



Location

As a group, investigate the effect of location on the water cycle.

View NASA earth observatory's cloud animation:

https://earthobservatory.nasa.gov/GlobalMaps/view.php?d1=MODAL2_M_CLD_FR_

Where is it most/least cloudy throughout the year?

Month	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Most cloudy												
Least cloudy												

View NASA's global water vapour animation: https://earthobservatory.nasa.gov/GlobalMaps/view.php?d1=MYDAL2_M_SKY_WV

Where is the most water in the atmosphere? Does this line up with your cloud table?

Where is it consistently hottest? Coldest? Use https://www.yo

What conclusions can you draw from all this data?





Topography

As a group, investigate the effect of topography on the water cycle.

View NASA's Australian topography map: https://earthobservatory.nasa.gov/IOTD/view.php?id=5100

Where are the highest mountains?

Where are the lowest areas?

Why do you think Australia is so flat?

Compare Australia's highest mountain to Mt Everest and some others in the world:

View the Bureau of Meteorology's average annual rainfall map: http://www.bom.gov.au/jsp/ncc/climate_averages/rainfall/index.jsp

Compare with the climate classification map:

How do the topography and climate zones match up with the rainfall? (Is the rainfall higher in the tropics? Is it lower in the arid zones?)

What about rainfall on either side of a mountain range? Can you see areas where this is obvious?

Which zone do you live in?





Seasonality

As a group, investigate the effect of seasonality on the water cycle.

View NASA's total rainfall map: https://earthobservatory.nasa.gov/GlobalMaps

In Australia what times of year are wetter?

In Australia what times of year are driest?

Compare this effect (wet vs. dry) in the north of Australia and in the south. Does the same pattern occur? If not, describe what happens.

View the Bureau of Meteorology's Rainfall percentiles map: http://www.bom.gov.au/jsp/ncc/climate_averages/rainfall-percentiles/index.jsp

Change the Percentile field to '90 %' the Period to 'May-July' (timescale 3 months). This map now shows that there is only a 10% chance that rainfall for a site will be above the shown value.

How likely is it that the area west of the Great Dividing Range in south-east Australia will receive rainfall above 300 mm at this time of year?

Click through the rest of the time periods. What part of this area does get rainfall above 300 mm at any time during the year?

When and where do you think most rain falls in the south-east of Australia?





Variability

As a group, investigate the effect of variability on the water cycle.

View the Bureau of Meteorology's rainfall variability map: http://www.bom.gov.au/jsp/ncc/climate_averages/rainfall-variability/index.jsp

What do you notice about where rainfall is most variable?

Investigate the Climate dogs (Enso, Indy, Ridgy and Sam). Watch a video about each of the dogs and how they influence rainfall:

- Enso: <u>https://www.youtube.com/watch?v=PyvG9cmFD01</u>
- Indy: <u>https://www.youtube.com/watch?v=9GDzqMcqmcM</u>
- Ridgy: <u>https://www.youtube.com/watch?v=X8ESfXt6Pqk</u>
- Sam: https://www.youtube.com/watch?v=ettDV8_UL1Q

What are the four main factors leading to south-east Australia's high rainfall variability?

What do you think about Australia's rainfall patterns in general?





Evaporation

As a group, investigate the effect of evaporation on the water cycle.

View the Bureau of Meteorology's Annual average evaporation map: http://www.bom.gov.au/watl/evaporation/

Where is evaporation the lowest?

Where is it the highest?

View the BOM's Australian landscape water balance map: http://www.bom.gov.au/water/landscape/

These show how much water is in the soil. Click on 'Root zone soil moisture, and 'Year' in the aggregation boxes at the top left. Then move through some years using the arrows above.

Which places have moderate to high soil moisture (roughly)?

How do things change year to year?

Looking at 2007, and west of the Great Dividing Range in the south-east, what could you say about conditions for growing things?

Under the heading Evapotranspiration click on Modelled actual. Click through the months of a year. When is it highest and lowest?

Thinking about Australia's topography, what things do you think are adding to evaporation rates?





Types of Earth's water

	Type of w	vater			% 0	f Earth's water
100 —						96.54
80						_
60 —						
40 —						
20 —						-
0	0.001	0.025	0.76	1.76	0.93	
	Fresh water vapour	Fresh surface (rivers, lakes, swamps)	Fresh under the ground	Fresh frozen icecaps, glaciers, snow	Salty under the ground	Salty oceans

What do you conclude from the above?

