Schools Carbon Literacy Teacher Notes

TEACHERS NOTES

Contents

This guide will provide you with all the information you need to carry out the activities. Please note that it is not meant to be read as a script but to be used as a guide for the activities. This guide will provide instructions to every section of the training, including what to do when students are entering the room and how to wrap up the session.

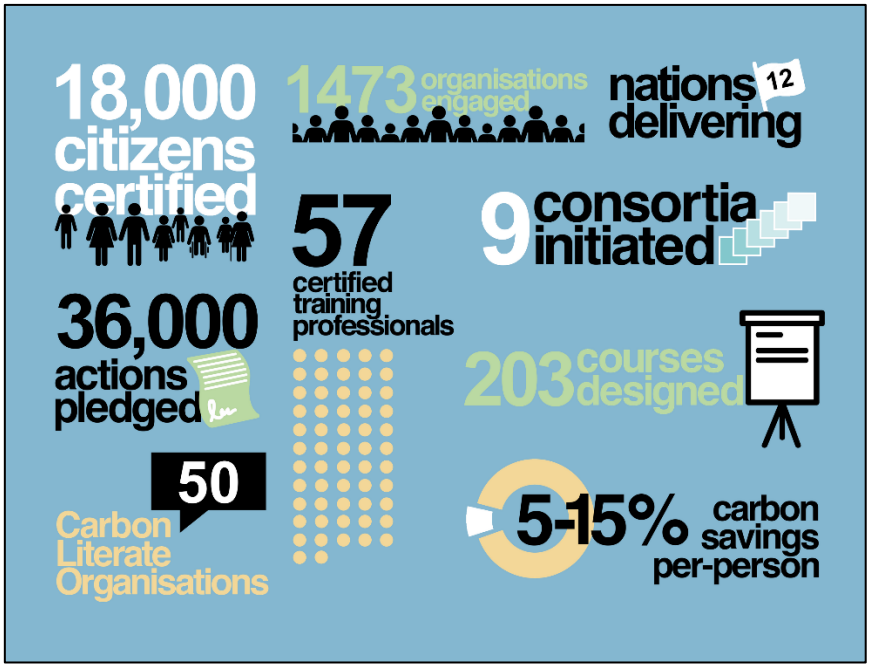
What is Carbon Literacy?

"An awareness of the carbon dioxide costs and impacts of everyday activities, and the ability and motivation to reduce emissions, on an individual, community and organisational basis."

The Carbon Literacy Project offers everyone a day's worth of Carbon Literacy learning, covering climate change, carbon footprints, how you can do your bit, and why it's relevant to you and your audience.

The Carbon Literacy Project is globally unique – there is nothing else quite like it anywhere. It was recognised as such by the UN at COP21, in Paris, where it was awarded as a TAP100, one of 100 worldwide Transformative Action Programs.

Carbon Literacy (CL) is aimed at three distinct audiences: Those that live, Those that work, and, Those that study. This allows us to capture all audiences in our aim to offer every citizen Carbon Literacy learning.



Schools Carbon Literacy in Leicester

In February 2019, Leicester City Council declared a climate emergency. We have developed a climate emergency programme of action to reduce carbon with the aim of the city becoming zero carbon.

In order to raise awareness through the community of Leicester we intend to use the Carbon Literacy Project as a way of accrediting university students and school staff to become carbon literate trainers who will deliver training to school students within the city.

The training takes place during a normal school day and a whole class can participate at once. The training will be delivered by the Environmental Education Team along with university students from DMU and the University of Leicester.

This course is suitable for Key Stage 2 and Key Stage 3 students. A timetable for delivery has been put together which shows 5.5 hours of face to face delivery. There is an expectation that the class

teacher will follow up with the carbon classroom activity, which is around 2 hours, plus prior work (carbon footprint calculation) which is 30 minutes. The course has been written by a qualified teacher which reflects the relevant knowledge that students will be able to understand. All resources can be downloaded from: https://schools.leicester.gov.uk/services/environment-health-and-well-being/environmental-education/project-work/carbon-literacy-project/carbon-literacy-resources/

Course Resources

Overview and timings (word 37 kb)

A full breakdown of timings for the session and signposting to the required resources and relevant slides.

Presentation slides (ppt 1.25 mb)

The main resource for session.

Sample Participant Form (word 85 kb)

The course is accredited by the Carbon Literacy Project and students can be accredited if you wish to self-fund at a cost of £10 per head. If you wish to accredit students, this form will need to be completed for each student and sent to the Carbon Literacy Trust along with a Certificate Request Form (see below). This form is updated regularly by the Carbon Literacy Trust, download the latest here: https://carbonliteracy.com/trainer-consultant/documents/

Sample Certificate Request Form (word 124 kb)

This form is updated regularly by the Carbon Literacy Trust, download the latest here: https://carbonliteracy.com/trainer-consultant/documents/

Certificate (pdf 47 kb)

If you are carrying out the course without accreditation, students can receive this Carbon Awareness Certificate.

Activity Resources (further details are provided in the Activities section)

- Activity 1 - Climate action bingo cards (pdf 1.1 mb)
  Print 1 card per student
- Activity 2a - Greenhouse Effect diagram (pdf 103 kb)
  Print 1 set per group of 5 or 6
- Activity 2a - Greenhouse effect statements (pdf 51 kb)
  Print 1 set per group of 5 or 6
- Activity 3 - Greenhouse gas card sort (pdf 211 kb)
  Print 1 set per group of 5 or 6
- Activity 4 - Country and vulnerability card sort (full set) (pdf 2.3 mb)
  Print 1 set for each class. Need at least 1 card per student
- Activity 4 - Country and vulnerability card sort (small groups) (pdf 1858 kb)
  Print 1 set per group of 5 or 6
- Activity 5 - Carbon footprint calculator (pdf 111 kb)
  Print 1 sheet per student
- Activity 6 - The carbon footprint of food card sort (pdf 246 kb)

Print 1 set per group of 5 or 6

- Activity 7 - The carbon footprint of travel card sort (pdf 112 kb)
  Print 1 set per group of 5 or 6
- Activity 8 – Quiz ABCD flashcards (pdf 2.2 mb)
  Print 1 set per group of 5 or 6 or get groups to make their own
- Activity 9 - Zero Carbon World - postcards from the future - vision hand outs (pdf 202 kb)
  Print enough postcards for a group to have one subject each
- Activity 10 - The Carbon footprint of a school card sort (pdf 58 kb)
  Print 1 set per group of 5 or 6
- Carbon Classroom Lesson 7 - Preparing for the carbon classroom (pdf 153 kb)
  Print 1 copy per presenter
- Carbon Classroom Lesson 8 - Practice, practice, practice (pdf 140 kb))
  Print 1 copy per presenter

Course Content

PRE-COURSE

Pre-course Activity	
Material:	Activity 5 - Carbon Footprint Calculator (pdf 111 kb)
Timing:	30 minutes
Purpose of the activity:	To make students aware of their carbon footprint in comparison to others
Task:	Students to complete their carbon footprint as a homework activity
Preparation:	Print required number of copies of Activity 5 - Carbon Footprint Calculator (pdf 111 kb)
Students to complete their carbon footprint by visiting https://footprint.wwf.org.uk, completing each question as honestly and as accurately as they can. There are hints and facts along the way to read. The worksheet allows them to record information, the results of which will be discussed in the training.	

COURSE START

Teaching : Introduction	
Material:	Slides 1 - 4
Timing:	10 minutes
Purpose of the activity:	Welcome students, provide background to Carbon Literacy project and overview of training

Task:	N/A
Preparation:	You may want to spend some time drafting a script for yourself using the bullet points below. Once you have worked out what to say, it would be useful to transfer your points to flash cards.

- Welcome the participants
- Housekeeping: Fire alarm, nearest emergency exit, toilets
- Introduce yourself

Intro to CL (what, why, future opportunities)

- The CL project is a large-scale education programme originating in Manchester. Appropriate for the world's first industrialised city, it now aims to become the word first carbon literate city.
- CL stems from the notion of a Low Carbon culture and to foster citizens who understand the scale of the problem and feel empowered to take action on climate change as well as support and accept climate mitigation policies.
- Carbon Literacy is defined as: An awareness of the carbon costs and impacts of everyday activities and the ability and motivation to reduce emissions, on an individual, community and organisational basis"
- The CL project plays an important role in Leicester's Climate Emergency Action Plan.
- So far, over 18,000 people are carbon literate.

Overview of training

- Provide an overview of the training and briefly cover what you will do in today's session.

Student introduction

- Alternatively, you can ask each person to introduce themselves to the whole group

Activity :Climate Action Bingo	
Material:	Slide 5 Activity 1 - climate action bingo cards (pdf 1.1 mb) ***Print 1 card per student***
Timing:	10 minutes
Purpose of the activity:	To get students to start thinking about what actions they are already taking
Task:	Play climate action bingo
Preparation:	You may want to spend some time drafting a script for yourself using the bullet points below. Once you have worked out what to say, it would be useful to transfer your points to flash cards.

- Each student receives a climate action bingo card.
- Starting on their table they must ask if anyone has completed the actions and enter the name of the person who has completed that action.
- Then students move around the room to complete their cards.
- Students can put their own name on their card once.
- The first student to complete their card shouts 'BINGO' and is awarded a small prize.

Teaching: Carbon Literacy and Leicester	
Material:	Slides 6 – 9 Plain paper Pens/pencils
Timing:	10 minutes
Purpose of the activity:	The purpose of this activity is to introduce what Carbon Literacy is, to highlight what will be covered during the day, what makes Leicester special and to capture what the students already know about climate change.
Task:	To create a mind map of what the students already know about climate change
Group size:	5/6
Overview of training • Provide an overview of the training and briefly cover what you will do in today's session. • In groups, create a mind map of what the students already know about climate change	

Activity: Greenhouse gases and their sources	
Material:	Slides 10 - 19 YouTube clip: https://www.youtube.com/watch?v=u2UVmqrdC4I • Activity 2a - Greenhouse effect diagram (pdf 103 kb) • Activity 2a - Greenhouse effect statements (pdf 51 kb) • Activity 3 - Greenhouse gas card sort (pdf 211 kb) ***Print 1 set per group***
Timing:	20 minutes
Purpose of the activity:	The purpose of this activity is to provide an understanding of the greenhouse effect and how this is impacting the earth
Task:	• Practical activity which shows how light and heat is trapped by the layer of CO_2 • Card sort activity on sources.
Group size:	5/6
10 minutes - Greenhouse Effect Activity • Sort the statements into the order they happen • Place them where you think they go on the diagram • More greenhouse gases are being added to our atmosphere (more on this soon). What effect will this have on our planet and why? **10 minutes – Greenhouse Gas Sources** • Seven main greenhouse gases are included in international climate change legislation (The Kyoto Protocol).	

- The film mainly focused on Carbon Dioxide (CO_2) but also mentioned Methane (CH_4) briefly. However, there is also Nitrous Oxide (N_2O) and a group of 4 Fluorinated gases (F-gases).
- All greenhouse gases are not created equal and some are more potent than others. i.e. the ability to trap heat in the atmosphere and the length of time they stay in the atmosphere differs between the greenhouse gases. This is also known as their Global Warming Potential. The numbers below the gas indicate its Global Warming Potential.
- In order to compare the greenhouse gases with each other, we use a metric measure called CO_2 equivalent (CO2-eq) in which we convert the amounts of the other gases into the equivalent of carbon dioxide.
- To do so, we multiply a gas GWP with its mass. For example, the GWP of Methane is 28, so emitting one tonne of Methane is the equivalent of emitting 28 tonnes of Carbon Dioxide. The GWP of Nitrous Oxide is 265, so emitting 1 tonne of Nitrous Oxide is the equivalent of emitting 265 tonnes of Carbon Dioxide.
- From now on when we use the term carbon or greenhouse gases, we actually mean carbon dioxide equivalent.

Explain that the purpose of the activity is to match the greenhouse gases with their main sources.

- Hand a pack of greenhouse gases and their sources to each group.
- Give the participants 5 minutes to complete the task.
- Circulate amongst the groups and use guiding questions to lead participants towards the right answer.

Feedback:

- Ask one group to feedback on Carbon Dioxide.
- Show the correct answers and expand wherever applicable.
- Ask next group to feedback on Methane and repeat the process.

Please find the answers in the table below.

Trainer Notes

There are many ways to explain the greenhouse effect. However, some of these are known as “useful lies”, such as the blanket and greenhouse analogy, as they are factually incorrect. Although, they are useful in terms of explaining a very complex process. This activity contains three explanations, please pick the one you feel most comfortable with explaining

The blanket explanation:

1. Greenhouse gases occurs naturally in the Earth’s atmosphere. They act as a blanket to trap energy from the sun.
2. The greenhouse effect is a natural process that ensures that the earth is warm enough to sustain life. Without the greenhouse effect the Earth’s average temperature would be minus 18 degrees Celsius (The Earths average temperature is currently 15 degrees Celsius).
3. However, for the past 250 years, human activities have increased the concentrations of greenhouse gases in the atmosphere. Essentially, we have been adding extra layers of blankets around the Earth. This has in turn lead to an increase in temperatures.

The greenhouse explanation:

1. Greenhouse gases occurs naturally in the Earth’s atmosphere. As a greenhouse traps the heat from the sun, so do the greenhouse gases trap the sun’s energy.
2. The greenhouse effect is a natural process that ensures the earth is warm enough to sustain life. Without the greenhouse effect, the Earth’s average temperature would be minus 18 degrees Celsius (The Earth’s average temperature is currently 15 degrees Celsius).

3. However, for the past 250 years (since the beginning of the industrial revolution), human activities have increased the concentrations of greenhouse gases in the atmosphere.

The "correct" explanation

1. Energy from the Sun is transmitted through space and reaches Earth.
2. Some energy is reflected back into space, from clouds and icecaps and other shiny surfaces- (this is why we can see Earth from space)!
3. The energy that isn't reflected passes through the atmosphere and is absorbed by the Earth's surface.
4. The earth warms up and emits infrared radiation (=heat, a bit like a heat lamp!)
5. Now, while the atmosphere is what we call "transparent" to visible light (incoming energy from the sun) it is not transparent to infrared radiation. That is because of the greenhouse gases, which can absorb infrared.
6. Therefore, these greenhouse gases absorb and re-emit the heat energy - some of which is emitted into space and some back to Earth. The heat is effectively trapped and warms the Earth.
7. The Greenhouse effect is a natural process…

Answers

Carbon Dioxide:

- **Burning of oil, coal and gas (fossil fuels**). (This also produces small amounts of Methane and Nitrous Oxide)
- **Manufacture of cement:** The cement industry accounts for 8% of global greenhouse emissions. There are two main reasons why cement is a significant source of carbon emissions. To make clinker, limestone (the main ingredient in cement) needs to be heated in a kiln to high temperatures (calcinated). Carbon dioxide becomes a waste product of this process. This accounts for 50% of cement's carbon emissions. Another 40% of the emissions stem from the fossil fuels needed to heat the kiln to high degrees required for the calcination process. The final 10% comes from the fuels needed for the transportation and mining of materials.
- **Deforestation:** When trees are logged or burned, they release their carbon into the atmosphere, therefore contributing to the carbon emissions.

Methane:

- Decay of organic waste in landfills
- Livestock (belching etc)
- (Also, leakage during extraction and transport of natural gas is a significant source.)

Nitrous oxide:

- Excess Synthetic fertilizers: Synthetic fertilisers contain nitrogen, and when too much fertiliser is applied to the soil, microbes will convert the excess Nitrogen into Nitrous Oxide.
- Livestock (manure)

F-gases (fluorinated gases)

- Refrigeration
- Aerosols

This is a group of 4 gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6) and nitrogen trifluoride (NF3). They are manmade and have been used as a replacement for ozone depleting gases called Chlorofluorocarbons (CFC's). The F-gases are a classic example of how we create one problem whilst solving

another. Whilst the F-gases are not a threat towards the ozone layer, they are really potent (10-10,000 times more potent than CO_2) greenhouse gases and contributes toward global warming.

Activity: Carbon Footprints	
Material:	Slides 20 – 30 • Activity 4 - Country and vulnerability card sort (pdf 1858 kb) ***Print 1 set for each class. Need at least 1 card per student.*** • Activity 5 - Carbon footprint calculator (pdf 111 kb) ***Print 1 sheet per student.***
Timing:	20 minutes
Purpose of the activity:	This activity has a dual purpose. It gives the participant an opportunity to explore the climate justice dimension (i.e. responsibility for carbon emissions and vulnerability to climate change) and it also give the participants an opportunity to introduce themselves to each other.
Task:	Once the participants have been given a Country footprint card, they are asked to line up from the country with the highest to the lowest carbon footprint.
Group size:	All students will participate in this activity.

Co trainer:

Ensure your cards are shuffled before giving each participant 1 card (make sure it's the side of the card with the carbon footprint rather than vulnerability)

Carbon footprint per country (5 min)

Lead trainer:

- Ask participants to line up from the country with the highest carbon footprint to the country with the lowest.
- Once lined up – ask students to introduce themselves to the person on each side of them
- Ask the students to read out their country name and the size of the footprint from highest to lowest
- Ask the students what they notice about the countries with high and low footprints (i.e. what do the countries with a high carbon footprint have in common? What do the countries with a low carbon footprint have in common?)
- Key points: Industrialised countries have high carbon footprints whilst less developed countries have low carbon footprints.

Vulnerability: (5 min)

Lead trainer:

- Ask the students to turn over their cards and explain what we mean by vulnerability
- Ask the students to read out the rank of their country
- Ask the students what they notice (if guiding is needed, ask: "What countries are most vulnerable to climate change?", "What countries are least vulnerable to climate change?")

- Reiterate key points: When we consider how vulnerable each country is to the impacts of climate change, we can see that the countries with the least impact are those most vulnerable.
- Ask students to retake seats

Further info:

About vulnerability:

- Vulnerability to climate change takes into account Exposure, Sensitivity, Capacity to adapt: To read more, please go to: https://gain.nd.edu/our-work/country-index/methodology/.
- The least vulnerable country in the world is Switzerland and the most vulnerable country in the world is Niger.
- If participants want to know more, you can direct them to www.climatewatchdata.org.

About the cards:

- The colour theme of the cards matches the vulnerability decile (i.e. dark blue = the 10% of countries least vulnerable to climate change; dark red = the 10% of countries most vulnerable) – see colour scale on vulnerability cards.
- The size of the footprint picture on the card is scaled (by area) to match the carbon footprint.

BREAK

Teaching: Visualising the UK consumption-based footprint	
Material:	Sides 33 - 44
Timing:	10 minutes
Purpose of the activity:	The purpose of this activity is to encourage participants to reflect on the carbon emissions stemming from everyday things and activities. This should also prepare participants for the action planning section later on in the session.
Task:	Listen to your presentation

Start off the activity by asking participants what a carbon footprint is. Show the answer on the introductory slide. Talk through the presentation:

Explanation of buses

In order to make it easier to visualise carbon emissions, we are using double decker buses to illustrate the carbon footprint of an average person for a year. We have based the calculations on data from Small World Consulting's Carbon Footprint Calculator.

Please note that the measurement is in volume and not in weight. I.e. 1 tonne of CO_2 occupies around the same volume as 5 double decker buses.

In order to make this section as interactive as possible, let the participants know what aspects you will focus on (i.e. Home, travel etc.). Then whilst going through each aspect on the presentation ask the participants what they think contribute to the carbon footprint of each aspect. You can use the table below as a guide.

Aspect	Number of buses	Where does the carbon come from?
Home: (2.4 tonnes of CO2e)	12	Usage of gas, electricity and water.
Travel: (3.5 tonnes of CO2e)	17.5	Fuel usage and manufacturing of cars, public transport, long and short haul flights.
Food: (3.7 tonnes of CO2e)	18.5	Meat/dairy consumption, farming equipment, transport (mode & distance), storage, seasonality, processing, eating out and staying in hotels.
Purchases: Physical items (1 tonne)	5	Gadgets, clothes, appliances, jewellery, newspapers, books etc.
Purchases: Services (0.9 tonnes)	4.5	Internet, home insurance, online banking (the carbon footprint of the companies providing these services).
Public services: (1.7 tonnes of CO2e)	8.5	Your share from emissions associated with construction industry, education, health, police, defence.
Total: (13.1 tonnes of CO2e)	66.0	

At this stage it is good to highlight the difference between the Carbon Footprints used for "The International Footprint Game" where the average UK person's carbon footprint is 7.8 tonnes whilst in this activity the average UK person's footprint is 13.1 tonnes. Please see explanation on the next page.

Consumption-based footprint versus production-based footprint

- The footprint numbers used for the International Footprint Games are what we call a '**production' based footprint** – that is the greenhouse gas emissions that are produced within the borders of a country.
- The footprint numbers used for this activity are what we call a **consumption-based footprint** as it takes into account everything that we import as well.
- The UK's production footprint is lower than the consumption footprint as we import a lot of goods. China's production footprint is higher than its consumption footprint because it exports a lot of goods.

The slide with the Indian carbon footprint again reinforces the social equity and justice aspect of climate change. i.e. the average UK carbon footprint is nearly 13 times higher than the average Indian carbon footprint.

Activity: Carbon Footprint of Food	
Material:	Sides 45 – 47 Activity 6 - The Carbon Footprint of Food Card Sort (pdf 246 kb) ***Print 1 set per group of 5 or 6***
Timing:	10 minutes
Purpose of the activity:	The purpose of this activity is to encourage participants to reflect on the carbon emissions stemming from food. Just as previous presentation, this should also prepare participants for the action planning section later on in the session.
Task:	Participants are asked to rank the carbon footprint of food items from highest to lowest.

Group size:	5/6

5 minutes: Carry Out the activity

Lead trainer:

- Explain the purpose of the activity
- Highlight that the footprints are calculated according to the size of one serving and are CO2 equivalents (i.e. they take into account the emissions from all the other greenhouse gases as well)
- Let the participants know they have 2 minutes to place the cards in rank order from highest to lowest.

Co-trainer:

- Hand out one set of cards per group.

Lead and co-trainer:

- Circulate amongst the groups whilst they are carrying out the activity.
- If any of the groups are struggling with the cards, you could suggest that they first put the carbon footprints in order before placing the cards with food items in order.
- You can ask some of the groups to explain their reasoning, just to check that they are on the right track. If they seem lost, consider asking them questions to guide them (and remind them of what they've learnt earlier on in the session) to the right answers. i.e.:
    - What greenhouse gases are associated with meat?
    - What are the sources of the greenhouse gases?

5 minutes: Feedback

- Ask one of the groups to explain why they put the cards in the order they did.
- Ask if any of the other groups have a different order and ask them to explain their reasoning.
- Show the group the right answers on the slides.
- Show the overview of the different carbon footprints of different diets

Here is an explanation of the amount of meat the meat eater diets contain

- High meat eater = more than 100 g meat/day
- Medium meat = 50–99 g meat/day
- Low meat eater = up to 50 g meat/day.
- As a term of reference, a Big Mac contains 90 grams of beef!

Key points:

- Cows and sheep are ruminants – have the highest emissions due to the methane they emit when burping
- Pigs are not ruminants, and as such they have a lower footprint
- Lentils and pulses have the lowest footprint

Activity: Carbon Footprint of Travel	
Material:	Sides 48 – 52 Activity 7 - The Carbon Footprint of Travel Card Sort (pdf 112 kb)

	Print 1 set per group of 5 or 6
Timing:	10 minutes
Purpose of the activity:	The purpose of this activity is to encourage participants to reflect on the carbon emissions stemming from travel. Just as previous presentation, this should also prepare participants for the action planning section later in the session.
Task:	Participants are asked to rank the carbon footprint of travel methods from highest to lowest.
Group size:	5/6

5 minutes: Carry out the activity

Lead trainer:

- Explain the purpose of the activity
- Let the participants know they have 2 minutes to place the cards in rank order from highest to lowest.

Co-trainer:

- Hand out the Travel footprint cards one set per group

Lead and co-trainer:

- Circulate amongst the groups whilst they are carrying out the activity.
- You can ask some of the groups to explain their reasoning, just to check that they are on the right track.

5 minutes: Feedback

- Ask each group to explain why they put the cards in the order they did.
- Show the group the right answers on the slides and add any necessary explanations

Points to add to feedback:

- Consider carbon footprint of mode – e.g. alternatives to flying
- Full cars share out the per person footprint
- Combine trips, travel for longer instead of short trips
- Consider more local versions of desired experience
- Useful sources: seat61.com; loco2
- Don't look at cost comparison to flight

Activity: Quiz: The Urgency of Taking Action on Climate Change	
Material:	Sides 53 - 71 Multiple choice flashcards (A, B, C, D) ***Print 1 set per group of 5 or 6 <u>or</u> get groups to make their own***
Timing:	10 minutes
Purpose of the activity:	To highlight the urgency of climate change and International and UK policies and targets

Task:	Students will be asked multiple-choice questions. They need to agree on an answer within their group and hold up a flash card with the answer option they believe is correct.
Group size:	4-5/group

Lead trainer :

- Introduce and explain the activity

Co-trainer:

- Hand out one set of multiple-choice flashcards per group. (Wait for the lead trainer to explain the activity before handing out the cards)

Lead trainer:

- Read out the questions on the slides as well as the multiple-choice options
- Give the students 30 second to discuss the answer

Once they have agreed on an answer ask them to hold up the flash card with the answer they believe is correct.

Further info:

- **The story so far:** Since the Industrial revolution, the average temperature of the planet has increased by 1 degree
- **Safe limits:** At the Paris Conference in 2015, 195 nations agreed on the target to keep temperature rise well below 2 degree warming. In addition to this, low lying nations and island nations pushed for the inclusion of keeping the temperature below 1.5 degrees as a 2-degree warming would not be a safe limit for them. In October 2018 the IPCC released a special report (SR 1.5) that found that the climate risks associated with a 2-degree warming were much greater than previously thought. As such, it is imperative to keep the warming below 1.5 degrees. You can read more about it here:
  - https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report and here: https://www.ipcc.ch/sr15/
- **Safe limits**: Net zero is defined as a 100% reduction of greenhouse gas (GhG) emissions. The "net" refers to that where some GhG emissions still exist, they must be offset (i.e. an equivalent amount of GhG's must be removed from the atmosphere) for example, through technologies like carbon capture and storage or planting trees.

Activity: Imagining a Zero Carbon World: Postcards from the Future	
Material:	Sides 72 – 82 Activity 8 - Zero Carbon World - Postcards from the Future -Vision Hand Outs (pdf 202 kb) ***Print enough postcards for a group to have one subject each***
Timing:	20 min
Purpose of the activity:	Explore what a Zero Carbon World would look like. (This is also a vital component of their Carbon Literacy certification)
Task:	In groups, participants need to read their "Postcard from the Future". Following on from this, they need to discuss a number of questions and feedback to the rest of the room.

Preparation:	Make sure you have read each of the Post cards
Group size:	5/6

Lead trainer: Introduce the activity:

- Proposed introduction (feel free to tweak it in a way that suits you): As you just learned from the quiz, globally we need to reach zero carbon by 2050 (and in Manchester, zero carbon by 2038) in order to avoid the worst impacts of climate change
- In this activity, we will explore in more detail what a zero-carbon world would look like. We will look at our buildings and our food, energy, and transport system.
- Each group will receive one aspect to explore. Your task is to read your "Postcard from the Future" and discuss the following questions:
    - What key actions are highlighted?
    - What can individuals do to support this?
    - What does government and business need to do?
    - What can you do in your future profession to support a zero-carbon future?
    - Beyond reducing our carbon emissions, can you see any other benefits of these actions?
- Give participants 10 minutes to read and discuss the activity

Co-trainer:

- Hand out the Postcards once the lead trainer has introduced the activity.
- Please make sure each group gets 2 cards with the same aspect (i.e. group number one gets 2 x Buildings postcards, group two gets x 2 Food postcards). This is to ensure they don't all have to read from the same postcard.

Feedback

- Ask each group to feedback their main points from each of the questions.
- Once all groups have fed back, summarise the key points of what a zero-carbon world would look like. (Please find the key points on next page). Make sure you highlight the other benefits of a zero-carbon world.
- Make sure to highlight that they will need to include these points at the end of the session when they complete their Carbon Literacy survey.

Key points	
Transport system	**Our Food system**
Key actions: • Less flying and driving • Vehicles powered by renewable energy • More public transport, walking and cycling **Co-benefits:** • Less polluting vehicles= cleaner air and reduction in respiratory illnesses • Increased physical activity would lead to healthier lifestyles	**Key actions:** • Less meat consumption and food waste • More plant-based protein and seasonal food **Co-benefits:** • Health benefits
Energy system	**Our Buildings**

Key actions: • Our electricity, heat and transport systems are powered by renewable energy. **Co-benefits:** • Generating new jobs	**Key actions:** • Existing buildings are retrofitted • New buildings meet net-zero carbon standards **Co-benefits:** • Warmer homes- increased health and wellbeing

Further notes and info

Buildings:

- According to the World Green Building Council, a net zero carbon building is: "A highly energy-efficient building with all remaining operational energy use from renewable energy, preferably on-site but also off-site production, to achieve net zero carbon emissions annually in operation".
- Zero Carbon Buildings: World Green Building council (2017): From Thousands to Billions - Coordinated Action towards 100% Net Zero Carbon Buildings By 2050 https://www.worldgbc.org/sites/default/files/From%20Thousands%20To%20Billions%20WorldGBC%20report_FINAL%20issue%20310517.compressed.pdf
- The Health Impacts of Cold Homes and Fuel Poverty: https://friendsoftheearth.uk/sites/default/files/downloads/cold_homes_health.pdf

Food:

- Food and planet health: https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf

LUNCH

Activity: A Zero Carbon School and City…	
Material:	Sides 83 – 91 Activity 9 - The Carbon Footprint of a School Card Sort (pdf 58 kb) ***Print 1 set per group of 5 or 6***
Timing:	15 minutes
Purpose of the activity:	The purpose of this activity is to encourage participants to reflect on the carbon emissions stemming from a typical school. Just as in the previous presentation, this should prepare participants for the action planning section later on in the session.
Task:	In groups, students arrange elements of a typical carbon school footprint from high to low.
Group size:	5/6
Introduce the activity: Give each group a card sort and arrange the elements of a typical school carbon footprint from high to low.	

Teaching: A Post-COVID Future	
Material:	Sides 92 - 98
Timing:	10 minutes
Purpose of the activity:	This activity helps participants to think about how the global pandemic has impacted carbon emissions with consideration to how we need to act with a similar level of action to tackle the climate crisis.
Task:	Presentation on the effect of Covid on GHG emissions and how the world responded to an emergency.

- Deliver mini talk about the effect of Covid on Greenhouse Gas emissions and how the world responded to an emergency.
- Discuss why the climate emergency doesn't always seem like an emergency.

Activity: Taking Action on Climate Change	
Material:	Sides 99 – 106 Postcards from the Future posters for reference Pledge tree leaves (can get students to cut them out if necessary) Branch
Timing:	35 minutes
Purpose of the activity:	This activity helps participants to think about all those that they can encourage and persuade to take action on climate change and reflect on why it is so important to engage with all of those within your sphere. This activity encourages participants to think outside of the box in terms of who they can influence to take action. This activity helps participants identify potential actions to reduce the carbon footprints of their personal lives and schools.
Task:	Make individual pledges and place on pledge tree
Preparation:	Collect a branch to use prior to the lesson. Cut out leaf shaped pieces of paper.
Group size:	5/6

Deliver mini talk about spheres of influence using PowerPoint slide

Highlight what it means to declare a climate emergency in school

- Ask each group to stand next to a poster each.
- Give them two minutes to brainstorm as many carbon reduction ideas as possible using the questions on the poster as a guidance.
- The participants have to write down their actions on post-it notes and stick these on the white spaces of the poster.

- Highlight that they need to think about both actions they can do on their own as well as actions they can do with others.
- Encourage staff to consider actions that they could take in the workplace, alone or with colleagues.
- Once the two minutes are up, ask the groups to move clockwise to the next poster and repeat the brainstorming process. Repeat this until every group has had the chance to brainstorm at each poster (as such identified actions for the main areas of carbon reduction in their workplace).
- Make sure you circulate amongst the groups and help participants that are stuck.
- Ensure that the groups know not to answer the prompt questions on the posters, but to use them for ideas on where action could be taken.
- *It is likely that participants will write down plastics related actions on the Resource Consumption and Waste Generation poster, if this occurs be sure to explain that plastics are an important environmental issue but are not significant contributors to greenhouse gas emissions.*

15 minutes – Allow reflective time for each student to come up with their own individual action. This then needs to be written neatly and added to the pledge tree.

Activity: Communicating Climate Change	
Material:	Sides 107 – 120 Paper Coloured pens PowerPoint Case studies
Timing:	15 minutes
Purpose of the activity:	In order to take action on climate change, we need to get other people on board. In order to do this, we need to be aware of strategies for influencing and communicating action on climate change. The purpose of this activity is for students to reflect on what different approaches can be used to influence others to act on climate change. By giving each group a different stakeholder to consider, it will demonstrate that you need to use a different approach depending on which audience you wish to communicate with.
Task:	Based on the stakeholder their group has been given, students are tasked to come up with a plan on how to communicate and influence action on climate change and then present this to the whole group.
Group size:	5/6

5 minutes - Lead trainer: Use the PowerPoint slide and pose the question:

- *Why is it important to be able to communicate and influence others in terms of climate change?*

Some answers might be: *"We can't act on climate change on our own, we need to get others along." "You need support with implementing actions in your home."*

- State it is also a very important skill in terms of employability.
- Go through mini lecture in the slides

Co-trainer: Hand out paper and pens whilst lead trainer is doing the mini lecture

Lead trainer to explain the activity:

- *You will all be assigned a stakeholder with whom you need to be able to influence or communicate action on climate change.*
- *Discuss what approaches would be suitable for communicating/ influencing your stakeholder to take action.*
- *Would any of the approaches above work well/not well?*
- *Decide what approach or strategy you would use.*
- *Create a poster with the strategy (remember to put your name on the poster).*
- *Present to the rest of the group.*
- Tell participants they have got 5 minutes to complete the activity.

Lead and co-trainer: Walk around the groups to ensure everyone is working on the activity and help students that are stuck.

- Tell each group they have got 2 minutes to present their strategy.
- Ask them to go to the front of the room to present.
- When they are presenting their posters, relate back to the communication strategies you have just talked them through. i.e. "That is a good example of adjusting your message to your audience".
- Make sure you give them encouraging feedback.

Teaching: The Climate Classroom	
Material:	Side 121 Carbon Classroom Lesson 7 - Preparing for the carbon classroom (pdf 153 kb) ***Print 1 copy per presenter*** Carbon Classroom Lesson 8 - Practice, practice, practice (pdf 140 kb) ***Print 1 copy per presenter*** How Bad Are Bananas books (class set)
Timing:	45 minutes minimum (this could be done on another day)
Purpose of the activity:	This lesson is about developing confidence to talk to adults about climate change and preparing to create your own Carbon Classroom.
Task:	They will practice how to approach adults, (especially if their target audience are the general public) practice their chosen activities and ask for feedback from both peers and participating adults.
Preparation:	A selection of activities carried out during carbon awareness training i.e.: • Activity - Climate action bingo cards (pdf 1.1 mb) • Activity 2a - Greenhouse effect diagram (pdf 103 kb) • Activity 2a - Greenhouse effect statements (pdf 51 kb) • Activity 3 - Greenhouse gas card sort (pdf 211 kb) • Activity 4 - Country and vulnerability card sort (pdf 1858 kb) • Activity 5 - Carbon footprint calculator (pdf 111 kb)

	• And so on…

Step one: Exploring tools to use to teach

- At the beginning of the session ask pupils to recap their knowledge of the basic science and main issues surrounding climate change. Distribute the activities which will help them examine climate change from a variety of perspectives. Ask pupils to focus on how they communicate the basic issues of climate change to each other and how they can best communicate the issues described by their activity.

Discuss:

- Ask pupils if they think any of these activities would be good for teaching adults about climate change.
- Ask pupils if they have any ideas for their own activities for teaching adults about climate change. For example, St Philip's Primary school Eco team created a Lazy-o-meter which was a reused cardboard box furnished with a turning cardboard arrow. They asked members of the public a set of questions, such as do you tend to drive everywhere, do you turn off the lights when you leave a room, do you recycle your waste, and with each answer gave the arrow a twist into the red zone, orange or green zone. The exercise was delivered in a way that made it fun but provoked the public to think about their actions.

Step two: Planning the Carbon Classroom. Discuss the practicalities of setting up a Carbon Classroom:

- Ask for a volunteer secretary to minute the session. Ensure the secretary is able to identify what the group intends to do, who is doing which tasks and when they are going to do the task by.
- Ask pupils who they need to talk to about climate change? Is there anyone in the school community they would like to approach? There are various community members such as the SLT, school governors, teachers and teaching assistants, peers, admin staff, lunchtime coordinators, parents, and family members, and they need to identify which group, or groups, to target.
- Ask the pupils to identify the aims of arranging a Carbon Classroom, the practicalities, and the best methods.

Ensure the class supports the volunteer secretary to make sure all the relevant points have been recorded.

Your Final Take Home Feelings / Messages	
Material:	Sides 122 - 123
Timing:	5 minutes
Purpose of the activity:	Reflection about the session and considering next steps
Preparation:	Printing of individual/group pledge forms

- Once they have completed their forms ask the students to turn to their neighbour and share "what is the main thing they will take away from today."
- If time allows- ask everyone to share what they have learnt. If you are very short of time, ask one participant/table to share.
- Thank them for their participation in the workshop
- Encourage the students to take home their Individual/Group pledge handout. The Individual/Group pledge handout will help them to remember the pledges they have made.

END OF SESSION