

States of Matter / Change

God is Truth

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.

The three states of matter, solid, liquid and gas, remind us of the three persons in the Trinity, Father, Son and Holy Spirit. They are one God, though persons. Just as substances remain true to their chemical nature, God never changes. Father, Son and Holy Spirit are members of the one true God.

Although God Himself never changes, He can supernaturally change aspects of the creation and people. In being born again we can be changed, and in becoming a follower of Jesus we look to Him as our example for living.

Our response to 'God is faithful and true'

Because God is faithful and true I will...

- Speak the truth
- Be honest and faithful to my word
- Never cheat
- Never steal
- Never lie or exaggerate
- Be trustworthy and faithful in friendships
- Be true to my word and keep promises.
- Be myself and not try to be someone I am not.
- Ask God to show me the truth.
- Ask the Holy Spirit to lead and guide me into all truth.
- Believe that God's word is the truth.
- Believe that Jesus is the Way, the Truth and the Life.

Supporting devotional resource

Themes for Christian Studies 2, (Truth): God is faithful to His word

Themes for Christian Studies 3, (Truth): God's truth doesn't change

Biblical references

Bible stories and passages: God is faithful and true

1 Samuel 18-20 The story of David and Jonathan who were faithful friends; their friendship did not change

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.

John 2:1-12 Jesus changed the chemistry of materials, (water to wine), through His supernatural power.

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.

Memory 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

About change

- How can God change a person?
- What changes should we expect to see from a person when they decide to become a follower of Jesus?
- How do the words and actions of people change when they are in a good/bad mood?
- How can we stay in control when bad things happen or when we are feeling angry?

About states of matter

- 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

Knowledge

- 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

Skills

- question and predict
- plan and conduct investigations
- measure and compare observations of change across a time period
- use senses to identify changes in objects
- safely use materials, tools or equipment
- make and record observations
- use formal measurements and digital technologies as appropriate
- process and analyse data and information
- use a range of methods including tables and simple column graphs to represent data
- compare results with predictions, suggesting possible reasons for findings
- evaluate and reflect on the investigation, including whether a test was fair or not
- represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports

Values

- trust in God, knowing that He does not change, but He can change aspects of creation and people
- be faithful to other
- keep their promises
- show loyalty
- be dependable
- appreciate that change can be for both good and evil
- recognize the role of Christians in contributing to change in society and the environment

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; 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.

Assessment

1. Make three charts using words and pictures to describe the properties of a solid, liquid, gas e.g.

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 the study of solids, liquids and gases...

- about God?
- about doing what God wants me to do?
- about the Bible?

Link with Australian Curriculum

Year 3 Science: Chemical science – a change in solids and liquids can be achieved by adding or removing heat

Science Year 6: Chemical sciences - Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible such as burning or rusting.

Learning connections

English: Writing a procedure (recipe)

Mathematics: 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.

Health: safety with hot objects and safety in the kitchen

Art: Make a volcano out of paper mâché, built around a bottle in the centre. Fill the bottle with vinegar and bi-carb soda and food dye to make it explode. (Do this outside!)

Link with other Building Blocks units:

“Heat”