



Water wheel a source of renewable energy

STEM4inclusive schools
WP2 – Toolbox

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Structure of the activity

A Introduction

about the topic

What's the renewable energy?

Requirements for a basic water wheel

B Training phase

about the training

Build your own simple water wheel

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What's the renewable energy? Essential elements for a simple water wheel

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Definition!



What is renewable energy?

Renewable energy is energy generated from natural sources that are replenished faster than they are consumed.

The most common renewable energy sources:

- **Solar power:** Solar power comes from the sun. Solar panels convert sunlight into electricity.
- **Wind power:** Wind power comes from the wind. Wind turbines use the wind to spin blades, which generate electricity.
- **Hydropower:** Hydropower comes from water. Dams use the force of water to turn turbines, which generate electricity.



Definition!



- **Geothermal energy:** Geothermal energy comes from the heat of the earth. Geothermal power plants use the heat of the earth to boil water, which turns turbines to generate electricity.
- **Bioenergy:** Bioenergy comes from organic matter, like plants and animals. Bioenergy can be used to heat homes and generate electricity.

Renewable energy sources are crucial for reducing greenhouse gas emissions, improving air quality, and providing sustainable energy solutions.



Definition!



What is a water wheel?

A **water wheel** is a machine that converts the energy of flowing or falling water into mechanical power. It typically consists of a large wheel with blades or buckets on its outer rim.

As water flows over or under the wheel, it causes the wheel to turn, which can then be used to power various types of machinery.

Water wheels have been used historically for a variety of purposes, including grinding grain in mills, pumping water, and even powering textile machines.



How a water wheel works



Water wheels work by harnessing the kinetic energy of flowing or falling water to generate mechanical power. Here's a step-by-step breakdown of how they operate:

- 1. Water Source:** Water is directed from a river, stream, or other source to the water wheel. This can be done using channels, aqueducts, or pipes.
- 2. Flow Direction:** Depending on the type of water wheel (overshot, undershot, or breastshot), water is directed to hit the wheel at a specific point.

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How a water wheel works



3.Wheel Rotation: The force of the water pushes against the blades or buckets on the wheel, causing it to rotate. The design of the blades or buckets is crucial for maximizing efficiency.

4.Mechanical Power: As the wheel turns, it drives a shaft connected to various types of machinery. This mechanical power can be used for grinding grain, pumping water, or powering other industrial processes.

5.Energy Transfer: The rotational energy from the wheel is transferred to the machinery through gears, belts, or other mechanical linkages.





Let's have a look at this
youtube video!

The water wheel video



Youtube channel name: Win-Win with Liv Boeree

Name of video: **How do Waterwheels Work?**

Link: <https://youtu.be/oayf60yFWkc?si=ng5O49q6VOfm3uep>

Accessed: 13.11.2024



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DID YOU KNOW?



There are a few famous historical sites with well-preserved water wheels:



Lijiang Old Town, China

<https://www.chinadiscovery.com/yunnan/lijiang/lijiang-old-town.html>



Norias of Hama, Syria

https://commons.wikimedia.org/wiki/File:Wasserrad_Hama.jpg



Knight Water Wheel, Mammoth Lakes, USA

https://noehill.com/mono/poi_historic_knight_wheel.asp

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What is required for a basic water wheel?

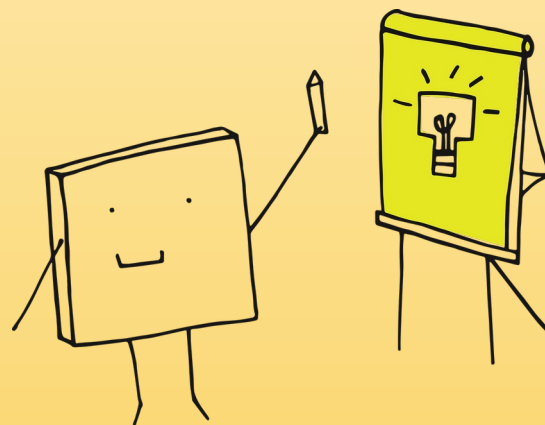
Device Type	Tasks
Wheel	It rotates using the force of flowing water
Buckets or Paddles	Capture the water energy
Axle	Transfers the rotational energy to the machinery or generator
Hub	It ensures the wheel rotates smoothly and efficiently
Water supply system	The design of this system is crucial for maximizing the efficiency of the water wheel
Support structure	Holds the wheel and axle in place



B: About the training



Training phase



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Task 1:

Work in **groups of five people** to complete the task.

You have **20 minutes** to draw the design of water wheel.

If there are learners with special needs in your group, you will receive an additional **10 minutes** to ensure that their contributions and ideas are fully integrated, while other groups work on refining their solutions.

Ensure that you collaborate effectively with your partner. Support learners who may have visual or physical impairments, ensuring everyone has the opportunity to contribute.



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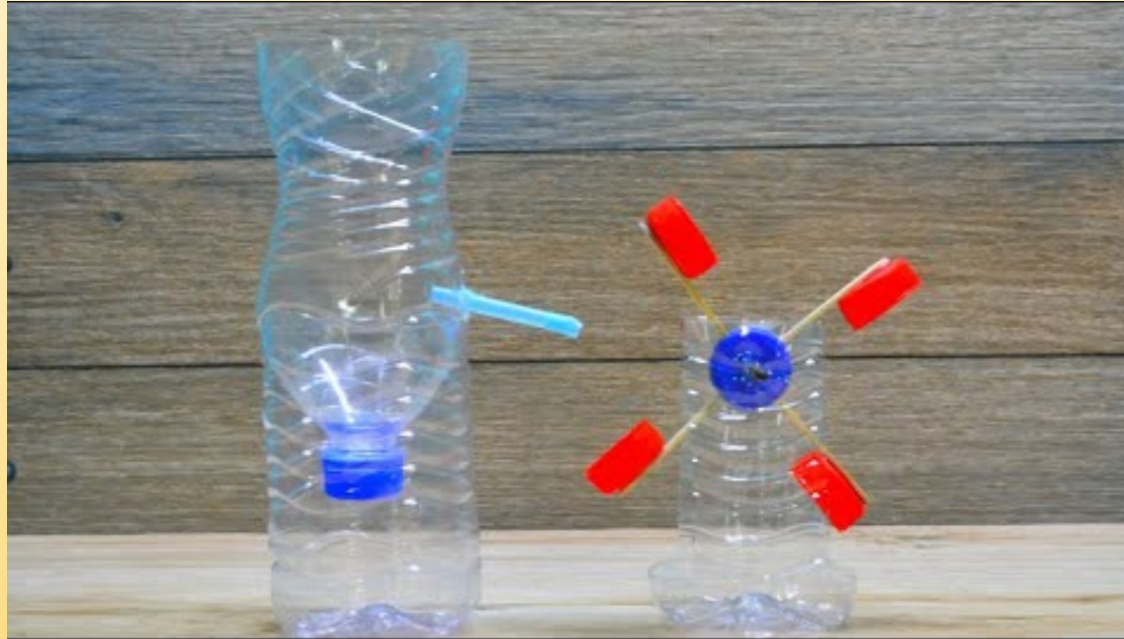


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Task 2:

Here is a DIY water wheel video



Youtube channel name: Creative Wayej
 Name of video: **How to Make a Water Wheel at home**
 Link: <https://youtu.be/i7w6g3KIJzY?si=-uOmVEi64eGxlwlp>
 Accessed: 13.11.2024

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Describe what you saw in a video. Please work together with other persons or record an audio about your ideas with your mobile phone.



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Task 3:

- Create your own water wheel and test it.
- After testing, discuss in your group and share your observations and experiences.
- Ensure that everyone is involved and that discussions follow the agreed-upon classroom norms and community guidelines.





H5P- Tasks 1: What is renewable energy?

Renewable energy is energy generated from natural sources that are replenished faster than they are consumed.

☐ True

☐ False

☒ Submit

H5P Reuse

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H5P- Tasks 2: What is a water wheel?

What is a water wheel?

- ☐ A **water wheel** is a machine that converts the energy of thermal spring into mechanical power.
- ☐ A **water wheel** is a machine that converts the energy of flowing or falling water into mechanical power.

✓ Submit

H5P Reuse

I am confused

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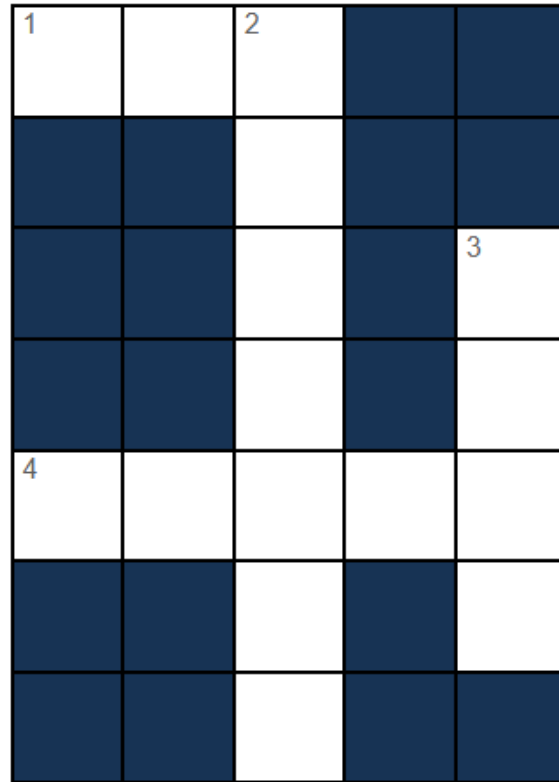
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H5P- Tasks 3: Water wheel components



Across

1 It ensures the wheel rotates smoothly and efficiently (3)

4 It rotates using the force of flowing water (5)

Down

2 Capture the water energy (7)

3 Transfers the rotational energy to the machinery or generator (4)





Congratulations!

**You mastered the activity about
water wheel a source of
renewable energy.**

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