

Year 7

Lesson 2

Rainfall processes

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Learning Objectives

Students will be able to:

- Identify conditions that contribute to rainfall events
- Name and describe three types of rainfall processes.

Learning outcomes

Outcomes Subject	Strand & Content Descriptors
Science	<p>Science Understanding</p> <ul style="list-style-type: none">• Water is an important resource that cycles through the environment (ACSSU222) <p>Science as a Human Endeavour</p> <ul style="list-style-type: none">• Science knowledge can develop through collaboration and connecting ideas across the disciplines of science (ACSHE223)• People use understanding and skills from across the disciplines of science in their occupations (ACSHE224)
Geography	<p>Geographical Knowledge and Understanding</p> <ul style="list-style-type: none">• Water is a resource that links places together as it moves through the water cycle• Water is a difficult resource to manage because it moves through the environment, is an essential but shared resource, has competing uses and is highly variable over space and time• Environmental hazards such as droughts, or storms, or floods have different causes, frequencies and distributions <p>Geographical Skills and Inquiry</p> <ul style="list-style-type: none">• Develop geographical texts using appropriate geographical vocabulary, concepts and geographical conventions to communicate effectively in one or more of the following forms: written, oral, visual and graphic

Important Questions

- What processes within the water cycle contribute to rainfall events?
- What climatic and geographic factors influence rainfall?
- What types of rainfall process are common in our region?



Lesson Plan

This lesson introduces students to three types of rainfall – orographic, frontal and convection.

Using the materials listed in Resource Requirements explain to students that they will observe an experiment that will mimic the process of rain forming and falling. The students will observe the process and then offer explanations on what occurred.

1. Pour 1 cup of boiling water into the jar
2. Place the metal lid upside down on the jar (the dimples should face down into the jar), make sure the lid completely covers the mouth of the jar
3. Place 3-4 ice cubes in the lid. Add a large pinch of salt, some cold water and stir.
4. Wait and observe.

Explanation: the cold surface of the lid cools the steam from the boiling water as it rises. The steam changes back into liquid, the indentations provide a place for the drops to gather, as they get heavier and bigger they fall as rain.

Following the experiment further gauge or reinforce student understanding of the water cycle and particularly the causes of rainfall; key points being the influence of wind in transporting moist air and the consequences of moist air (clouds) cooling as they rise.

Ask students to contribute recollections relating to storm events, including weather conditions prior to rainfall; time of rainfall; location of rainfall event. For example summer afternoon storms (convection) or rain in the hinterland or other higher ground (orographic)

Use this information to introduce the terminology - orographic, frontal and convection and briefly explain the processes contributing to each type of rainfall.

Students identify suitable sources and undertake further research into at least one type of rainfall and produce a diagrammatic representation of the process; utilising appropriate vocabulary and concept explanation in a visual or graphic format.

Present and explain their representation to their peers.

Rainfall Definitions:

Orographic: also known as relief rainfall. Winds travelling over the ocean pick up moisture and make the air moist. When the moist air reaches land it may be forced to rise over hills, ranges or mountains. As it rises it cools, the water vapour condenses and forms clouds. If it continues to rise and cool, rain is produced. On the other side of hills or mountains, the air drops and warms. It is now able to hold more water and rain may cease - this area is referred to as a 'rain shadow'.



Convection: Familiar to Queenslanders, convection rainfall is common in tropical and subtropical regions and is marked by regular, heavy rainfall in the afternoon. Sunlight heats the ground and increases surface temperatures; warm air above the ground rises, as it rises, it cools, the water vapour condenses and forms clouds, if it continues to rise and cool rain is produced.

Frontal: Caused when two air masses – one warm and one cold meet. The lighter, less dense, warm air is forced to rise over the denser, cold air. As it rises, it cools, the water vapour condenses and forms clouds, if it continues to rise and cool rain is produced.

Resource Requirements

Rainfall activity: Jar with a metal lid; ice cubes; salt; spoon; kettle; water; prior to the experiment use the hammer and nail to make 5 or 6 indentations on the inside of the metal lid – do not pierce the lid.

Additional Activities

Using a suitable vessel (e.g. plastic bottle with top removed) students design and construct a rain gauge

Students collect additional data on climatic conditions, such as wind direction and speed; cloud type; movement of hot and cold fronts through physical observation and reference to weather forecasts.