CLASSROOM SCIENCE ACTIVITIES

Activity 1: Fishing Game

Aim

Students will investigate which materials are magnetic and which are not, while designing and making their own fishing game.

What you need

- string
- magnets
- card
- a selection of materials such as paper clips, pins, aluminium, old plastic fridge magnets, plastic ice cream container lids, buttons, coins, wood (match sticks or pop sticks), aluminium foil, lolly wrappers, rubber bands, string, twist ties
- fish templates
- sticky tape
- a large bowl or box

What to do

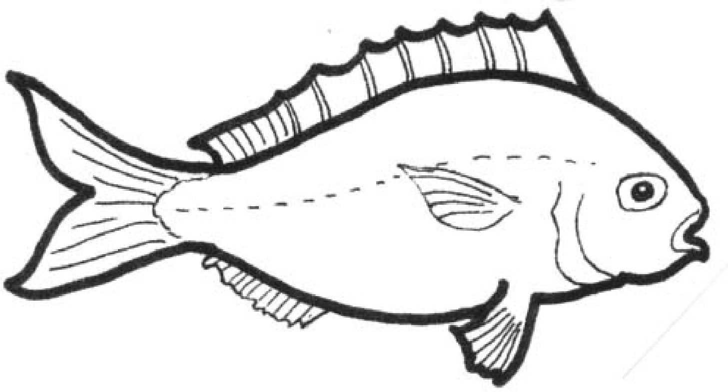
1. Attach a magnet to the end of a length of string to make a fishing line.
2. Cut a number of different fish out of card using the templates provided. Colour in the fish.
3. Use the sticky tape to attach a different material to each fish. The ice cream container lids, foil, string and fridge magnets can be cut up into small pieces.
4. Put all the fish into the bowl.
5. Use the fishing line to 'catch' the fish.

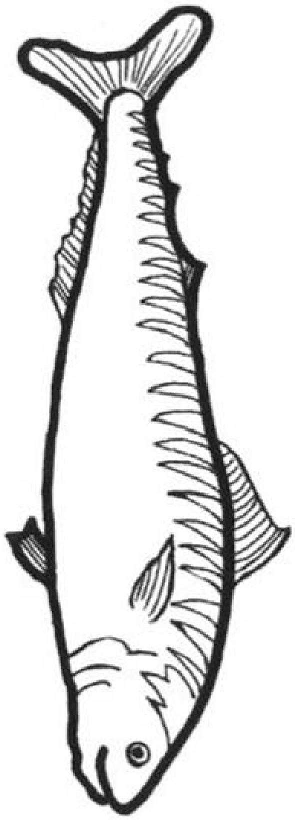
Optional

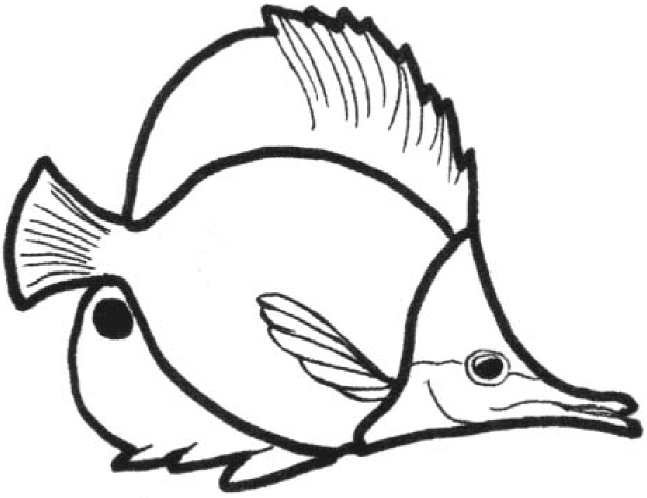
- Make a list of the materials that are magnetic and those that are not.
- In pairs, develop rules for a game that can be played using the fishing line and the magnetic fish. Include some type of point system.
- Swap game ideas with your class mates. Play each other's games.
- Do some research and find out where magnets are used every day.
- Ask students to predict whether objects around the classroom or home are magnetic or not.
- Use the magnet on the fishing line to test these predictions.
- Instead of using the fish templates provided, design and create your own sea creatures.

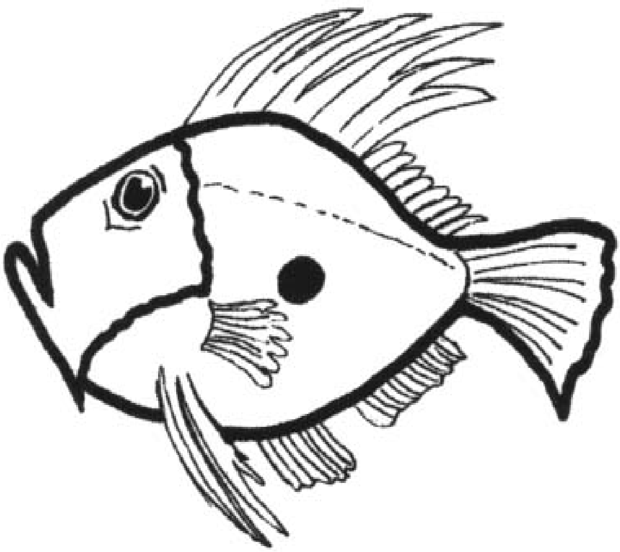
CLASSROOM SCIENCE ACTIVITIES

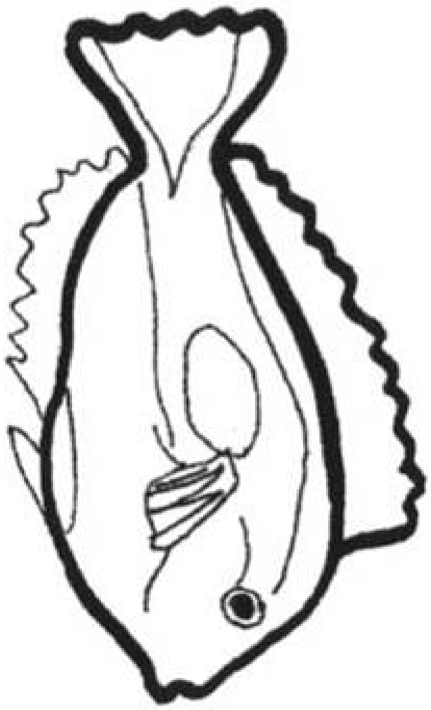
Fish templates











CLASSROOM SCIENCE ACTIVITIES

Activity 2: A Simple Electromagnet

Aim

Students will investigate the relationship between electricity and magnetism by making a simple electromagnet.

What you need

- large nail or bolt
- long piece of insulated wire
- 1.5V batteries
- packet of paper clips

What to do

Ask the students to:

1. Strip the insulation from each end of the wire.
2. Wind the wire around the nail about 15 times.
3. Connect the two ends of the wire to opposite ends of the battery.
4. Hold the nail close to a small pile of paper clips.
5. Count how many paper clips were picked up and record the number in the table on the Electromagnet worksheet.
6. Repeat steps 2-5 changing the number of coils of wire wrapped around the
7. Nail, each time recording the number of paper clips picked up by the electromagnet.
8. Try connecting two batteries in the circuit and repeat steps 2-6.

Questions

- Record the findings on the Electromagnet worksheet and answer the questions.

Optional

- Encourage the students to experiment with various combinations of the number and size of batteries and the number of coils of wire around the nail.

CLASSROOM SCIENCE ACTIVITIES

Activity 2: Electromagnet Worksheet

Fill in the number of paper clips lifted in each column.

		Number of winds (coils) of wire			
		15	20	25	30
Number of Batteries	1				
	2				

Create a graph to show your results.

Use your results in the table above to answer the following questions.

Questions

1. How many paper clips can be picked up using 15 coils and one cell?

2. How many paper clips were picked up using 25 coils and two cells?

3. Did connecting more cells in the circuit affect the number of paper clips picked up?

4. What affects the number of paper clips that can be picked up?

CLASSROOM SCIENCE ACTIVITIES

Activity 3: Dancing Dolly

Aim

Students will make an electromagnetic toy.

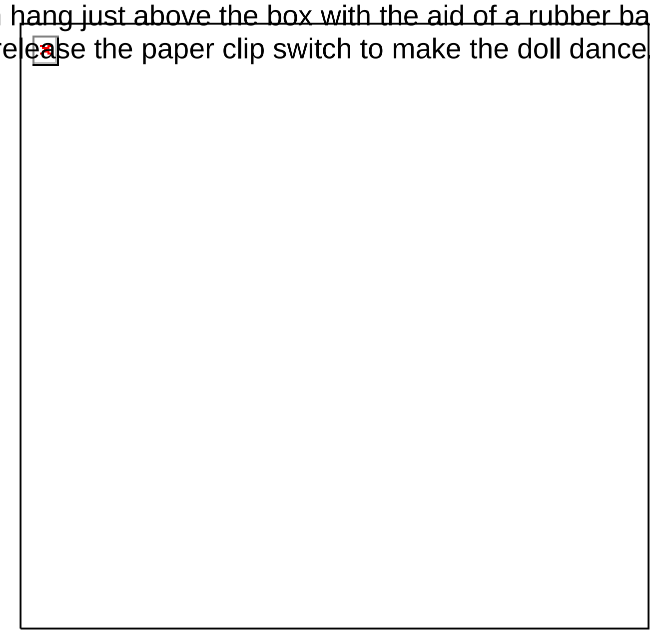
What you need

- thick steel bolt
- insulated wire
- stiff paper
- scissors
- pencils
- paper clips
- small cardboard box (about the size of an individual fruit drink box is suitable)
- two 1.5V batteries
- sticky tape
- rubber band
- wire coat hanger
- two drawing pins
- small cork.

What to do

Ask the students to:

1. Make a switch by pressing one drawing pin into the side of the cork so that it anchors the single end of a paper clip.
2. Push the other drawing pin into the other end of the same side of the cork.
3. Swivel the paper clip so it is able to touch the other drawing pin. This closes the switch.
4. Wind the wire around the bolt about 100 times.
5. Connect to the switch and the two cells. (See diagram below.)
6. Place the cardboard box over the electromagnet making sure the magnet is close to the top of the box.
7. Draw and cut out a doll body from stiff paper. Use two paper clips for each arm and each leg of the doll.
8. Connect wire from the coat hanger to the box with tape and twist the free end so that the doll can hang just above the box with the aid of a rubber band.
9. Press and release the paper clip switch to make the doll dance.



CLASSROOM SCIENCE ACTIVITIES

Activity 4: Thaumatrope

Aim

Students will investigate ‘persistence of vision’ by making a thaumatrope.

What you need

- template of the two pictures (choice of two given provided)
- scissors
- a drinking straw
- sticky tape
- glue

What to do

1. Cut around the box outside the two pictures.
2. Fold the paper along the dotted line so that the pictures face outwards. Unfold.
3. Tape the straw to the centre back of one of the pictures.
4. Apply glue to the back of the picture with the straw attached
5. Glue the back of the pictures together to finish your thaumatrope. You can colour it if you like!
6. Hold your Thaumatrope between the palms of your hands.
7. Make it spin by rubbing your hands together quickly, twirling the straw. (see the diagram)
8. You should be able to see both pictures at once. The pictures from each side will appear to merge together.

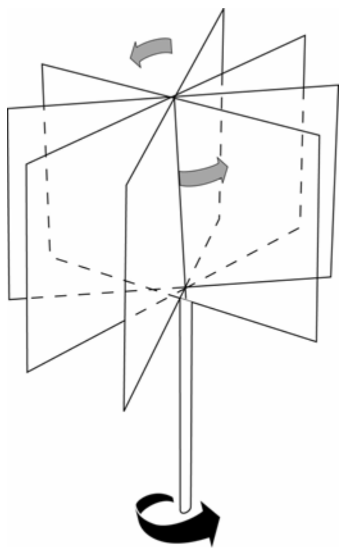
Questions

1. What is ‘persistence of vision’?
2. How does the thaumatrope work?

Optional

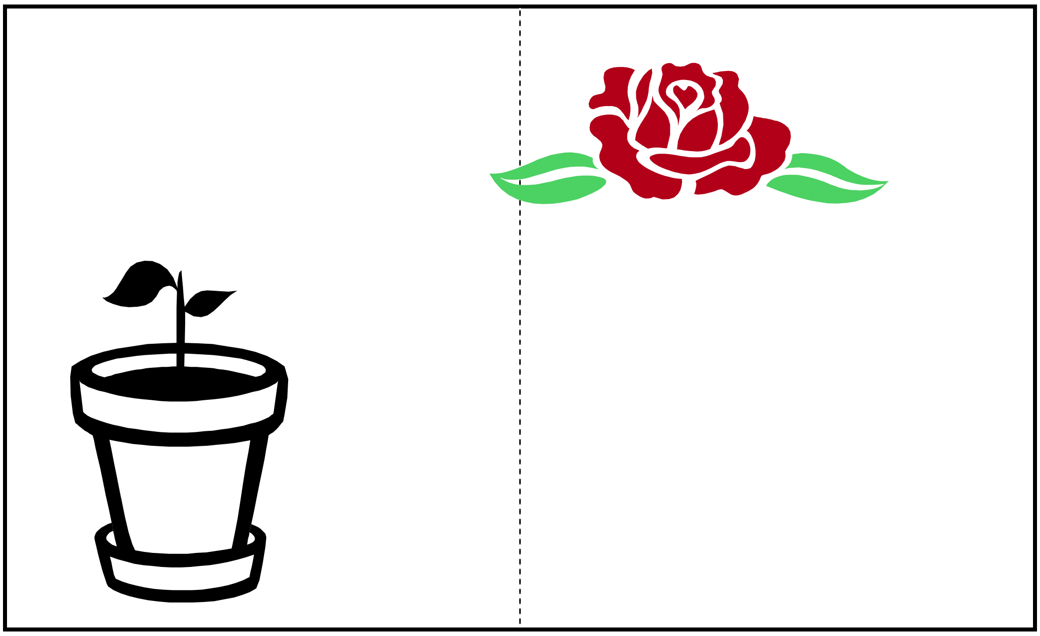
Think of other images you could use to design your own thaumatrope. You could put a:

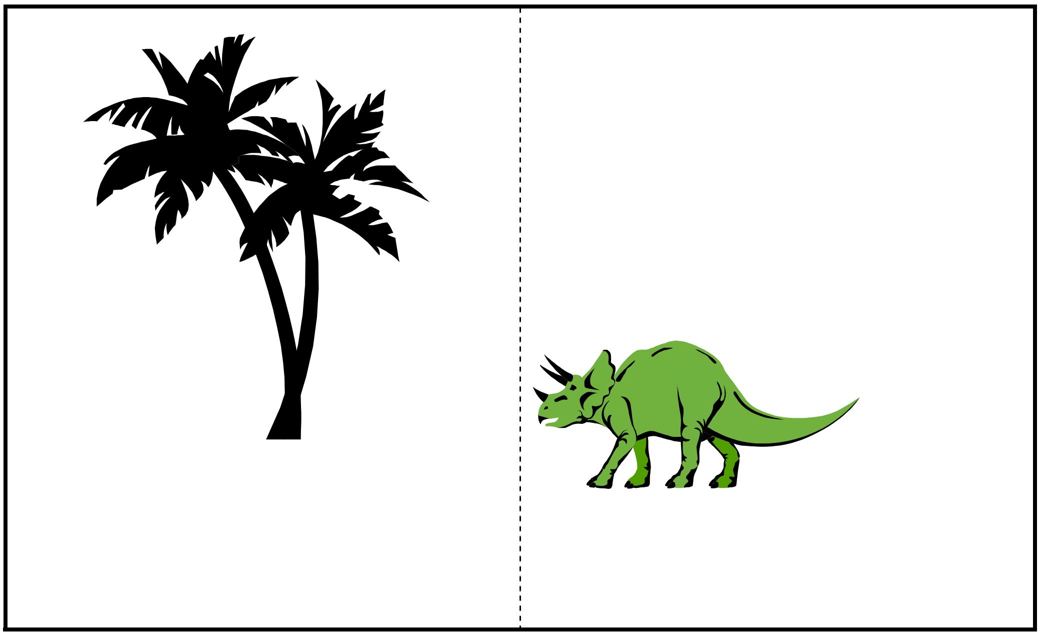
- fish in a bowl
- smile on a clown
- bird in a cage
- jack in a jack-in-a-box



CLASSROOM SCIENCE ACTIVITIES

Thaumatrope templates





CLASSROOM SCIENCE ACTIVITIES

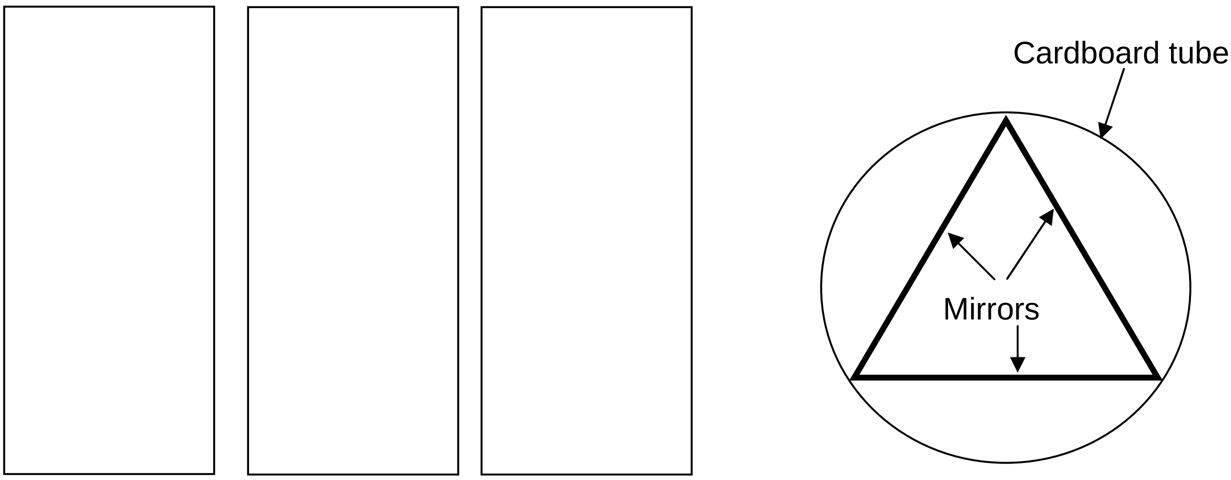
Activity 5: Kaleidoscopes

Aim
Students will investigate reflection by designing and making a kaleidoscope.

What you need
- sample kaleidoscope
- three rectangular unbreakable mirror pieces
- cardboard tube
- sticky tape
- clear plastic
- coloured cellophane
- beads and sequins

What to do
1. Use the kaleidoscope to discuss its construction and how it works.
2. Brainstorm ideas for the construction of kaleidoscopes.
3. Write or draw a design brief for a kaleidoscope.
4. Use the material listed above to construct a kaleidoscope. (Hint: use the cardboard tube to hold the three mirrors into a triangle shape)
5. Test and modify the designs of the kaleidoscopes.

Three rectangular mirrors (same size)



CLASSROOM SCIENCE ACTIVITIES

Activity 6: Returning Tin Can

Aim
Students will investigate energy transformations by making a 'Returning tin can'.

What you need
- a tin can with a removable metal lid (for example a coffee can)
- a long rubber band
- a heavy nut or bolt
- scissors
- a 'punch' type can opener

What to do
1. Use the can opener to 'punch' two holes on opposite sides of the base of the can.
2. Punch two matching holes in the lid of the tin can. (see the diagram.)
3. Cut the rubber band to make one length of rubber.
4. Carefully thread each end of the rubber through the bottom holes so that it is even. Cross the ends of the rubber over and tie the nut or bolt onto the rubber so that it is in the centre of the can.
5. Thread the free ends of the rubber through the holes in the lid. Put the lid on the can so that the bottom holes and the top holes line up.
6. Tie the two ends of the rubber together firmly outside the lid.
7. Gently roll the can along the ground away from you.

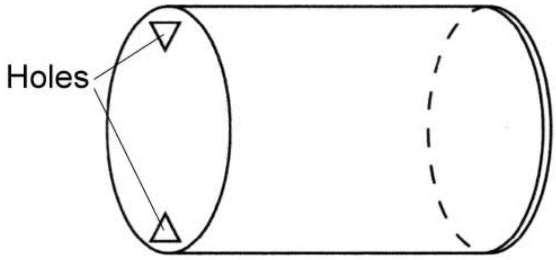
Questions
1. What happens to the can when you roll it along the ground?
2. Why do you think it stops?
3. Where does the can get the energy to roll back to you?
4. What do you think is happening inside the can?
5. What are the energy transformations taking place?

Optional
- You can cut a small window in the lid to help find out what is happening inside the can.
- Measure the distance rolled versus the return rolling distance. Is there a relationship?

CLASSROOM SCIENCE ACTIVITIES

Returning tin can diagrams

1



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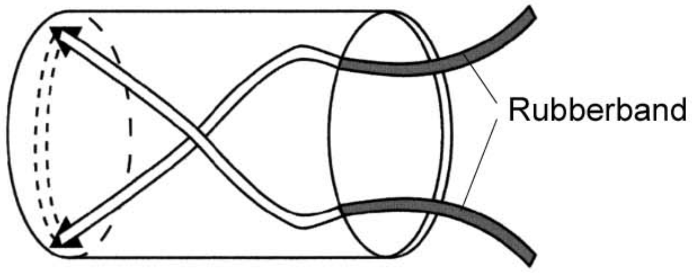

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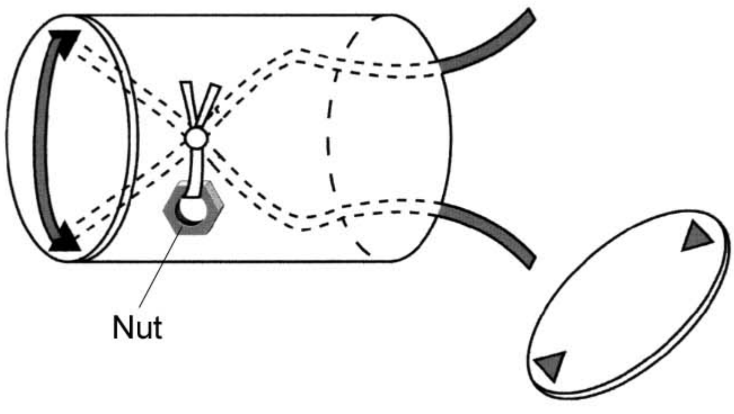

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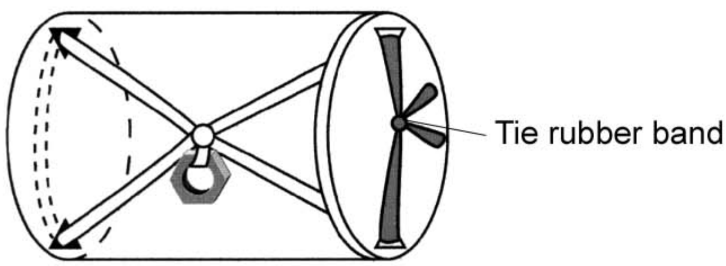


CLASSROOM SCIENCE ACTIVITIES

Activity 7: Make Your Own Powerboat

What you need

- a piece of polystyrene (8cm x 5.5cm x 1cm)
- two wooden pop sticks
- a rubber band
- an ice cream or margarine tub lid
- scissors
- sticky tape

What to do

1. Place the pop sticks on either side of the piece of polystyrene.
2. Angle both sticks downward so that they will point into the water when you float your boat
3. Hold the pop sticks to the polystyrene by wrapping sticky tape around them both.
4. Place a rubber band over the pop sticks towards the free ends.
5. Cut a rectangular piece of plastic from your ice cream lid. This will be the paddle for the boat so its size will depend on the size of your polystyrene. It will have to be small enough to spin freely between the sticks, but large enough to make your boat go fast (for an 8cm x 5.5cm x 1cm piece of polystyrene, a 2cm x 5cm paddle is perfect).
6. Slide the paddle through the rubber band and wind it backwards. Keep a hold of it…
7. Put your boat in water, release the paddle and watch it go.

Questions

1. What type of energy is being transformed into kinetic energy?
2. What other types of energy may it be transforming into?
3. Investigate ways to make your paddle boat go faster.

Optional

- You can also use an empty matchbox instead of polystyrene. To waterproof your boat for durability, wrap up the empty matchbox using cling wrap or plastic contact. Safety tip: Never play with matches, ask an adult for an empty box.

CLASSROOM SCIENCE ACTIVITIES

Activity 8: Car Launcher

Aim

Students will investigate potential and kinetic energy by making a machine to launch toy cars.

What you need

1. toy cars
2. rubber band
3. one litre milk carton
4. ruler
5. paper clips
6. scissors

What to do

1. Cut the top and one side from the milk carton. (see diagram)
2. Attach the rubber band to the inside front of the carton using paper clips.
3. Use the ruler to mark distances at one centimetre intervals back from the rubber band.
4. Use the rubber band to launch the toy car from the 1 cm mark, measure how far the car travels.
5. Repeat step 4, launching the car from increasing distances.
6. Record your results.

	Launching distance (cm)	Distance travelled by car (cm)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

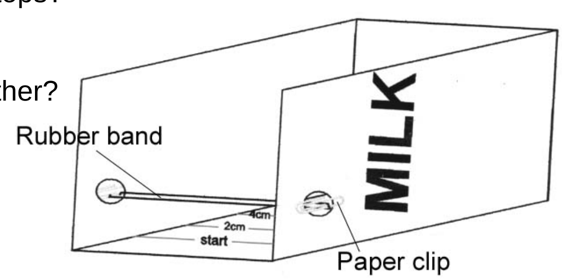
Questions

1. What type of energy does the car gain when the rubber band is stretched?

2. What type of energy does the car have once it is moving?

3. What happens to this energy when the car eventually stops?

4. How can the car get more energy and go faster and further?



CLASSROOM SCIENCE ACTIVITIES

Activity 9: Climbing Monkey

Aim
Students will investigate friction by making a rope climbing toy.

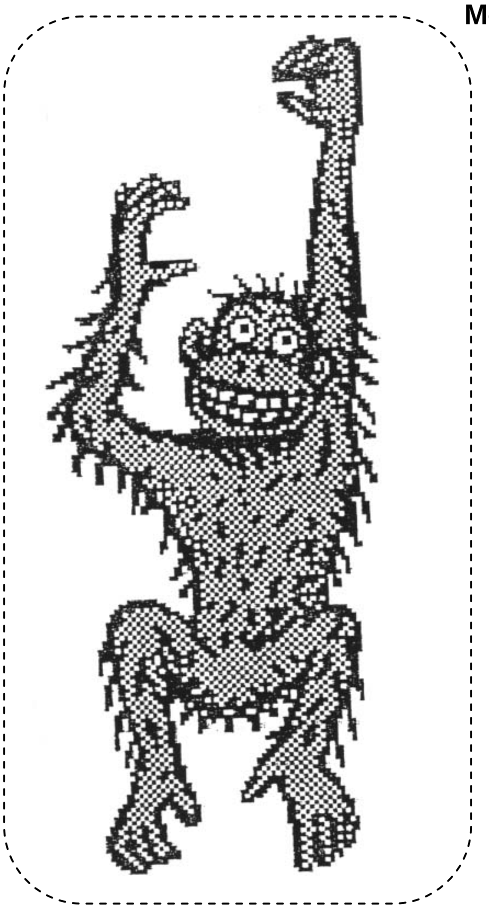
What you need
- stiff card
- a drinking straw
- string
- sticky tape
- scissors
- two weights (modelling clay or washers)
- a thumb tack
- access to a pin board
- Monkey template

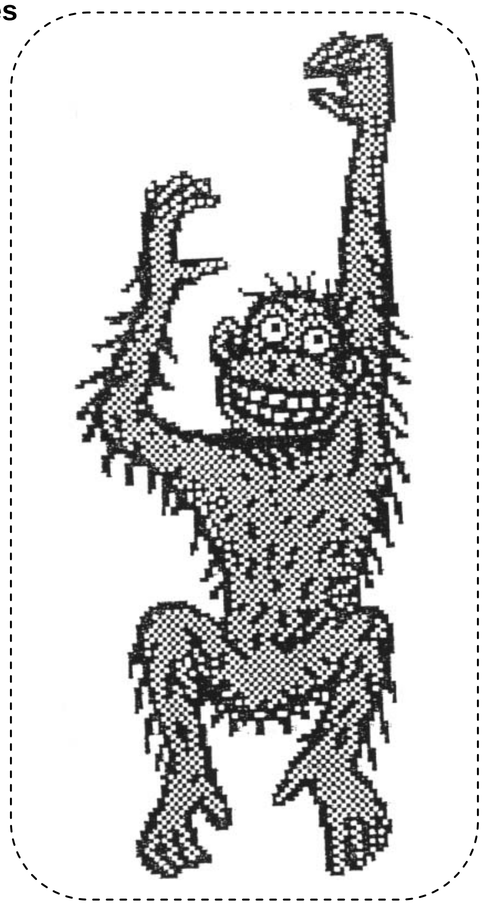
What to do
1. Colour the picture of the Monkey, cut it out and glue onto a piece of card.
2. Cut two 5cm pieces from the straw; attach them to the back of Monkey as shown in diagram. Tie the weights onto the ends of the string.
3. Put a thumbtack into a pin board or some other vertical surface.
4. Thread the string through the straws and attach weights to the ends as shown in diagram.
5. Hang up the monkey from the thumbtacks. Make your Monkey climb by pulling on the weights.

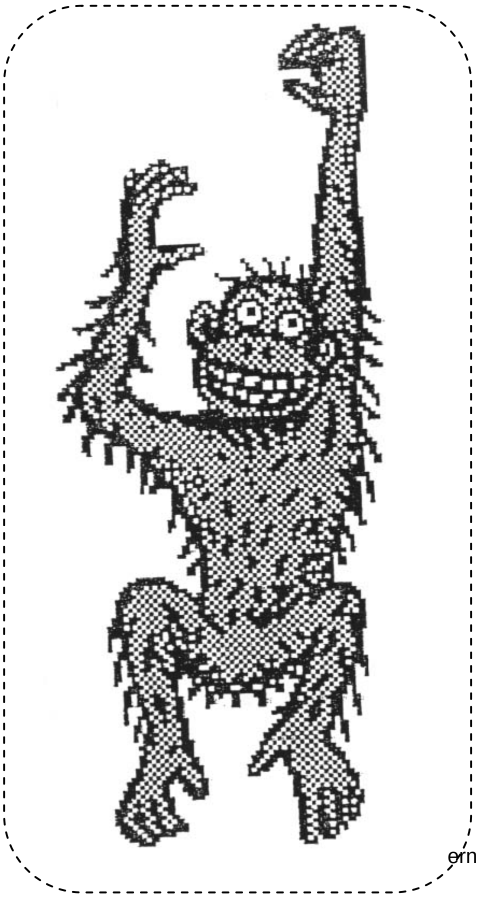
Questions
1. What force stops Monkey from falling down the string?
2. What force is pulling down on the monkey?

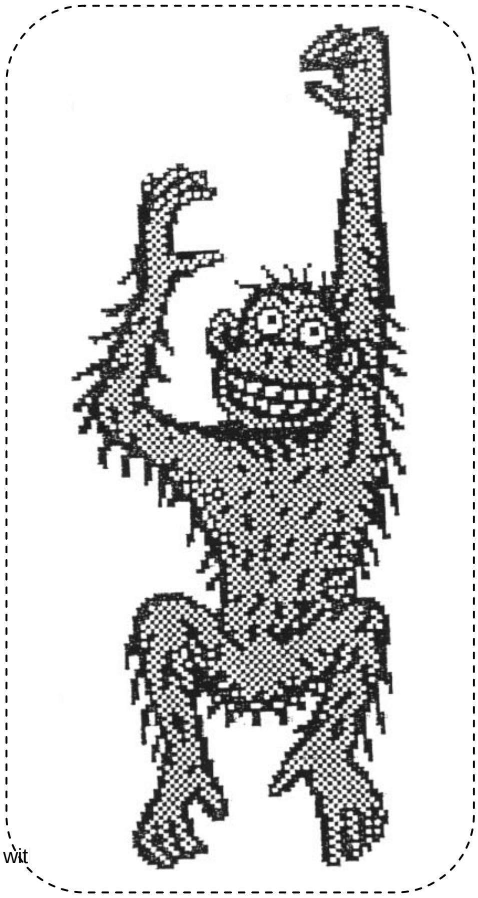
CLASSROOM SCIENCE ACTIVITIES

Monkey templates









CLASSROOM SCIENCE ACTIVITIES

Activity 10: Understanding Waves

Aim

Students will investigate the nature of sound waves.

What you need

- a slinky
- a toy xylophone
- 5-6 similar jars
- rubber bands (various thickness)
- empty boxes and plastic containers of different sizes

A series of demonstrations and activities to investigate rarefactions and compressions in sound waves

What to do

1. Use a slinky to demonstrate sound waves by stretching a number of coils in the slinky (about 6) back and then letting go. Observe the motion of the spring and identify compressions and rarefactions in the spring.
2. Listen to different pitches on a toy xylophone.
3. Make a xylophone by filling the jars with different amounts of water.
4. Rubber bands of different thickness can be stretched across boxes and other small empty containers. Pluck the rubber bands to hear different pitches. Try to arrange the containers in order to make a xylophone.

Questions

1. Describe the movement of the coils in the slinky.
2. Which direction did the energy travel through the slinky?
3. Why can't we hear sounds in space?
4. How does the length of the bar on the xylophone and the height of the water in the jar relate to the pitch of the sound produced?
5. How does the thickness of the rubber bands relate to the pitch of the sound produced?
6. Does varying the size of the box that the rubber bands are stretched across change the pitch in any way?

CLASSROOM SCIENCE ACTIVITIES

Activity 11: Clucking Cup

Aim
Students will investigate how sound travels in solids while making a hybrid musical instrument.

What you need
- a plastic drinking cup
- 50 cm of string
- a plastic ice-cream container lid
- a paper clip
- a small piece of sponge or foam (eg kitchen sponge)
- scissors
- sticky tape

What to do
1. Carefully make a small hole in the centre of the base of the cup.
2. Tie one end of the string to the paper clip.
3. Thread the loose end of the string through the hole from the inside, so that the paper clip is on the inside of the cup.
4. Tie a piece of sponge to the other end of the string for a handle.
5. Cut a square from the ice-cream container lid. It should be just bigger than the top of the cup. (Trace a circle using the top of a cup as a guide, then make the square a bit bigger)
6. Sticky tape the square base onto the top of the cup.
7. To play your instrument, hold the square base near your ear with one hand (but not too close). With your other hand, hold the foam between two fingers, hold the sponge firmly around the string under the base of the cup and pull down along the string.

Questions
1. Describe the sound of your instrument?
2. Explain why we hear a sound when the sponge moves along the string?
3. What can you modify so that the instrument makes a different sound?
4. Investigate different lengths of string and the sounds they make. Do you find that there is a pattern?
5. Can you make the instrument sound louder? What would you need to modify?