

# Raindrops – Drip, Drip, Drip

**Band level:** Year 6 and Year 8

**Description:** Students will explore layers of the atmosphere with Augmented Reality and the Merge Cube. This lesson is a science simulation for a deeper look into the **Water and Weather** section of the **Merge Explorer** app. Here students can explore the water cycle within the atmosphere and how extreme weather conditions impact on the earth.

## Resources:

- iPad, (no internet required)
- Merge cubes
- Mega Merge Cube (optional)
- MERGE Explorer app – **Water and Weather**
- Worksheet – **Water and Weather**



**Prior Student Learning:** Merge Cube Magic lesson

**What is Augmented Reality?** Augmented reality is using technology to superimpose information such as sounds, images and text onto real world objects that we see. It works by adding the digital content onto a live camera feed, making that digital content look as if it is part of the physical world. This could be anything from making your face look like a dinosaur to overlaying digital directions onto the physical streets around you.

**What is a Merge Cube?** The Merge Cube is a spongy, dense black foam cube with silver markings on all six sides in patterns similar to QR codes. The patterns provide an Augmented Reality trigger that launches when any of the Merge apps are pointed at the cube. It provides a powerful interactive experience in a real world environment where an object (the cube) is enhanced by a 3D digital-generated image that comes to life by using the camera on a digital device.

**What is the Merge Explorer App?** With the MERGE Explorer app students will learn about topics such as earth science, life cycles, the solar system, anatomy, properties of matter, weather and climate, ecosystems and more. The app provides students with an interactive experience in which digital images, sounds and text can be seen on the Merge Cube. Students can investigate a volcano, examine inside the human body, and hold the earth in the palm of their hands. They can even dissect a frog (humanely)!



## Curriculum Links:

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|-------------|--|
| Year 5 to 6 | <p><b>Digital Technologies Achievement Standard</b><br/>By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks.</p> <p><b>Content Descriptions:</b><br/>Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)</p>   |
| Year 7 to 8 | <p><b>Digital Technologies Achievement Standard</b><br/>By the end of Year 8, students distinguish between different types of networks and defined purposes. They plan and manage digital projects to create interactive information.</p> <p><b>Content Descriptions:</b><br/>Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance (ACTDIK023)</p> <p>Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness (ACTDIP025)</p> |
| Year 6      | <p><b>Science Achievement Standard</b><br/>By the end of Year 6, students ... explain how natural events cause rapid change to Earth's surface.</p> <p><b>Content Descriptions: Science Understanding:</b><br/>Sudden geological changes and extreme weather events can affect Earth's surface (ACSSU096)</p>  |
| Year 7      | <p><b>Science Achievement Standard</b><br/>By the end of Year 7, students ... analyse how the sustainable use of resources depends on the way they are formed and cycle through Earth systems.</p> <p><b>Content Descriptions: Science Understanding:</b><br/>Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable (ACSSU116)</p>  |



## Whole class activity: Explore Phase

The teacher introduces the students to layers of the atmosphere and the water cycle through Augmented Reality and using the **Water and Weather** section of the MERGE Explorer app (see Attachment A). Explain how the AR happens through the camera of the device and superimposes the image onto the cube. This could be done using the Mega Cube for the whole class to see.

## Group work activity: Play Phase

1. Divide the students into pairs or groups and provide an iPad and merge cube to each.
2. Open the Explorer app and navigate to the **Water and Weather** section.
3. Read through the topic card information.
4. Interact with each AR activity to explore, discover and learn.
5. Students should be able to answer the following questions.

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|--|---|
| <p style="text-align: center;"><b><i>Air around Earth</i></b></p> <p style="text-align: center;"><b>What are the layers of air that surround Earth?</b></p> <p>Students explore through a <b>visual simulation</b> of layers in the <b>atmosphere</b>. Tap each layer to see what objects can travel at different <b>altitudes</b>. Students could convert imperial measurements to metric. Research what gases are found in each layer.</p>                                 | <p style="text-align: center;"><b><i>Water Cycles</i></b></p> <p style="text-align: center;"><b>What is happening to water?</b></p> <p>Students investigate the <b>water cycle</b> to explore its process. The module will <b>visualize</b> how water on Earth is continuously moving through a cycle of <b>evaporation</b>, <b>condensation</b> and <b>precipitation</b>. Let students move the slider to see how layers <b>accumulate</b> on top of each other. Match each layer to a <b>time frame</b> in history.</p> |
| <p style="text-align: center;"><b><i>Four Season in a Day</i></b></p> <p style="text-align: center;"><b>What are the weather patterns where you live?</b></p> <p>Weather conditions and patterns over time make up our <b>climate</b>. Think about the climate where you live. What kind of <b>weather events</b> might be extreme for your climate? Using the Merge Cube, observe different types of <b>extreme weather</b> from blizzards to drought to thunderstorms.</p> | <p style="text-align: center;"><b><i>Water forms</i></b></p> <p style="text-align: center;"><b>Where is water on Earth?</b></p> <p>Explore the places on Earth where water is found. Rotate the Merge Cube in your hand to see groundwater, ice caps, oceans, rivers and lakes, and water in the atmosphere. Tap on each type of water to find out what the percentage of total water it makes up on Earth. Make a data chart showing where water is found.</p>   |

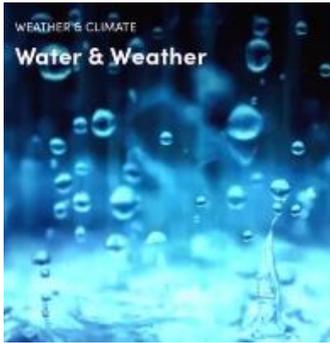


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## Attachment A



# Water and Weather

### Essential Questions

- What are the different layers of the atmosphere?
- How does the atmosphere interact with the geosphere, biosphere, and hydrosphere?
- How can you see the interaction between the atmosphere, geosphere, biosphere and/or hydrosphere in the water cycle?
- How is the water cycle driven by energy from the sun and the force of gravity?

### Activity:

1. Using your Merge Cube, access the “Weather and Water” Topic Card inside Merge Explorer. In **Activity One** explore the Earth’s atmosphere, water cycle, weather, and where water is found on Earth. Layers of the Atmosphere. What do you know about the atmosphere and the gases that surround Earth?
2. Now explore **Activity Two** the Water Cycle! The hydrosphere is made up of Earth’s water and ice. Water on Earth is continuously moving through a cycle of evaporation, condensation, and precipitation. Evaporation happens when heat turns water from liquid into gas. Condensation occurs when it cools down and becomes water again. When water falls from the sky as rain, snow, hail, or sleet, it is called precipitation.
3. Observe evaporation. What is happening to the water? Next observe condensation. What happened to the water? Next look at precipitation. What is happening now? What is water run-off? Click through to watch the cycle once again.
4. Next read **Activity Three** Extreme Weather. The weather conditions and patterns over time make up its climate. Think about the climate where you live. What kind of weather events might be extreme for your climate? Using the Merge Cube, observe different types of extreme weather. First, look at the normal weather. Press Next and look at the blizzard. Press Next again to observe the blizzard, then press Next and observe the thunderstorm.
5. The geosphere consists of the outer layer of the Earth’s crust. Think about how the geosphere interacts with the atmosphere. Now use the Merge Cube and look at each weather event again. How are the atmosphere and geosphere interacting during each event? How does this affect the biosphere (hint - the biosphere is a term that describes all the living things on Earth!)?
6. Go to **Activity Four** Where’s the Water? Let’s discover the hydrosphere, or the places on Earth where water is found. Rotate the Merge Cube in your hand to see groundwater, ice caps, oceans, rivers and lakes, and water in the atmosphere. You can even tap on each type of water to find out what the percentage of total water it makes up on Earth. Did any of the percentages surprise you?

### Assessment:

**Video Recording:** Thinking about what you learned in all four activities, describe verbally some ways that the hydrosphere, biosphere geosphere, and atmosphere interact with one another.

**Class Notebook:** Answer the Essential Questions in your science notebook.

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