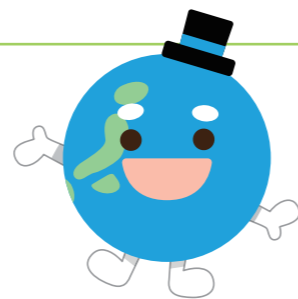


Worksheet

Possibilities of Renewable Energy



Let's Investigate

1. We use many different kinds of energy in our daily lives, such as in engines and motors. Let's focus on electricity. We cannot get electricity unless it is generated. What methods of generating electricity are there? Let's investigate using a book from the library or the internet.

- Thermal power generation
- Hydroelectric power generation
- Nuclear power generation
- Wind power generation
- Solar power generation
- Geothermal power generation
- Biomass power generation
- Tidal power generation
- Wave power generation
- Hydrogen power generation

Let's Summarize

2. Now summarize the characteristics of each electric power generation method in the table on the right. Write down the names of each generation method (ex: "Hydroelectric power generation"). How is power generated using this method? Then outline the advantages and disadvantages of each power generation method.



Dam discharge

Types of Electricity Generation

Method	Generation	Characteristics (advantages, disadvantages)
Thermal power generation	Driving an electrical generator using steam produced by burning petroleum, coal, or natural gas.	A large amount of power can be generated immediately. Facilities are large and costs are high. Carbon dioxide is emitted.
Hydroelectric power generation	Sending water downstream using a dam, etc. and using it to drive an electrical generator.	A large amount of power can be generated. Facilities are large and costs are high. Carbon dioxide is not emitted. Small-scale generation is also possible using water.
Nuclear power generation	Producing steam with heat from a uranium fission reaction and using it to drive an electrical generator.	A large amount of power can be generated. Facilities are large and costs are high. Carbon dioxide is not emitted. There is a danger of radioactivity.
Wind power generation	Using the power of the wind to rotate blades and drive an electrical generator.	Wind turbines are tall and may be broken by a natural disaster, etc. They are noisy and may impact birds. Carbon dioxide is not emitted.
Solar power generation	Generating electricity by exposing solar panels to sunlight.	A large area is necessary. Can be installed even on a small scale. Carbon dioxide is not emitted.
Geothermal power generation	Producing steam with heat from underground magma and using it to drive an electrical generator.	Needs to be installed near a volcano. There are concerns about impact on scenery and sightseeing. Carbon dioxide is not emitted.
Biomass power generation	Producing steam by burning vegetative materials such as scrap wood and using it to drive an electrical generator.	Scrap wood or garbage are burned directly or methane gas is generated from cattle manure and burned. Small-scale generation is possible. Carbon dioxide is not emitted.
Tidal power generation	An electrical generator with blades is driven by a tide such as the Kuroshio current.	No impact on the environment and highly efficient, but has not been put into practical use. Carbon dioxide is not emitted.

3. What is renewable energy?

Renewable energy is attracting a lot of attention now due to issues like global warming. Look at the table showing the various methods of electricity generation. Please circle any examples of "renewable energy".

What is renewable energy? Why is it attracting a lot of attention. Summarize the main points below.

Renewable energy is a power generation method that uses as energy sources the power of nature or waste materials that can be used repeatedly, rather than sources that are depleted, like petroleum or coal. Since carbon dioxide is not emitted through generation, it does not cause global warming. It is an environment-friendly generation method. Since the natural environment is greatly affected by the construction of facilities, hydrogen power generation cannot be called renewable energy.

Group discussion

4. In groups, discuss each members table from 2. Then as a group, combine your ideas and create a new table. Present your groups summary of generation methods and characteristics to the other groups.

Listen to Group Presentations and Summarize Them

5. Now listen to each group presentation and summarize their ideas, new things you learned and discuss the differences between your ideas. Write down any questions or opinions you have.

Review the lesson

Looking back on today's class, sum up what we have learned, noticed, and would like to use in future classes.

- We learned that, depending on the power generation method, carbon dioxide is emitted or not emitted.
- We learned about renewable energy.
- We learned that, in view of global warming, methods that do not emit carbon dioxide are necessary.
- We generate (would like to generate) electricity at home.