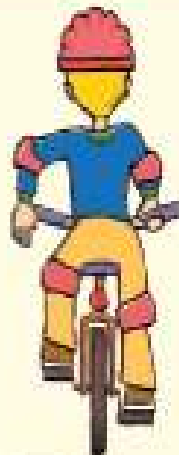
Fill in the blanks with the letters that match each hand signal below.



1. \_\_\_\_\_



2. \_\_\_\_\_



3. \_\_\_\_\_

- A. right-hand turn
- B. left-hand turn
- C. stopping, slowing down

ANSWERS:  
1-B; 2-A; 3-C

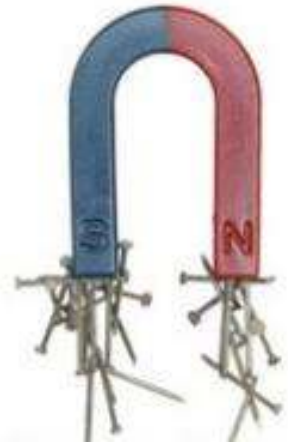




# How do magnets work?



Have you heard the phrase opposites attract? It's especially true with magnets. You are probably most familiar with the types of magnets that hold your drawings to the refrigerator, but magnets have lots of uses. They are used in generators to make electricity, in junkyards to pick up scrap metal and to make computers, phones, doorbells and some trains work!



Magnets seem to have a magic sticking power. The surface of a magnet is not actually sticky. Your hand won't stick to it. What magnets do is they create a magnetic field, which is a space around the magnet where energy is actually changed. Just like the Earth has two poles, so do magnets. They have north and south poles that change energy in different ways. Just because they are called north and south doesn't mean they have to face those directions. They can face any way, but they are always at opposite ends of a magnet.

A magnetic field enters a magnet at one pole and leaves through the other. A magnetic field can be hard to imagine, because it is something invisible, just like wind. If you have two magnets and put their north poles together, the magnets will be repelled, or "pushed away from each other." The energy fields around them are moving against each other, so it won't let the magnets touch.

When the south pole of one magnet comes near the north pole of another, that's when you hear a clacking sound and see the two magnets move together. Opposites attract! In a sense the two magnets become one single magnet with a single magnetic field. The magnetic field exits the magnet at the north pole of one and then returns through the south pole of another.

Often, magnets are made by rubbing certain metals with other magnets. Three chemical elements (which make up metals) are able to be turned into long-lasting magnets. They are iron, cobalt and nickel.



# Magnetism

## Experiment 1



### What you will need:

- Magnets of different sizes and shapes (horseshoe, bar and round magnets)
- Paper-clips made of iron, nails, coins, etc
- Three cardboard boxes

### How to do it:

- Take one cardboard box and put coins into it.
- Similarly, take the other two cardboard boxes and put nails and paper-clips into each.
- Take the round magnet and hold it against each of the boxes. Count how many objects are attracted towards it.
- Repeat the step using the bar magnet and the round magnet. Count how many objects are attracted towards each of the magnet.

### What is going on?

Magnetic power depends a lot upon the shape of the magnets. The poles of the horseshoe magnet are closer to each other, thus, its power is concentrated at these places. Thereby, exerting a very strong magnetic power. The round magnet is not that strong as it does not have any defined poles and the magnetic power is distributed throughout its surface. In case of the magnets that are of the same size, the larger the magnet, the better is its magnetic force.



## Experiment 2

### What you will need:

- Horseshoe magnet
- Things made up of Different Materials and Surfaces: Plastic, Glass, Wood, Metal, Stainless Steel, etc.

### How to do it:

- Take the horseshoe magnet and place them against the different materials
- Take the horseshoe magnet and place them against the different surfaces.

### What is going on?

Certain materials are friendly to the magnets while others are not. The metals that are attracted to the magnet are called magnetic. The magnet is drawn towards the surfaces that have these metals because the surface is larger than the magnet. When the magnet is bigger than the magnetic object, the object is drawn to the magnet.

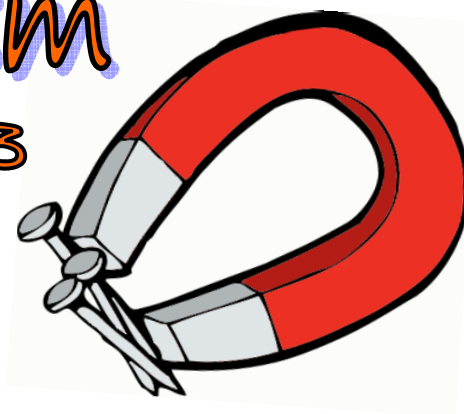


# Magnetism

## Experiment 3

### What you will need:

- A sheet of paper
- A paper-clip
- Sticky tape
- String
- Horseshoe magnet



### How to do it:

- Cut/Fold the paper to form a kite
- Stick a paper-clip on the paper.
- Attach a string at the tail of the kite and glue it.
- Hang a horseshoe magnet at a distance.

### What is going on?

The kite starts 'flying' towards the magnet. When any object is within the magnetic field, it will experience magnetism more than the gravitational pull. Thus, force of magnetism can overcome the force of gravity.



### What you will need:

- A toy Car
- 2 Magnets
- Tape

## Experiment 4

### How to do it:

- Take 1 magnet and tape to the toy car
- Take the other magnet and put it next to the toy car.
- The magnets will stick together but if you turn the magnet the other way round the car will start moving.
- 



### What's going on?

Magnets have what is called a North Pole on one side and a South Pole on the other. If you take the North Pole of one magnet and put it next to the South Pole of the other magnet they will stick together. If you put 2 South Poles or 2 North Poles together they will repel each other. Opposite Poles attract each other.



# How do telephones work?



Do you enjoy picking up the phone and hearing the voice of someone you care about?

While many people now use cell phones to communicate with their friends and family members, some still enjoy using landline telephones, which connect callers through a system of wires.



No matter what type of phone you use, it has a microphone that you talk into and a speaker that lets you hear the person on the other end of the phone. The microphone takes the sound of your voice and changes it into electrical signals.



The electrical signals travel through wires until they reach the person on the other end of the phone. The speaker on the other caller's phone then takes the electrical signals and turns them back into sound so your voice can be heard!

Telephones truly connect us with the people in our lives, making staying in touch easy and fun!



# Cup Telephone

*What you will need:*

- 2 Cups
- Long String
- 2 Paper Clips
- Scissors



*How to do it:*

- Use a sharp point to make a small hole in the bottom of both cups.
- Thread a string through each of the holes tying the end to a paper clip to prevent it from being pulled back through the hole.
- Now you can talk in one of the cups and the other person can listen to you from the other cup.





# How do batteries work?



How would you like using an MP3 player or your television remote control if they had long cords and had to be plugged into an electrical outlet? It's a good thing we have batteries, so we can pick up these devices and move around. We don't have to worry about tripping on the cords or getting tangled!



Batteries are small containers full of special chemicals that can make electricity. The chemicals react with each other to create special tiny particles called "electrons," and those get stored in one end of the battery. The electrons have only one purpose. They want to get to the other side of the battery. It gets very crowded at their end. The electrons keep pushing against each other, while at the other end, there's open space for them. If they get the chance, they're going to go where there is more room, until they even out and both sides have the same number of electrons.

However, the electrons have one big obstacle! There is a barrier in the middle of the battery. They can't get through until we give them a chance. When something like a wire connects both ends of the battery, the electrons speed through it. This flow of electrons is electricity, and it can power lots of our electronic devices!



# How do televisions work?

Televisions are pretty amazing inventions. There aren't tiny actors inside our TV sets performing for us, but by watching TV, we can see the images of actors, sports, cartoons, and much more right in our own homes!



TVs actually work by tricking our eyes and our brains! The screens show us many still images, like pictures. They change very quickly, often 30 times every second! That's so fast that you'll really miss some if you blink your eyes. With pictures moving so fast, and each picture being just a little bit different, our eyes are tricked into thinking we're actually seeing something moving. Really we're just seeing pictures changing really fast!

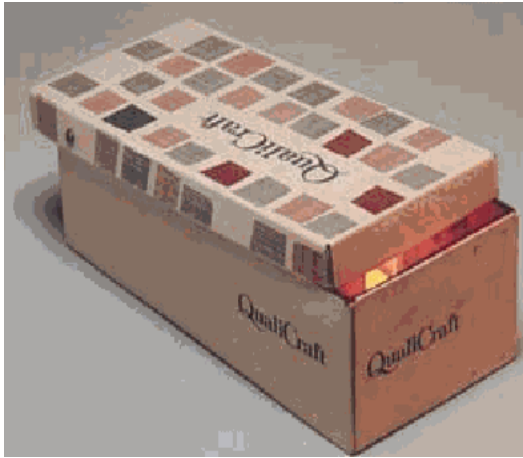
The picture isn't made with paints, or ink, or anything in your art supplies. It's actually made with light! Thousands of tiny dots or stripes of light are used to make a full picture on our TV screens. There are usually three primary colours of light that are used: red, green, and blue. By using those three colours in different combinations, our TVs can make any colour we can think of!

How does a TV know which colours to display? A video signal comes into the TV from antennas, satellite dishes, cable or other TV services. This is an electrical signal that tells the TV's speakers what sounds to make, and it tells the screen which colours of light it should show. Many TVs use what's called a *cathode-ray tube*, which actually shoots beams of energy (electrons) at the backs of our TV screens. These beams are so precise that they can hit just one tiny red, green, or blue point on the screen. When they hit, a small part of the TV screen shines as one of those colours! The rays of energy zigzag across the screen, lighting up different colours faster than our brains can notice. We just see a full picture on the TV!

# Making Your Own TV

## What you will need:

- 1 Shoe Box
- Silver Wrapping Paper
- 3 Cork tops
- Drinking Straws
- Glue
- Picture of your Favourite tv programme
- Round tipped scissors



## How to do it:

Beavers wrap the shoe box with the silver wrapping paper.

The flat bottom of the shoe box will be your TV screen.

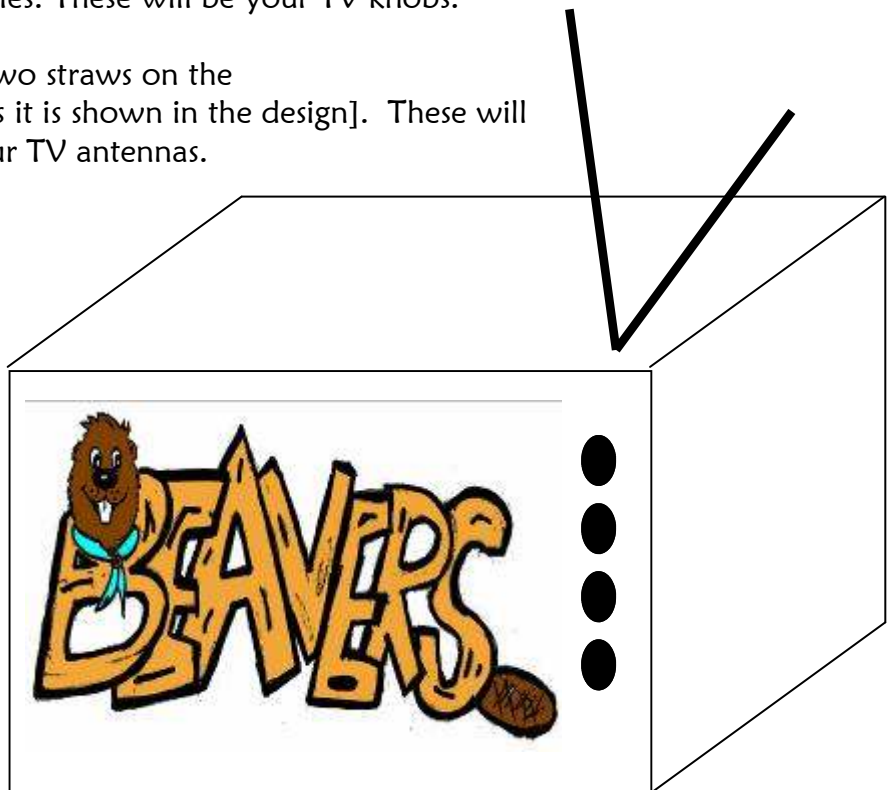
Stick a picture of your favourite TV programme on the 'screen'.



Pierce 4 big holes on the side of the picture. Insert the cork tops in the holes. These will be your TV knobs.

Stick two straws on the top [as it is shown in the design]. These will be your TV antennas.

And here you are....  
your very own  
Beaver Television!!







# How do kites work?



People can't fly, but some of our inventions can. Kites are one of them, and they're very fun toys to play with on the beach or in a wide-open field! A kite might seem pretty simple. There are no wires or microchips, but they actually have a very special design that keeps them soaring, high off the ground.

Kites are light! And that's very important. If they were heavy, they'd just fall to the ground. We could still pull them with a string, but it wouldn't be very fun! Kites are also very sturdy. They're often made of light plastic or fabric stretched across a frame. It's very important that a kite holds its shape, or else it wouldn't be able to stop wind from blowing through it.

The tail is very important too! The wind in the sky blows the tail, which actually causes the kite to be pointed towards the wind. When the wind meets the body of the kite, it has nowhere to go but downward, and this causes the kite to have the opposite reaction. It gets pushed up!



The last part of the kite is the string, which you hold onto. This anchors the kite in the air so it doesn't blow away. Also, the string helps for getting the kite into the air. If there's not a lot of wind, pulling the kite with the string against the still air has the same affect as the wind. The air gets pushed down, and the kite gets pushed up, up, and away!

There are many different shapes and forms of kite, but most work in this way.



# How do pictures get into a camera?



Cameras help you have lots of pictures of your favorite memories! To get those pictures into the camera, it's made with special devices inside of it that copy and hold onto your images.

**CHEESE!**



When you press a camera's button, its shutter opens and closes really quickly, kind of like a blinking eye. This allows the energies and colors of light from the scene in front of the camera to enter through the lens, and gives the camera a chance to see whatever you are pointing it at and trying to photograph. Just like an image you see goes into your memory and you store it there, the image a camera sees goes into its memory too!



Today, most cameras store the images they collect using digital technology. This includes a sensor made up of lots and lots of *pixels*, which are like teeny tiny dots in a grid. All of these little dots together help make up your picture! So, for example, if you've taken a picture of your sister wearing a funny purple hat, the camera's light-sensitive pixels record her hat as a series of purple dots. If you were able to zoom in really, really close on your photo, you might be able to see some of the individual dots, but otherwise, because they're packed so closely together, the tiny dots combine together to form your picture! You can then transfer the image from the camera to your computer, or have it printed onto paper!



# How do scissors work?



Here's a snippet of info for you!

You might have a pair of small scissors that you keep with your art supplies. Scissors are very useful tools and how they work is actually pretty simple!

Scissors are made of two blades. These blades are sharp, just like a knife, so always be careful. The blades are set up so that when you squeeze the handles, the sharp edges meet each other and cross very closely, cutting through any thin material, like paper or fabric, that is between them.

Thanks to scissors we can make paper snowflakes, paper stars and paper hearts to decorate or to use in art projects!

Scissors are also used to cut the thread and fabric that make clothes, so it's a good thing that scissors exist!

## Scissor Safety!

It's important to remember to be careful when using scissors. Just like they can cut paper, they can cut skin, so keep your hands away from the sharp edges of the blades. Walk with them slowly and carefully and keep the blades pointed down and away from you. It's a good idea to have a grown-up watching you. Maybe they'll even help with your art project!



# Why does soap make bubbles?



When it comes to staying clean, soap bubbles are hard to avoid. In fact, they seem to “pop” up when you least expect them! But what is it about soap that causes these bubbles to form?

If you’ve ever tried to blow a bubble using a bubble wand and plain water, you probably haven’t had much luck. That’s because of something called *surface tension*—the tiny molecules in water’s outer layer cling to each other tightly, making the water less flexible, which keeps a curvy bubble from forming.

But add soap, and the water’s surface tension decreases. Together, the soap and water “stretch” much easier than water alone, making a circle-shaped bubble around air that gets trapped inside! Sometimes this air comes from your breath, as when you blow bubbles with soapy water and a wand. At other times, the air and soapy water form a bubble during everyday tasks, like washing your hands in a sink!

I think we’d all agree that bubbles make clean-up time much more fun!



# How do pencil erasers work?



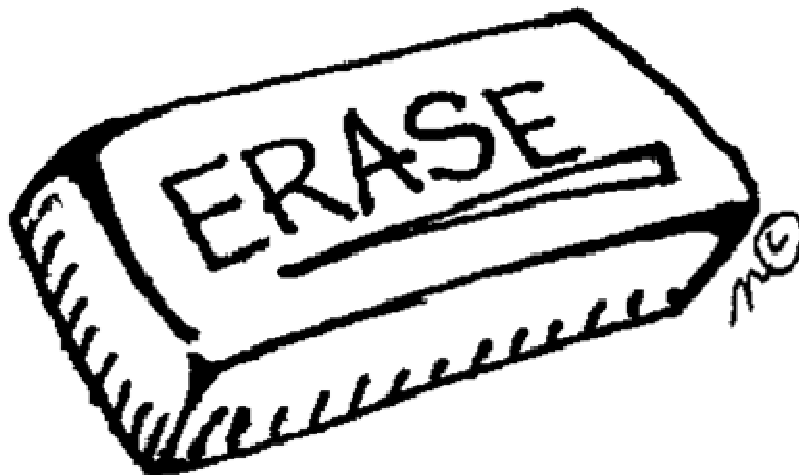
**Erasers are pretty cool!!**

They let you fix mistakes or change the way a drawing looks by getting rid of the pencil lines (or sometimes even pen lines) on your paper!

Most erasers today are made from rubber, plastic, or vinyl. The exact way how an eraser removes a pencil line depends a little on the exact type of eraser, but there are two main techniques:

- An eraser either works by scratching away the line of writing using abrasive substances in its mixture,
- or, it works by being sticky and “picking up” the dark lines of graphite left behind by your writing utensil! – Lots of erasers are made to do a little bit of each.

So when you misspell a word or want to draw the tree in your picture a little bigger, an eraser can help you change the other markings on your page by scratching them off and picking them up off the page!  
– Cool!!





# How do glowsticks work?

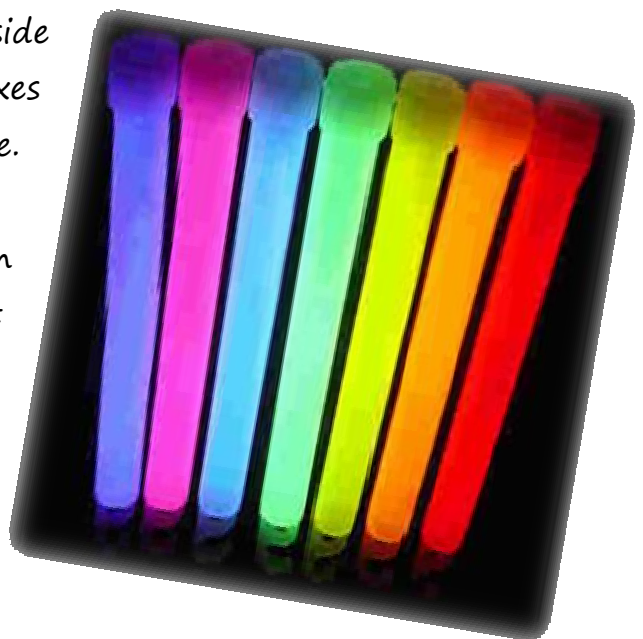
A glow stick is a pretty cool invention when you think about it. It gives us light without needing to be plugged in. It also doesn't use any batteries. Everything that the glow stick needs to glow is right there inside of it!

There is a special chemical reaction that makes it happen. Inside the glow stick there is a liquid chemical and some dye, but when you first take a glow stick out of its package, they aren't doing much. Nothing is glowing yet.

Inside the glow stick, there is also another smaller tube that is made of a very brittle material, like glass. That smaller tube holds another chemical inside it. That way, the chemicals stay separated. What do you think happens when the chemicals mix?

By bending the glow stick, we actually break the smaller tube on the inside. You usually will hear a tiny crack when this happens. The chemical inside the smaller tube leaks out and mixes with the other chemical on the outside.

A new chemical is formed, and it's an unstable one, meaning that it can't keep itself together very well. As the new chemical breaks down, it gives off energy that excites the atoms of the dye. When this happens, the glow stick lights up!

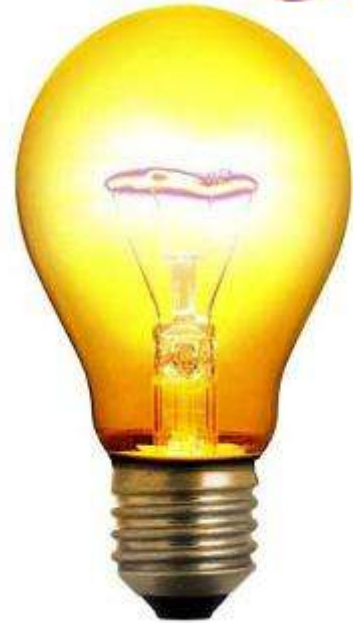




# How do light bulbs work?



Sometimes in cartoons you'll see a light bulb shine over a person's head if they have a bright idea. In the real world, we use them in lamps to light our homes. How these tiny lights work isn't too complicated. It's a bright idea based on electricity!



Electricity is dangerous, so you never want to touch a wire that's carrying electricity. It might not look too dangerous because most of the time, it doesn't have any effect on the metals found in wires. Sometimes though, it can make special types of metals heat up. When those metals get very hot, they start to glow, and that's the reason light bulbs light up

There is a special metal coil in light bulbs that gets very hot and glows very brightly when electricity runs through it. It's called a "filament". If you look closely at a light bulb you can see this tiny, thin metal coil at the center of the bulb. Make sure you have a grown-up help you though, and make sure that the bulb is cool and not plugged into a lamp! The filament inside may look very small, but when it heats up, it gives off a lot of light! This way we can see and read in the dark!

The glass of the light bulb does more than stop the hot filament from burning anything. It keeps air away from the filament. If air touched the filament, it would catch on fire and burn out very quickly. So it's a good thing that glass is there!

# Candy Crystals

## What you will need:

- Mug
- Hot water
- 2 tablespoons of sugar
- 2 plates
- Tin foil
- Food dye



## How to do it:

- Half fill a mug with hot water. Gradually stir in about two tablespoons of sugar until it is dissolved.
- Cover two small plates with tin foil and pour two tablespoons of the liquid onto each plate.
- Add a different drop of food dye to each. Leave them in a warm room. After three days, crystals will form.

## What is going on?

The water from the plates evaporates into the air and turns into water vapour—tiny water particles, spread so far apart that they are like a gas. Leaving the plates in a warm room speeds up the evaporation. Once the water has evaporated, only the crystals are left.



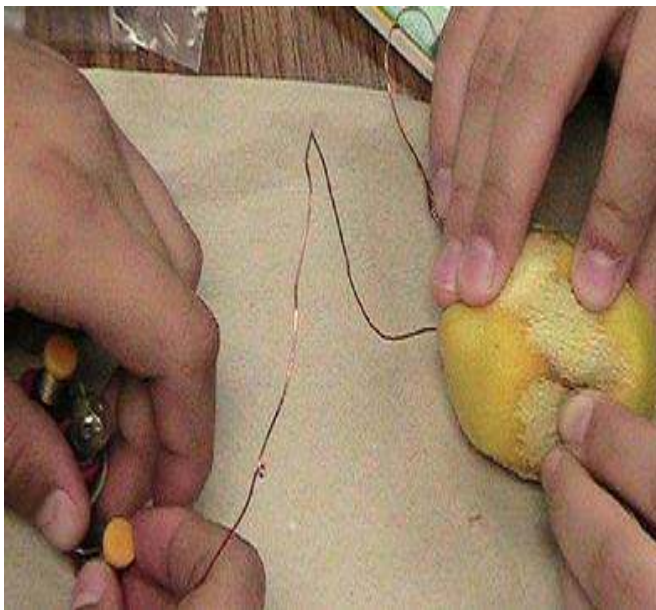
# A Simple Torch

## What you will need:

- 1 Lemon
- Drawing Pin
- Paper Clip
- 1 metre of flex wire
- Small bulb

## A lemon??? Why???

Because in Lemons there is what is called '*citric acid*' and it will act as a conductor of energy.



## How to do it:

- Insert the pin on one side of the lemon and the paper clip on the other side.
- The pin is made of copper and the paper clip of zinc.
- Wind one end of the wire with the pin and another end of another wire to the paper clip.
- Wind the remaining ends to the bulb and the bulb should light up.







# Games





### *TICK TOCK WHERE'S THE CLOCK*

Beavers stand in a circle with their eyes closed, the leader switches off the lights and hides a clock preferably a clock with a loud tick tock noise. When the leaders puts on the lights again, He/she shouts 'Tick Tock Find The Clock' and the Beavers search the area to find the clock. The aim of the game is to listen attentively to sounds.

### *BLOW PING PONG*

Colony is divided in 2 teams. Each team stands at the side of a table and kneels in front of it. A ping pong ball or a ball of light material is placed in the centre of the table. Each team blows hard to try to blow the ball onto the other team's side. First team to make the ball reach the other end of the table wins.



# Visits

**A Bakery**

**Olive Farming Facility**

**A Photo Studio**

**A Weather Station**

**A Locksmith**

**Watch a 3D Movie**

**Animal Breeding Farm**

**Glass-Blowing Facility**

**Pottery Facility**