## Learning hook

1. Introduce the big questions: **Is it going to rain today? Tomorrow? Next week? How have we made these predictions? Can we use data to help us make better predictions?**

**Additional Scaffolding/Limited Abstract Thinking Skills:**

Weather prediction might be a topic that students never seriously thought about – some students may not realise how weather forecasts are determined, so they may need a lesson or introduction on weather forecasting, perhaps using a video or worksheet.

1. Introduce how we measure rain (in millimetres). If you have a plastic rain gauge, show that to the students. Also show the video Learn [How to Measure Rainfall (Professor Pete's Classroom)](https://www.youtube.com/watch?v=WyMabcRzUcw).
2. Divide the class into pairs, each pair with a device. Have each group watch your selection of a recent episode of the Bureau of Meteorology (BOM) [Climate and Water Outlook series](https://www.youtube.com/playlist?list=PLbKuJrA7Vp7naJL31deES8QAV5E0q6U_H). As students view this, have them focus on information about rainfall only.
3. Hand out some sticky notes to each group.
4. Give students some guiding questions before viewing the [Climate and Water Outlook](https://www.youtube.com/playlist?list=PLbKuJrA7Vp7naJL31deES8QAV5E0q6U_H) video.   
   * What has rainfall been like in our area for the past three months?
   * Was there anything unusual about it?
   * Were any reasons given for recent rainfall patterns in our locality?
   * Were there any meteorological terms that you didn't understand?

How does this information compare with their local area?

**Provide multiple means of expression:**

While this lesson is about rainfall, students could alternatively choose to investigate how we collect temperature, snowfall, or wind data.

1. Ask students what they know about rainfall data. How is it collected? How is it measured? How is it recorded? How can it be accessed?  
   Provide students with access to [BOM Climate Glossary](http://www.bom.gov.au/climate/glossary/) to help them understand any unfamiliar terms related to climate.

## Learning map and outcomes

1. Read the [graphic organiser](https://www.digitaltechnologieshub.edu.au/docs/default-source/getting-started-years-5-6/rainfall/graphic-organiser.pdf?sfvrsn=0) for this activity. This is for teacher use only.
2. Introduce the focus of this series of lessons.  
   Governments, communities and individuals spend large amounts of money so that there is enough water available for everyone. Collecting and understanding rainfall data is important so that the right decisions are made.
3. In a group discussion ask students what information may be useful in answering the first few of the big questions: Is it going to rain today? Tomorrow? Next week?
4. Introduce the final few big questions.   
   How have we made these predictions? Can we use data to help us make better predictions? Explain to students that they will need to read, collect and analyse data to answer these big questions.
5. Introduce the Bureau of Meteorology (BOM) dataset [Climate Data Online](http://www.bom.gov.au/climate/data/index.shtml).  
   Explain how to access, search and filter rainfall data by projecting this content on a screen that either the whole class or sections of the class can view.
6. Teach a method of getting data from Climate Data Online.  
   * Select Using Text > 1. Select Monthly Rainfall 2. Enter Location. Click Find > Select Matching Town > Select Nearest Bureau station > 3. Get Data. Monthly Rainfall chart will appear.

**Additional means of Engagement:**

To promote engagement, ask students to enter in their birthday. As a class, try to find the student that has the least rain on their birthday.

* + Select and discuss a small amount of this data, either by focusing on two years, eg the most recent, and 10 years ago. What's the same and what's different?

Alternatively, Click on the graph under the word Annual and a bar graph will appear.

1. Organise the students into pairs to use the method you have just modelled.
2. Organise a sharing session with all students on reading this dataset. Are students making sense of the dataset? Is collaboration in pairs assisting? Does there need to be more teacher-led work with the whole class or groups, using the classroom's digital whiteboard?
3. Introduce the Assessment Rubric . Explain what is being assessed, the terminology involved, the need for goal-setting, and how it will help students to work out whether they are on track or not.   
   * Remind students of the rubric during the series of lessons, so that the students will be aware of their learning progress, understand what they need to do next and what further assistance/explicit teaching they may require.
   * This rubric can be used for student self-assessment, peer assessment as well as formative assessment (by you).

## Learning input

1. Reiterate the big questions. Is it going to rain today? Tomorrow? Next week? How have we made these predictions? Can we use data to help us make better predictions?
2. Introduce some of the Digital Technologies terminology (see above) when talking to students. Encourage students to use it as well!
3. Introduce the three major parts of the lesson sequence, in this order:
   1. Finding, sorting and interpreting existing rainfall datasets from the Bureau of Meteorology for a local area over different time periods.   
      (Skill set, including explicit teaching by you, required by students: searching rainfall data for a local area from the BOM website; filtering data from the BOM website; interpreting data from the BOM website – text/graphs/maps; selecting data from the BOM website to re-use in a new – with attributed –data visualisation at a later stage.)

 **Reducing Working Memory Load/Additional Scaffolding:**

You may wish to provide the spreadsheet with the data already downloaded from BOM so that students can focus on the collection of data and adding it to a spreadsheet.

* 1. Collecting local rainfall data using a digital device.  
     + Introduce a digital rain gauge to students. (How does it work? How will it be set up? What sort of data does it produce? How will this be recorded?)
  2. Recording, sorting (including using a spreadsheet) and analysing data. Reporting findings to school and community through visualisation.  
     + Tell students that they will be comparing the data that the digital rain gauge produces with that available from the Bureau of Meteorology. They will be recording, sorting (using a spreadsheet) and analysing.
     + Scaffold making statements about dataset sources.
     + Scaffold reporting findings via a data visualisation.

(Skill set, including explicit teaching by you, required by students: analysis of data and making some statements; identification of key data from the BOM website and locally sourced data; production of visualisation – chart, infographic, etc – of major findings.)

## Learning construction

1. Monitor students for their insights and the support and skills that they may need.
2. Support/scaffold and teach as required (see lists above for the skills required by students and the explicit teaching that may need to be delivered).
3. Re-introduce the digital rain gauge for collection of local rainfall data
4. Introduce students to data visualisation. Look at data visualisation examples, particularly infographics, on the Internet.
5. Have students make their own form of data visualisation by using desktop publishing/graphics software.   
   * You may wish to introduce how to make a chart from data in a spreadsheet. Or you could direct students to information and resources on the Internet, which will guide them on how to make infographics.

[Tools to make infographics](http://www.creativebloq.com/infographic/tools-2131971) (Teacher background only)

***Optional***

Students may create their own recording spreadsheet, (refer to assessment section for guidance on rubric).

A common way to design a user-friendly spreadsheet is to separate the data entry and recording from the presentation for example as a dashboard.

Ask students what information they would want to display to a user. An [example spreadsheet](http://www.digitaltechnologieshub.edu.au/docs/default-source/Lesson-Ideas/5-6/rainfall/alphington_rainfall-recording-sheet.xlsx) has been set up to auto populate for data between Jan and Jun.

The spreadsheet:

* Separates data entry from the dashboard
* Uses historical data from the BoM.
* Uses ‘Count if’ formula to count number of days of rain per month
* Auto sums the monthly data entered
* Use conditional formatting to compare monthly recorded rainfall total and historical monthly mean. An icon (arrow) is used to indicate higher or lower than historical monthly mean.
* A graph that can be filtered by month.

Students can decide on what data they want to display and what the interface (dashboard) will feature. Students may be able to continue the formula for the remaining cells July to December.

## Learning demo

1. Provide adequate time and support for students to share ideas, demonstrate and showcase their work and ask for feedback.
2. Give feedback and encourage other students to give feedback to each other.
3. Set up individual (written) or group/whole-class discussion how each group dealt with the big questions:  
   Is it going to rain today? Tomorrow? Next week? How have we made these predictions? Can we use data to help us make better predictions?

## Learning reflection

You, as the teacher, should reflect on the following below. One way of doing this is with video software and a webcam on a computer or tablet. Record your thoughts at the start, during the lessons and at the conclusion. Another way to reflect is by blogging.

* Did the students have the required knowledge to start this unit? How was this assessed?
* Did you understand the Digital Technologies terminology? Were you able to use this in your lessons? Did your students start using it during the lessons?
* How successfully were you able to get your students understanding data to make evidence-based decisions?
* How successfully were you able to get your students using data analysis, planning and project management to solve this real-world problem related to rainfall)?
* Model learning reflection for your students.

## Curriculum links

| Links with Digital Technologies Curriculum Area | |
| --- | --- |
| **Strand** | **Content Description** |
| **Processes and Production Skills** | Select and use appropriate digital tools effectively to create, locate and communicate content, applying common conventions [(AC9TDI6P07)](https://v9.australiancurriculum.edu.au/f-10-curriculum.html/learning-areas/digital-technologies/year-5_year-6/content-description?subject-identifier=TECTDIY56&content-description-code=AC9TDI6P07&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick). |

| Links with other Learning Areas | |
| --- | --- |
| **Learning Area** | **Strand and Content Description** |
| **English** | Literacy  (Re: using software)   * Use a range of software, including word processing programs, learning new functions as required to create texts [ACELY1717](http://www.australiancurriculum.edu.au/english/curriculum/f-10?layout=1) (Year 6) |
| **Mathematics** | Statistics and Probability   * Data representation and interpretation ([ACMSP011](http://v7-5.australiancurriculum.edu.au/mathematics/curriculum/f-10?layout=1)). * Pose questions and collect categorical or numerical data by observation or survey ([ACMSP118](http://www.australiancurriculum.edu.au/mathematics/curriculum/f-10?layout=1)) (Year 5) * Describe and interpret different data sets in context ([ACMSP120](http://www.australiancurriculum.edu.au/mathematics/curriculum/f-10?layout=1)) (Year 5) * Interpret secondary data presented in digital media and elsewhere ([ACMSP148](http://www.australiancurriculum.edu.au/mathematics/curriculum/f-10?layout=1)) (Year 6) |
| **Science** | Science Understanding  Earth and space sciences   * Sudden geological changes and extreme weather events can affect Earth's surface ([ACSSU096](http://www.australiancurriculum.edu.au/science/curriculum/f-10?layout=1)) (Year 6)   Science as a Human Endeavour (Years 5–6)  (Re: nature and development of science)   * Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions ([ACSHE081](http://www.australiancurriculum.edu.au/science/curriculum/f-10?layout=1)) (Year 5) ([ACSHE098](http://www.australiancurriculum.edu.au/science/curriculum/f-10?layout=1)) (Year 6)   (Re: planning and conducting)   * Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks ([ACSIS086](http://v7-5.australiancurriculum.edu.au/science/curriculum/f-10?layout=1)) (Year 5) ([ACSIS103](http://v7-5.australiancurriculum.edu.au/science/curriculum/f-10?layout=1)) (Year 6) |
| **Humanities and Social Sciences** | Inquiry and Skills (Years 5-6)  (Re: analysing)   * Interpret data and information displayed in a range of formats to identify, describe and compare distributions, patterns and trends, and to infer relationships ([ACHASSI100](http://www.australiancurriculum.edu.au/humanities-and-social-sciences/hass/curriculum/f-10?layout=1#page=2),[ACHASSI128](http://www.australiancurriculum.edu.au/humanities-and-social-sciences/hass/curriculum/f-10?layout=1#page=2)). |

## Assessment

### Assessment rubric

|  |  |  |  |
| --- | --- | --- | --- |
| **Element** | Finding, sorting and interpreting existing rainfall datasets from the Bureau of Meteorology [BOM] website for a local area over different time periods and creating a data visualisation. | Recording and analysing rainfall data. Making statements about dataset sources. | Designing, building and testing a rainfall data recording User Interface [UI].\* Note that this activity is an extension activity and the rubric needs to be modified if this activity is not taught. |
| **Digital Technologies skill set** | * Searching rainfall data (with guidance) for a local area from the BOM website. * Filtering data from the BOM website. * Interpreting data from the BOM website (text/graphs/maps). * Selecting data from the BOM website to re-use in a new (and attributed) data visualisation. | * Recording rainfall data * Analysis of data and making some statements. * Identification of key data sourced both from the BOM website and locally. | * Designing a rainfall data recording User Interface (UI) using non-digital or digital technologies. * Project managing the construction of the UI. * Testing the UI with a sample of users. * Evaluating the user experience. * Modification of UI. * Release of rainfall data recording user interface (UI). |
| **Beginning** | * Reads rainfall data (with assistance) for a local area from the BOM website * Can read a rainfall map of Australia (with assistance) and make a statement showing some understanding. * Can (with assistance) pick out some important points from the BOM datasets. * Saves some data from the BOM website for a data visualisation, e.g. chart or graph (with assistance). | * Collects data from a dataset and enters it (with assistance) into a spreadsheet. * Looks at BOM data and (with assistance) makes a statement about meaning. * Records (with assistance) data from the rain gauge. * Makes a statement (with assistance) about rainfall data. | * Designs (with assistance) a rainfall data recording User Interface (UI) using non-digital technologies. * Makes a model (with assistance) of the rainfall data recording User Interface (UI) using digital or non-digital technologies. * Tests (with assistance) the UI with a sample of users. * Notes user feedback. * Makes changes (with assistance) to the UI, if necessary. * Releases (with assistance) the rainfall data recording user interface (UI). |
| **Emerging** | * Understands (with guidance) some BOM website rainfall data for a local area. * Can understand a rainfall map of Australia (with guidance) and make some statements showing some understanding. * Reads data from the BOM website (text/graphs/maps) with guidance. * Saves (and can retrieve) some data from the BOM website for a data visualisation, eg chart or graph (with guidance). | * Collects and enters (with guidance) data from a dataset and enters it into a spreadsheet. * Looks at BOM data and (with guidance) makes some statements about meaning. * Records (with guidance) data from the rain gauge into a spreadsheet. * Makes some statements (with guidance) about rainfall data gathered from the rain gauge. | * Designs (with guidance) a rainfall data recording User Interface (UI) using digital or non-digital technologies. * Plans and produces a model (with guidance) of the rainfall data recording User Interface (UI), using digital or non-digital technologies. * Tests (with guidance) the UI with a sample of users. * Responds (with guidance) to user feedback. * Makes changes (with guidance) to the UI, based on testing and feedback. * Releases (with guidance) the rainfall data recording user interface (UI). |
| **Developing** | * Can search rainfall data for a local area from the BOM website. * Can search rainfall data from the BOM website to find historical data. * Makes statements about data from the BOM website (text/graphs/maps). * Selects, labels, stores (and can retrieve) useful data from the BOM website. * Produces visualisation (chart, infographic, etc) of major findings. | * Collects and enters data from both dataset sources into a spreadsheet. This data needs be made into a chart/graph. * Analyses data from one dataset and makes some statements about meaning. * Identifies key data from the BOM website and locally sourced dataset. | * Designs a rainfall data recording User Interface (UI) * Plans production process using digital technologies for the construction of the UI. * Tests the UI with a sample of users. * Responds to user feedback. * Modifies the UI in the light of this feedback. * Releases the rainfall data recording user interface (UI). |
| **Proficient** | * Searches/filters rainfall data for a local area from the BOM website. * Can search and filter rainfall data from the BOM website to understand historical differences. * Interprets data from the BOM website (text/graphs/maps). * Selects, labels, stores (and can retrieve) important data from the BOM website. * Produces oral and written reports that include a visualisation (chart, infographic, etc) of major findings. | * Collects and enters data from both dataset sources into a spreadsheet. This data needs to show evidence of sorting, and having a function applied (eg Sum, Average) and made into a chart/graph. * Analyses data from both datasets and makes some statements about meaning. * Identifies and discusses key data from the BOM website and locally sourced dataset. | * Designs a rainfall data recording User Interface (UI). * Plans production process using digital technologies, and project manages the construction of the UI. * Tests the UI with a sample of users. * Modifies the UI. * Releases the rainfall data recording user interface (UI). |