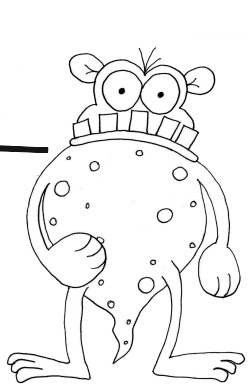
Monster Sciences

ENERGY



SPIRAL HEAT ENGINE

What you will need:

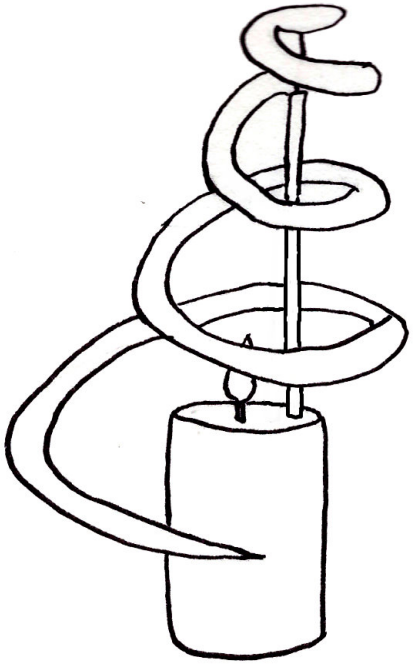
- A column or jar candle
- A skewer
- A pin
- Tape
- Paper plate
- Pen or marker
- Scissors

What you will do:

1. Tape the pin to the blunt end of the skewer so it sticks up past the end.
2. Push the sharp end of the skewer into the top of the candle so the skewer stands upright.
3. Now use the pen to draw a spiral on the paper plate. Start by drawing a circle and then spriral out from there. TRY TO MAKE SURE YOU START IN THE MIDDLE OF THE PLATE AND KEEP YOUR SPIRALS NICE AND EVEN.
4. Cut the spiral out very carefully, leaving the small circle in the middle.
5. Ask a grown up to light the candle for you. MAKE SURE YOU ARE VERY CAREFUL NOT TO TOUCH THE CANDLE OR THE FLAME.
6. Carefully balance the circle at the center of the spiral on the pin. Make sure you don't put the plate into the flame! It should hang down in a spiral around the skewer and the candle.
7. Once it's balanced let it go and watch what happens!

What should happen:

Hot air is less dense than cool air, in other words when we heat the air particles up they get more active, which takes up more room. There's more space in between the busy air particles so the air becomes lighter and rises. Watch what happens to the spiral as the hot air rises!



Monster Challenges:

- What other shapes could you cut out of the paper plates and still have this experiment work?
- Can you make it go the opposite way?

TEACHING NOTES:

Monster Sciences Experiment: Energy EN08

Key Concepts:

- Hot air rises

Resources:

- Experiment description Energy EN08 - one copy per student.
- Paper plates, pens or markers, scissors, candles, skewers, tape, pins, matches
- Investigation record IR - one copy per student.

Lesson Notes:

Before the lesson revise what the students already know about the states of mater (gas, liquid, solid) and discuss that the molecules move more and further in liquids than solids, and more in gases than liquids.

As a class discuss the experiment prior to undertaking it, and students should complete the sections of their Investigation Report IR01 from ”Title to “Hypothesis”. Remind the students of the safety issues to do with working with a flame. This experiment is best done in pairs or small groups so that the students can double check that each other is being safe.

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?

The sprirals need to be pulled apart a little so they hang down in a cone shape. Students should be able to see their spiral spin as the hot air rises. It should be balanced on the pin so that it can move freely. You can also experiment with cutting vents into the paper plate to see if you can come up with a design that will also spin.

Follow up questions:

- What makes the spiral?
- What do you think would happen if we had more candles under the spiral?