

Pupil Investigation Booklet

for 'Power your School'

An amazing 33 Million Terawatt hours of energy hit the earth from the sun each year. Solar panels turn that energy into electricity. Would you like to find out if you could have solar panels in your school? In this project you will be a scientist and use a range of scientific equipment!

A short quiz to start!

A. What is energy? _____

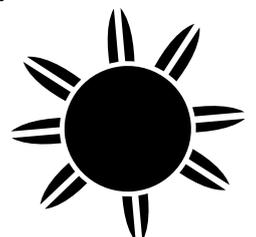
B. List **three** things that you use every day, that require energy. _____

C. Give a reason why we care about solar and wind energy. _____

D. Which do you think would be better for **your** school? Why? _____

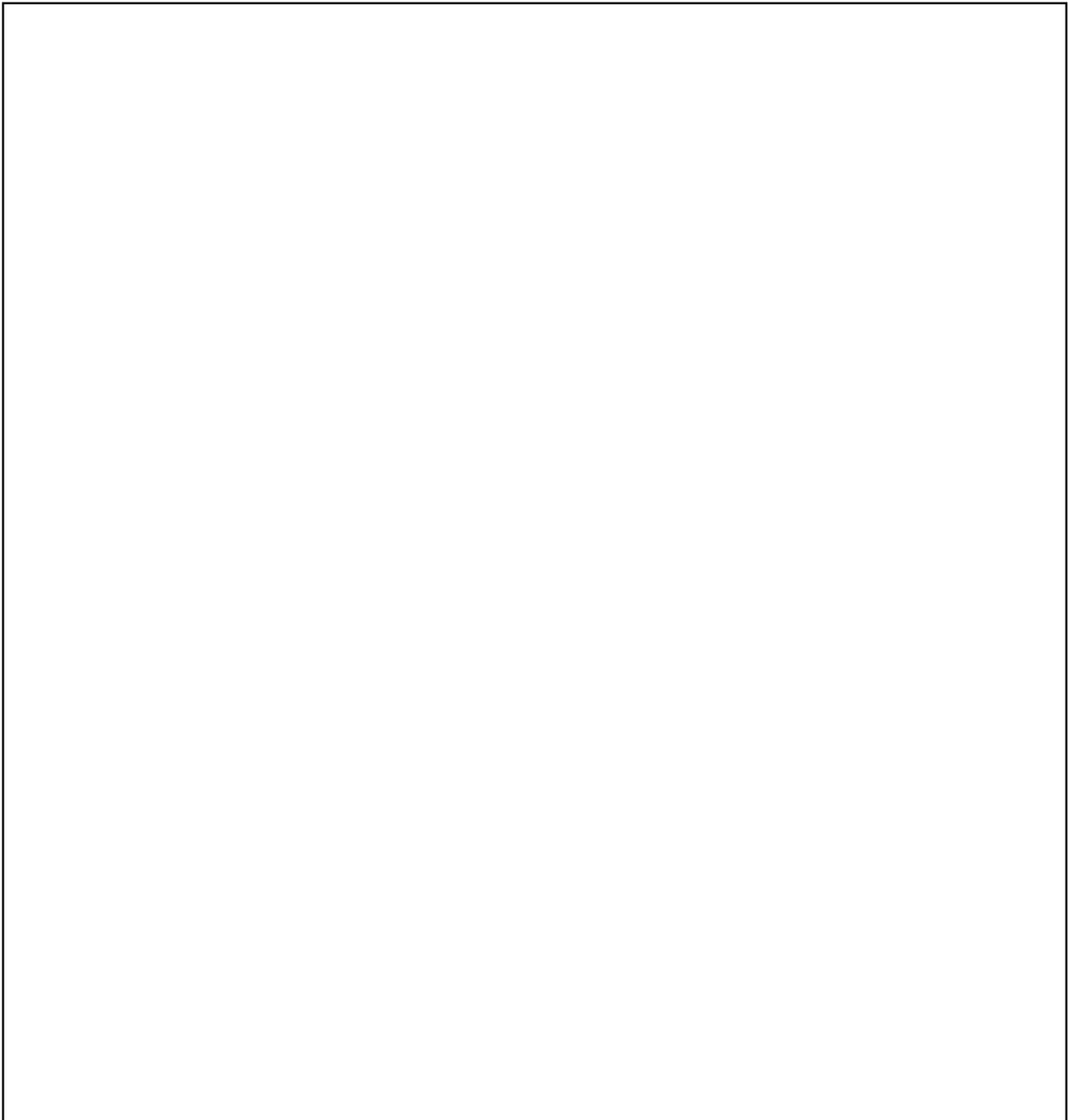
E. How do solar panels work? **Circle your answer.**

- They block heat from the sun to help buildings be more energy efficient.
- They reflect light from the sun to convert light into electricity.
- They absorb light from the sun which is converted into electricity.
- They absorb heat from the sun which is converted into motion.



1) Mapping out the school and immediate local area

- Can you picture what the school would look like on a map, from a bird's eye view?
- Walk around the school grounds and begin to draw the layout.
- Can you include any of the following: building layout, playground equipment, playing fields, gardens, paths, local roads, existing solar panels and any interesting buildings.
- Does looking at the example map give you any ideas? Is there anything you like or dislike about the way it is drawn? Are you going to include a key? Does looking at Google Earth help?



2) Where should the solar panels go?

If you are going to look for somewhere to put a solar panel then it needs one very important thing – sun! Think of all the sun’s light that we do not use every day!

First you must be safe when you are collecting this information, so you must not climb up anywhere. Some examples of where you could look where it may be sunny:

- On a piece of exposed roof (which you can see from the ground or a window).
- A bit of the playground or playing fields.
- Any storage sheds or other buildings.
- A piece of wall.

Some points to consider

- Is there anything that is obstructing the sun’s path?
- Which direction does it need to face to get the most sunlight throughout the day?
- What is the size of the space because solar panels are approximately 1.5m long and 1m wide?

You are going to record the amount of light using a luxmeter. Choose 3 possible places and record what the light is like there.

Fill your table with measurements

Place you are considering for the solar panel	9am	10.30am	12pm	1.30pm	3pm
1)					
2)					
3)					

I recommend putting the solar panel/My area where I would place the panel is:

because _____

It is especially important to be accurate with your results as your data is going to be used to help create a countrywide energy picture. You are being a scientific researcher! Make sure that you only enter your results for the best site for the solar panel, which is the sunniest spot.

3) Solar panels are good for the environment, but will they end up being more expensive than your normal electricity bill?

The following figures are approximate estimates and how much electricity bills are and the cost of solar panels will be different for every school.

Solar panels for a school cost £650 per month for 3 years, then they belong to the school and all the electricity the school gets from them is free.

If solar panels cost £650 per month how much will they cost for 1 year?

How much will the solar panels cost in total over the 3 years?

Information about electricity bills

A 1 or 2 form entry primary school will be £280 per month

A 3 or 4 form entry primary school will be £350

How much is your school's electricity bill for 1 year?

How much is your electricity bill for 3 years?

How much more is it to have solar panels then pay the electricity bill for the first 3 years?

To start with the solar panels are more expensive, but after those 3 years the school does not have to pay for the solar panels. This means within 10 years the solar panels are cheaper.
As a super challenge can you work out how many years you need solar panels to make it cheaper than normal electricity bills?

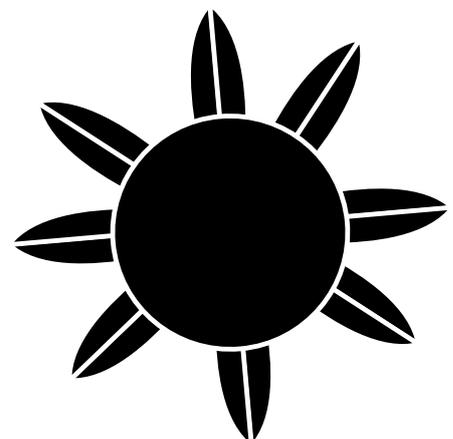
4) As pupils you will need the School Governors' support so that they approve the budget being changed and the money being spent on the solar panels.

The following ideas will help to create a persuasive poster:

- Solar energy does not cause pollution. It is an environmentally friendly alternative to fossil fuels
- Solar energy is infinite. It is renewable and sustainable
- Once the equipment to collect it has been built, solar energy is free
- Once installed solar panels are low maintenance and just need a quick clean

Possible phrases to include:

"renewable energy", "no pollution", "cheaper within 10 years".



Create your poster:

A large, empty rectangular box with a thin black border, intended for students to create a poster. The box occupies most of the page's vertical space.

5) Problem! What do we do if it is not sunny? There are other renewable energy sources too which may be more suitable for your school. Depending on your area would a wind turbine be a better alternative for your school?

You are going to use the same method as you did when you tested areas for the amount of light, they had but this time it will be for the wind speed. First you need to choose 3 potential test sites.

Some points to consider when you choose your 3 potential test sites

Are there any obstructions?
Do you think you will be better in an open space or next to a wall?
Is height going to make a difference?

You are going to record the amount of wind using a digital wind speed meter. Choose 3 possible places and record what the wind is like there.

Fill in the table with your measurements

- Your unit of measurement is metres per second.
- You will need to stand in the same spot in order to carry out a fair test.
- Remember that this is for summer and your study would need to be repeated at different times of the year.
- Can you decide which way the prevailing wind is coming from? If you drop a blade of grass which way does it blow?
- Make sure you hold the digital wind speed meter up high as the higher you are the windier it will be.

Place you are considering for the wind turbine	9am	10.30am	12pm	1.30pm	3pm
1)					
2)					
3)					