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MONTHLY ACTIVITY 1

DEFINITIONS – RENEWABLE ENERGY, NON-RENEWABLE ENERGY AND CLIMATE CHANGE

Key words: energy, electricity, fossil fuels, climate change, carbon dioxide, renewable and non-renewable energy, atmosphere.

Energy explained

We use energy to light and heat our homes and schools; to power our cars and buses and to work electrical appliances. Most of this energy is made from burning fossil fuels such as coal, oil, gas and peat. These are called non-renewable sources of energy because they cannot be used again and they will eventually run out. When we burn these fossil fuels we release a lot of a gas called carbon dioxide or CO₂ into the air. We have released so much CO₂ into the air that it has started to trap heat around the earth and this has created global

warming which causes climate change. Energy can also be created by using renewable sources of energy such as wind, water, solar (energy from the sun), wave, tidal, biofuels and geothermal. These sources of energy will not run out, they can be used again and again. In addition, they will not release any CO₂ into the earth's atmosphere and will not contribute to climate change. It's thanks to the work of engineers and scientists that we are able to harness the renewable energy available to us and make it useful.

What is climate change?

Climate change is a change in the normal weather patterns across the whole world. One part of the world might begin to get unusually cold winters whilst others might start having uncommonly hot summers. It might start to rain a lot in one place while, in another part of the world, there may be droughts. Climate change usually takes hundreds of millions of years to happen but the climate change that we are seeing now is happening really quickly. Scientists believe that climate change is happening because we are

creating a lot of CO₂ and releasing it into the earth's atmosphere. This CO₂ sits around the earth like a layer and keeps it warm, allowing the sun's rays in but not out. The earth is gradually heating up – this is called global warming and is creating the climate change we are experiencing.

One way to do this is by using renewable energy instead of non-renewable sources of energy. We can also be more energy efficient and waste less energy in our daily lives.

XPERIENCE ENGINEERING

Did you know?

- In Ireland more than 90% of our electricity is made from fossil fuels which are a non renewable source of energy.
- If it could be properly harnessed, enough sunlight falls on the earth in just one hour to meet world energy demands for a whole year
- There are 113 wind farms, in 21 counties on the island of Ireland
- In Ireland we use more than twice as many cars as we did just 10 years ago.

ACTIVITIES

Link each picture to its appropriate word:

Wind turbine

Hydropower station

Solar panel

Biofuel crop

Electric pylon

Wave power station

Geothermal power cables



Quick Quiz

Name a type of farm that doesn't have any animals or crops?

- a – Wind farm
- b – Pig farm
- c – Orchard

Solar panels can

- a – Heat water
- b – Power a calculator
- c – Power a parking meter
- d – All of the above

Hydropower station is powered using:

- a – Water
- b – Sand
- c – Wind

Which of these is a biofuel crop?

- a – Corn
- b – Oak trees
- c – Rape seed oil

Renewable energy will eventually run out:

- a – True
- b – False

Which of these are a source of non-renewable energy

- a – Wind
- b – Petrol
- c – Ocean
- d – Geothermal

Burning fossil fuels can create a lot of which gas?

- a – Oxygen
- b – Carbon dioxide
- c – Nitrogen

Classroom activity: A renewable energy house

Build a house which only uses renewable energy for power, heat and light.

What you will need:

- Shoe box per group of students
- Tin foil
- Pipecleaners/wool/straws to make 'geothermal pipes'
- Stiff card (from cereal box would be fine)
- Scissors (under supervision)
- Glue
- Art materials to decorate your house

Activity: Let each group recreate a house using a shoe box or other light card such as a cereal box. The house does not need to have more than one room but it should have a roof and a garden or yard.

Ask each group to decide which types of renewable energy they will have in their house.

Note: this is a model house and is not expected to provide power.

Wind power – Wind turbines need to get frequent wind so they should be placed away from the shelter of buildings and as high as possible. In Ireland they are usually placed near the coast and on hills. For your house you can make a small wind turbine to place on the roof or on a hill you have made beside the house. See The Energy File book, How to make a windmill. Available to download or order www.sei.ie/schools.

Solar panels – there are two types

- 1) **Photo voltaic** – these need strong sunlight and they convert the sun's light into electrical energy so they can be used to power electrical appliances in the house
- 2) **Solar thermal** – these harness the sun's heat and don't need strong sunlight so they are very suitable for Ireland. They can be used to heat the hot water in your house.

Solar panels are made of a shiny metal and are usually placed on a roof to get maximum sun. Make solar panels on the house by adding small strips of silver foil or painted black panels on the roof of the house. Make sure they are high up enough to get sun.

Hydropower – if the house is beside a river or waterfall you may be able to harness the power of the moving water to make electricity. The water has to be moving at speed so a lake, pond or slow stream won't do. Add a waterfall or fast running river beside the house with silver foil or painted card. And build a small dam over the water to capture the power – a small match box with holes in it (to let the water through) would represent a hydropower station. The Energy File book, How to make a waterwheel. Available to download or order www.sei.ie/schools.

Geothermal – Pipes are laid in the garden or yard under the ground for geothermal energy. Use straws, wool or pipecleaners to demonstrate this in your model house.

If time is limited the class could draw the plan of their 'renewable houses' as diagrams with labels to explain the features. The pictures or models could then be displayed together as a renewable energy city.

More activities on sustainable energy available on www.sei.ie/schools.

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