Guzzler Investigates Energy!

SESE activities and investigations for infant and junior classes

SUSTAINABLE ENERGY IRELAND

Sustainable Energy Ireland
Glasnevin, Dublin 9
T 01 836 9080 • F 01 837 2848
info@sei.ie • www.sei.ie

Guzzler Investigates Energy!

SESE activities and investigations for infant and junior classes

Welcome to *Guzzler Investigates Energy!* This workbook, produced by Sustainable Energy Ireland, and the accompanying story book *Guzzler's Big Book on Energy* form a resource for teaching infant and junior classes about energy in the context of the SESE curriculum.

The book is divided into four main themes

This resource has been developed in consultation with teachers of infant and junior classes and tested in the classroom. It addresses energy-related strands of the SESE curriculum (Science, Geography and History). Some of the physical activitites are also relevent to SPHE.

Curriculum links

SESE, Science strands

→ Livings things
Strand units: Myself, Plants and animals

→ Energy and forces
Strand units: Forces, Heat, Sound, Electricity, Light

→ Materials
Strand units: Properties and characteristics of materials

→ Environmental awareness and care

SESE, Geography strands

→ Human environments
Strand units: Living in the local community

→ Environmental awareness and care

SESE, History strands

→ Myself and my family
Strand units: Myself, My family, When my grandparents were young, Games in the past

→ Story
Strand units: Stories

This workbook uses a combination of demonstrations, activities and investigations to communicate the importance of energy in our lives and to introduce the idea of saving energy whenever we can.

Most activities are teacher-led and incorporate demonstrations to explain various aspects of energy and energy use. There are also activities and investigations for the children to undertake themselves. The resource is for classes up to and including second class. Teachers with infant classes may decide to keep discussion to a minimum by spending less time on each theme and concentrating more on the activities and demonstrations. For children in first and second classes the concepts and discussion can be developed further.

The activities are individually linked to the relevant strand units in the curriculum throughout the workbook.

Note: It is advisable to try the demonstrations before undertaking them with the class, as some may require a little practice before they work effectively!

Theme 1

What is Energy?

Introduction

Energy is all around us, and we use it for everything we do. Energy is constantly being used up and changed into different forms. We get the energy our bodies need to function from food.

Here are a series of activities to introduce the concept of energy. These activities could take place in the PE hall or in the classroom with the tables moved back. Ideally the children should be sitting on the floor, a little back from the front, to give room for demonstrations.

Curriculum Link: Science

Strand: Living Things

Strand Unit: Myself – Identify some requirements for growth in humans, i.e. food

Activity 1

Food energy

You will need

Grapes, raisins or tokens to represent energy. Counters from a board game could be used.

Action Steps

1. Begin with a general discussion of energy to introduce the group to the topic.
   - → Do we use energy when pushing a trolley?
   - → Where do TVs and GameBoys get energy from?
   - → Have the class ever felt very tired or low in energy?
   - → Do you feel like running around when you are very hungry?
   - → Where do we (humans) get our energy from?
   - → Discuss the importance of healthy food to give us energy and help us grow.
2. Ask for or pick three volunteers and ask them to stand in front of the class. For this exercise they all start off with no energy. Encourage a little drama here – ask your volunteers to look tired, to let their arms flop down by their sides and to let their heads droop.
3. Give the first volunteer one raisin, the second volunteer two raisins and the third volunteer three raisins (or tokens). Then ask the volunteers to eat the raisins or count their tokens.
4. Ask the class to identify the volunteer with the most energy. Explain that for this exercise one raisin/token gives you enough energy to jog on the spot for ten seconds. Ask the class how long each of our volunteers should be able to jog for.
5. Explain to the volunteers that the class are going to count to thirty and they are going to jog on the spot. Volunteer one will only have enough energy to jog for ten seconds, so they should stop after the class count to ten. Volunteer two should stop after twenty seconds, and volunteer three should stop after thirty seconds.
6. Count to thirty, getting the class to join in.
7. Ask for a round of applause for the volunteers and ask them to return to their seats.
8. Discuss which volunteer stopped first and why.

Curriculum Link: Science

Strand: Energy and forces

Strand Unit: Forces – Explore how objects may be moved

Strand Unit: Sound – Recognise and identify a variety of sounds in the environment

Activity 2

Energy use and forces in ball games

You will need

A basketball

Action Steps

1. The teacher demonstrates the activity described below and talks the group through what is happening.
2. Lift the basketball to about shoulder height and explain that you are using the energy that you got from food. That means you have given some of your energy to the ball.
3. Drop the ball and point out that the ball has the energy to bounce up again.
4. Lift and drop the ball again, but this time ask the children to notice the height the ball was dropped from and how far it bounced back. If it was dropped from shoulder height it should bounce back to around waist height. You could use these heights as markers.
5. Explain that not all of the energy that you gave the ball by lifting it up went into making it bounce back. Where did the rest of the energy go?
6. Ask the children to close their eyes, then drop the ball. Ask them how they know the ball dropped. Did they hear it drop? Some of the energy is used up making noise or sound.
7. Now ask the children to put both hands palm down onto the floor (this will not work if the floor is carpeted). Drop the ball again. They should feel a vibration when the ball hits the floor. Some of the energy went into making the floor shake or vibrate.

Curriculum link: Science

Strand: Energy and forces

Strand Unit: Forces – Explore how objects may be moved, investigate how forces act on objects

Activity 3

Energy transfer

You will need

A basketball, a tennis ball and a little practice!

Action steps

1. The energy we get from eating food can be passed on to the ball when we lift and drop it, making it bounce. In this demonstration energy moves from one ball into the other.

   Note: Do this demonstration in the yard or in the PE hall if possible, as the tennis ball may be propelled quite forcefully.

2. Place the tennis ball on top of the basketball and drop the two balls together. You will need to support the tennis ball to keep it on top of the basketball until they drop – this takes a little practice, so it is good to try this out before demonstrating to the class.

3. When the basketball hits the ground and bounces back up into the air most of its energy is transferred into the tennis ball, which it pushes (it exerts a force on the tennis ball), making it shoot up in to the air.

4. The first time you do this the children will only be looking at the tennis ball as it shoots off, so repeat the demonstration and ask them to see how far the basketball bounces up. If they look carefully they will notice that the basketball only bounces up a small distance as most of its energy is transferred into the tennis ball.

Theme 2

Energy in our lives

Introduction

There is energy all around us, and we are constantly using it and changing it into different forms. Energy can be used to inflate a balloon or pop a lid. On our planet we get all our energy from the sun. A lot of the food we eat comes from plants, and plants get their energy from the sun. The following activities and demonstrations can introduce the concept of energy transfer. Depending on the age of the class you can limit or expand your explanation of the various activities or demonstrations.

Curriculum links: Science

Skills: Designing and making

Strand: Living things

Strand Unit: Myself – Recognise that all living things grow and change, identify some requirements for growth and development in the human

Strand Unit: Plants and animals – Appreciate that living things have essential needs for growth

Activity 1

Energy chains

As discussed in Theme 1, humans get energy from food. Our food comes from plants and animals. Plants get energy from the sun (animals eat plants, so their energy also comes from the sun). In this exercise the class are going to build up energy chains (much like food chains) to follow the movement of energy from the sun into living things. The class will be divided into groups and will have to collect materials or draw pictures to represent each part of the chain. Depending on the age of the class the teacher can limit or expand the number of steps or elements in each energy chain. Three steps is probably enough for infants.

You will need

Cardboard, paints, single or double-sided sticky tape, scissors, glue or stapler, any other equipment that might be useful to make a model of the sun e.g. papier mâche

Action steps

1. It can be useful to divide this activity over two days, designing and making on day one and placing the objects or pictures in order in a display and discussing the work on day two.
2. Divide the class into groups of four or more (but not more than six).
3. Ask the class what their favourite foods are or what they eat for breakfast or dinner. Using examples given establish where each food comes from. Is it from a plant, an animal or a combination of both? Ask if this food is a good source of energy.
4. Pick foods that would be easy to represent: e.g. a seed uses heat and light energy from the sun and grows into corn; we eat cornflakes, which give us energy. The group working on corn could bring in a cereal box and corn or a picture of corn to make their energy chain.

5. Ask each group to name their favourite pastime or sport. Each group should bring in something to represent this activity (pick the suggestions that would be easiest to represent – e.g. a ball, a skipping rope, a paint brush, a hand-held electronic game, a book).
6. Each group will have to make a model of the sun. Younger classes could be given a picture to stick onto card, and the older classes could make their own representation of the sun.
7. When all the necessary materials have been collected, each group can place the objects in order to make their own energy chain. You could ask each group to come to the front of the class and arrange the chain in the right order (if the groups have five or more members you could get two people to hold the sun shining down on the plants, one person could hold the plants, another could hold the food and two people could demonstrate the sport or activity).
8. Ask the class which group's activity would take the most energy e.g. which activity would use the most energy – reading or tennis?

Taking it further

Curriculum link: Science & Geography

Strand: Environmental awareness and care

Strand unit: Caring for my locality – Begin to recognise that people, animals and plants depend on one another

Curriculum link: Geography

Strand: Human environments

Strand unit: Living in the local community – Begin to recognise the interdependence of individuals and groups in the local community, e.g. people we rely on to bring us food and other things

Action Steps

Develop this activity for older classes by including further steps in the energy chain e.g. if they pick corn as the food, the steps could include the corn being planted or watered, the corn being harvested, the harvest being delivered to the factory, the cereal being made in the factory, the delivery truck collecting the cereal boxes and delivering them to the local shop, the shopkeeper selling the cereal and the customer buying and eating the cereal.

Curriculum link: Science

Strand: Materials

Strand Unit: Materials and change – Mixing and other changes (investigate how materials may be changed by mixing)

Activity 2

Alka seltzer pop

You will need

An Alka-Seltzer tablet, a film canister, Blu-tack

Note: Sometimes a full tablet can cause the lid to pop before you can even put the canister on the ground. If this happens try again with half a tablet.

Action steps

1. Using the Blu-tack, stick the Alka-Seltzer to the underside of the lid of the film canister.
2. Half fill the canister with water.
3. Close the lid.
4. Shake the canister well and place upside down (lid downwards) on the ground.
5. Stand back!

What happened?

The energy stored in the tablet was released and it moved the lid. The water reacted with the tablet causing it to fizz and release carbon dioxide gas, which built up in the film canister. Gases take up lots of space so the canister was too small to contain the gas, the pressure built up and the lid popped. Energy is stored in food just like it is in this tablet, and when we eat food that energy is released.

Curriculum link: Science

Strand: Materials

Strand Unit: Materials and change – Mixing and other changes (investigate how materials may be changed by mixing)

Activity 3

Inflating balloon

You will need

A 500ml plastic drinks bottle, bread soda (a common cooking ingredient found in the supermarket), vinegar, a funnel, a balloon

Action steps

1. Before starting the experiment, pre-stretch the balloon by blowing it up and letting the air out.
2. Put eight teaspoons of bread soda into the bottle.
3. Using the funnel, pour the vinegar into the deflated balloon.
4. Without spilling the vinegar, slide the mouth of the balloon onto the bottle.
5. Lift and squeeze the balloon so that the vinegar pours into the bottle.
6. Within a minute or two the balloon will inflate – you may have to hold the balloon in place around the neck of the bottle to prevent it popping off.

Note: If you find it difficult to put the balloon onto the bottle without spilling the vinegar, you can put the vinegar into the bottle and the bread soda into the balloon. It takes a bit of time to get the bread soda through the funnel into the balloon and you should make sure the funnel is completely dry before starting.

What happened?

This experiment demonstrates that foods and other materials can store energy, which can be released. In this case there was a chemical reaction when the bread soda and vinegar mixed, producing carbon dioxide gas, which filled the balloon.

Theme 3

Energy long ago and energy worldwide

Introduction

The way we use energy today in our everyday lives is very different to how people used energy in the past. We use more energy now than our grandparents used when they were growing up. We also use much more energy than people living in less developed countries. These differing levels of energy use can be investigated through the following activities.

Curriculum link: Science

Strand: Energy and forces

Strand units: Electricity and magnetism – Become aware of the uses of electricity, identify household appliances that use electricity, become aware of the dangers of electricity.

Curriculum link: History

Strand: Myself and my family

Strand units: Myself, My family, When my grandparents were young, Games in the past

Strand: Story

Strand unit: Stories

Strand: Change and continuity

Strand unit: Continuity and change in the local environment

Skills: Working as an historian – Using evidence

Curriculum link: Geography

Strand: Human environments

Strand units: Living in the local community, People and places in other areas

Activity 1

Bits 'n bobs from past and present

You will need

Pictures, objects or stories from the past. Ask the class to collect these by gathering information and pictures in history and geography books as well as old family pictures, old books and old appliances, e.g. an old kettle (not electric) manual kitchen utensils (such as a hand beater or whisk) or anything else that would give information on the past.

Action Steps

1. Assemble this material so that the class can see it or else distribute it around the classroom.
2. Use the pictures and objects to prompt a class discussion about what kind of energy was used in the past compared to today.

Topic 1:

Cooking in the past

Looking at pictures and other evidence, discuss how cooking methods have changed throughout history. Collect or make a list of the cooking equipment we have now – cookers, ovens, microwaves, bread-makers, electric beaters and food processors, and list what kind of energy each uses. Discuss how these appliances use electricity and need to be plugged in to a socket in order to work. Point out that electricity can be dangerous – children should never touch wires, sockets or plugs or handle electrical equipment without adult supervision.

Hand beater versus electric beater

You will need

A hand beater, an electric beater, cream, two large bowls

Action steps

1. Put an equal amount of cream in two bowls.
2. Choose a volunteer from the class or arrange for an adult assistant to help you.
3. The teacher stands at one bowl with the electric beater, and the other person stands at the second bowl with the hand beater.
4. Race your helper to beat the cream until it thickens. Get the class to start the race with 'Ready, Steady, Go!'
5. It will soon be obvious to the class which method is easier!
6. Ask what kind of energy the hand beater uses. The electric beater uses electricity, which makes a lot of tasks much easier but uses up electrical energy.
7. Now discuss safety issues around the use of electricity and how more and more jobs are performed by machines and other equipment, all of which use energy in the form of electricity, petrol or gas.

Topic 2:

Transport

Look at transport in the past – people travelled on foot, on horseback and by boat (either rowing or sailing). When cars and other mechanical modes of transport were developed, public transport was used a lot more, as not many people could afford cars. Now nearly everyone has a car, so instead of people sharing cars, or going by bus or train, more and more people are travelling alone by car, and this is using more energy.

Travel to school survey

Action Steps

1. Put the table below up on the board or on an overhead projector.
2. Ask the class how they travelled to school today.
3. Count how many came by car, on foot, by bike, bus or train, and fill in the figures in the table.
4. Talk about what type of energy each type of transport uses, and fill in the last section of the table.
5. Ask what type of transport uses up more of our energy resources.

Travelled by…	Number of class	Type of energy used
Car		
Car share/pool		
Bus		
Train		
Foot		
Bicycle		

Topic 3:

Toys in the past and present

If possible show a modern toy, preferably a battery operated one, and a wind-up toy. Where does each toy get its energy from? Demonstrate the wind-up toy in action, and explain that we use the energy we get from food to wind-up the toy, giving it energy to work. The modern toy gets its energy from batteries, which run out and have to be replaced.

The class could ask a parent or grandparent what kind of toys they played with when they were young. Spinning tops, skipping ropes or a hoop and stick may be easy to find for demonstration purposes. Hopscotch and skipping, popular games in the past could be taught to your class. This could lead to a discussion of the benefits of exercise and more active play.

Topic 4:

Schools

For this exercise the children could interview their parents, grandparents or other relatives about when they went to school.

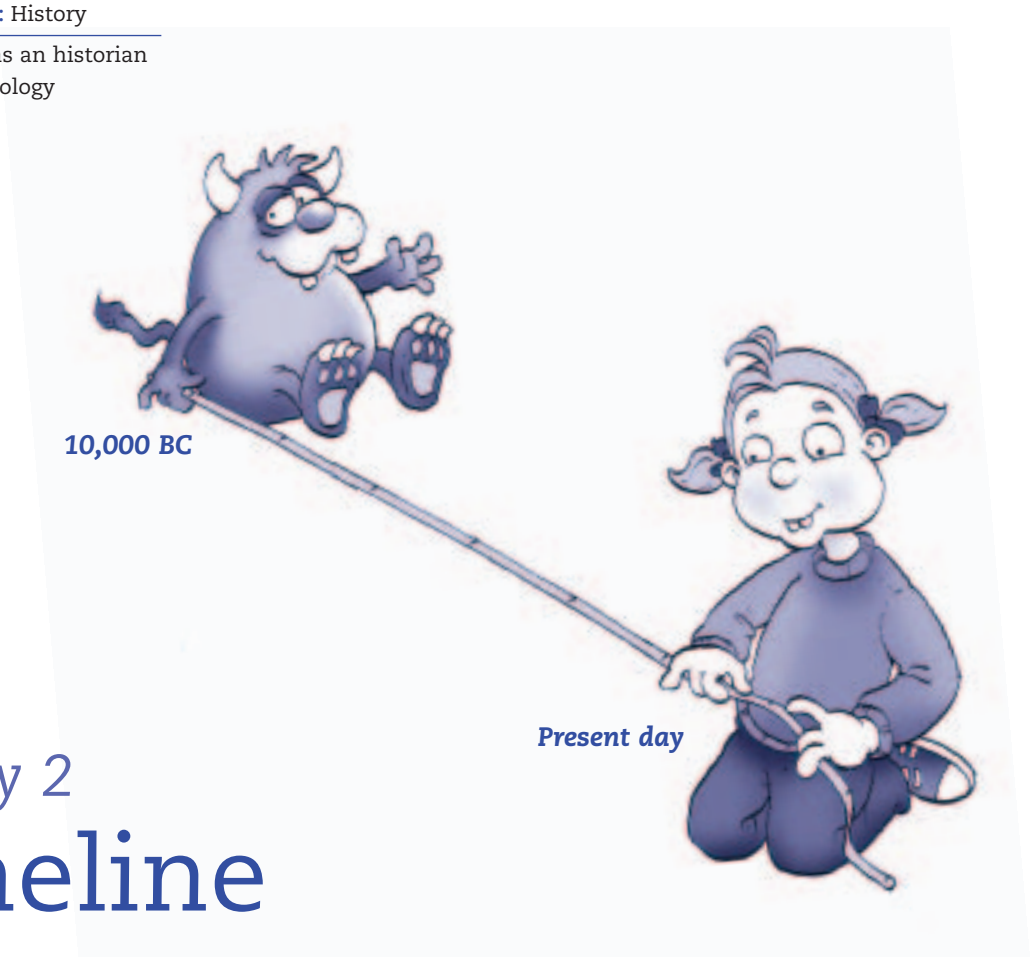
Here are some questions they could ask:

- How did you travel to school?
- What kind of building was the school?
- Was the school heated? If so, how?
- How many people were in each classroom?
- How many classrooms were in the school?
- Did the school have electricity?
- What kind of equipment did the teachers have compared to nowadays?
- Did they have a tape recorder, a black board, a television and video or a computer?

Explore other ideas in the context of energy use, such as housing, work and industry.

Curriculum Link: History

Skills: Working as an historian
– Time and chronology



Activity 2
Timeline

You will need

As with the previous activity you will need pictures, objects or stories from the past. Ask the class to collect these by gathering information and pictures in history and geography books as well as old family pictures, old books and old appliances, e.g. an old kettle (not electric) manual kitchen utensils (such as a hand beater or whisk) or anything else that would give information on the past.

Action Steps

1. Take some of the pictures and objects that have been collected from the past, and with the help of the class arrange these chronologically to make a time line.
2. Point out that as we move along this time line the amount of energy we are using is increasing.

Curriculum Link: History

Skills: Working as an historian – Time and chronology

Activity 3

Time Travel

Action Steps

1. Tell the class that you are going to travel back in time to when people lived in houses without electricity or central heating. Candles and lamps were used to light the house and fires were used for heat and cooking.
2. Each member of the class has to choose one item to bring back in time with them.
3. Make a list of all the suggestions on the board.
4. Go through the suggestions to see if the class picked things that would be useful or not e.g. any electrical appliance, such as a TV, video, CD player or computer game would be useless. Matches would be useful. Wood or coal would be useful for the fire.
5. Discuss safety issues.

Theme 4

Saving energy

Introduction

A trip to the Smart planet allows children to imagine, in an ideal world, how things could be done in a more energy efficient way. By thinking about how we use energy in our daily lives we can find ways to reduce the amount of energy we use. In this section children can investigate composting, paper recycling, good and bad insulators and other ways of saving energy at home and in school.

Curriculum Links: Science & Geography

Strand: Environmental awareness and care

Strand Unit: Caring for my locality

Activity 1

A visit to the Smart planet

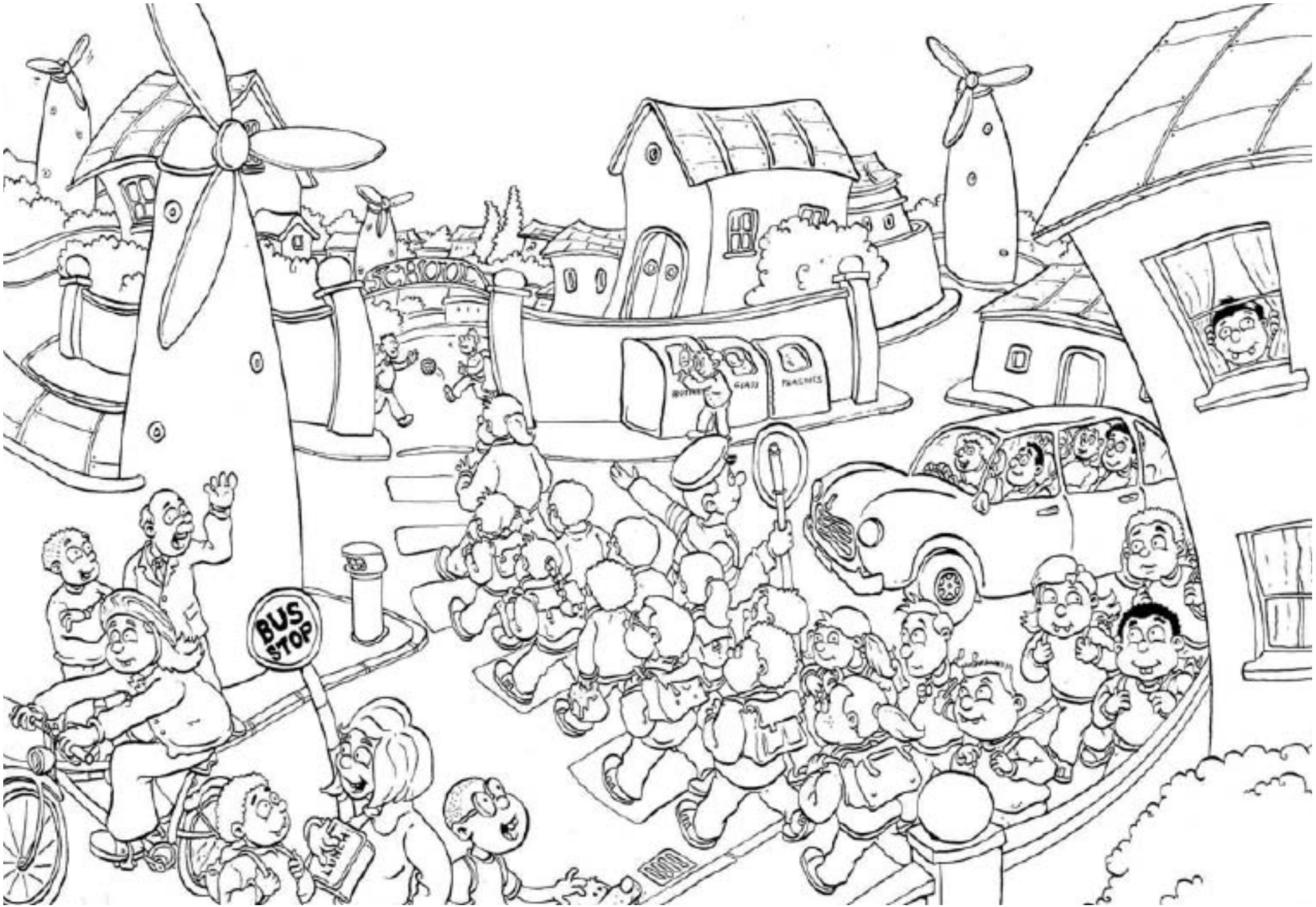
Action Steps

We are going to take a trip to another planet, one which looks very like our own planet. The people on the planet have comfortable houses and all the equipment and luxuries that we have. However they are much smarter because they know that using less energy than we do is a good idea.

The Journey

1. Tell the class that they need to prepare to travel to the Smart planet. Ask the class what they would need to travel to another planet. Ask students what kind of clothing they would need to travel in a spaceship. Infant classes can pretend to put on a space suit, helmet and astronaut boots. We are now ready for our journey and we travel to the Smart planet.
2. We are going to find out what it is like on the Smart planet by hearing about a day in the life of a Smart family that live on the Smart planet.
3. Photocopy the drawing of the Smart planet for the class.
4. Go through the picture with the class and ask the class how energy is being saved by the Smart family. Ask what they think of life on the Smart planet. Do they think we could try be more like the people on the Smart planet?

The following are a series of experiments to demonstrate ways in which we can save energy on our own planet.


BUS
STOP

Curriculum Links: Science & Geography

Strand: Environmental awareness and care

Strand Unit: Caring for my locality

Investigation 1

Composting

A lot of our rubbish in Ireland gets dumped without being separated into materials that can be recycled or composted. Children are encouraged to think about various waste items (an apple core, a can, a newspaper, a plastic container) and what happens to them when we throw them away. This investigation shows that food waste can be composted – it will break down and can be added to soil to give nutrients to other plants to help them grow. We could recycle the aluminium can and the newspaper, and we could find a use for the plastic container somewhere in the classroom. So a lot of the rubbish we throw away could be re-used, recycled or composted.

You will need

An apple core, a piece of scrunched up newspaper, an aluminium can, a plastic container, a shovel. If you want to try the composting exercise indoors you will need four plastic containers and some soil.

Action steps

1. Take the class out to a suitable area in the school grounds (a corner of a garden or playing field). If you wish to stay indoors, you can fill four plastic containers with soil and keep them in the classroom or just outside the door for ease of access.
2. Dig four holes in the garden.
3. Place one item of rubbish in each of the holes (or plastic containers) and cover with soil.
4. Mark where each item is buried so that they can be located again.
5. After a few weeks dig up each item to see how much they have decomposed (check the apple core in advance and if there is very little change in the apple core leave it for a few more weeks).
6. Take photographs or ask the class to draw pictures or describe what the items look like now. Compare how much each has decomposed.
7. Cover the three items again and check in another few weeks.
8. The apple core should have started to decompose, and if you can continue the experiment for long enough it may become unrecognisable. The newspaper may become soggy but will still remain intact for a longer period. There should be no change in the can or the plastic container.

Curriculum Links: Science & Geography

Strand: Environmental awareness and care

Strand Unit: Caring for my locality

Investigation 2

Paper Recycling

Recycling something often uses less energy than making it all over again. By recycling more of our waste we can save energy. This classroom activity can be done in groups.

You will need

Old newspapers, a blender or food processor (using the blade attachment) with a lid to pulp the paper, coat hangers (two per group), heavy nylon tights (one pair per group), a bowl and spoon for each group, a rolling pin, a chopping board, paper towels, white PVA glue.

Note: The teacher should operate the blender or food processor and unplug immediately after use.

Action steps

1. Before the class begins, bend the coat hangers into a square. Make two screens for each group as the paper needs to be left on the screen to dry out, so each screen can only be used once on the day you conduct the activity.
2. Cut one leg off the tights and make a knot near the toe. Cover the loop with the tights, pull taught and tie to form a screen. Be careful, as the tights will rip easily on the end of the hanger.
3. Divide the class into groups of four to six.
4. For each group to make two sheets of paper the size of the screen, give each group four broadsheet sheets of old newspaper (eight tabloid sheets) and a bowl. Ask them to tear the newspaper into little pieces, about the size of a postage stamp and place them in the bowl.
5. Collect the bowls of torn newspaper from each group and add enough hot water to the bowl so that all of the paper is well covered. Allow the paper to soak for two hours before blending.
6. Fill the blender with the soggy paper from one bowl and add a cup (150ml) of hot water. Blend the paper mixture well until it is a soggy grey pulp. Blend for a further two minutes. Repeat for the remaining bowls of torn newspaper.
7. Put the pulp back into the empty bowl. Add one to two tablespoons of white PVA glue to the pulp and ask students to mix it well.
8. Each group should spoon half of the pulp onto a screen and use the spoon to spread it evenly over the screen to about 3cm from the edge.
9. Repeat steps 4 to 7 if you need more pulp.
10. Instruct each group to place the screen between two sheets of paper towel.
11. Go around to each group and place this paper towel sandwich on the chopping board and flatten out with the rolling pin. Make sure there are no gaps in the layer of pulp on the screen.
12. Remove the paper towels and allow the paper to dry on the screen (put on a sunny windowsill for a few days). Peel the paper off the screen.
13. The paper can be ironed by the teacher to dry it further.

Curriculum Links: Science

Strand: Materials

Strand Unit: Properties and characteristics of materials

Investigation 3

Insulation

Coats are good insulators – they keep us warm in winter. We can insulate the hot water tank in the school or at home by putting a jacket on it. This is called a lagging jacket. It acts like a coat, keeping the heat in. Houses should have insulation in the walls and roof to keep the heat in so that we can use less energy for heating.

You will need

A light coat, a heavy winter coat, a clock to time the exercise

Action steps

1. Pick three people from the class, around the same height and build, to help with this demonstration.
2. Ask two of the children to put on a coat each. The third child should be wearing a T-shirt or a light top.
3. Ask the class to predict what will happen. Who will get warm, tired or flushed faster? Will that volunteer's heart beat faster?
4. Ask all three to jog on the spot for two minutes, and ask the class to time them on a clock.
5. The child with the heaviest coat should get hot first, then the other child wearing the lighter coat and then the one without a coat.
6. Ask the class to review their predictions and discuss.

Curriculum Links: Science

Strand: Materials

Strand Unit: Properties and characteristics of materials – Group materials according to their properties, begin to explore how different materials can be used in the construction of homes

Strand Unit: Materials and change – Explore ways in which liquids and solids may be kept warm and cold

Strand: Energy and forces

Strand Unit: Heat – Learn that temperature is a measurement of how hot something is

Investigation 4

Good and bad insulators

You will need

A range of materials, e.g. newspaper, cotton wool, tinfoil, thick fabric and bubble wrap. A number of similar containers, such as plastic cups, jam jars or beakers, a vacuum flask, a thermometer, sticky tape, glue, scissors, a measuring jug, a kettle.

You may wish to have another adult present to stay beside the kettle at all times. Alternatively, you could undertake the variation on this investigation using frozen water, as described at the end of this investigation.

Action steps

1. Divide the class into groups.
2. Give each group a container and one type of material.
3. Ask each group to wrap up their container as best they can, leaving the top open. Tell them they can make a removable cover for the container if they want.
4. Heat some water in the kettle until it is warm but still safe to touch.
5. Take the temperature of the water in the kettle using the thermometer.
6. Pour the water into the measuring jug and then pour an equal amount of water into each groups' container. This is important in terms of making the exercise a fair test.
7. Pour the same amount of water as is in each container into the vacuum flask and put the lid on.
8. After a few minutes take the temperature of the water in each container and in the flask. Note down the temperatures in a table on the board.
9. Leave for another 5–10 minutes and take the temperature of the water in each container again.
10. The flask will obviously keep the water the hottest, but compare the other materials to see which retained most heat (which is the best insulator).

Try this with 'snowmen'

As a variation on this exercise you can freeze water in plastic bottles and allow the children to dress the bottles up as snowmen, using different materials for their coats. Children can then observe which snowman melts first. This investigation can be developed by placing bottles without coats in different sunny or shaded positions so children can observe which snowman melts first.

Curriculum Links: Science

Strand: Energy and forces

Strand Unit: Heat – Learn that temperature is a measurement of how hot something is

Investigation 5

Save energy in the kitchen

You will need

Water, an electric kettle, a watch or stopwatch

Action Steps

1. Measure two cups of water and pour into the empty kettle (increase the amount if the element is not covered by two cups).
2. Boil the water in the kettle timing how long it takes to boil.
3. Empty the kettle and allow it to cool down.
4. Now put four cups of water into the kettle and time how long this takes to boil.
5. It takes longer to boil four cups of water, so the more water you boil the more electricity you use. If you only want one cup of tea it would be a waste of energy to boil a full kettle of water.

Note: Children should not have access to the area around the kettle. Always make sure the element is covered for safety reasons.

Sustainable Energy Ireland
Glasnevin, Dublin 9
T 01 836 9080 • F 01 837 2848
info@sei.ie • www.sei.ie

Sustainable Energy Ireland is funded by the Irish Government through the National Development Plan 2000-2006 with programmes part financed by the European Union.

For more ideas on teaching energy, please visit the Sustainable Energy Ireland website www.sei.ie