

# States of Matter: Teacher's topic guide

## God is Truth Year 3

### Spiritual Awareness

God is true to His word and never changes. He is a faithful God. He is faithful to His word. In the study of 'states of matter' we see that a substance retains its chemical compositions despite changing from solid to liquid to gas. There is consistency in the created world, reflecting God's immovable consistency. God and His word never change.

### Values: Our response to 'God is Truth'

- **Honesty:** Speak the truth; Never cheat, steal, lie or exaggerate
- **Trustworthiness;** keeping promises
- **Integrity:** Be true to our word and keep promises.
- **Life-long learning:** always seeking the truth
- **Faith** in the word of God being the truth, and that Jesus is the way, the truth and the life
- **Respect for truth**
- **Trust** in the Holy Spirit to lead and guide us into all truth.

### Bible stories and passages: God is faithful and true

Genesis 9:8-17 God gave the sign of the rainbow, a sign that He would keep His promise never to destroy the world again with a flood.

Genesis chapters 15, 17, 18 God kept His promise to Abraham

1 Samuel ch 1 Hannah made a promise to God that if she had a son, she would give Him back to God. Hannah kept her promise.

Acts 9:1-23 Saul was changed to become Paul, and he became a faithful follower.

Daniel ch 13 Shadrach, Meshach and Abednego did not change their mind about the true God.

Daniel ch 6 Daniel also stood up for the true God and would not change.

### Bible verses

Malachi 3:6 "I am the Lord, and I do not change." (GNB)

Psalms 119:86a All Your commandments are faithful.

Proverbs 30:5 God keeps every promise He makes (GNB)

John 3:16 For God loved the world so much that He gave His only Son, that whoever believes in Him should not die, but have everlasting life.

Psalms 33:4 The words of the Lord are true and all His works are dependable. (GNB)

Numbers 23:19 God is not like men who lie; He is not a human who changes His mind. (GNB)

### Key Questions

- What is matter?
- What is a solid?
- What is a liquid?
- What is a gas?
- Can any of these be changed by heat? What happens?
- Can any of these be changed by cold? What happens?

## **Outcomes:** Students will

Understand that in chemistry the three traditional states of matter are solids (fixed shape and volume) and liquids (fixed volume and shaped by the container) and gases (filling the container)

- Understand that the solid state of water is called ice
- Understand that all matter is made of tiny particles. In solids, the particles are very close together, in liquids the particles are further apart, and in gas the particles are even further apart.
- Understand that a change of state between solid, liquid and gas can be caused by adding or removing heat.
- Understand that change is a process in which objects and events become, or are made to become, different from their former status
- Understand that change can be fast or take considerable time

## **Activities**

- Make ice cubes.
- Melt ice cubes using a heat source.
- Observe and describe the changes from water to ice cube and back to water.
- Boil water to create steam. Measure the temperature of water being heated to boiling point.
- Classify materials and substances into categories of solid, liquid, gas
- Experiment with saturation and drying of sponges and fabrics in different drying conditions. Explain why some materials dried faster than others
- Conduct kitchen chemistry activities, such as melting butter, coconut oil or chocolate to make no-bake cookies (refrigerated); melting sugar to make toffee, making jelly (jello); making fruit ice-blocks.
- Describe what happened to the ingredients when making the food.
- Compare the amount of heat necessary to melt butter and sugar by placing both butter and sugar in a warm (but not hot) place. Draw conclusions about the melting temperatures of different materials.
- Inflate and over-inflate balloons to show that air takes up space and can be contained.
- Blow bubbles.
- Make a chart divided into 3 sections: solid, liquid, gas. Use rice bubbles or similar to show how the particles would look inside a solid object, a container or liquid, and a container of gas.
- Discuss the properties of solids, liquids and gases.
- Discuss solids and liquids in relation to volcanic lava and rocks.
- Measure room temperature using a thermometer. Time how long it takes water to boil and record the rising temperature on a thermometer every minute. Graph the rise in temperature from cold to boiling point.

## **Assessment**

1. Make three charts using words and pictures to describe the properties of a solid, liquid, gas  
**Solid:** doesn't change shape; doesn't move around; can be changed by heat  
**Liquid:** flows smoothly from one place to another; can be clear or not clear; has not shape of its own; can be changed by heat  
**Gas:** can't see most gases; air is a gas; wind is moving air that you can feel; it will fill a bubble or balloon; you can breathe it.
2. What have I learned from this study about God; about doing what God wants me to do?

# Values education Year 3

## God is Truth

### Respect for Truth

#### Respect for truth means that ...

- we live by what we know to be true
- we obey what is true
- we do the things our parents and teachers tell us to do.
- we do what the Bible tells us to do.
- we follow the laws that are right and true.

#### Activities

1. Dad is driving to an important meeting and he is late. The road sign says not to go faster than 60 kilometres per hour. What should Dad do?
2. Mum has asked you to clean your room. Your friend wants you to come and play. What should you do?
3. You find a coin in the school playground. What should you do?
4. You have promised your grandma that you will help her with the sopping but your friend has just dropped in to see you. What should you do?

#### What does the Bible say about respect for truth?

1 John 3:24 Those who obey His commands live in Him.

1 John 5:3 This is love for God: to obey His commandments.

Psalms 25:2 Guide me in your truth and teach me, for you are God my Saviour, and my hope is in you all day long.

# Practical Science Year 3

## God is Light

### Topic: States of Matter

### Will the Ice Melt and Overflow?

<http://www.sciencekids.co.nz/experiments/iceoverflow.html>

At first thought you might think that an ice cube sitting at the very top of a glass would eventually melt and spill over the sides but is this what really happens? Experiment and find out!

#### What you'll need:

- A clear glass
- Warm water
- An ice cube

#### Instructions:

1. Fill the glass to the top with warm water.
2. Gently lower in the ice cube, making sure you don't bump the table or spill any water over the edge of the glass.
3. Watch the water level carefully as the ice cube melts, what happens?

#### What's happening?

Even though the ice cube melted the water doesn't overflow. When water freezes to make ice, it expands and takes up more space than it does as liquid water (that's why water pipes sometimes burst during cold winters). The water from the ice takes up less space than the ice itself. When the ice cube melts, the level of the water stays about the same.

# Art Year 3

## God is Truth

### Topic: States of matter

**Biblical connection:** God created the universe with scientific laws that are true, dependable & unchanging

**Bible art as a wall display:** Shadrach, Meshach and Abednego in the fiery furnace.

God says “Yes” to all His promises. (2 Corinthians 1:20)

#### Painting

How can we change liquid paint? Experiment with making paint thick, (by adding flour or glue) or thin (by adding water). Experiments with different techniques using thick and thin paint,

Examples for thin paint:

Coloured wash over crayon drawings

Straw blowing of thin paint, and holding page at various angles and allowing paint to run down to make patterns.

Examples for thick paint:

Make textures by applying thick paint to paper, and making patterns with pieces of corrugated cardboard, ice block sticks and other objects to give interesting patterns and textures in the paint.