

Activity C

Ideas about particles

Developed by Sam Peyton

Introduction

This lesson is based on a concept cartoon activity, in which students are presented with three theories and some evidence. Through discussion they have to select the theory that they believe and justify their decision by referring to the evidence. This lesson gives teachers the opportunity to elicit the students' ideas about particles, a concept that many find difficult and about which many hold misconceptions.

Objective

Pupils will learn about the role of evidence in science.

This lesson also provides the teacher with an opportunity to explore children's initial ideas about particles.

Learning Outcomes

By the end of the lesson, pupils will be able to:

- choose relevant evidence to support a statement;
- produce evidence to support a theory;
- produce evidence to disprove a counter argument;
- participate in discussion.

Teaching Sequence

- A starter activity is used to encourage and assess pupils' involvement. The pupils are presented with the statement; 'I am in a laboratory'. They are then asked, 'What evidence backs this up?' The teacher collates a list of evidence statements on the board, and asks the students which of the statements are relevant and which are not. The activity serves to model the idea of evaluating relevant evidence.
- The teacher presents a concept cartoon with evidence statements and asks the pupils to decide which character they agree with. They are then asked to select the evidence that backs up their choice. They can use the evidence statements provided or their own evidence.
- The teacher presents a scenario about condensation and gives the pupils three theories that can serve to explain the scenario. The correct theory is fairly obvious,

but the task is for pupils to provide evidence why this theory is correct and the other theories are incorrect.

- In the plenary, the teacher provides a writing frame to help the pupils to document their choices and evidence.

Writing Frame: Theories and evidence

I believe _____'s theory.

I believe this theory because_____

I don't believe _____'s theory.

I don't believe this theory because_____

I don't believe _____'s theory.

I don't believe this theory because_____

Student Activity Sheets

Ideas about particles

Who do you agree with?



Discuss with your partner who you agree with and why.
Select the evidence that backs up your choice.

Helium Balloons float

When you heat water it expands

Steam rises

Liquids become gases when they are heated

Hot water is less dense than cold water

Steam is very hot and can burn you

When you pop a helium balloon it falls

Clouds are droplets of water which float in the air

Not all the evidence will be useful.

Student Activity Sheets

If Jules held a mirror above the kettle as it boiled small water droplets would begin to appear. This is condensation.

How do the water droplets get there?

Theory 1

The mirror is upside down so the water in it runs to the outside and gathers on the shiny surface.

Theory 2

The steam hits the surface of the mirror and cools down and turns into a liquid.

Theory 3

When you are holding the mirror your hand gets hot and sweaty. The sweat drips down onto the mirror.

Which theory do you support?
When else do you see condensation?
Think of evidence to prove your theory.
Think of evidence to disprove the other theories.