



Rain, Clouds and Rainbows - Teacher's Notes

Rain, Lovely Rain - Classroom Discussion

It is important to notice **when it rains and how much rain has fallen** because everyone in Australia depends directly or indirectly on rain for water.



Some suggestions for discussion:

- Water is used for drinking by most animals (including us).
- Plants take in food from the soil dissolved in water.
- Water is used for household activities such as washing clothes, showering, cooking and cleaning. If there is a water shortage we need to limit our usage or we will use it all up.
- We play sports such as swimming, sailing and fishing in water.
- Water is needed for farming, fishing and most industrial processes.
- Too little rain and we have a drought, too much we have a flood.

In Science we use our senses to test for change

Rain and Senses - Student Activity (with worksheet)






For discussion with the class:

Can you see rain?	Yes you can see raindrops and sheets of rain
Can you hear rain?	Yes, particularly if there is a tin roof.
Can you feel rain?	Yes, your hair and skin feel colder and wet.
Can you taste rain?	We don't test by tasting in Science and fresh rainwater has no taste.
Can you smell the rain?	Rain itself doesn't have a smell but it often releases dried chemicals into the atmosphere producing a smell.





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SEE	HEAR	FEEL	TASTE	SMELL
				
YES	YES	YES	NO	?

Students are also asked to survey the class (hands up?) to find who likes and who dislikes rain. This will demonstrate if more people like or dislike rain.

Rain Making - Teacher Demonstration

Make "raindrops" appear in a zip-lock plastic bag by half filling the bag with hot water then plunging it into icy cold water. Condensation of steam will form drops of water on the inside of the bag. This replicates the condensation of water vapour in clouds when they cool, to form raindrops.

Make a Rain Gauge - Student Activity

Plastic cool drink bottles can be modified to make rain gauges. They can be temporarily saved from the recycling bin, washed in soapy water and pre-cut with a bread knife or craft knife. The top section can be up ended to make a collection funnel and stop birds and some animals from getting in. The Weather Bureau takes reading of their gauges at 9am every day. The measurement given is over the prior 24 hours. The gauge should be emptied completely after each reading. The gauge





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should be positioned in the open, away from the school's reticulation system spray. Unless the ribs on the side of the bottle are horizontal a ruler may be needed for measuring any increase.

Materials per student or group

- 1 pre-cut clean cool drink bottle (for safety we recommend taping the cut edges with electrical or other flexible tape)
- A few stones without sharp edges
- A plastic ruler
- A watering can or large water bottle

Method

1. Place a few stones into the bottom of the bottle so it doesn't blow over easily.
2. Turn the bottle top upside down and place firmly into the bottom half.
3. Test the gauge by sprinkling some water over it. I added food colouring to this water to make it easier to see.
4. Measure how much water was collected using the ruler on the outside of the gauge. Estimate to the nearest half-centimetre.
5. Empty out all the water and place the gauge in an open area.
6. Repeat every Science day and enter the results in your weather report sheet.

Option

An inexpensive commercial rain gauge can be purchased from some \$2/reject shops. This one cost \$3.00 and has units on the side that are clear and easy to read.

Some teachers top up the rain gauges so that students can practice reading them during dry periods. In Year One they only have to be able to read to units and half units.

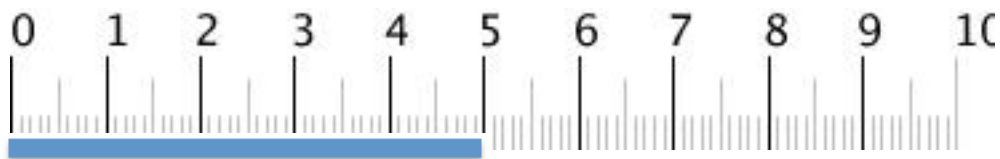




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Read a Rain Gauge - Student Activity (with worksheet)

Read the rain gauges and write how many units of rain were collected on each day.



Monday: How much rain has fallen? 5 units



Tuesday: How much rain has fallen? 3 units



Wednesday: How much rain has fallen? 3 and a $\frac{1}{2}$ units



Thursday: How much rain has fallen? $\frac{1}{2}$ a unit

Which day had the **most** rain? Monday

Which day had the **least** rain? Thursday



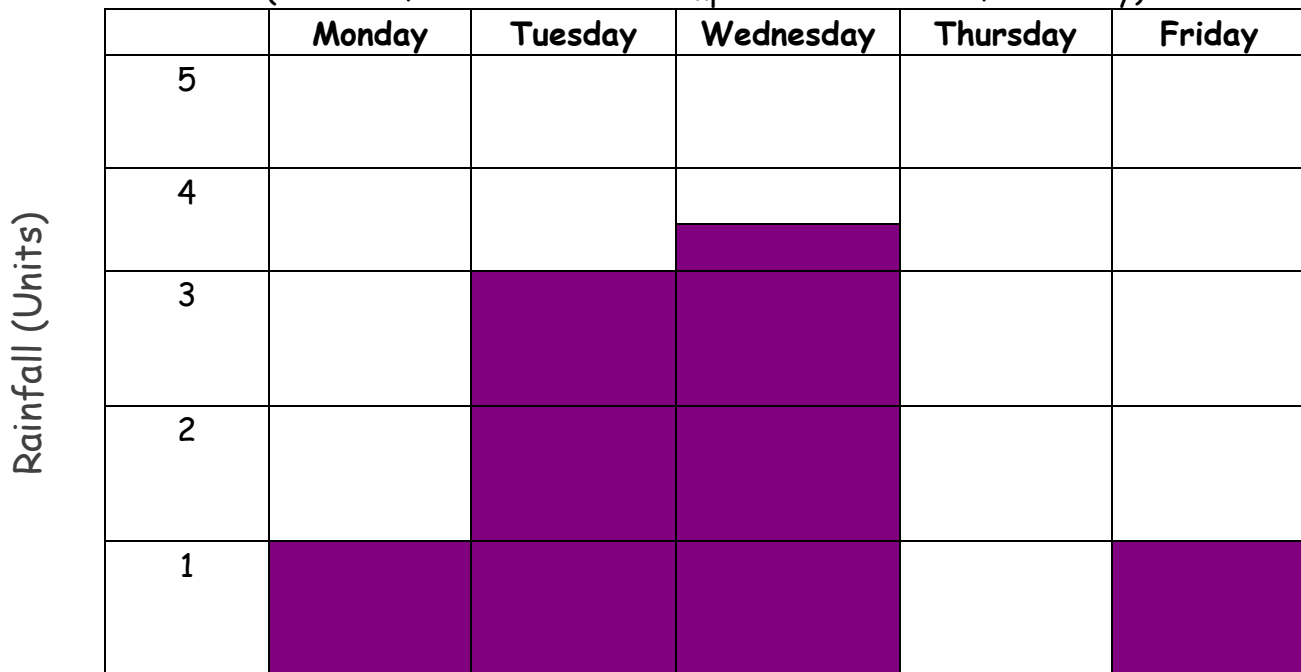


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Rainfall Graph - Student Activity (with worksheet)

Rainfall graph at **YOUR SCHOOL NAME HERE**

(The rainfall collector was emptied at the end of each day)



Use units (milliliters) collected by group or class or provide units to students
e.g.

Monday 1 unit, Tuesday 3 units, Wednesday $3\frac{1}{2}$ units, Thursday 0 units, Friday 1 unit

Possible questions for discussion:

Which day would be best for school Sports Day?

Thursday

Which day would be best to stay inside?

Tuesday or Wednesday





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Changes in the Weather - Student Activity (with worksheet)

Change the pictures of these students to suit a very rainy day. Would their clothes be the same?



Student answers will vary due to where your school is located. Students in temperate locations will have different experiences from those in the Tropics and from those in the inland.

If these students were outside, how would they know it was raining?
(may need a scribe)

- What would they hear? Pitter patter/rainfall, thunder & lightning, downpipes gurgling.
- What would they see? Rainfall, sheets of rain, clouds, darkness, wet and dripping plants, puddles, drainpipes running, floods.
- What would they feel? Wet, colder, dripping, shivering, wonderfully wet and steamy.
- What would they smell? Wet soil.



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Rain Words: Wet, rainfall, damp, clouds, dark, lightning, puddles, gutters & downpipes.

Make Clouds - Teacher Demonstration

Clouds appear when warm air containing water vapour gets cooler. Two people are needed for this experiment and it is recommended to wear eye protection during this demonstration.

Materials

- A bicycle pump
- A large clear bottle (minimum of 1.25L)
- Cap for bottle with a hole (about 30mm) drilled through
- A measuring cup
- Warm water
- Matches
- Blu-tack

Method

1. Pour about half a cup of warm water into the bottle.
2. Shake the bottle to get the inside wet.
3. Light a match and let it burn for a few seconds before dropping it into the bottle. The idea is to introduce some smoke particles into the bottle.
4. Place the cap upside down on the bottle and someone holds it firmly on top of the bottle. Blu-tack may be used to create a good seal.
5. Hold the tube of the bicycle pump onto the hole in the cap and pump two or three times.
6. Pull the cap away from the bottle. There will be a pop and a cloud forms in the bottle!





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The air inside the bottle is compressed as the bicycle pump adds more air and it gets hotter. When the cap is rapidly removed it suddenly gets cooler and water vapour (gas) forms water droplets (condensation). These water droplets attach to the tiny smoke particles, making larger droplets, which collect together to form a cloud. Other tiny particles such as dust, salt from sea spray or ash from volcanoes can also help to form clouds.

Blue Skies - Teacher Demonstration

This activity works best in a darkened room. Turn out any lights or demonstrate in the storeroom. White light is actually made from a mix of all the colours of the rainbow.

Materials

- A large clear glass beaker or jar
- Water
- Milk (1Tbs)
- Pasteur pipette or teaspoon
- Torch

Method

1. Fill the beaker (or jar) full of water.
2. Shine the torch through the side of the beaker.
3. Observe the light pass through the clear water
4. Add two or three drops of milk to the water.
5. Shine the torch through the beaker again.

When a little milk is added to the water it causes the white light to be split up and scattered. The blue light is scattered more than the others so the white milky water appears to turn blue.





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Sunlight entering our atmosphere is similarly scattered by atmospheric gases. This is what causes the sky to change colour. Clean dry air only scatters blue and that is why the sky is blue on a sunny summer's day. On rainy days the atmosphere is full of water vapour and all the colours are scattered making the sky grey.



Rainbows Explained

Raindrops are actually not shaped like the drips beloved by artists. Rain falls in little spherical ball shapes. These act like glass prisms and regularly separate and scatter back all the colours of sunlight to create a rainbow. You can only see a rainbow with the Sun behind you and rain in front of you.

Make a Rainbow - Teacher Demonstration

This activity works best early in the day. Ask the class to line up three deep with the Sun at their back.

Ask a student to set a garden hose held high with its nozzle pointed down to make a high sprinkling arc a couple of meters in front of the line of students. A rainbow should appear. Exchange the student in charge of the hose so that they too can see the rainbow.

Testing Guesses - Student Activity (with worksheet)

Our Wheatbelt farmers know we need a good rainfall of 20mL before they can plant seed for wheat and have some hope that it will germinate. They monitor the weather reports and try to get out just before it rains to sow the seed. Trying to plant after rain is messy and vehicles can get bogged. Further rainfall is necessary for the wheat to grow.

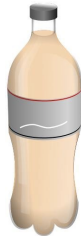




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Guess which container would hold 20mL of water exactly.

A bucket, a cool drink bottle or four teaspoons? Four teaspoons



A bucket contains about 10L, a cool drink bottle about 600mL and a teaspoon 5mL

My guess _____

Let's test the guess

A teaspoon holds 5mL. Colour in five blocks for each teaspoon.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

How many teaspoons do we need? 4 (this is much less than a 600mL bottle and would only cover the very bottom of a 10L bucket).

Reading Suggestions

Tiddalik the frog by R Roennfeldt

The Rainy Day by A Milbourne & S Gill

Little Cloud by E Carle

