

Brontosaurus Learning

Making science fun!

An Experiment about

Energy Concentrating Heat



What you will need:

- A magnifying glass
- A balloon
- A sunny day

What you will do:

1. Blow up the balloon and tie it.
2. Take the balloon outside and place it on the ground. *If it wants to blow away, you may need to tie it to something with a piece of string.*
3. Now hold the magnifying glass above the balloon between it and the sun. *Be careful not to look at the sun!*
4. You should be able to see a little spot of bright light on the balloon. Hold the magnifying glass very still and keep that bright light on the same spot on the balloon. *It may take a little while for something to happen. Be patient!*

What is going on?

The sun's energy reaches the Earth both as light and as heat. I don't want to spoil the surprise, but the sun's heat is being concentrated by the curved shape of the glass in the magnifying glass, so that spot on the balloon is going to get very, very hot! What do you think will happen?

Can we make sunshine even hotter?



Challenges:

- Find out how this idea of concentrating the sun's rays can be used for cooking.
- What other uses can you think off? Draw and label a picture of your invention.

TEACHING NOTES:

Brontosaurus Learning Experiment:
Energy EN05

Topic: Energy

Key Concepts:

- The sun produces heat energy

Resources:

- Experiment description Energy EN05 - one copy per student.
- Magnifying glasses, balloons, maybe some string
- Investigation record IR - one copy per student.

Lesson Notes:

As a class, read through the procedure of this experiment and explain, or demonstrate, the process. Getting the balloons blown up and tied can be tricky—you might need to help some students with this!

Explain the safety aspects of the experiments, in particular what areas of the playground the students can use. You also need to remind the students not to look at the sun because it can damage their eyes.

Pass out the magnifying glasses and ask the students to investigate them. Ask them to describe how they look, what they are made of, what shape they are etc. You are aiming for someone to notice the curved shape of the lens. Ask them to look through the magnifying glass and describe what they see. Discuss how the light that comes through the magnifying glass is bent and this is what makes things look bigger. Then explain how using the magnifying glass outside bends the sun's rays into a small area, making it hotter.

Before beginning the experiment, the students should complete the sections of their Investigation Report IR01 from "Title to "Hypothesis".

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?

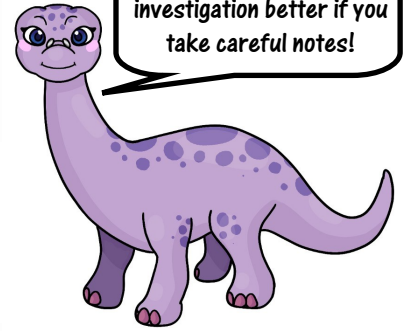
When the wall of the balloon gets hot enough, the rubber will melt and it will pop!

If this isn't working, it is likely because the student is not holding the magnifying glass still enough for the light to be heating the same spot on the balloon for long enough. Help them aim at the same spot by resting their arm on something like a chair.

Follow up questions:

- Did the pop give you a fright?
- What would happen if the magnifying glass lens was curved the other way?
- Does it make a difference how far away the magnifying glass is from the balloon?
- Could you make this happen at night? [No] Why not? [you need sunlight]
- Could you make it happen on a cloudy day? What would be different? [It may take longer]

Investigation Record



Experiment Title:

Scientist (that's you!):

Materials: What will I need?

Investigation—what am I going to do in this experiment?

Diagrams are a great idea!

Hypothesis: What I think will happen:

Observation: What I SAW happen:

Diagrams are a great idea!

From my investigation I learnt:

Great work scientist!