

Wind Turbines



Key knowledge

Wind turbines convert the wind's kinetic energy into electrical energy.

Wind turbines are generators that turn to produce a potential difference.

Wind turbines turn through a magnetic field to produce a potential difference. This is the generator effect.

The faster the motion, the greater the potential difference.

Most electricity is generated using a turning motion. Exceptions to this are solar (photovoltaic panels) and cells/batteries.

Wind power is renewable and sustainable.

Renewable energy uses sources that are replenished in our life-time. The wind will not be used up.

Renewable energy still has an impact on the environment. For example land use issues and challenges to habitats and wildlife.

Prototypes are working models that can be made before production to see if a product works. This can save money, materials, time and energy.

Isometric drawings are drawing with lines that are 30° to the horizontal to make drawings appear 3D.

Design—Test—Evaluate.

Key Skills

When testing designs and collecting data it is important to carry out a fair test. Keep the wind speed, distance, circuit and motor the same. Only change one thing.

By repeating tests, the data will be more reliable. The data should be recorded in a table, drawn in pencil using a ruler. Units go at the top of the column only.

When drawing a graph, the independent variable (that you changed) is on the x-axis and the dependent variable (potential difference) is on the y-axis. Line graphs should have a line of best fit.

Link the data from your readings to wind turbines and wind farms. Describe the patterns in your data.

The motor circuit must be complete to work.

When using equipment follow the safety instructions given.

Wear appropriate PPE for the situation.

Tidy away all equipment to the correct place so that others can find it. Report any damage or wear and tear of equipment.

Put all scrap materials in the bin (or appropriate recycling container.)

Use the minimum amount of material possible.

Key vocabulary

Wind turbine— a device that converts the wind's kinetic energy into electrical energy.

Renewable—energy sources that will not run out, they are naturally replaced in our lifetime.

Sustainable—be able to be maintained at a certain level without depletion.

Generator effect—a potential difference is generated when a wire is moved through a magnetic field.

Blade—captures the motion of the wind, often shaped like an aircraft wing.

Tower—supports and holds up the turbine in the wind.

Potential difference—a measure of how much energy is transferred between two points in a circuit. Also known as voltage. Measured in volts (V).

Current—Flow of charge in a circuit. Measured in amperes/amps (A).

Voltmeter—used to measure potential difference.

Design—a plan or specification for the construction of an object or product.

Evaluate—to assess or determine the quality of a product against its specification.

Scenario—the real life problem that the investigation is linked to.