ROYAL STATISTICAL SOCIETY

DATA | EVIDENCE | DECISIONS

Activities to accompany the William Guy Lecture 2024-25 for ages 5-11

From sweets to streets: understanding the world through statistics

This document provides ideas for activities to accompany the RSS William Guy Lecture 2024-25 for ages 5-11: https://rss.org.uk/policy-campaigns/policy-groups/education-policy-advisory-group/rss-william-guy-lecturers/

There are four activities. Each activity links with ideas outlined in the video. They vary in complexity to suit different age groups. They are intended to be structured so they can be adapted to reflect children's ages and interests.

Activity 1: Rolling a dice six times

Activity 2: Carrying out a survey

Activity 3: Using data to make decisions

Activity 4: Interpreting data provided by others

Please get in touch via wgl1@rss.org.uk if you have any questions.

Activity 1: Roll a dice six times

For this activity, each person will roll a dice six times and look at the results.

Can you make a prediction about what will happen?

Do you think everyone will get at least one six? Do you think anyone will get the same number on two of their rolls? Do you think different people will get the same six numbers from six rolls?

Can you use knowledge of probability to improve your prediction?

Do you know the probability of rolling a six? For any individual roll the probability of a six is 1 in 6 (1/6) as there is one chance to get a six, out of six possible numbers (1,2,3,4,5,6).

If you want to work out the probability you will get at least one six it is easiest to work out the probability you will not get any sixes and take this away from 1. The probability of not getting a six is 5/6. The probability of not getting a six all six rolls is 5/6 x 5/6 x 5/6 x 5/6 x 5/6 x 5/6 which equals approximately 0.335. 1- 0.335 = 0.665 (or 66.5%).

Now, roll your dice six times and note down what you get!

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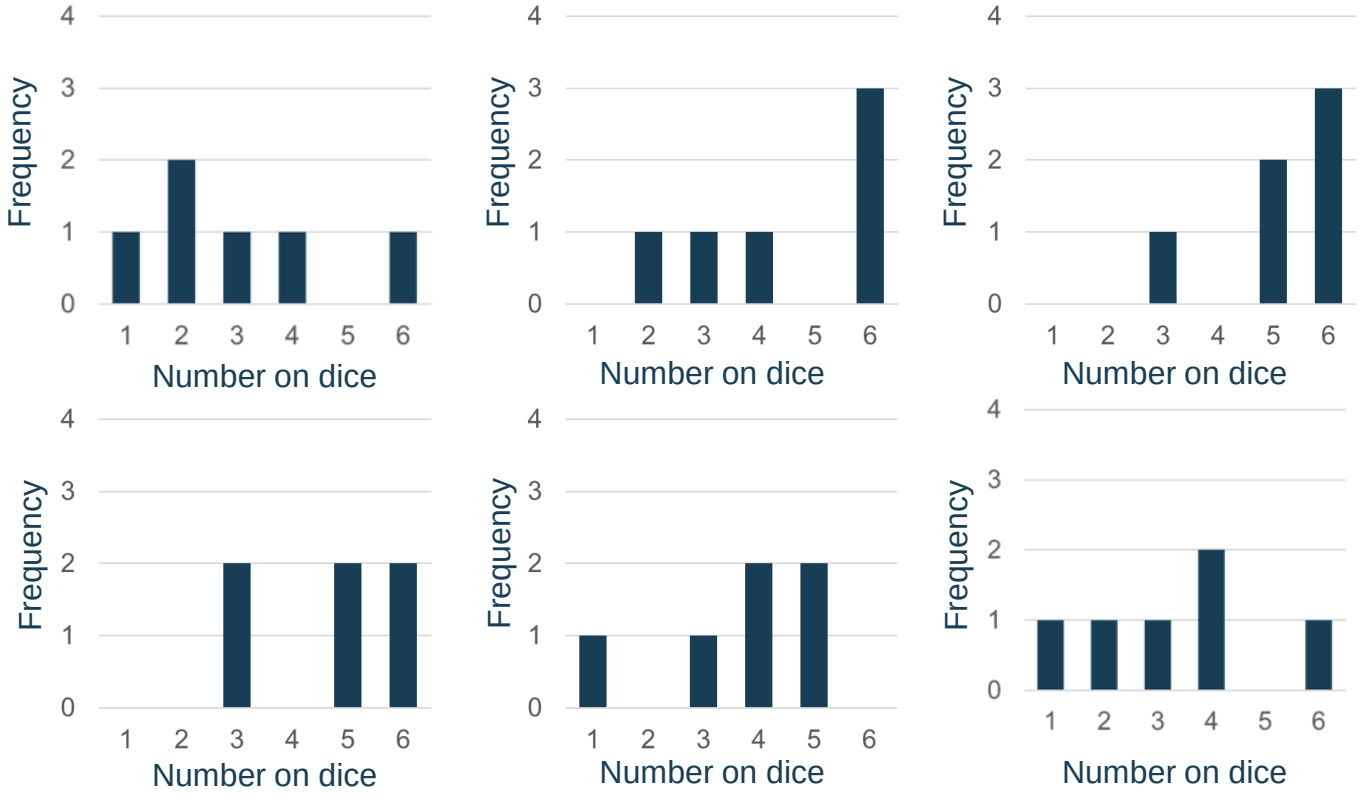
Activity 1: Roll a dice six times - continued

Discuss what you found as a class. Did you all get different results? Can you talk about probability and likely outcomes? Did you find there was a lot of variation for individuals, but if you put together the results for the whole class you get a more even distribution? Can you see how this is similar to the distribution of the skittles in the video? You can read more about probability on BBC Bitesize: [Probability - BBC Bitesize].

For those who want some examples to compare with, here are six examples of rolling a dice six times:



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Activity 2: Carry out your own survey

For this activity, you will undertake your own survey.

Choose a topic for your survey.

What would you like to find out about? You could ask friends or family their favourite sport, fruit or colour.

Or, for older groups, you could ask opinions on something in your local community eg access to shops, or find our if people know about a specific piece of information eg whether children in your school know your school motto?

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Activity 2: Carry out your own survey - continued

Design the questions and categories.

Who are the questions going to be aimed at? If your survey is more complex, you might want to test your questions on someone before carrying out the survey, to check they are understood as you intended.

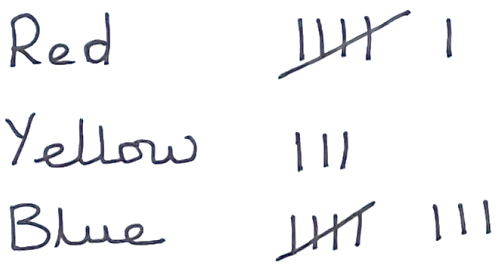
Do you want to allow each individual to provide any response for the answers (open responses), or are you going to provide pre-defined options?

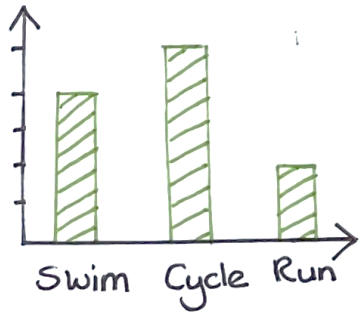
Now go and ask people the questions in your survey!

Activity 2: Carry out your own survey – continued

How will you present your results?

Have you thought about the different ways you could present your results?





Why not talk about what approaches could have been used and why people chose the approach they did?

Will some people find some approaches easier to understand or interpret than others?

Does the presentation of the results make a difference to how they are interpreted? What aspects could make a difference eg if you did a bar chart, have you started the chart at zero on the y-axis?

Activity 2: Carry out your own survey – continued

Think about biases in the data and whether the results are representative.

For older children, you could discuss whether the class thinks the results they collected are representative, or if there are any biases in the data. For example, are the results representative of the school, or all children of their age, or of everyone in the UK?

This could be linked with thinking about whether the colours of skittles seen in one packet were representative of all packets.

It can be extended to think about who participated in the survey (what was the sample), and how they might differ from the whole population.

Thinking about these issues can help with interpreting numbers provided by others (see Activity 4 and final section of video).

Activity 3: Using data to make decisions

For this activity, you will look at how to use data about the people who live in an area to think about what is needed in that area.

First, you need to know about the people who live in the area (the population).

There are two ways you could do this:

1. Use the official population estimates published by the Office for National Statistics: Latest estimates for mid-2023 England and Wales, dataset here or mid-2022 dataset also including Scotland and Northern Ireland). You could look at your local area or pick a different local area.

2. Make up a fictional distribution: You could use the information from the dice rolling activity to determine the distribution. Eg for the UK, six approximately equal groups would be: 14 and under, 15 – 28, 29 – 40, 41 – 53, 54 – 66 and 67 or older. Ones on the dice could represent 14 and under and sixes could represent 67 or older. If you have more ones, you have more young people, and more sixes is more older people. If you have a school set of micro:bits you could programme a random number generator on these instead of rolling a dice.

Activity 3: Using data to make decisions - continued

Now you know about the population, think about what local services and amenities would be needed.

Looking at the ages of people in the area, could you design a town centre? Do you think you would need lots of schools or hospitals? What about playgrounds or swimming pools? And what sorts of shops or leisure activities might you want to locate in the area?

For older age groups, you can think about the limitations of making decisions based on the data available?

You can also use this activity as an opportunity to think about the challenges of making decisions based on data.

For example:

- Is there uncertainty in the data, or what those people may want or need in their area?
- Do you know what will be needed in the future? Will the age distribution for the area look similar in 10 years or 50 years? And what does this mean for your decisions eg whether it is worth building a new school or hospital?
- How do you balance the needs of the area with the funding available to provide the services?

Activity 4: Interpreting data provided by others

For this activity, look at information shared from another source (eg social media or the news).

Look at a number you have seen recently on social media, or in the news. As a reminder the video outlined three things to consider when faced with information from others:

1. Do you **trust** the source?

You could ask yourself: Does the person sharing the information have an agenda? Are they presenting it to suit their own narrative or position? Do they have the skills to be able to calculate the number in a reasonable way? Do they have access to collect the right data?

2. Does the number seem **accurate**?

Are there any ways you can verify the number to see if it seems approximately correct? Do you know anything about the topic to help with knowing if it's right? Can you put the number in context?

3. Is the number **relevant** - is it telling you about what you want to know about?

This could be because a definition has been used which doesn't cover what you want to know about, or it could be because it's talking about something totally different – like the example of number of bananas versus price of bananas.

Activity 4: Interpreting data provided by others - continued

Take a number you have seen recently on social media or in the news. Consider the areas outlined in the previous page and discuss your interpretation in the context of the number you have seen.

You can find out more about principles for best practice in producing and publishing statistics in the Code of Practice for Statistics.

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Activity 4: Interpreting data provided by others - continued

If you'd like an example, here is one from summer 2024, looking at two possible versions of headlines from the Paris 2024 Olympic Games:

- Team GB matched its medal haul from London 2012, with its second highest number of medals at a single Olympic Games on foreign soil.
- Team GB had its lowest placing in the medal table (7th) since Athens 2004.

These two headlines appear to show contrasting outcomes. Discuss how these separate bits of information could be interpreted, who might want to use which headline and why? Perhaps you could think about what a more informative single headline could look like?

In this case, both descriptions are accurate, but there is an important distinction between gold medals, which are used to determine position in the medals table, and all medals (golds, silvers and bronzes) which give the figure for total medals. Differences in definitions can often account for different people giving different narratives – this makes it even more important to understand the source of information, and whether it is telling you what you want to know about. Which is more important to you? Position in the medal's tables or total number of medals?

If you want to draw your own conclusion on whether Team GB did well in the Paris 2024 Olympic Games, you can see more on the numbers that support these statistics via the BBC website here.