

Wind Turbine Simulator

Re-Energy
Activity
Grade Level 7-12



Main Objectives

In this activity, learners will use an interactive simulator for a hands-on experience with a wind turbine.

Learning Outcomes

By the end of this activity, learners will:

- Understand how a wind turbine works with changes to speed and wind direction.
- Name and understand the function of the different components of a wind turbine.

Curriculum Connections

Alberta

Science 7: Heat and Temperature
 Science 9: Electrical Principles and Technologies
 Science 10: Energy Flow in Technological Systems
 Science 24: Understanding Common Energy Conversion Systems
 Science 30: Energy and the Environment (D1.4, D1.5k, D1.3s, D2.3k, D2.4k, D2.1sts, D2.3s, D2.4s)

Ontario

Science & Technology 6: Electricity and Electrical Devices (1.1)
 Science & Technology 7: Heat in the Environment (1.2)
 Science 9: The Characteristics of Electricity (Academic) (E1.2)

- Electrical Applications (Applied) (E1.1)

 Environmental Science 11: Scientific Solutions to Contemporary Environmental Changes

(University/College Preparation) (B1.2)

- Conservation of Energy (University/College Preparation) (F1.1)
- Energy Conservation (Workplace Preparation) (D1.2)

Physics 11: Electricity and Magnetism (F1.2)

Physics 12: Energy Transformation (E1.1, E1.2)

Chemistry 12: Energy Changes and Rates of Reaction (D1.1)

Length of Activity

20 minutes

Materials List

Internet-enabled device per learner
 Wind Turbine Simulator
 Harnessing the Wind Webinar

Procedure

Step 1: Explore wind energy with this [interactive wind turbine simulator](#) by GreenLearning!

- The first part of the simulation explores how a wind turbine works. Learners will change the wind direction and wind speed to complete the statements.
- Learners will then continue inside the turbine where they will drag and drop the name to match the correct part of the wind turbine.

Discussion Questions

1. In a few sentences, explain how a wind turbine works.
2. What happens to the electricity output if the wind speed increases from calm to stormy? Explain what happens and why.
3. What happens to the electricity output when the wind speed decreases from stormy to calm? Explain what happens and why.
4. What happens to the electricity output when the wind direction changes? Explain what happens and why.
5. Why is there a maximum electrical output at a certain wind speed for a wind turbine? What determines this maximum electrical output and how can we find it?

Extension Activities

- Visit our Wind Energy Unit to build your very own wind turbine!