



STEM@CGI
SCIENCE - TECHNOLOGY - ENGINEERING - MATHEMATICS

Renewable
Energy



We hope you enjoy this STEM activity on Renewable Energy.

This STEM activity pack helps us think of ways to reduce the amount of carbon emissions that contribute to climate change on our planet.

Children can learn and research how renewable energy works and its benefits, participate in energy coding challenges, code a water usage calculator, complete a word search and design their own renewable energy magazine.

Note: These activities are designed for children around the ages of 10-12 and some require a computer and Internet access to complete.



Researching renewable energy

What is renewable energy?

Renewable energy uses sources that cannot run out. For example, solar panels use the sun, wind turbines use the wind and hydro power uses water. Carbon-based energy sources, such as coal, gas and oil, are not only damaging to the environment, but are not renewable, meaning nature can't replace them.

Why is renewable energy important?

Once non-renewable energy sources run out, they cannot power our homes, businesses and cars. This is why we must develop sustainable energy methods that can run forever, produce less pollution and are better for the environment, providing us with cleaner air and water.



Wind energy

Wind energy is usually sourced from wind turbines- tall structures with large blades that move with the wind. Wind turbines work the opposite way a fan works. Instead of using electricity to make wind, the turbines use wind to make electricity.

The wind rotates the blades of the turbine, which then spins a shaft. The shaft is connected to a generator, making electricity. The electricity is then sent through distribution lines to a substation, then into our homes to help power them.



What are the advantages of wind energy?

Are there any disadvantages to using wind energy? Do your own research to find out.

Solar energy

Solar energy harnesses the power of the sun. This can be done in two different ways – as a heat source and as an energy source. Solar energy can heat the water and air in our homes and can be used to make electricity through a process called photovoltaics.

Solar panels convert sunlight directly into an electric current. This process starts with sunlight in the form of photons hitting the solar cells, knocking loose tiny particles called electrons. All the movement in the electrons bouncing around creates electricity. The panel then collects all of the electricity and sends it through cables to be used in your home.



What are the advantages of solar energy?

Are there any disadvantages to using solar energy? Do your own research to find out.

Hydro energy

As strange as it sounds, we can actually use the force of moving water to make electricity. Though water and electricity are a dangerous combination, the two elements never actually come into contact when creating hydro electricity.

Hydro energy systems called hydroelectric plants exist all over the world, with some systems in the U.S. generating power for more than 75 million homes! And in Canada, 6 out of every 10 homes and businesses are powered by hydro power. Hydro energy starts with water flowing down a river or water stored in dams. The falling water spins the turbines of a generator, harnessing electricity.



What are the advantages of hydro energy?

Are there any disadvantages to using hydro energy? Do your own research to find out.

Your task:

Do your own research to discover: what are the following types of energy and how do they work?
Write your answers in the space below.

Biomass energy?

Geothermal energy?

Researching renewable coding



Electricity generation

Follow the link to Raspberry Pi's site below and use Scratch* to input real data on the type and amount of natural resources used by countries across the world to generate electricity. Then, compare the results using an animated data visualization. Electricity is important. After all, it powers the computer you are using!

[+ Click here](#)

Water use calculator

In this project, you'll follow the link below to Raspberry Pi's site and use Scratch* to make an interactive calculator to help people think about how much water they use. You'll also write code that draws a chart to compare the amount of water used in various different activities.

[+ Click here](#)

*The Raspberry Pi Foundation is a UK-based charity with the mission to enable young people to realize their full potential through the power of computing and digital technologies.

Scratch is the world's largest coding community for children and a coding language with a simple visual interface that allows young people to create digital stories, games, and animations.

Renewable energy cost savings

Can you solve these renewable energy math questions?



Tony is considering getting solar panels installed on his home. Using a government program, this will cost him \$3,000. He is told that this will save him an average of \$240 on his energy bills each year.

How long will it take for the solar panels to pay for themselves?

Answer:



Mary has 6 wind turbines on her farm, four small and two large.

Last year, each small turbine saved her \$280 and each large turbine saved her \$312 in energy costs. How much did she save in total over the year?

Answer:



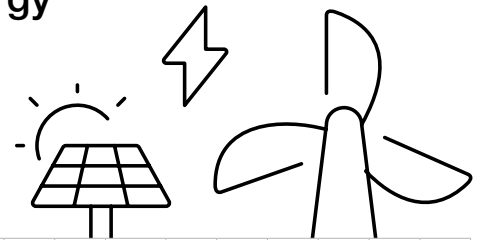
Rahima has recently moved into a new home that has an air source heat pump. The pump saves her \$30 a month on her bills. If she lives in the home for five years, how much money will she save?

Answer:

Renewable energy word search

How quickly can you find all 12 renewable energy related words in the word search?

Time yourself and compete against your family!



A	Y	X	T	S	G	E	M	R	N	T	P	Q	F	B	A	W	O	J	E	H	X	D	Z	Y	E
V	R	V	A	O	V	T	R	B	P	U	G	R	E	M	F	H	P	N	R	Y	Q	Q	O	K	V
D	W	R	U	L	X	S	G	Z	W	Y	X	G	K	U	R	Y	E	Q	Y	J	E	N	M	N	J
S	A	B	W	A	X	A	R	A	N	G	J	A	M	I	W	R	L	T	F	H	F	T	I	H	N
R	U	W	X	R	S	S	D	B	F	H	U	Q	S	J	G	E	V	Q	I	G	P	H	E	A	T
I	B	L	S	Q	X	G	X	T	Q	L	E	H	Z	Y	I	T	O	S	G	L	N	I	K	U	J
C	S	H	C	F	U	D	Y	E	T	B	S	S	H	K	H	P	V	G	R	X	K	A	Q	L	V
E	L	E	C	T	R	I	C	I	T	Y	J	Z	U	F	H	N	O	U	E	U	Z	E	J	P	I
Z	U	G	M	C	W	N	V	O	F	Z	F	C	E	X	O	J	I	Q	W	O	G	P	M	J	M
Q	R	B	W	Y	S	W	R	A	D	U	S	F	G	I	W	L	C	F	O	G	J	N	E	L	K
R	G	L	F	H	T	N	T	R	M	J	D	G	T	E	O	Z	I	L	P	J	O	D	O	J	I
E	C	Q	X	A	Y	X	S	D	Z	I	V	U	H	F	K	Y	Z	U	J	Z	L	D	I	Y	E
D	S	O	B	B	J	V	I	B	T	R	L	Z	Y	F	S	E	V	I	O	I	E	J	N	M	R
G	T	R	T	C	B	A	F	R	H	L	X	C	Q	P	I	A	L	D	P	G	D	K	Q	O	E
U	R	D	A	S	Z	F	K	S	O	F	L	F	Y	H	E	H	Y	H	U	T	Q	D	L	E	T
W	K	Y	K	W	F	R	X	P	R	A	P	T	V	L	W	L	O	P	L	M	L	K	W	K	A
R	S	H	B	O	S	C	Y	N	E	P	W	S	D	X	P	A	B	Y	K	I	K	J	H	N	W
M	W	X	E	X	D	H	B	B	X	W	E	X	C	Q	A	H	G	A	N	Z	L	I	K	M	L
A	B	E	R	D	P	Q	F	C	P	S	A	I	X	D	F	Z	T	P	N	P	O	B	N	A	K
Z	T	Z	R	V	O	Q	D	E	N	L	W	J	Q	T	H	M	O	I	C	I	Q	D	G	E	U
D	Q	K	E	T	E	V	W	J	B	E	M	C	Y	K	U	T	L	C	G	N	A	G	O	J	Z
N	U	F	K	A	P	G	W	C	Y	P	D	M	H	Y	N	A	U	D	A	C	M	T	W	M	P
I	V	C	J	X	Q	V	P	X	Q	R	W	H	L	C	D	K	U	V	G	O	L	N	S	C	B
W	Y	I	Y	Z	D	M	S	T	N	T	V	B	C	Y	V	T	O	C	V	O	Z	C	K	U	M
Q	T	P	M	V	U	I	R	B	N	F	O	Z	B	H	M	W	N	R	A	U	L	M	V	B	S
M	C	X	S	U	V	P	N	O	E	N	V	I	R	O	N	M	E	N	T	L	I	K	J	B	P

Wind	Environment	Water	Pollution	Energy	Solar
EV (Electric vehicle)	Sustainable	Power	Electricity	Hydro	Heat



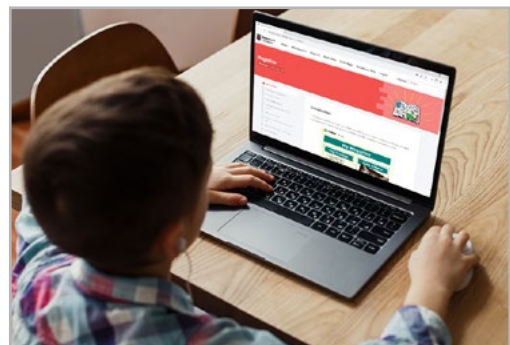
Design your own renewable energy magazine

Now that you know how renewable energy works and its benefits, your task is to create a virtual magazine to encourage people to use energy from renewable sources.

Using [Raspberry Pi's Magazine](#) activity, encourage people to use renewable energy in their homes and businesses.

Some things to consider:

- What are the different types of renewable energy that people can use?
- What are the benefits of using renewable energy?
- How do renewable energy sources work?



Don't forget: Use bright colors and images to really make your magazine stand out!

Ask your parent/guardian to upload pictures of your STEM creations to [LinkedIn](#) or [Facebook](#) using **#STEM** and **#CGIForGood**



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