NCCA
An Chomhairle Náisiúnta Curaclaim agus Measúnachta
National Council for Curriculum and Assessment

Investigating ☐ Communicating ☑ Knowledge and understanding ☑

Meeting Current and Future Energy Needs

Learning outcomes in focus

Students should be able to:

ES6 **research** different energy sources; **formulate** and **communicate** an informed view of ways that current and future energy needs on Earth can be met

NS6 **conduct research** relevant to a scientific issue, **evaluate different sources of information** including secondary data, understanding that a source may lack detail or show bias

Learning intentions

We are learning to:

- conduct independent research
- synthesise information from a variety of sources
- present findings in manner appropriate for the chosen audience
- evaluate different energy sources in terms of suitability, sustainability and reliability
- understand that a reliance on non-renewable resources is unsustainable into the future

Teaching and Learning Context

This task was undertaken by two mixed-ability classes of First Year students. Prior to the task, students had been introduced to energy types and energy conversion. They had also worked collaboratively in small groups to complete and present for peer review a STEM activity called Moja Island.

http://practicalaction.org/moja-island-1

Students all have Ipads and were given a single class and the weekend to complete the task.

Task

Project title - *How to meet current and future energy needs.*

Students were given the following instructions:

1. Research the topic using your Ipad and/or other sources. Present your findings either as a poster, pamphlet, keynote/powerpoint/ Prezi, video, drama, song or any other means.
2. Discuss your choice(s) of energy source and explain how it meets the project title: *How to meet current and future energy needs.*

Success criteria:

I can:

- **SC1:** search for and find relevant information about the topic
- **SC2:** arrange and report my findings
- **SC3:** use data in an informed manner to argue my position
- **SC4:** acknowledge sources

Hydroelectric Power

Contents

Introduction

This project is about a certain source of energy that is used to create electricity. Flowing water creates energy that can be captured and turned into electricity. This is called hydroelectric power.

What is Hydroelectric Power?

Hydroelectric power is a source of energy used to create electricity. It is very helpful because there will always be water which is used to create hydroelectric power, making it very convenient for now and in the future. However, hydroelectric power is not absolutely mandatory in our lives because it is only one of the many sources of energy used to create electricity, and there are other very efficient and convenient ways to generate electricity.

SC2: Excellent use of Table of contents to arrange findings.

SC3: Clearly sets out position, would have been useful to mention more than one source for comparative purposes when arguing position.

How is Hydroelectric Power Generated?

The most common type of hydroelectric power plant uses a dam (the main focus of this project). A dam is built in a river to store water in a reservoir. The water that is then released from the reservoir flows through a turbine, spinning it. This activates a generator to produce electricity. There are dams all over Ireland and in many other countries as well.

Building a dam on a river (damming a river) has its benefits, but it can also cause problems. Some benefits are...

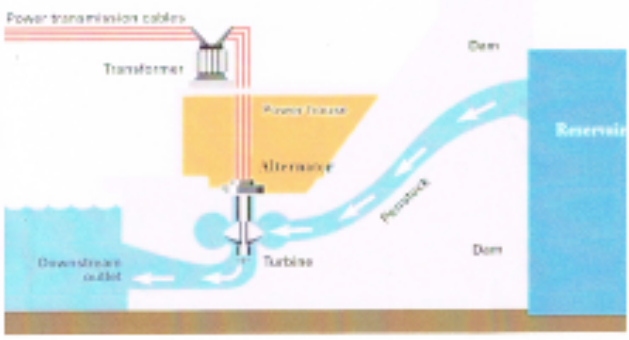
- they generate power for our homes
- dams create artificial lakes (water trapped behind dams) which can be used as reservoirs to store water
- artificial lakes are good places for fishing and other water sports

Some problems are...

- artificial lakes can flood valuable farmland
- river creatures (eg. salmon) can be harmed because of the change to their natural habitat
- it is expensive and quite difficult to dam a river

SC1: All information is relevant and pictures have been sourced. Mentions both benefits and drawbacks in the technology

Hydroelectric power generation



How Much Electricity does Hydroelectric Power provide?

Hydroelectric power generate 20% (1/5) of the world's electricity. This may not seem like a lot, but it really does make a difference, as well as being very convenient. We have become very dependant on electricity over the last 50 years, so we need a lot.

SC3: Figure is generous, but mphasises the capacity of hydroelectric power to meet global electricity consumption; 'almost 20%' would be more accurate.

What is this electricity used for?

After the energy from the rushing water goes through the dam and it turned into electricity, the electricity is sent to our homes, schools, work etc. We use electricity all the time, even more than we know. We use it for heat, light, cooking, different types of entertainment (eg. television, radio etc.) and many other things. A huge amount of money is wasted on electricity bills as we leave lights and other electrical devices on when we don't need to and other things like that. We are so dependant on electricity that we would barely be able to survive without it. This includes things like food (oven, microwave, refrigerator to keep the food safe to eat etc.), cleaning (washing machine, dishwasher etc.) travelling long distances (car, ~~aeroplane~~, train etc.) and so much more.

Where is Hydroelectric Power used?

Hydroelectric power isn't just used in Ireland - lots of other countries use it too. for example...

- 99% of Norway's electricity comes from hydroelectric power.
- America produces the most hydroelectric power in the world (due to good technology and many rivers) but only 13% of America's electricity comes from hydroelectric power. This shows that America uses a lot of electricity.
- 18% of Italy's electricity comes from hydroelectric power. Italy is the 14th largest producer of Hydroelectric power in the world.

How will Hydroelectric Power Help Us in the Future?

Hydroelectric power will help us in the future because unlike things like solar power, which only works when the sun is shining, the water that generates hydroelectric power will always be found on Earth through the rain cycle. There are reasons it could become a struggle, like if a river were to dry up and also there are disadvantages of dams (see page 5), but it is still a very convenient source of electricity. It

SC1: SC1: Extensive research on hydroelectric power, but lack comparison to other sources.

Conclusion

In conclusion, hydroelectric power is useful in many ways, but does have flaws. The world is very dependant on electricity and hydroelectric power does not cause pollution. However, it is expensive to create and harms the local river creatures by building over their natural habitat. There are many other pros and cons to hydroelectric power.

Thanks for reading!

CREDITS AND SOURCES

- renewableenergy.com
- water.usgs.gov
- New Complete Geography, Gill & Macmillan eBooks
- Wikipedia

SC3: Focuses on the low pollution impact to argue in favour of hydroelectric.

SC4: Sources are acknowledged

Overall judgement: Above expectation