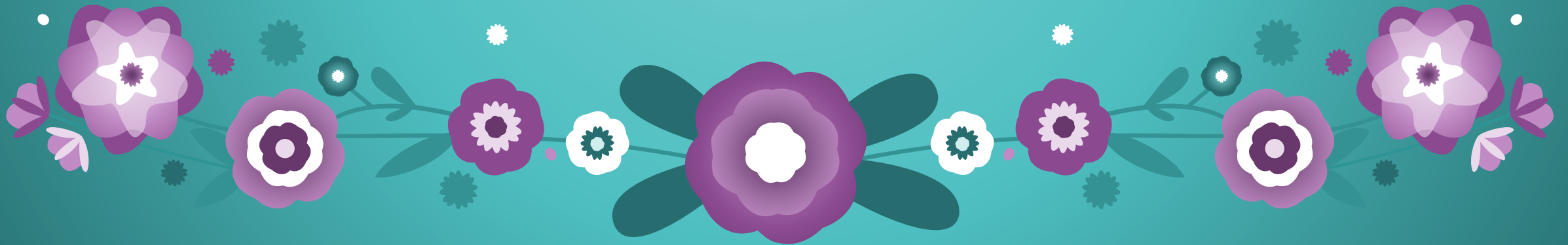


# PROBABILITY

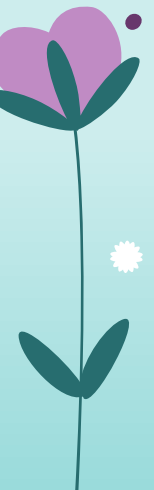
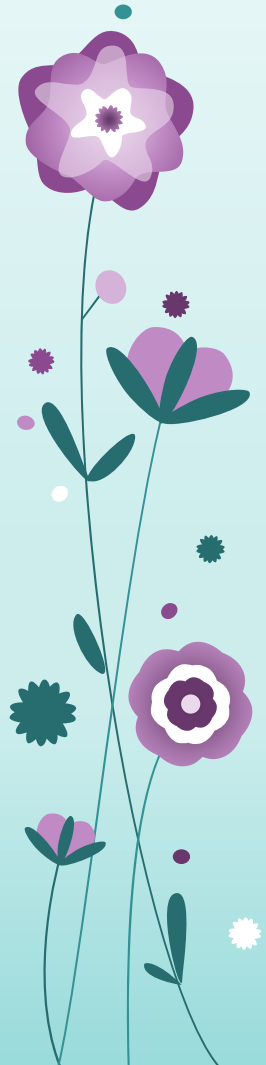
Subtítulo



# Probability



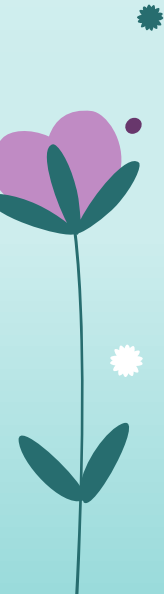
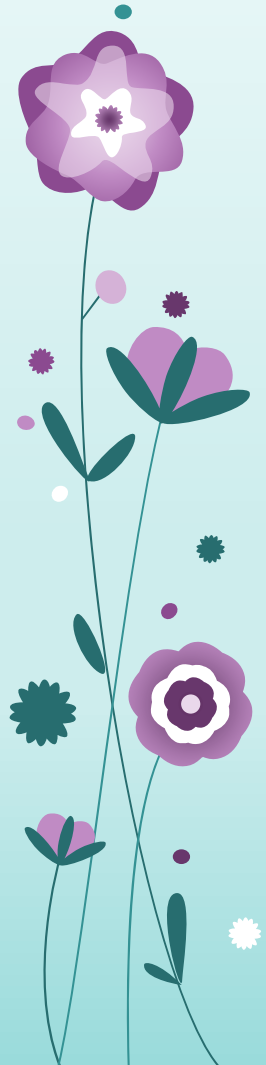
- Probability is a measure of how *likely* something is to happen.
- Many events can't be predicted with total certainty. The best we can say is how *likely* they are to happen, using the idea of probability.
- For example:
  - Today there is a 60% chance of rain.
  - The odds of winning the lottery are a million to one.
  - What are some examples you can think of?



# Probability



- Probabilities are written as:
  - Fractions from 0 to 1
  - Decimals from 0 to 1
  - Percents from 0% to 100%



# Probability

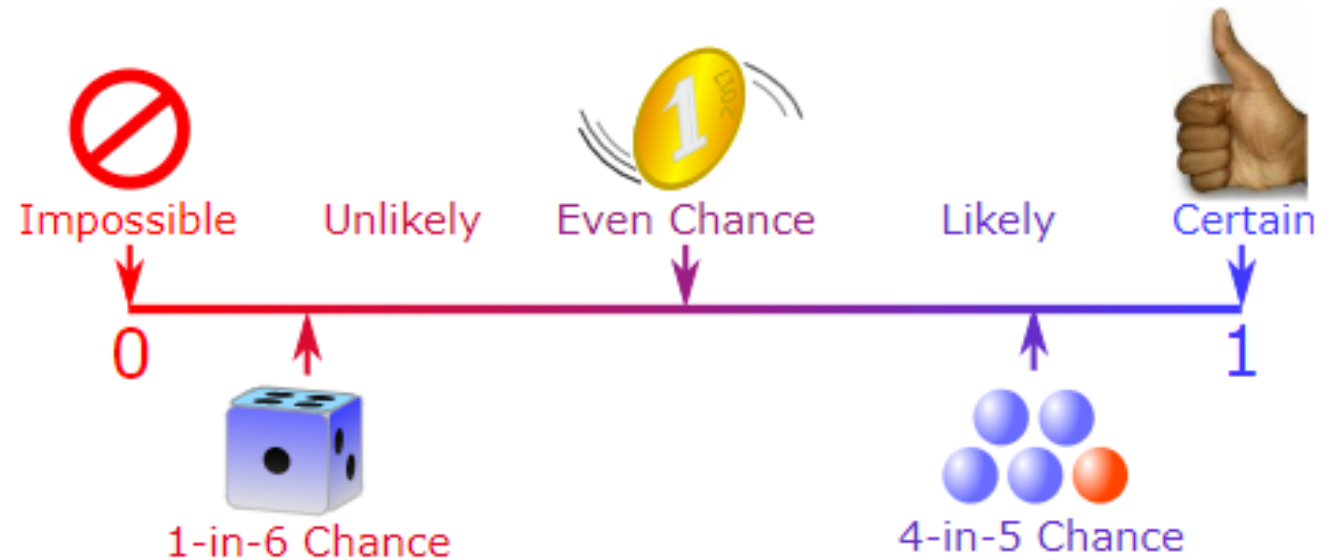


- If an event is certain to happen, then the probability of the event is 1 or 100%.
- If an event will NEVER happen, then the probability of the event is 0
- If an event is just as likely to happen as to not happen, then the probability of the event is  $\frac{1}{2}$

# Probability

## Probability Line

We can show probability on a [Probability Line](#):

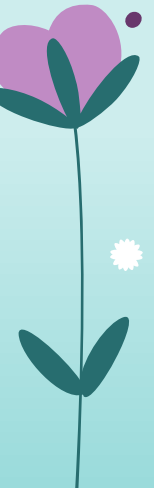
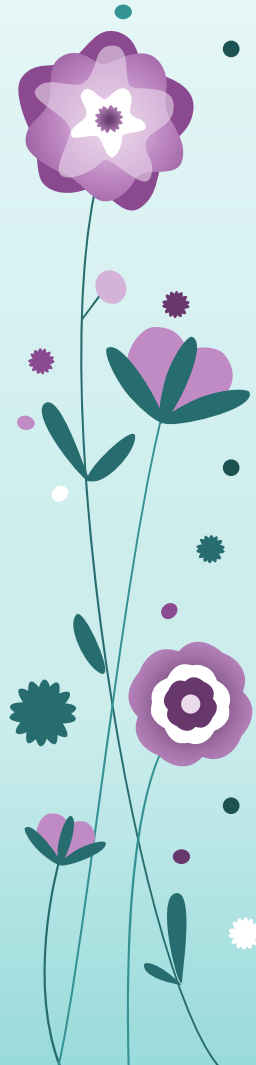


Probability is always between 0 and 1

Probability is always between 0 and 1

# PROBABILITY

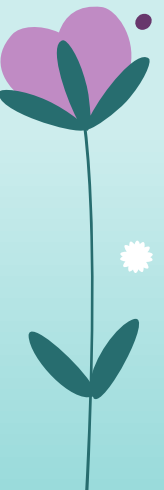
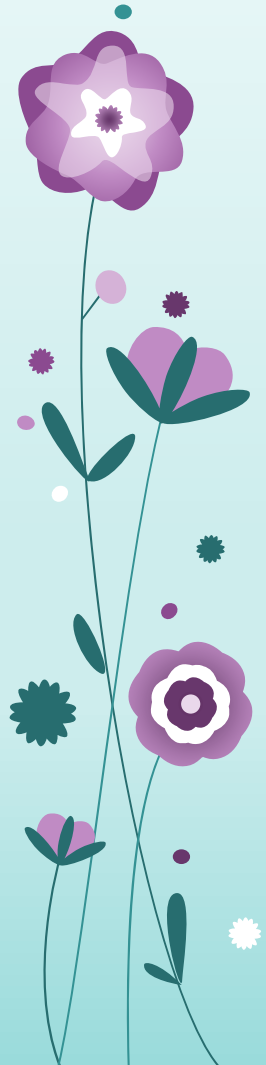
- When a meteorologist states that the chance of rain is 50%, the meteorologist is saying that it is equally likely to rain or not to rain.
- If the chance of rain rises to 80%, it is more likely to rain.
- If the chance drops to 20%, then it may rain, but it probably will not rain.



# Probability



- What are some events that will never happen and have a probability of 0%?
- What are some events that are certain to happen and have a probability of 100%?
- What are some events that have equal chances of happening and have a probability of 50%?



# Probability



- The probability of an event is written:

$$P(\text{event}) = \frac{\text{number of ways event can occur}}{\text{total number of outcomes}}$$



# Probability



$P(\text{event}) = \frac{\text{number of ways event can occur}}{\text{total number of outcomes}}$

- An outcome is a possible result of a probability experiment

# Tossing a Coin

When a coin is tossed, there are two possible outcomes:



- heads (H) or
- tails (T)

*What is the probability of getting heads when flipping a coin?*

$$P(\text{heads}) = \frac{\text{number of ways} = 1 \text{ head on a coin}}{\text{total outcomes} = 2 \text{ sides to a coin}} = \frac{1}{2}$$

We say that the probability of the coin landing H is  $\frac{1}{2}$

And the probability of the coin landing T is  $\frac{1}{2}$

# Throwing Dice

When a single die is thrown, there are six possible outcomes: 1, 2, 3, 4, 5, 6.



The probability of any one of them is  $\frac{1}{6}$

Example: the chances of rolling a "4" with a die

Number of ways it can happen: 1 (there is only 1 face with a "4" on it)

Total number of outcomes: 6 (there are 6 faces altogether)

$$\text{So the probability} = \frac{1}{6}$$

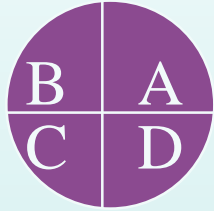
Example: there are 5 marbles in a bag: 4 are blue, and 1 is red. What is the probability that a blue marble gets picked?

Number of ways it can happen: 4 (there are 4 blues)

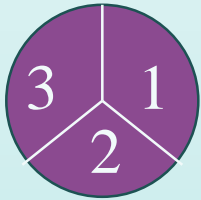
Total number of outcomes: 5 (there are 5 marbles in total)

$$\text{So the probability} = \frac{4}{5}$$

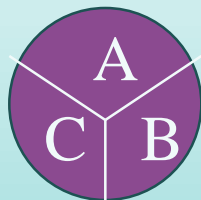
# TRY THESE:



1. What is the probability that the spinner will stop on part A?



2. What is the probability that the spinner will stop on  
(a) An even number?  
(b) An odd number?



3. What is the probability that the spinner will stop in the area marked A?

# Probability Word Problem:

- Lawrence is the captain of his track team. The team is deciding on a color and all eight members wrote their choice down on equal size cards. If Lawrence picks one card at random, what is the probability that he will pick blue?

Number of blues = 3

Total cards = 8

$$\frac{3}{8}$$

blue

yellow

red

green

blue

blue

black

black



# Let's Work These Together

Donald is rolling a number cube labeled 1 to 6. What is the probability of the following?

a.) an odd number

odd numbers - 1, 3, 5

$$\frac{3}{6} = \frac{1}{2}$$

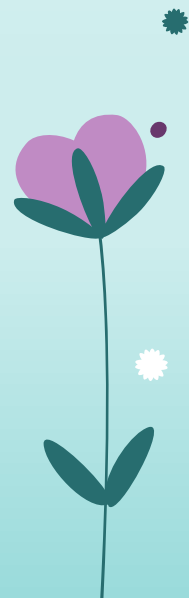
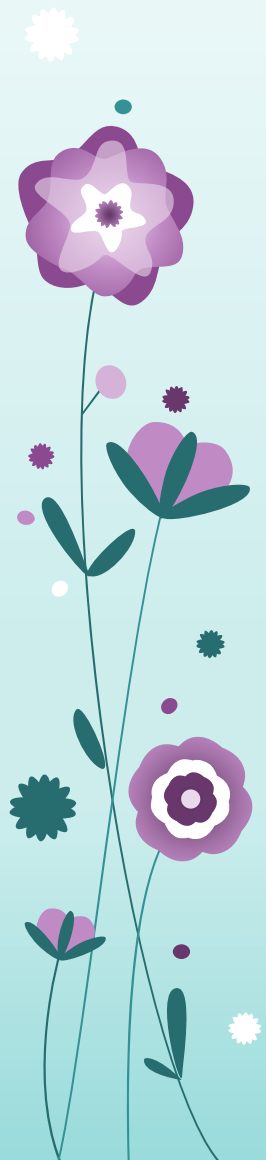
total numbers - 1, 2, 3, 4, 5, 6

b.) a number greater than 5

numbers greater - 6

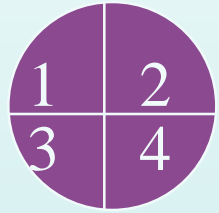
$$\frac{1}{6}$$

total numbers - 1, 2, 3, 4, 5, 6

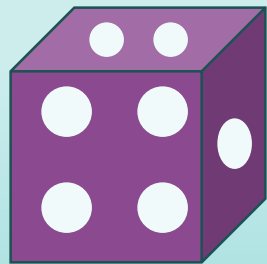




# TRY THESE:



1. What is the probability of spinning a number greater than 1?
2. What is the probability that a spinner with five congruent sections numbered 1-5 will stop on an even number?



3. What is the probability of rolling a multiple of 2 with one toss of a number cube?

<https://www.mathsisfun.com/data/probability.html>

