Wind

Date:

Name:

Class:

WESTMILL WeSET SUSTAINABLE ENERGY TRUST

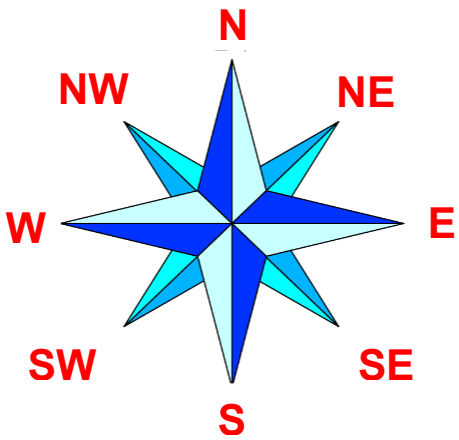
Task 1 – Look at the compass below. Label the **cardinal points**: North **N**, South **S**, East **E** and West **W.**

Now see if you can you label the **intercardinal points** midway between each cardinal point: northeast **NE**, southeast **SE**, southwest **SW**, and northwest **NW**.

TIP:

When labelling intercardinal points, North **N** or South **S** always comes first! For example:

NW or **SE**



Task 2 - Match the **descriptions on the post-its** with the relevant turbine parts below.

The first one has been done as an example.

This **streamlines** the turbine making it more **aerodynamic** and also **protects** the rotor hub

These need to be **deep** and wide enough to **anchor** the turbine in high winds

These can be **pitched** (or **feathered** in high winds) depending on wind speed

This **converts** rotational mechanical energy into **electricity**

This **houses** all the working parts and **protects** them from the weather

This **measures** the **wind speed**

This **turns** the **nacelle** so that the rotor hub is **facing into the wind**

Concrete foundations	The yaw system	Nosecone	Rotor blades	Anemometer	Nacelle	Generator

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Task 3 – The turbine challenge!

In your teams, design and make a **horizontal wind turbine** to create the power to **lift a paper cup** off the floor. The turbine will be powered by 'wind' from a fan/hairdryer.

- Use as many or as few of the materials provided
- Choose the number and pitch (angle) of your rotor blades
- Rig up your cup and use the wind source provided to test your design

You can attach your turbine to a desk.

You will be given a paper cup to lift and you can use the following materials:

String ~ plasticine ~ cardboard toilet rolls ~ cardboard ~ tape ~ pencils ~ wooden dowel

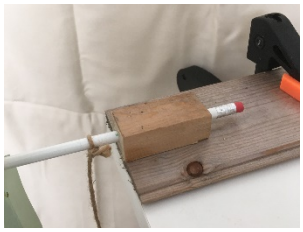
Design your wind turbine in the space below

Used here:

2 x lollipop sticks
4 x luggage tags
1 x round pencil
garden twine
hot glue
off cuts

Creating simple jigs to hold the windmill designs is relatively quick and easy and can save time.

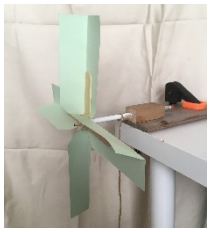
1. Mark out a strop of 20mm x 30mm pine section to 50mm length and mark the centre on one end
2. Drill 8mm hole, preferably using a pillar drill to ensure it is perpendicular
3. Ensure the pencil or dowel rod fits but turns freely
4. Glue the block to a flat offcut, enabling it to be clamped to a bench or table



This image shows the drilled holding jig clamped to a table.

Make sure the string is secured tightly.

This image shows 2 x lollipop sticks drilled and glued together and mounted on the driveshaft (pencil).



Luggage tags can be folded to find the optimum pitch for the blades.

Use a hairdryer or fan to simulate wind.

The following video clip also gives an idea of other possible outcomes

https://www.youtube.com/watch?v=ZGmMkMkQ_gc