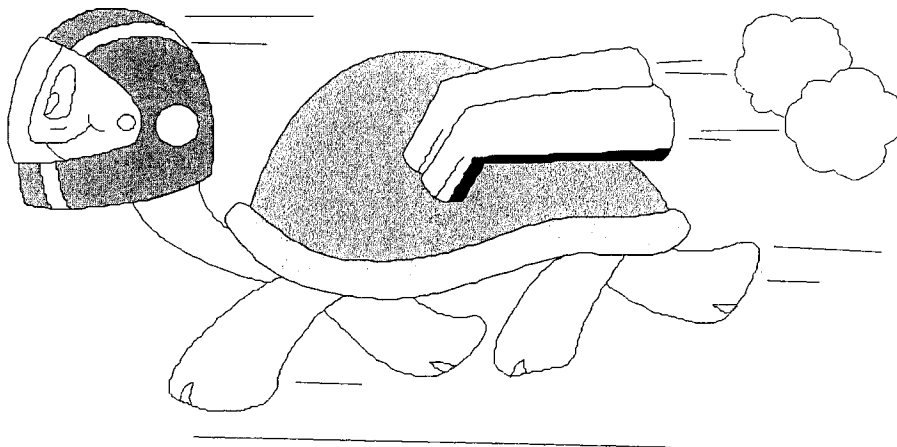




Ideas and worksheets for a 'Science Unit'
that focuses on the strand:

Energy and Change



This package will help the teacher to plan an entire Science unit for the strand of *Energy and Change* in the Science Syllabus years 1-10.

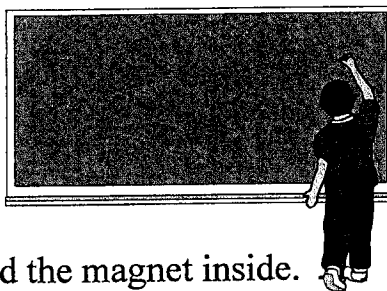
Students can achieve outcome levels 2, 3, 4 (Energy & Change Strand) through exploring the topics suggested in this package.

The worksheets included aim to help students achieve the different outcomes in the Energy and Change strand.

Concepts introduced in this package:

- Power of Magnets & Use of Magnets
- Energy used in the Community & on the Farm
- Energy of Movement - Forces & how they change shape, motion & behaviour of objects.

Ideas to further explore the concept of magnets in your classroom

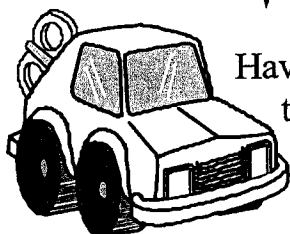


Pull apart a tape and find the magnet inside.

Rob a magnet of its strength
(Give the power to another item)

Destroy a magnet
(heat it, drop it or hit it with a hammer)

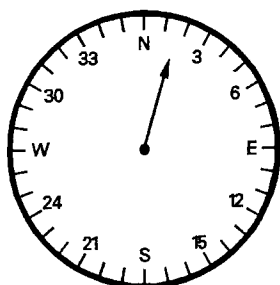
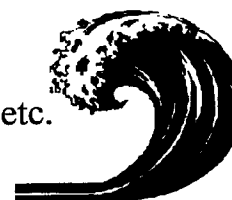
Perform experiments using magnetic and electrostatic forces
-ie: electric shocks from carpet, combing hair with a fine tooth comb.



Have students bring in any battery or electrical toys and discuss how they work- Students can design their own toy /contraption.

Research about artificial magnets - 'Electromagnets' - what are their uses?

Discuss the Magnetism of the Earth and its Magnetic poles -
How it effects rotation of the Earth, the moon & tides etc.

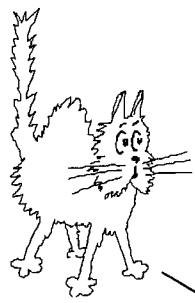


Explore Magnetic fields

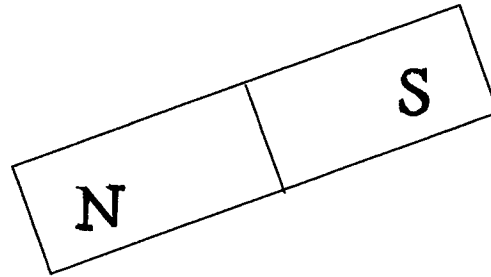
Use compasses and discuss how they work- Orienteering

Useful Web sites:

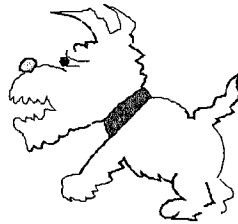
www.reachoutmichigan.org/funexperiments/
www.vcaa.vic.edu.au/csfd/sc/kssc.htm
<http://hallkidsscience.com/>
<http://www.yahooligans.com/>



Animal



Attract or repel?



Attraction

Magnets contain iron and can attract certain objects.

Experiment:

1: Circle the objects you think a magnet can attract?

Paperclips, Ruler, Nail, Scissors, Pin, Eraser, Pencil, Al foil, Cork, Paper, Cloth, String, Chalk, Duster, Desk, Chair, Window, Stapler, key,

2: Now have a turn using a magnet. Were you correct?

3: Classify the items above into the correct column

| Items attracted to magnet | Items not attracted to magnet |
|---------------------------|-------------------------------|
| | |

4: Can you think of any other objects a magnet might attract?

What is a magnet?



- 1) A magnet has an invisible force that pulls things towards itself and pushes things away. This ability is called: *a_t and r_l*.
- 2) It has the ability to attract certain metals, including: *i_r, s_l & n_ck*.

What is a magnet used for?

Magnets are used in electric motors that power everything from trains to hair dryers.

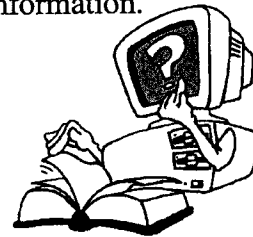
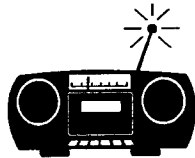
Magnets are also found in:

Computers & disks use magnets to record information.



Microphones

Magnets in videos, tapes & stereos make it possible for us to listen to music and watch videos.



Magnets help to convert electrical current into sound waves, enabling people to hear each other talking on the phone



MAGNET SURVEY

What items can you find in your home that might use magnets?

Clue: think of electrical appliances-try to think of 3 items from each room

| Room | Magnet used for: |
|------------------------------|---------------------|
| Kitchen | Magnetic tin opener |
| Lounge room & study | |
| Bedroom | |
| Bathroom | |
| Tool / garden shed, workshop | Cordless Drill |

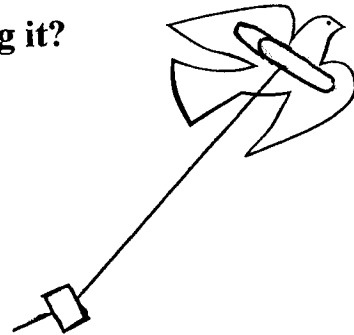
HOW FAR DOES A MAGNETS POWER REACH?

Experiment

Can a magnet hold something in the air without touching it?

You will need:

Thin paper Bar magnet scissors sticky tape
paper clips thread or string (light weight)

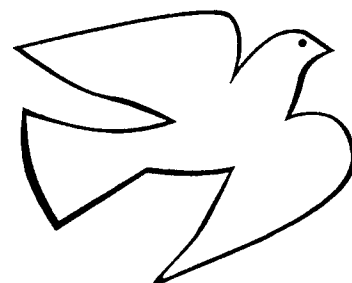


1. Cut out bird from bottom of page.
2. Tie the thread to the paper clip & tape onto one side of bird .
3. Tape the other end to a table top.
4. Use the magnet to pick up the bird and make it fly in the air untouched!
5. Try putting different objects between the magnet and the flying bird. ie: different types of paper, an eraser, a ruler, a small piece of tissue, alfoil, bubble wrap etc.

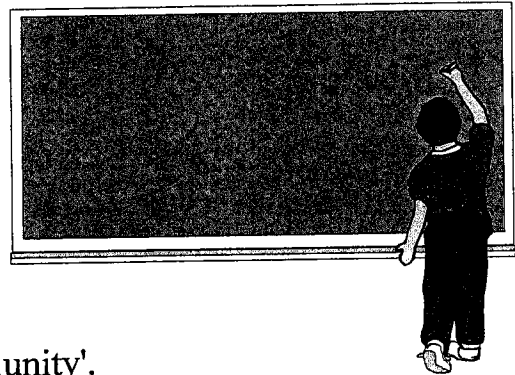
Q: Which materials did you put between the magnet and the bird?

Q: Which materials made the bird fall when it was placed between the magnet and bird? _____

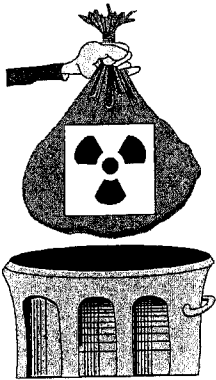
Q: If you used a stronger/larger magnet, do you think the magnetism could then pass through these materials?



Ideas to further explore energy in your classroom



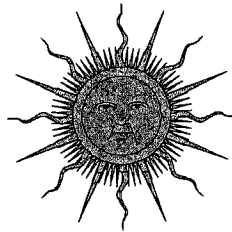
Construct a concept map of
'How energy is obtained and used in the community'.



Discuss Harmful energy & waste products

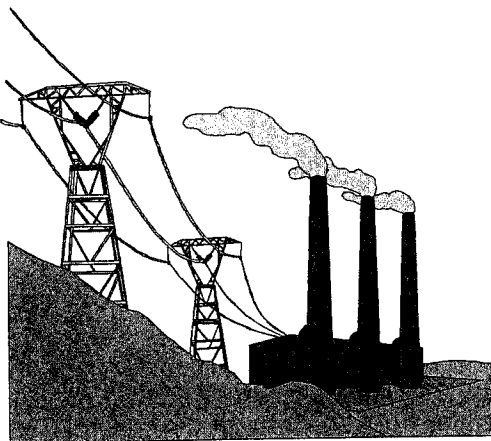


Have students research a particular type of energy.



Design a solar powered item

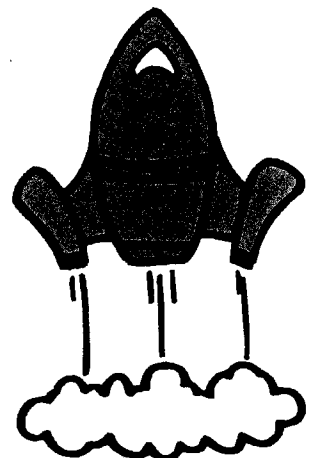
Make fossils using plaster of paris.
Look at different rocks and minerals- which ones can produce energy?

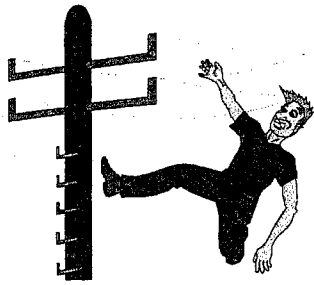


Go to the City Council electrical power plant or
water works or have a guest speaker come to you.

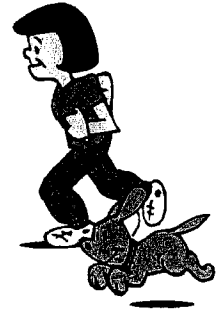
Useful Web sites:

www.reachoutmichigan.org/funexperiments/agesubject/lessons/
<http://school.discovery.com/lessonplans/>
www.energyquest.ca.gov
www.vcaa.vic.edu.au/csfd/sc/kssc.htm
<http://hallkidsscience.com/>
http://www.yahooligans.com/science_and_nature/physical_sciences/Energy/





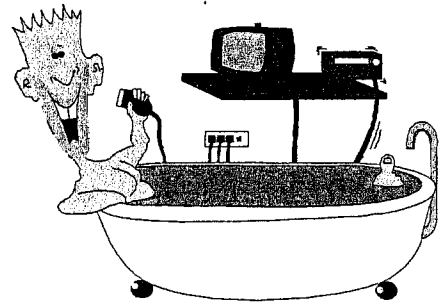
WHERE DO THEY GET THEIR ENERGY?



Q: What do humans and animals do to get energy so they can walk, run & play?

Cryptic Clue: night time, coles, farmers, vitamins

Types of energy used in our lives



Draw a line to match the energy with the explanation

Solar energy

Fossil Fuel

Heat energy

Natural Gas

Sound energy

Magnetic energy

Electricity

When coal is burnt it releases large amounts of heat

Used to heat up your hot water system

Vibrations travelling through air

Motors can use this type of energy

Can give you a 'shock' if voltage is high.

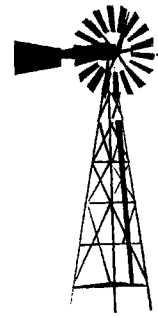
Using the rays from the sun

Found in mines -in rocks formed millions of years ago

In your own words, write the meaning of energy, what is it?

Now write the definition of Energy:

ENERGY RESEARCH PROJECT



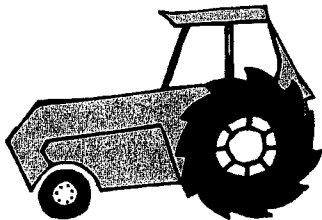
What types of Energy are used by us?

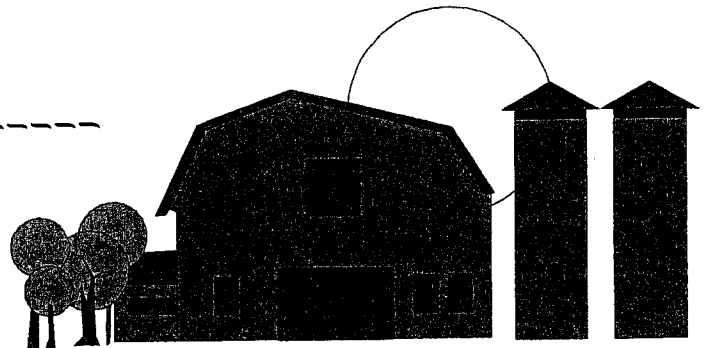
What produces this energy in Our Community vs On the Farm?

fill in this table.

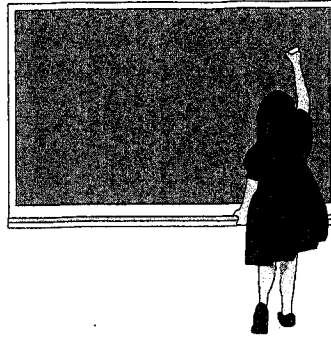
| Type of Energy | In my community What produces it? Where does it come from? | On The Farm How/What produces it? Where does it come from? |
|----------------|---|---|
| GAS | Comes through underground pipes from the street- to our house. Energex gives us gas from Natural resources. | |
| WATER | | |
| ELECTRICITY | | |
| | | |

List ten things related some way to energy that you would see on a farm, but not see in the city.

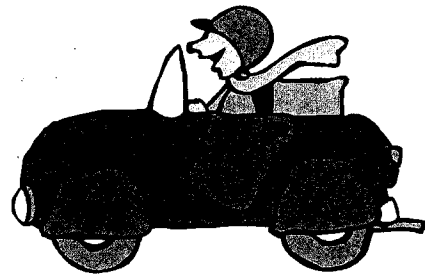




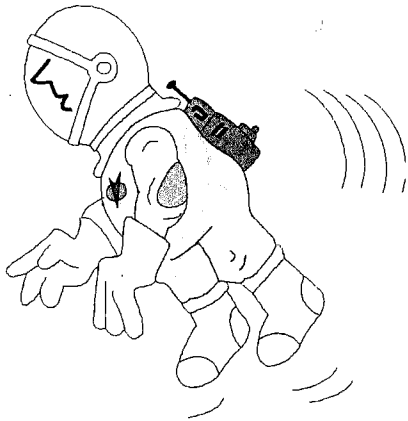
Ideas to further explore forces & movement in your classroom



Talk about safety concepts related to force
ie: car crashes, why we wear safety belts -
what forces are involved- how force is transferred.



An individual or group experiment could be that students have to come up with a way of protecting an egg if they drop it from the 10m- what would they cover the egg with? How would they cover it?



Go into more detail about movement concepts such
as: Motion, Kilometres per hour, Mass, Gravity,
Weight, Inertia, friction, Kinetic or Potential energy
etc.



Useful Web sites:

<http://school.discovery.com/lessonplans/physci.html>
<http://www.vcaa.vic.edu.au/csfc/home.htm>
www.vcaa.vic.edu.au/csfc/smp/spin3a.htm (forces)
<http://hallkidsscience.com/>
<http://www.yahooligans.com/>



FORCES

Teacher can read this to the class and have a discussion throughout the story to help students understand the concept of force.

**Imagine you are riding straight down a hill on your bike or skateboard.
Gravity is pulling you down the hill.**

What is gravity? (discuss)

Gravity is the force of attraction that occurs between all objects. Earth attracts you and you attract earth - what goes up must come down!

**All of a sudden there is a huge tree at the bottom of the hill right in front of you.
What do you do?**

Discuss what students would do.

*You use a force to change direction on your bike/skateboard.
You use a force to put on the brakes and slow down the bike.*

*A force can be described as a 'push or a pull' (Newton 1642-1727).
A force can change the motion or shape of an object.*

Q: Does the size of the force make a difference?

Discuss if you would need a little force or a lot of force to stop the bike from hitting the tree.

Some outdoor activities to perform to help students explore the concept of force.

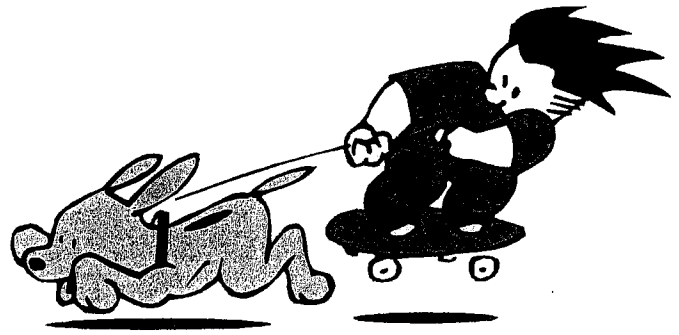
Tug of war - What forces are at work? Why did one side win? What happens when one side lets go? Was there a time when both sides couldn't move?

Bike Riding/Skateboarding - Have a student ride their bike in front of class - stop, start, turn, do tricks etc. Get students to say 'force' every time they think the student has to use force on the bike. What forces are happening between the bike and the ground? What about between the student and the ground? What happened to students' body when he stopped suddenly - what force was on his body? Where the forces all the same or did he have to use a harder force at some stage? When might he need greater force? (riding on grass needs more force than concrete)
Discuss Motion (kinetic energy) - while riding on a bike/skateboard etc.

Hitting a ball off a Tee (game of Tee Ball) - Discuss with students about what forces are present when the ball is on the Tee. Will it move off the tee all by itself or must there be a force applied? Is force used when you hit the ball off the tea? Discuss the motion of the ball & the motion of the swing to hit the ball.

Trust game - In a tight circle, one student in middle keeps a very stiff body. Students around the circle catch & push student in middle - discuss force needed to catch student & change their direction.

FORCES RESEARCH PROJECT



What is the definition of a force?

Write ten items that can produce a force?

| | |
|-------|-------|
| ----- | ----- |
| ----- | ----- |
| ----- | ----- |
| ----- | ----- |
| ----- | ----- |

Do forces influence the motion, shape and behaviour of an object?

Name five of these influencing forces ?

