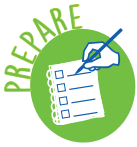


Carbon Footprint

Teacher's Guide

Sustainability



To prepare for teaching students about carbon footprint, review the United Nations 17 sustainability goals and the major causes of greenhouse gases. Students will explore how carbon footprint is measured and how the term is used to represent the growing global predicament of CO₂e-related pollution caused by the greenhouse gases. These gases are released into the atmosphere as byproducts of human activities such as using transportation, processing food and agriculture, producing heating and cooling systems, etc. The components of CO₂e are carbon dioxide (CO₂) and its equivalents: nitrous oxide (a byproduct of fertilizers), methane (emitted during agricultural processes such as raising cattle), and the release of other gases into the atmosphere such as fluorinated gas.

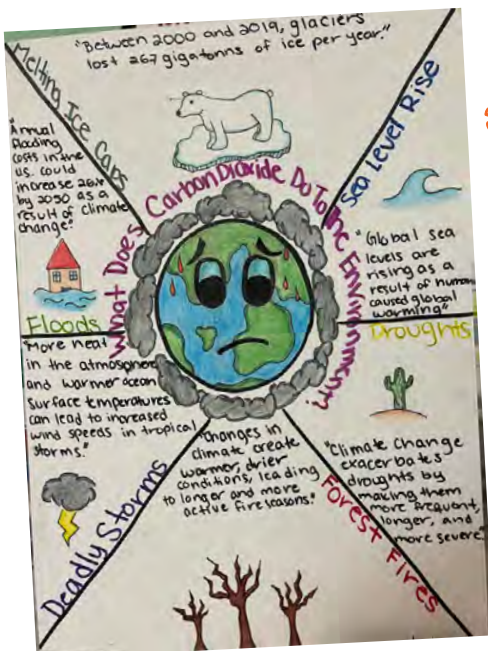
Greenhouse gases absorb the sun's heat, trap it in our atmosphere, and prevent it from escaping into space (similar to the way a glass roof on a greenhouse traps the sun's heat in that building). Because greenhouse gases cause the Earth to get warmer, the term *global warming* is used to describe this aspect of climate change.

Students will use their Thinking Sheets to plan and create a draft of an informational poster and receive feedback on their visuals and text. You may want to assess prior knowledge by seeing how familiar they are with the vocabulary they'll use in this activity: carbon footprint, greenhouse gases, atmosphere, carbon dioxide, equivalents, energy, electricity, agriculture, transportation, posters, and visual representations.



This section of the student Thinking Sheet helps them organize the factual information from their carbon footprint research. Students might work individually or in small groups to conduct their research and record highlights in the RESPOND section of their Thinking Sheets.

- Students RESPOND to the thought bubbles by exploring local, regional, or global examples of carbon footprint.
- Discuss where science-based factual information can be found and how to determine the difference between science-based facts and opinions, giving examples of each. For example: changes in the patterns of rainfall over several years are measurable and documented facts. Attributing the amount of any one rainfall to global warming is an association or opinion.
- After they gather factual information, ask them to articulate what else they would like to know. This will inspire additional research and demonstrate that learning is an ongoing process based on their curiosity.



This section encourages students to plan a visual communication of what they know and have researched.

- Help students identify images, including symbols and icons, that visually communicate their ideas. Encourage them to generate ideas for the title and text, paring down the words to those that are most important and would have an impact in the poster format.
- The Thinking Sheet asks students to visualize a draft which will help them plan the composition and layout of their actual poster, which they will create later as they transfer their refined ideas onto a large sheet of cardboard or poster board.
- Experimenting with various color combinations on the Thinking Sheet will help students decide how to use colors and contrast in their posters.

Sustainability



This section encourages students to present their work in progress to classmates and use feedback to refine their draft. The process of presentation deepens learning, as students articulate their ideas, show their work, and respond to others' feedback. As they present they develop confidence and learn to listen to other perspectives.

- Help presenters conduct interactive presentations where they ask the audience what they see before telling what was made.
- Encourage students to ask for suggestions for how to improve their visual communication in their draft posters.
- It might help to divide the class into small groups, so that each audience participant has an opportunity to provide the presenter with feedback. Students can help decide how to form those groups, based on their interests or research insights.



This section asks the students to apply the insights they learned while creating these informational posters to other issues they care deeply about.

- As a whole class or in small groups, have students generate ideas for additional informational posters they could create.
- Urge them to articulate why the topic(s) are important enough to allocate time, materials, and effort.
- Decide which topics will be explored and when students will work on the additional informational posters.



At the end of this experience, meet with students to assess how it went. What did students like, what do they wish had been different, and what could they have done differently? Together, set refined collaboration and presentation goals or focus on another aspect that they would like to work on, so they can continue to develop life skills in addressing real-world problems like carbon footprint.

Crayola Commitment to Reducing Carbon Footprint

Environmental experts agree that reducing carbon footprint is one of the most important ways to slow global warming and positively impact the environment. The Science Based Target initiative (SBTi), a collaboration of global nonprofit organizations, businesses, and world governments, set goals to limit global warming to not exceed 1.5°C. To achieve these goals, participating organizations, including Crayola and its parent company, Hallmark, which joined SBTi, will reduce carbon emissions significantly by 2030.

Crayola sources raw materials locally and manufactures crayons and markers close to where they are used, which helps reduce the carbon footprint. Crayola has reduced CO₂e emissions from the company-owned facilities' direct and indirect energy sources* by 82% since 2019, with investments in renewable energy as well as efficiencies in US manufacturing processes. (*Direct energy is the use of gasoline, natural gas, oil, etc. Indirect energy emissions are created when the energy is produced, but not when it is used.)