

Monster Sciences

ENERGY

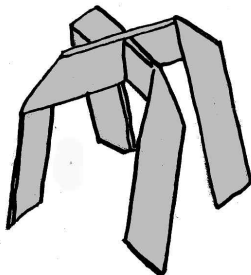
SOLAR FAN

What you will need:

- aluminium foil
- black marker
- scissors
- string
- sticky tape
- a large, clean clear jar with a lid

What you will do:

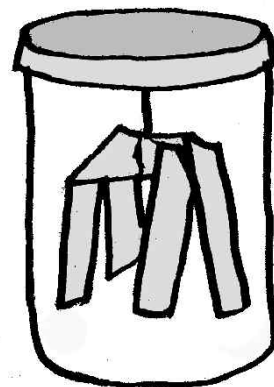
1. Carefully cut 2 strips of aluminium foil about 3cm wide and 10 cm long.
2. Colour the non-shiny side of the aluminium foil strips black with the marker. *Be careful - it tears easily!*
3. Fold each strip in half to mark the middle, then open them out again and cut a slit half way through each like this:



4. Slide them together and then fold the sides down as shown in the picture.
5. Sticky tape the string to the centre of the fan you have now made, and tape the other end of the string to the middle of the inside of the jar lid.
6. Put the lid on the jar. The fan should be able to spin freely in the jar, so if it can't shorten the string.
7. Put the jar in a hot, sunny place and watch what happens!

What should happen:

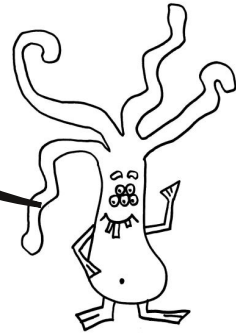
The sun will heat the black side of the blades of the fan more than the silver side, which will make the black sides heat the air beside them. The hot air rises and causes air currents that turn the fan.



Monster Challenges:

- Try it in different places - on the grass, on concrete, in partial shade. How does it change the movement of the fan?
- Can you invent another way to use the sun's energy to make something move? Draw your ideas and if possible, build it!

Let's harness the sun's energy!



TEACHING NOTES:

Monster Sciences Experiment: Energy EN03

Key Concepts:

Suitable for Ages: 8 -12+

- The sun provides us with energy

Resources:

- Experiment description Energy EN03 - one copy per student.
- Aluminium foil, scissors, black marker, sticky tape, string, clean clear jar with lid.
- Investigation record IR - one copy per student.

Lesson Notes:

Begin the lesson by discussing the term "energy" and what it means. Discuss the sun's energy - what it is, how we feel it (as heat), where it comes from.

As a class read through the procedure of this experiment and demonstrate the construction of the solar fan. Remind students to be careful as the foil tears easily.

Break the students into small groups or pairs to complete the experiment. They will need some time outside to observe their solar fan - in very hot environments the fan can start to work very quickly, in cooler areas it might take a few minutes to get going. Remind students that they must be patient and watch their fan without touching it.

At the end of the lesson gather the students together again and hold a whole class discussion about their results. Students can then complete their Investigation record.

What should happen in this experiment, and why?

Students should be able to see their solar fan spinning as it heats up in the sunlight. The hotter it gets the faster it should spin. Students should be able to explain in general terms that the black side of the foil is absorbing more heat from the sun than the silver side, which reflects some heat and that the difference in temperature causes air currents to form in the jar, spinning the fan.

Follow up questions:

- What effect do you think the shape of the fan has on this experiment? Could we try different shapes?
- Imagine that we used different colours. What effect would that have?
- What if we used different materials? Paper instead of aluminium foil for example?