



# Have I Got Climate Science for You?

# Teacher notes

This fast-paced interactive quiz will get your students thinking about, talking about and engaging with climate science. Use it as the wrap-up to your climate science collapsed timetable day or use a round as a way of starting or ending a lesson on climate science.

Age group: KS3 and KS4

Timing of activity: Approx. 70 minutes

Number of students: Approx. 30 students, split into

teams of 3-5

#### Overall learning outcome:

The aim of the film quiz is to reinforce students' knowledge and understanding of climate science and foster teamwork and creativity.

# The activity

The film quiz is self-contained. You are the 'Quizmaster' and your job is to score the teams and award bonus points at your discretion (the answers are on the film and given after each round).

#### Introduction

(approx. 5 mins)

Presenters Jammie and Shana introduce the quiz and the 'Quizmaster' (i.e. you) and then ask teams to come up with a team name.

# Round 1

If I ruled the world (approx. 10 mins)

Teams create a logo that represents what they would do to combat climate change. Each team presents their logo and plan to the class.

Each team needs: A fist-sized lump of modelling clay

**Scoring:** All students vote for their favourite team (not their own), the number of votes each team gets is their score for the round.

## Round 2

Odd one out (approx. 5 mins)

Teams are shown four pictures on a theme and they have to pick the odd one out by holding up the letter card for that picture. Themes include 'ways of measuring climate change' and 'greenhouse gases'.

**Each team needs:** Envelope 1 (containing A, B, C and D cards)

Scoring: 10 points for each correct answer

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## Round 3

The truth will out (approx. 10 mins)

Each team reads out a set of topic statements (there are six statements per topic) and decide which statement is true. Topics include 'farts and burps', 'future predictions' and 'possible solutions to climate change'.

**Each team needs:** Envelope 2 (containing statement cards)

**Scoring:** 10 points for each correct answer (highlighted below)

# He who denied it, supplied it statements (farts and burps topic)

- 1. Every fart contains methane.
- 2. If you hold in a fart it'll come out as a burp.
- 3. Vegetarians do smellier farts than non-vegetarians.
- 4. Every day the average human adult passes enough gas to fill 100 party balloons.
- 5. Cow burps are worse for the environment than cow farts.
- 6. Eating Brussels sprouts is 100% guaranteed to make you fart.

#### You wanna bet? statements (future predictions topic)

- 1. The average temperature must be higher over the period 2012–17 than it was from 1998 to 2003.
- 2. Manchester United beat Chelsea in the FA Cup final next year.
- 3. Moscow floods because of rising sea levels before London does.
- 4. There are at least 2.5% more tsunamis in 2015 than there were in 1985.
- 5. Moscow has the hottest December on record before London has the coldest June.
- 6. By 2020 someone will have invented an aeroplane that doesn't cause any greenhouse gas emissions.

# Radical solutions statements (possible solutions to climate change topic)

- 1. Putting thousands of tiny mirrors in space to reflect some of the Sun's energy away from Earth.
- Adding nutrients to the oceans to encourage the growth of tiny sea creatures that carry out photosynthesis.

- 3. Using extremely long pipes to move water from the deep ocean to the surface, where it will absorb carbon dioxide from the atmosphere.
- 4. Making the atmosphere dirtier. Scientists think that adding particles to the atmosphere could make it reflect more of the Sun's energy away from Earth.
- 5. Towing the Earth further away from the Sun to reduce the amount of heat energy it receives.
- 6. Firing salt particles into clouds to make them whiter and brighter so they reflect more sunlight away from the Earth.

## Round 4

Picture this (approx. 10 mins)

Three objects from the Science Museum's atmosphere gallery are presented and teams need to decide what they are used for. Objects include a Keeling flask (used for collecting atmospheric gas samples), a Lackner Polytree (a futuristic idea to take carbon dioxide out of the air) and a SoloSmart domestic energy monitor.

**Each team needs:** A small dry-wipe board and cloth (or paper) and marker pen to write down team answers

Scoring: 10 points for each correct answer

## Round 5

Supermarket challenge (approx. 10 mins)

Teams have to put the grocery cards in order of their life-cycle carbon footprint, from highest to lowest.

**Each team needs:** Envelope 3, labelled 'Supermarket basket' (containing grocery cards)

**Scoring:** 10 points for each item in the correct position and a bonus of 20 points if the students lay them all out in the correct order – correct order is milk (174  $CO_2e$ ), cola (170  $CO_2e$ ), bread (130  $CO_2e$ ), orange juice (117  $CO_2e$ ), crisps (80  $CO_2e$ ), sugar (2  $CO_2e$ )\*

<sup>\*</sup> CO<sub>2</sub>e = carbon dioxide equivalent

## Round 6

### What happens next (approx. 5 mins)

Students watch a clip of Iain Stewart conducting an experiment using a candle in a tube and a heat camera to show how carbon dioxide traps heat. The film is stopped just as carbon dioxide is being added to the tube. What does the camera see? You may need to prompt students: 'Does the flame get bigger, smaller or disappear?'

**Each team needs:** A small dry-wipe board and cloth and marker pen (or paper) to write down team answers

**Scoring:** 10 points for the correct answer – the flame disappears

## Round 7

#### Building on your experience (approx. 10 mins)

The teams use plastic bricks to represent what the term 'climate change' means to them. They then present their creation back to the class.

**Each team needs:** Envelope 4 (containing two handfuls of plastic construction bricks)

**Scoring:** All the students get to vote for their favourite team (not their own), the number of votes each team gets is their score for the round

Add up the overall scores for each team while they are doing Round 7. At the end of the round add on their final points and any bonus points you have awarded, pausing the film if necessary, ready to announce the winner in the wrap-up.

# Wrap-up

(approx. 5 mins)

Announce the winning team and hand out prizes.

#### You will need...

- Internet access and an interactive whiteboard with sound enabled
- Have I Got Climate Science for You? quiz: www.sciencemuseum.org.uk/climatequiz
- Quizmaster score sheet
- Prizes (optional)

#### Each team will need on their table...

- Four A4 envelopes (numbered 1–4), containing
  Envelope 1: one set of voting cards (A, B, C and D)
  Envelope 2: statement cards
  Envelope 3 (labelled 'Supermarket basket'):
  grocery cards
  Envelope 4: two handfuls of plastic construction bricks
- A small dry-wipe board and cloth (or plain paper) and marker pen
- A fist-sized lump of modelling clay

#### Before the session...

- 1. Watch the film quiz: www.sciencemuseum.org.uk/climatequiz
- 2. Lay out the four pre-filled envelopes, a lump of modelling clay and a small dry-wipe board and cloth (or paper) and marker pen for each team and a score sheet for you.
- 3. Split the group into teams of 3–5 students.

# National Curriculum links

KS3 Science QCA (2007) 3.4 a, c; 4 a, c, g

KS3 Geography QCA (2008) 1.6 a, b; 1.7 b; 2.1 a; 2.4 a; 3 q; 4 a, b, q, i

KS3 Citizenship QCA (2007) 1.2 b, c; 2.1 a; 2.2 b; 3 e; 4 a, g

KS/

Supports work in the AQA, OCR and Edexcel areas of climate change, sustainability and the environment.

## Science Museum links

For more information about climate science go to the Climate Science Info Zone:

www.sciencemuseum.org.uk/ClimateChanging/ClimateScienceInfoZone

Visit the *atmosphere ...exploring climate science* gallery at the Science Museum.

# For this activity and many more, visit sciencemuseum.org.uk/climatescienceresources

Courses - Resources - Visits - Products - Outreach - Science Night - 3D IMAX films - Exhibitions - Events - Science Museum Clubs