

Student Name:



Fire - Ed Up

ISTEM - SCENARIO 1
STUDENT RESOURCE FOLIO

Class:

Teacher:



Fire-Ed Up: New Technologies in Bushfire Prevention - Satellites

Welcome to the High-Tech World of Satellites!

Ever wondered how we spot and track bushfires from space? Let's explore how different types of satellites help us keep an eye on bushfires!

1. Geostationary Satellites

- **What Are They?**

- These satellites are super high up, about 36,000 km above the Earth! They stay over the same spot all the time.

- **Pros:**

- They provide a constant watch over the same large area, like a big part of Australia.
- Great for monitoring ongoing bushfires and weather conditions.

- **Cons:**

- Because they're so high, they might not catch small or early-stage fires.
- The images can be less detailed than those from closer satellites.



2. Low Earth Orbit Satellites

- **What Are They?**

- These satellites zoom around closer to Earth, between 160 to 2,000 km up.

- **Pros:**

- They give us super detailed images, which is great for spotting small fires or changes on the ground.
- They're fast! They can zip around the Earth in about 90 to 120 minutes.

- **Cons:**

- They can't watch one spot all the time. They move around, so we have to wait for them to come back over an area.



3. Constellation of Microsatellites/CubeSats (e.g., Starlink)

- **What Are They?**

- Imagine a group (constellation) of tiny satellites, like small boxes (CubeSats), working together in space.

- **Pros:**

- They can cover huge areas because there are so many of them.
- They're quick to launch and less expensive than big satellites.

- **Cons:**

- Each one is small and not as powerful as the big satellites.
- They might not last as long in space.



Fire-Ed Up: Exploring the Bureau's Satellite Viewer

Welcome, Junior Space Explorers!

Get ready to journey into space with the Australian Bureau of Meteorology's satellite viewer! You'll be using images from Himawari-8, a geostationary weather satellite, to understand weather patterns and bushfire risks in Australia.

About Himawari-8:

- **Location:** 35,800 km above the equator, in line with Papua and central Australia.
- **Purpose:** Provides detailed weather images of the Australian region.
- **Launched:** September 2015 for testing and improvement.



Your Mission Objectives:

1. Satellite Viewer Exploration:

- Watch the introductory video [Himawari-8: Using the Satellite viewer](#).
- Visit the Australian Bureau of Meteorology's [satellite viewer website](#).
- Navigate to the different imagery types: Day + Night, Visible Greyscale, Infrared Greyscale, and Lightning over Infrared.

Day + Night Imagery:

- Observe how the satellite captures true-colour images every ten minutes.
- Note how areas without sunlight are shown with greyscale thermal infrared imagery.

Visible Greyscale Imagery:

- View the images based on a single visible wavelength.
- Understand how these images appear black in regions with no sunlight.

Infrared Greyscale Imagery:

- Study the infrared images that show the temperature of the Earth's surface or cloud.
- Identify areas with the hottest (black) and coldest (white) temperatures.

Infrared and Zehr Imagery:

- Explore the Zehr enhancement and how it highlights deep convection related to cyclones and thunderstorms.

Lightning + Infrared Imagery:

- Observe the lightning data overlaid on infrared images.
- Explore the lightning viewer and understand the lightning data scale.

Think About It:

- How do these satellite images help us understand weather and bushfire risks?
- If you could design a satellite feature to help monitor bushfires, what would it be?

Fire-Ed Up! - Operation Map-It-Out

Hello Fire Safety Explorers!

Your quest today is to become map masters and discover how prepared our school is in case of a bushfire. So, let's gear up with our detective hats and find some clues!

Your Mission Objectives:

1. Map Master: Head over to the Spatial Information Exchange or Six Maps ([Six Maps Link](#)) and pinpoint our school. See that "Basemaps" button? Click it and make the topographic map pop up. This will be our treasure map!

2. Mountain or Molehill?: Can you tell how high our school sits above sea level? Find the contour lines on the map and write down the altitude in your mission log (Table 1).

3. Fire Station Distance: How far is your school from the nearest fire heroes' headquarters (aka the Fire Station)? Measure the distance and jot it down. Every meter counts!

4. Compass Challenge: Imagine you're guiding a fire truck from the station to the school. What directions would you give? Write them out like a true navigator. (E.g travel south 117m down Smith St, turn East at the T-intersection and follow High Street for 2kms, turn south at Jones Ave and travel 110 m, turn east at Smith St and travel 215 m to the school).

5. Green Spots: Print out the map of the area around the school and on your map highlight all the bushland spots. A satellite map might give you a clearer view - it's like having a spy satellite!

6. Bushland Area Analyst: Whip out the Ruler tool and measure the the distance from the school to the nearest bushland. Then select the area tool to determine the total area of the bushland near your school. How big is our green backyard?

7. Safety Spots Sketch: If we have Neighbourhood Safer Places (NSP), mark them on your map. They're like safe zones when bushfires happen. Click here to locate your [nearest neighbourhood Safer Place](#).

8. Escape Routes Recon: Count and highlight all the roads that could be our exit paths in case of an emergency.

9. Risk Rank Reporter: What's our school's bushfire risk rank? Visit the NSW Department of Education's [Bushfire planning and response page](#) and in the 'Prevent Section' enter your schools name into the Bushfire and Grassfire Risk Register.

10. Comparison Detective: Now, play the compare game. How does our school's risk rank stack up against other schools in your district?

11. Public School Puzzle: Locate a school who has a Category 1 rank, which means high bushfire risk. Look at the bushland around it and try to solve the mystery of why it's ranked so high.

