



THE SCIENCE OF SANTA



Scan to review worksheet

Expemo code:
144N-LDFK-NBI

1

Warm up

The pictures show Christmas traditions about Santa Claus in the English-speaking world. Decide if the sentences are true or false.



1. Santa Claus is also sometimes called Kris Kringle or Father Christmas.
2. Santa's sleigh flies by itself.
3. Santa has a pet reindeer called Rudolph.
4. Santa enters people's homes through the door or windows.
5. People leave a plate of sandwiches for Santa to enjoy when he visits.



2

Before you watch

You are going to watch a video called, "What If Santa Really Delivered Presents in One Night?" This video considers how the story of Santa Claus would be scientifically possible.

Read these facts from the video and choose the best answers. Use the glossary to help. Then watch to check your ideas.

1. Around **600 thousand / 600 million / 6 billion** people in the world expect a visit from Santa every year.
2. There are several children in every home, so Santa would only need to visit **24 million / 200 million / 240 million** homes.
3. He would have **31 / 24 / 13** hours to deliver all the presents.
4. Santa would have to fly **twice as fast as / 100 times as fast as / 1,200 times as fast as** the fastest plane in the world.
5. Reindeer can run **18 / 80 / 118** kilometres per hour.
6. Santa's bag of presents would weigh around **6,000 / 60,000 / 600,000** tons.
7. The reindeer would fly at **3 / 300 / 3,000** times the speed of sound.
8. When Santa sat in the sleigh, he would experience a force that is **tens of thousands / hundreds of thousands / millions** of times stronger than gravity.
9. Santa would receive a total of **72 million / 720 million / 7 billion** cookies from all the houses that he visited.
10. Santa would consume **39 million / 396 million / 396 billion** calories if he ate all the cookies and drank all the milk that people left for him.

Glossary:

one hundred thousand: 100,000

one million: 1,000,000

one billion: 1,000,000,000

gravity: the force that pulls objects towards the earth

Which number surprises you the most?



3 Vocabulary

Match these words and phrases from the video with their meanings.

Group 1

- | | |
|----------------------|---|
| 1. <u>accelerate</u> | a. accept that something is true without checking |
| 2. <u>assume</u> | b. include or consider a piece of information |
| 3. <u>deafen</u> | c. increase speed, start to go faster |
| 4. <u>factor in</u> | d. make someone lose their hearing |
| 5. <u>survive</u> | e. manage to stay alive in a dangerous situation |

Group 2

- | | |
|----------------------------|--|
| 1. a rough <u>estimate</u> | a. a difficult or dangerous experience |
| 2. <u>bystander</u> | b. a guess which is more or less correct, but not exact |
| 3. load | c. a person who is close to an event but is not actively taking part in it |
| 4. <u>massive</u> | d. the amount of something which an animal is carrying or pulling |
| 5. <u>ordeal</u> | e. very large |

1. How are the words in Group 1 the same?
2. Which word in Group 2 is different to the others?
3. Which of these words would a space scientist use frequently?





4

Watch again

Complete these sentences from the video with a word or phrase from the vocabulary exercise. Change the word endings if you need to so that the word fits the grammar of the sentence. Then watch the video again and check.

- But if we consider certain religious and cultural traditions, we get _____¹ of about 600 million people.
- So _____² the different Christmas Eve start times across the planet, and Kringle's got a luxurious 31 hours to make his deliveries.
- Since we don't know exactly how fast a reindeer can fly, let's _____³ they can manage those incredible speeds.
- Even then, the _____⁴ they have to lug is much too heavy for them.
- For starters, the team would create a _____⁵ sonic boom as they hurtle through the air at 3,000 times faster than the speed of sound, _____⁶ any _____⁷ on the ground below.
- When a typical coaster _____⁸, you get pushed back against your seat.
- Let's assume Santa and friends miraculously _____⁹ this _____¹⁰.

Glossary:

lug: pull (informal)

a sonic boom: a loud noise made by an airplane when it starts to travel faster than the speed of sound

Think of something...

...that you **assume** when you meet a new English teacher

...that **accelerates** to a very high speed

...that you have to **factor** in when you plan how much money you need every month

...that is **massive**

...that can **deafen** you



5

Language in context

Choose the best meaning for these informal expressions in bold from the video, using the context to help you.

1. **Legend has it that** he drops by when the kids are asleep. So that gives him eight hours, right?
 - a. it's a true fact that
 - b. the popular story says that
 - c. Santa is a great guy because
2. So factor in the different Christmas Eve start times across the planet, and Kringle's got a luxurious 31 hours to make his deliveries. Unfortunately, **this is where his luck runs out**. Because just to reach every house, he'll have to fly 1,200 times faster than the world's fastest jet fighter.
 - a. the situation changes from good to bad
 - b. the situation changes from bad to worse
 - c. no one knows what's going to happen
3. A force tens of thousands of times stronger than gravity would pin him to the sleigh, smashing his bones and internal organs to jelly. **But it's not all doom and gloom**. Let's assume Santa and friends miraculously survive this ordeal.
 - a. everything is terrible
 - b. no one understands why this happens
 - c. there is something positive in this situation

Can you think of any other contexts where you could use these expressions?

6

Talking point

Discuss these questions in pairs or small groups. Use words and phrases from the lesson.

1. In your country, do you have a magic character that brings children presents at Christmas or another time of year?
2. When you were a child, did you believe in Santa Claus or in some similar character?
3. How old were you when you stopped believing this?
4. How did you find out the truth?
5. Do you think it's healthy for children to believe in magic characters like Santa Claus? Why/not?
6. If/when you have a child, what will you tell them about magic characters like Santa Claus?



7

Optional extension

This video asks us to imagine that the story of Santa Claus is true. We often use conditionals (if sentences) in this situation:

If every household offers him three sugar cookies and one 8-ounce glass of whole milk, that's 720 million cookies and enough milk to fill 23 Olympic swimming pools total.

There are other phrases that we can use when we ask people to imagine something. Underline these phrases in the sentences below:

1. Now, let's say each household has, on average, two and a half kids.
2. Since we don't know exactly how fast a reindeer can fly, let's assume they can manage those incredible speeds.

We also use the word *even* to explain the results of an unlikely imaginary situation:

- Since we don't know exactly how fast a reindeer can fly, let's assume they can manage those incredible speeds. **Even then**, the load they have to lug is much too heavy for them.
- Meanwhile, the average reindeer can pull up to twice their weight, or about 225 kilograms. So those deer aren't going anywhere. And **even if** they could, well, it wouldn't be pretty. For starters, the team would create a massive sonic boom as they hurtle through the air. ... But it gets worse. ... the reindeer would heat to blistering temperatures

In these examples, **even then** / **even if** means that two opposite conditions lead to the same result. This is surprising!

- *Conditions*: Reindeer fly quickly/slowly. Result: They can't pull the heavy load.
- *Conditions*: Reindeer can pull a heavy/ light load. Result: There will be negative effects like a sonic boom and high temperatures.

Finish these sentences with your own ideas:

- If every household in the world bought a Christmas tree, ... would ...
- Let's say there's snow this Christmas. **Even then** ...
- Let's assume ... **Even if** this happens, ...