



# TEACHER'S NOTES

## THE CHANCE FACTOR

### OVERVIEW

(Prep time 5 mins/Class time 30 mins)

Learners engage with the concepts of likelihood and risk and practise their skills using examples. They then watch a video story about a boy who has a genetic condition and consider the likelihood of a baby being born with the same condition.

### LEARNING OBJECTIVES

- To calculate simple probabilities and express them in terms of fractions, decimals and words
- To compare different probabilities with one another
- To consider the probability of real events and scenarios

### CURRICULUM LINKS

- **Key Stage 2 (9-11 years)**
- **KS2** Mathematical understanding: use data to assess likelihood and risk and develop an understanding of probability through computer simulations, games and consideration of outcomes of everyday situations
- **KS2** Mathematical understanding: discuss, sort and order events according to their likelihood of occurring

### you will NEED

- A calculator for each learner
- Internet access
- A **The Chance Factor** worksheet for each learner

### Activity

- Write the words 'impossible', 'unlikely', 'likely' and 'certain' on the board. Explain that you are thinking of entering a TV singing contest. Which of the words do the class think describes your likelihood of winning? Why do they say that?

Explain that you can work out the likelihood of different events using maths. So, if there were ten people entering the contest, you'd have a likelihood of 1 in 10 (or  $1/10$ ) of winning. Ask the class to calculate what that likelihood is as a decimal and what word they would use to describe it. They should answer 0.1 and 'unlikely'. If there was only one person entering the contest the likelihood of you winning would be 1 in 1 (or 1). This would be 1 as a decimal and would be described as 'certain'.

- Use the **The Chance Factor** worksheet to practice working out the likelihood of similar scenarios. Answers are also provided.

- Explain that you want the class to watch a film about a boy who likes singing. As they watch, ask learners to remember what condition Ashley has, and how he got it. Watch Ashley's video story at:

<http://www.genesareus.org/filmlibrary/ashleysstory>

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### Activity

continued

- Ask structured questions to draw out information about Ashley's condition and what the likelihood of being born with it is. For example:
  - The odds of being born with Treacher Collins syndrome are 1 in 10,000. What does this mean?
  - For every 10,000 children born, one baby will probably have Treacher Collins syndrome, so the likelihood is 1/10,000.
  - Which of the words written on the board would describe this?
  - This is a relatively unlikely situation.
  - If Ashley has a child, the likelihood of it having Treacher Collins syndrome would be 'fifty-fifty'. What does this mean?
  - There is a fifty per cent chance something will happen, and a fifty per cent chance it won't. So the likelihood is 50/100 or \_.
  - Which of the words written on the board would describe this?
  - Because there is a fifty-fifty chance, it is equally likely and unlikely that the child would have Treacher Collins syndrome. However, since \_ is a much larger number than 1/10,000, it is much more likely that Ashley's child would have the condition than the child of an unaffected parent.

### EXTENSION

- Learners discuss what odds they are comfortable with in different situations. Given a range of probabilities and situations, the class votes on which are acceptable and unacceptable. For instance:
  - If the likelihood of being struck by lightning is 1/10,000,000, would you go out in a thunderstorm?
  - If the likelihood of winning the lottery is 1/14,000,000, would you bother to buy a ticket?
- Both these scenarios are relatively unlikely, but people's views might be influenced by whether the potential outcome is positive or negative.

### FURTHER information

- You can play this online probability game on an interactive whiteboard: [www.bbc.co.uk/schools/ks2bitesize/maths/data/probability/play.shtml](http://www.bbc.co.uk/schools/ks2bitesize/maths/data/probability/play.shtml)
- Listen to the BBC World Service discuss the psychology behind chance and luck: [www.bbc.co.uk/worldservice/sci\\_tech/features/figure\\_it\\_out/lottery.shtml](http://www.bbc.co.uk/worldservice/sci_tech/features/figure_it_out/lottery.shtml)

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# THE CHANCE FACTOR

Work out the likelihood of each example and circle the word which describes how likely the event is. The first one has been done for you.



a) You are entering a TV singing contest. There are 200,000 people auditioning in total. What is the likelihood of you winning?

As a fraction:  $1/200,000$

As a decimal:  $0.000005$

It is 

impossible	<b>unlikely</b>
neither likely or unlikely	
likely	certain

that you will win the contest.

b) Lucky you! You've made it to boot camp. Only 32 of the 100 people here will make it through to the judges' houses stage. What is the likelihood that you'll be one of them?

As a fraction:  $32/100$  (or  $8/25$ )

As a decimal:  $0.32$

It is 

impossible	<b>unlikely</b>
neither likely or unlikely	
likely	certain

that you will make it to the judges' houses stage.

c) You've done it! You're in the final 32. Now you are each assigned to one of four judges. You know who you want. What is the likelihood that you get your favourite judge?

As a fraction:  $1/4$

As a decimal:  $0.25$

It is 

impossible	<b>unlikely</b>
neither likely or unlikely	
likely	certain

that you will get your favourite judge.

d) Only 12 people can make it through to the live finals. What's the likelihood that you'll be one of them?

As a fraction:  $12/32$  (or  $3/8$ )

As a decimal:  $0.375$

It is 

impossible	<b>unlikely</b>
neither likely or unlikely	
likely	certain

that you will make it to the live finals.

e) Congratulations! You've made it to the live finals. You are one of just twelve competitors left. What is the likelihood of you winning now?

As a fraction:  $1/12$

As a decimal:  $0.083$

It is 

impossible	<b>unlikely</b>
neither likely or unlikely	
likely	certain

that you will win the contest if you are in the final.

# THE CHANCE FACTOR

f) You're sharing a room with three other contestants. What are the odds that one of you will win the contest?

As a fraction:  $\frac{4}{12}$  (or  $\frac{1}{3}$ )

As a decimal: 0.33

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you or one of your roommates will win the contest.

i) Not everyone can win, though. What is the likelihood of you being sent home?

As a fraction:  $\frac{2}{3}$

As a decimal: 0.66

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will be sent home if you are in the final three.

g) In the first week of the finals two contestants will be sent home. What are the odds of you packing your bags?

As a fraction:  $\frac{2}{12}$  (or  $\frac{1}{6}$ )

As a decimal: 0.16

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will be sent home in the first week.

j) Wow! You won the contest. The papers say the winner has a fifty-fifty chance of becoming a major star. What is the likelihood of you becoming a star?

As a fraction:  $\frac{50}{100}$  (or  $\frac{1}{2}$ )

As a decimal: 0.5

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will become a major star if you win the contest.

h) Incredible! You've made it to the final three. What is the likelihood of you winning now?

As a fraction:  $\frac{1}{3}$

As a decimal: 0.33

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

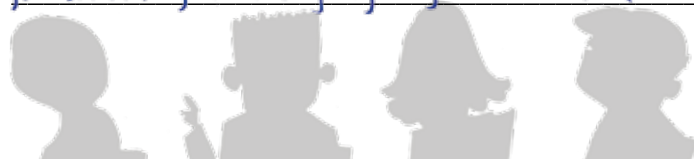
that you will win the contest if you are in the final three.

Which of all these events in the most likely to occur:

Being sent home in the final three (with a probability value of 0.66)

When you reached the final 32 was it more likely that you would get the judge you wanted, or that you would make it to the final twelve?

It was more likely that you would make it through to the final twelve (0.375) than that you would get the judge you wanted (0.25)



# THE CHANCE FACTOR

Work out the likelihood of each example and circle the word which describes how likely the event is. The first one has been done for you.



You are entering a TV singing contest. There are 200,000 people auditioning in total. What is the likelihood of you winning?

As a fraction:  $\frac{1}{200,000}$

As a decimal: 0.000005

It is 

impossible	<b>unlikely</b>
neither likely or unlikely	
likely	certain

that you will win the contest.

You've done it! You're in the final 32. Now you are each assigned to one of four judges. You know who you want. What is the likelihood that you get your favourite judge?

As a fraction:

As a decimal:

It is 

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will get your favourite judge.

Only 12 people can make it through to the live finals. What's the likelihood that you'll be one of them?

As a fraction:

As a decimal:

It is 

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will make it to the live finals.

Lucky you! You've made it to boot camp. Only 32 of the 100 people here will make it through to the judges' houses stage. What is the likelihood that you'll be one of them?

As a fraction:

As a decimal:

It is 

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will make it to the judges' houses stage.

Congratulations! You've made it to the live finals. You are one of just twelve competitors left. What is the likelihood of you winning now?

As a fraction:

As a decimal:

It is 

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will win the contest if you are in the final.

# THE CHANCE FACTOR

**You're sharing a room with three other contestants. What are the odds that one of you will win the contest?**

As a fraction:

As a decimal:

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you or one of your roommates will win the contest.

**Not everyone can win, though. What is the likelihood of you being sent home?**

As a fraction:

As a decimal:

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will be sent home if you are in the final three.

**In the first week of the finals two contestants will be sent home. What are the odds of you packing your bags?**

As a fraction:

As a decimal:

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will be sent home in the first week.

**Wow! You won the contest. The papers say the winner has a fifty-fifty chance of becoming a major star. What is the likelihood of you becoming a star?**

As a fraction:

As a decimal:

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will become a major star if you win the contest.

**Incredible! You've made it to the final three. What is the likelihood of you winning now?**

As a fraction:

As a decimal:

It is

impossible	unlikely
neither likely or unlikely	
likely	certain

that you will win the contest if you are in the final three.

Which of all these events in the most likely to occur:

\_\_\_\_\_

When you reached the final 32 was it more likely that you would get the judge you wanted, or that you would make it to the final twelve?

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