2.4 What state is that?

At the end of this activity students will be able to:

- identify the states of everyday materials.

What ideas might your students already have?

Students should know the properties of the three states of matter and be able to identify the states of everyday materials.

Equipment list

Each CLASS will require:

- access to **Student Digital**
- jar of granulated sugar
- ingredients for elephant toothpaste

Each STUDENT will require:

- ***Notebook***

Things to consider and hints for success

You might like to start the activity by demonstrating elephant toothpaste. There are several recipes on the internet. These are either for teacher demonstrations or student-friendly experiments. Some may contain chemicals now banned in schools. Check with your laboratory technician, advisor or your education authority if you are unsure.

Video clips at the end of this activity demonstrate elephant toothpaste.

Teacher content information:

Elephant toothpaste is made using the decomposition of hydrogen peroxide. Dishwashing liquid is added to make the solution foam when oxygen gas is released. A catalyst is added to rapidly breakdown the peroxide.

Students are only required to write the word equation in this activity. You could get them to write the unbalanced chemical equation to show how symbols are used – depending on the ability of the class.

Reactant = hydrogen peroxide (H_2O_2 (l))

Products = oxygen gas (O_2 (g)) and water (H_20 (l))

(NOTE: technically you should use (aq) for water, however at this stage we are only asking students to identify substances as solids, liquids or gases).

Word equation: hydrogen peroxide (l) → oxygen (g) + water (l)

Balanced equation: $2H_2O_2$ (l) → O_2(g) + $2H_20$ (l)

Lesson plan

Step 1: Demonstrate elephant toothpaste (optional).

Step 2: Students look at each substance on the sick elephant's hospital tray and identify its state. This could be done as a class activity using an interactive whiteboard or data projector. Use a show of hands or the less threatening thumbs up/thumbs down:

- thumb up (solid)
- thumb horizontal (liquid)
- thumb down (gas).

This method is less threatening as it can be done in front of the body, unseen by the class.

Step 3: Show students a jar of granulated sugar. Get them to answer Questions 1 and 2 in their ***Notebooks*****.** Discuss their answers.

Step 4: Students watch videos on elephant's toothpaste then answer Questions 3 and 4. You might need to do this as a class or optional extension activity depending on student ability and familiarity with chemical equations. At this stage, they are only being introduced to the terms chemical equation, reactants and products.