Statistics lesson plan / Exploring census

Year level: 5
Session number: 13

Introduction to probability

Learning goals

- Exploring words used to describe probability
- Exploring chance statements in stories

Resources

- Large numbers for probability activity
- Example of a set of probability word cards (set of 30 probability word cards)
- smaller (size) version - set of probability word cards
- A Very Improbable Story | created by NZ Maths
- A Very Improbable Story By Edward Einhorn YouTube Video
- Socks for an improbable story (two sets of 5 pairs of socks per page)

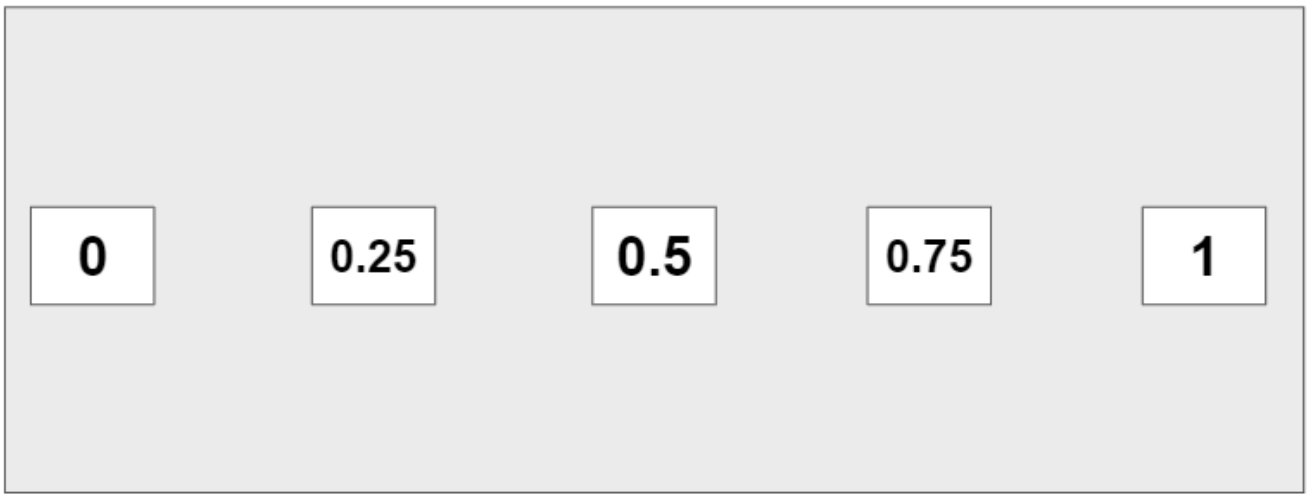
Activity

Exploring words that describe probability

In this introductory activity students sort words that describe probabilities from the least likely to the most likely.

The probability of an event is a numerical value between 0 and 1.

In your classroom, using one wall or direction as the probability scale, place 0 at the left hand end and 1 at the right hand end. You can add in 0.5, and 0.25/0.75 as you want. See Large numbers for probability activity if you want to print these off, but they can be made by writing on sheets of paper.



Showing the probability values spread across a wall

If wanted, you can also add in percentages, this will depend on where your students are at.

Discuss what students know about probability, what does a probability of zero mean? (*It won't happen*), what does a probability of one mean? (*It will happen*).

Get the students to brainstorm words they know of that describe probability. These words can be written onto cards and distributed amongst the class. Additional words are available here if needed Example of a set of probability word cards.

Students then take their word card and they work together to place themselves on the continuum from 0, it won't happen to 1, it will happen. Discuss choices. Words can then be stuck by blu tac onto the continuum.

Alternatively, groups can be given a subset of the probability words and place them on their own continuum. A smaller version of the probability word cards are here.

Expanding further the idea and looking to match up different events with the probability words

If the words are set up on a continuum in the classroom, then different events can be added to the continuum. For example:

- What is the chance of rain?
- What is the probability that the New Zealand soccer team will qualify for the next FIFA world cup?
- What is the probability that our school hockey [insert any team] team will win the next game that they play?
- What is the probability of throwing a six when rolling a dice?
- What is the chance of getting a head on a coin toss?
- What is the probability that … students add other ideas and these get added to the continuum.

A Very Improbable Story

This activity from **nzmaths** is based on the picture book *A Very Improbable Story*

Description of Mathematics

1. The probability of an event occurring is dependent on the number of possible outcomes.
2. Models of possible outcomes can be represented in numerical terms using fractions.

Required Resource Materials

- A Very Improbable Story by Edward Einhorn https://youtu.be/Ya4nRzzsCH0
- Pairs of socks (paper cutouts or real ones)
- Socks for an improbable story (two sets of 5 pairs of socks per page)

Sock it to me!
This activity is based on the picture book: A Very Improbable Story
Author: Edward Einhorn
Illustrator: Adam Gustavson
Publisher: Charlesbridge (2008)
ISBN: 978-1-57091-872-8

Summary:
Ethan wakes up one morning to find the improbable has happened- there is a cat stuck on his head. The cat, named Odds, will not detach itself until Ethan wins a game of probability with it. They play several

games and explore several situations involving chance until Ethan is finally successful. He then applies his new understanding to his goal shooting outcomes and makes a strategic decision.

Lesson Sequence:

1. Prior to reading, explore the students' understanding of chance and probability by working through a few scenarios with marbles or counters or unifix blocks of different colours. Model the language used to express chances of an outcome occurring.
   If this jar is filled with only red lollies what is our chance of taking out a red one?
   If there is 1 green lolly and 11 red what is the probability of getting the green one? A red one? Can we express that as a fraction?
   If there are 3 blue, 3 green and 6 red what are the chances of getting each colour? Let's test that a few times. Why was our result different from the "odds"?
   Discuss places in our lives where we have to consider probability when we make decisions. Record some of these to refer to later

2. Share the book with your students. As you read, discuss some of the scenarios (or games) Ethan and Odds play. Discuss the concepts of *fairness, chance, and impossibility.*

3. Go back to the sock game in the story (pp. 11-13). Discuss how the odds get better after each withdrawal of a sock. Ask students to work in several small groups and model this situation using a set number of different pairs of socks (or paper cutouts of socks). For example 5 pairs = 10 socks. As they work through their model, ask them to record each new possible outcome as a fraction. Withdraw one and now the chance of getting a pair is 1/9, then 1/8 etc. Ask them to play the game until they get a pair. Bring the class back together and look at the results for the groups.



Selecting two "socks", this time it is not a matching pair

How do we account for the variance in the number of times it took to get a pair?
How would we make this an impossible game? Better odds or worse odds?

4. In conclusion go back to the ideas from the introduction about places in our lives where we have to consider probability.
   What role does chance play in our lives?
   What kind of things do we do to improve odds or when do we decide it is worth taking a chance when the odds are "bad"?

Notes for teachers

Depending on how deep you go in the language activity, the work in this session might take two sessions. Or you might only do the language activity.

Example of a set of probability word cards (smaller version)

groups could get a half set

Possible	Always
Very probably	A good chance
Likely	Unlikely
Very unlikely	50/50
Very likely	Most probably
Almost certain	Even chance
Sometimes	Maybe
Certain	Impossible
Less than 50/50	Never
Probably	Almost certainly not
Usually	More often than not
Might happen	Rarely
Not often	Real possibility
Often	Frequently
Serious possibility	Almost always

Example of a set of probability word cards

Possible	Always
Very probably	A good chance
Likely	Unlikely

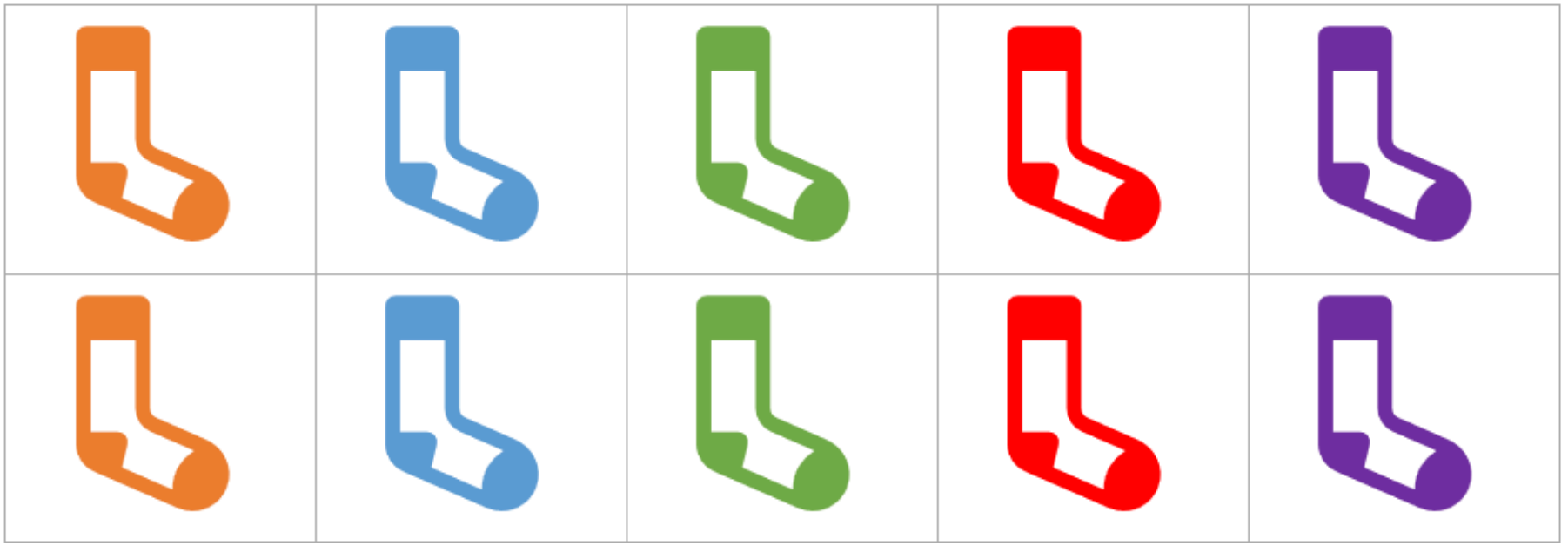
Very unlikely	50/50
Very likely	Most probably
Almost certain	Even chance

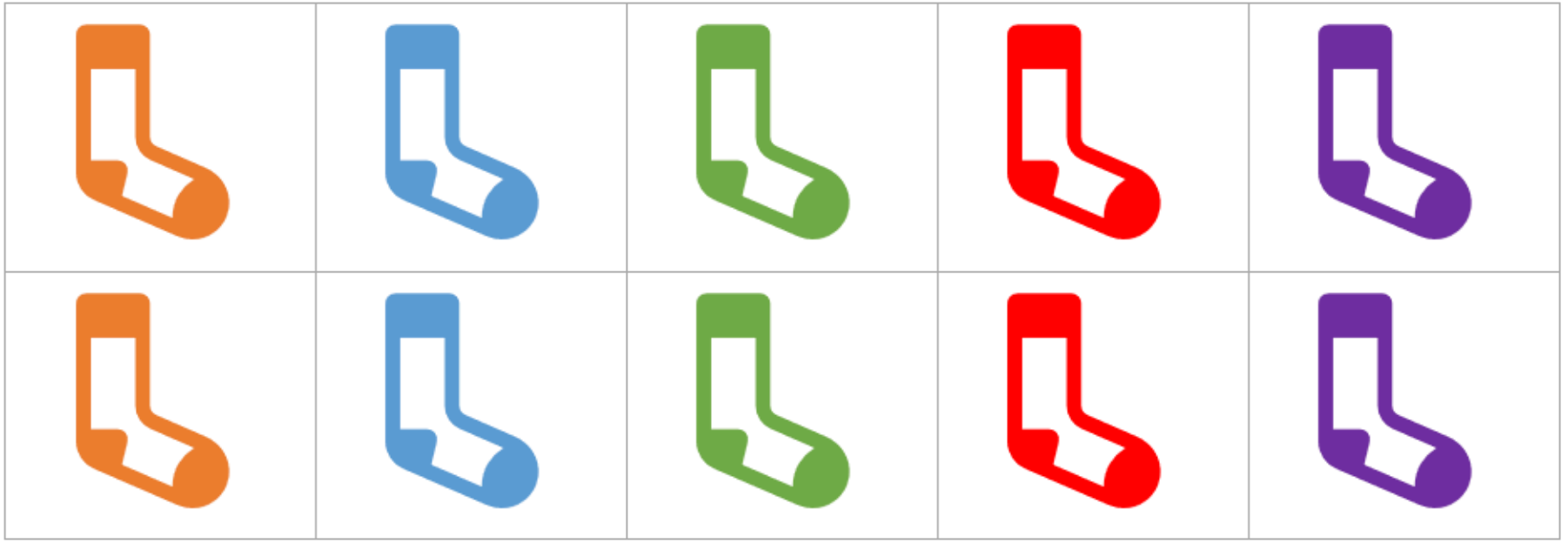
Sometimes	**Maybe**
Certain	**Impossible**
Less than 50/50	**Never**

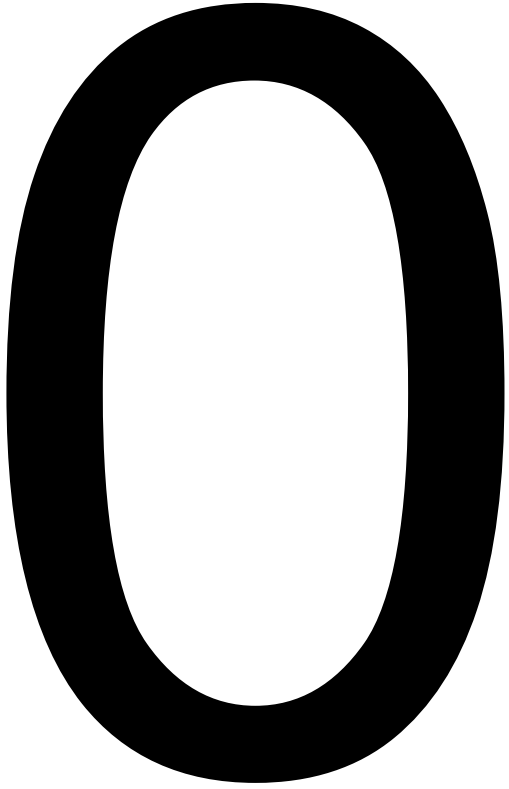
Probably	Almost certainly not
Usually	More often than not
Might happen	Rarely

Not often	Real possibility
Often	Frequently
Serious possibility	Almost always

Socks






0

0.5

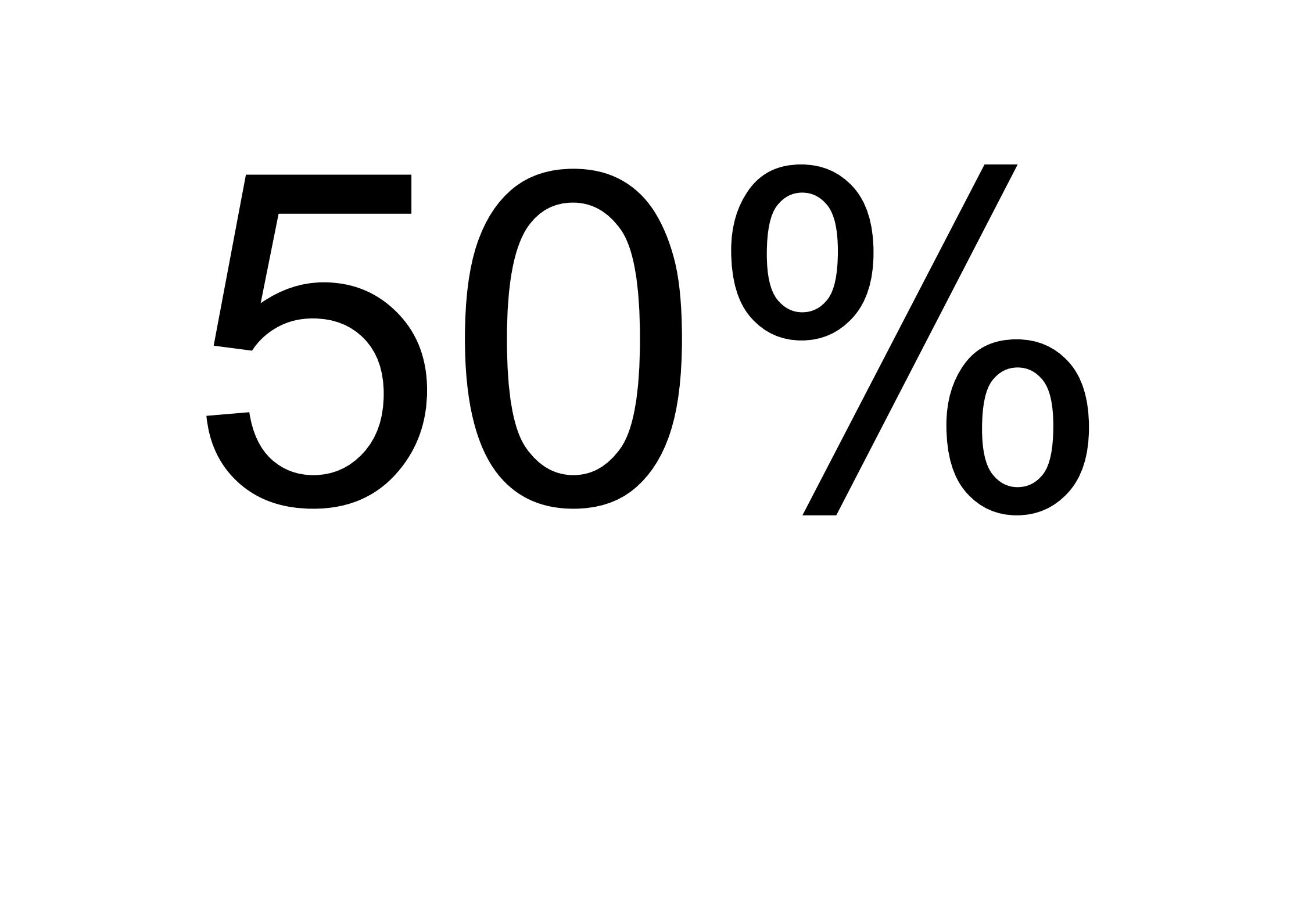
1

0.25

0.75

0%

25%


50%

75%

100%