YuMi Deadly Maths

Year 1 Teacher Resource:

SP – Deadly data

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

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QUT

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ACKNOWLEDGEMENT

We acknowledge the traditional owners and custodians of the lands
in which the mathematics ideas for this resource were developed,
refined and presented in professional development sessions.

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Year 1 Statistics and probability

Deadly data

Learning goal

Students will:

- select a suitable question for gathering data
- collect simple data and record responses
- use a simple data display to represent, read and interpret data.

Content description

Statistics and Probability – Data representation and interpretation

- Choose simple questions and gather responses (ACMSP262)

Big idea

Statistics – graphs provide ways of representing collected data to interpret, make decisions and predict

Resources

A4 sheets of two different colours

Reality

Local knowledge

Discuss types of events where you need to make a choice, e.g. favourite food, most popular pet to own, TV show to watch, most popular sport, most popular activity at school. Review examples given by students and establish a question such as: *Which TV show do the most students watch?* Ask the students what topic they would like to find out about and focus the lesson on that topic.

Prior experience

Check students' experience in making lists, tables, pictographs or simple two-category graphs. *How would you draw a table to compare the breeds of dogs owned/liked by students as pets?* [two columns – with headings, **Breed/Number**, with a smaller column for Breed to allow a larger column for Number tally marks; name for table – **Class Pets**]. *What are tally marks?* [one line to represent each dog]. *How will you draw these tally marks?* [in sets of five – four vertical lines going down, one for each dog, and one line crossing through all the lines going down to make our set of five]. *Why do we draw tally marks like this?* [it makes it easy to count how many there are because we can count in fives, groups of four vertical lines with another line crossing off and making a set of five]. *What happens if there are less than five for a breed?* [only put the number of lines going down that there are].

Kinaesthetic

Once the question to be considered has been established, write it on the whiteboard, e.g. *Which fruit is more popular – apples or oranges?* Discuss what can be done so that we can easily see the information about how many students like apples or oranges. Gather students' suggestions: We could have a show of hands – not easy to compare; we could line up apples and oranges one for every student to show which fruit they like – we don't have enough fruit; we could make a list/table/pictograph.

Outside students are told to form a group on one side if they prefer apples and a group on the other side if they prefer oranges (no directions are given regarding the formation of the groups). Look at both groups. *Is it easy to tell how many like apples/oranges?* Work out how the group can stand so that it is easy to see and compare the number in each group. *If one group is huddled closely together and the other is spread out at arms' distance, what happens to the length of the lines? What do we need to do to make the lines easier to compare?* [Students stand side by side with hands joined in front of them.] They then compare the length of the lines to observe which line has more.

Abstraction

Body

Today for our deadly data, we are going to make observations by taking a sheet of green paper if we prefer apples and a sheet of orange paper if we prefer oranges. (Have these A4 coloured sheets available outside on a desk.) Each student takes either a green or orange sheet. A white chalk line is drawn to indicate the starting point. The teacher puts the students into two lines, a green line and an orange line. Each student places the A4 sheet on

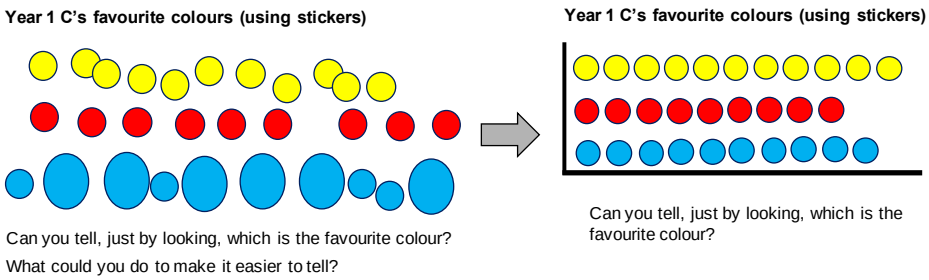
the ground in two parallel lines 30–40 cm apart starting from the white chalk line, making sure that every subsequent sheet is placed in line with the preceding sheet not overlapping it nor leaving any gaps.

Questions that may be asked:

- *Which line is the longer/shorter?*
- *Which line has more/fewer?*
- *How many students prefer apples/oranges?* For both lines, each student counts in turn (one-to-one correspondence) and then the students say*: There are x number of students who prefer apples/oranges.*
- *How many more students prefer apples to oranges?* Teacher stands next to the last student in the oranges' (shorter) line and teacher aide stands next to the corresponding student in the apples' (longer) line; they join hands across the two lines. *Are there the same number of students in both the apples' and oranges' lines up to here? Yes. How many more apples are there than oranges?* Adult hands are still joined. The extra apples' students count on to tell how many more apples there are than oranges.
- *Which fruit should the tuckshop order more of for students in our Year 1 class? Why?*

In the classroom, students replace their A4 sheet of paper with a sticky note the same colour and put it on a class chart starting at the bottom black line so that none overlap or leave a gap. One sticky note stands for one apple or orange. When both colours of sticky notes have been put on the class sheet, the teacher asks, *What does this tell us?* Educe that the green or orange could stand for anything hence the need to name or label the parts. Repeat process for the number axis. Lead students to understand our representation/graph needs each axis to be named and the whole graph needs to have a name/title, e.g. **Most popular fruit in Year 1**. Stress also that each sticky note/picture has to be the same size (this leads to an understanding of scale).

Examine graphs that are easy/hard to read and interpret (no labels, pictures of different sizes, unequal spacing, starting midway and not at the starting point). An example is given below:



Hand Students have a sheet of paper on which to put small sticky notes that represent the model on the class graph. They write the names on each axis and the title of the graph.

Mind Students visualise what a sticky note graph would look like given different objects, numbers for each object and colours. See a pictograph or list for these.

Creativity Students choose their own information to display and devise their own way to represent this. (Have materials such as small coloured squares, counters, or blocks available.)

Mathematics

Language/ symbols data, develop, observe, investigate, information, identify, question, collect, represent, record, compare, most, least, same, interpret, graph, picture, object, list, table

Practice

1. Students join green and orange cubes to represent the numbers in the apple/orange activity above. When they have joined the cubes together and compared their length, they draw a line just above the bottom of the paper, place each group of cubes on the line and trace around the tower. They then colour the towers appropriately, name them, insert corresponding numbers along the vertical axis and write the graph's name at the top.
2. Students are given string, green and orange pegs, small green and orange label cards to construct the above information gluing the appropriate label to the string of pegs. Hang these around the room.
3. Make a table that shows this information. Draw a pictograph.
4. In pairs, students show and discuss the graphs they have made in Creativity and the information each graph is displaying. The teacher asks students to share their graph with the class and other students may ask questions.

Connections Make the connection to pictographs, lists, tables.

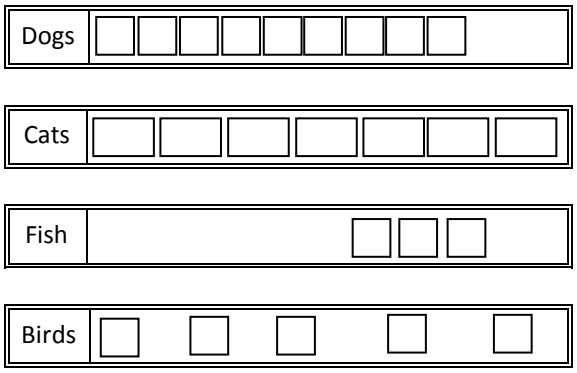
Reflection

Validation Discuss where this information is useful or important in their world: tuckshop convenor, fete convenor; shops – knowing the products that people like and will sell easily; birthday charts – knowing how many students have birthdays in which months and to compare ages.

Application/ problems Provide applications and problems for students to apply to different contexts independently, e.g. look at the information in the table below and then look at the way this information has been presented. *Is the information easy to read? Does it give a good comparison of the number for each pet? What is wrong with some of the diagrams?*

Class Pets

Type of Pet	Number of students with that pet
Dog	9
Cat	7
Fish	3
Bird	5

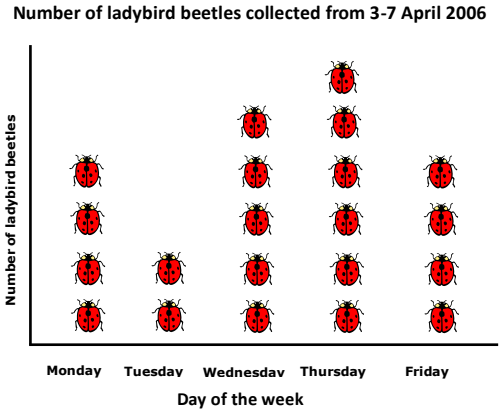


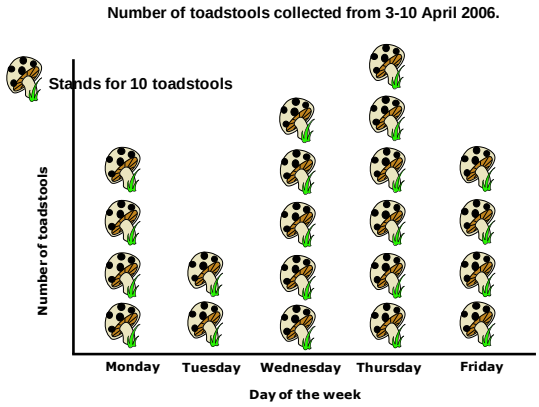
Extension **Flexibility**. Students demonstrate as many ways as possible to show the same information: lists, tables, pictographs, coloured squares, Unifix cubes, bar graphs.

Reversing. Go from activity to construction to interpretation. Reverse to start with graph to interpretation to activity. *What might a graph represent if there are no labels?*

Generalising. *Graphs, tables and lists make it easier to understand information. One picture represents one data item. To interpret graphs/tables, each part needs to be labelled; the scale needs to be uniform and the graph should be named so that we know what it is about.*

Changing parameters. From one-to-one correspondence, students explore the possibility of using one picture or block to represent a given number so they develop one-to-many correspondence (see below – beetles is one-to-one; toadstools is one-to-many [10]).





Teacher's notes

- Picture graphs facilitate comparisons of quantities. They can represent the data with one-to-one or one-to-many correspondence. It is important to ensure that students understand the need for picture graphs to use same-sized images to represent each piece of data and that pictures must be consistently spaced. These are the beginning understandings for scale and proportion and are most easily accomplished by giving students same-sized pieces of paper to create their initial graphs. Picture graphs are easily converted to bar graphs.
- Students need to be taught the skill of visualising: closing their eyes and seeing pictures in their minds, making mental images; e.g. show a picture of a kookaburra, students look at it, remove the picture, students then close their eyes and see the picture in their mind; then make a mental picture of a different bird.
- Suggestions in Local Knowledge are only a guide. It is very important that examples in Reality are taken from the local environment that have significance to the local culture and come from the students' experience of their local environment.
- Useful websites for resources: www.rrr.edu.au; https://www.qcaa.qld.edu.au/3035.html
- Explicit teaching that **aligns with students' understanding** is part of every section of the RAMR cycle and has particular emphasis in the Mathematics section. The RAMR cycle is not always linear but may necessitate revisiting the previous stage/s at any given point.
- Reflection on the concept may happen at any stage of the RAMR cycle to reinforce the concept being taught. Validation, Application, and the last two parts of Extension should not be undertaken until students have mastered the mathematical concept as students need the foundation in order to be able to validate, apply, generalise and change parameters.

