

A Warmer World

Unit 4

This slide deck is intended to help guide you and your students through the sequence of this unit. While you may choose to use these slides as a helpful tool to prompt and facilitate students, all detailed information for each unit is in the student and teacher unit booklets.

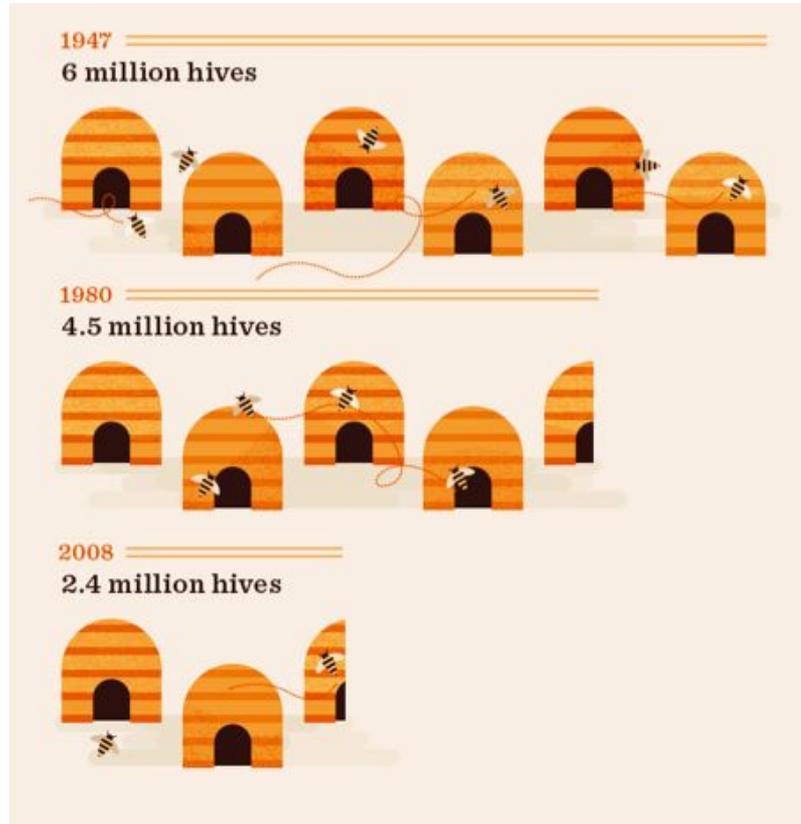
Unit Essential Question

How do humans impact organisms around the world and what can we do about it?

Bad News for Bees

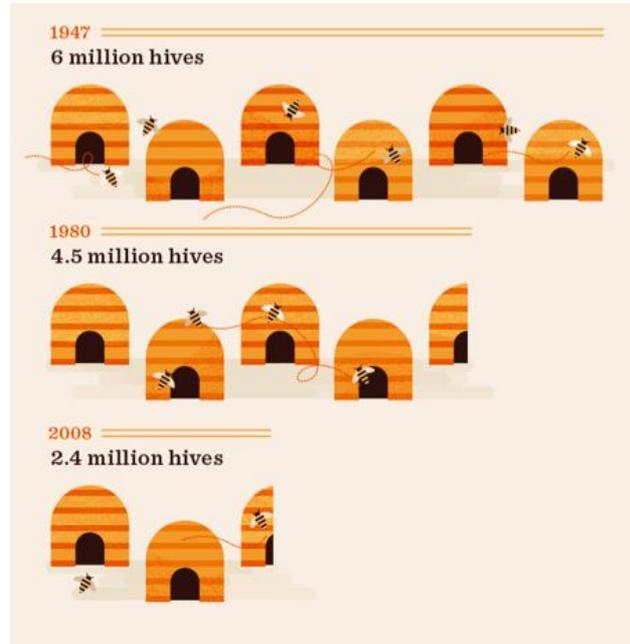
Lift-Off Task

Population of Bees



Generate Questions!

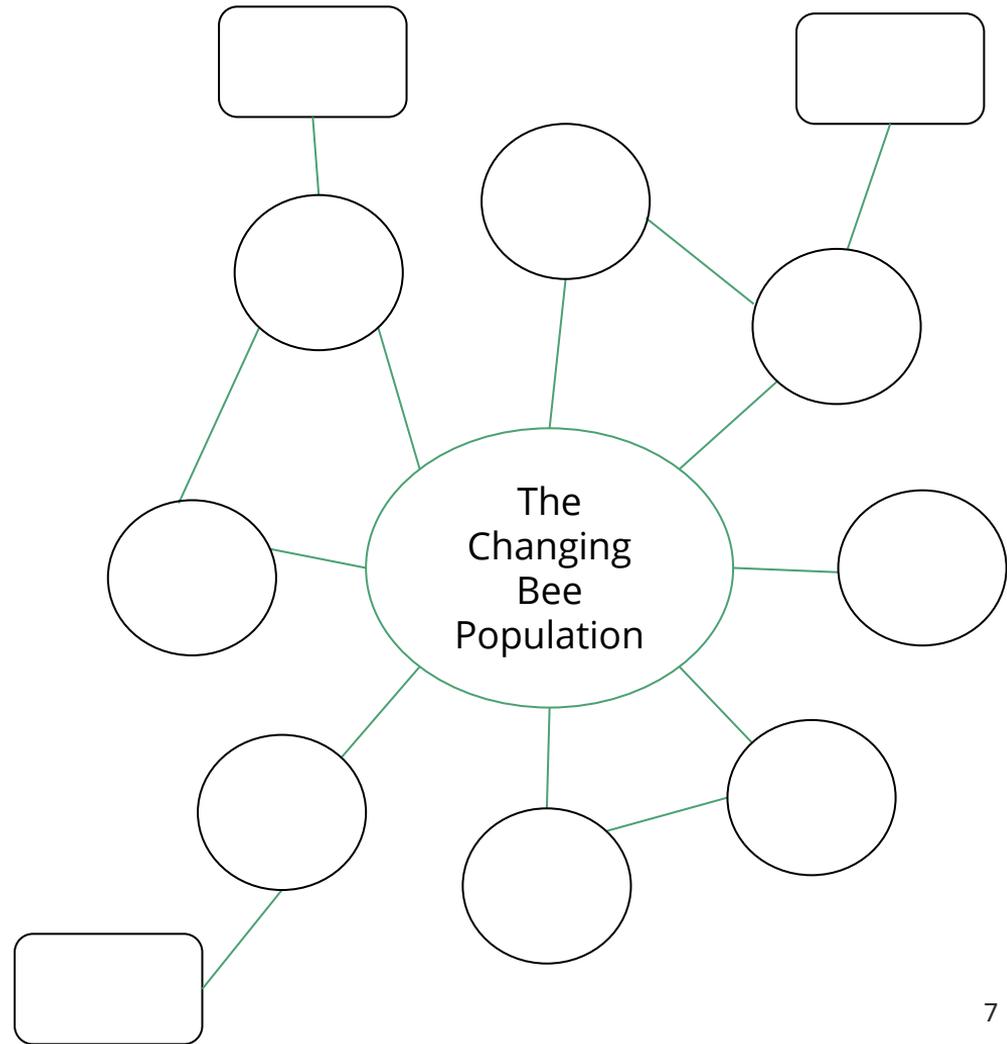
If you wanted to know more about the world's bee population between 1947 - 2008, what questions would you ask?



Group Concept Map

As a group, create a concept map that shows:

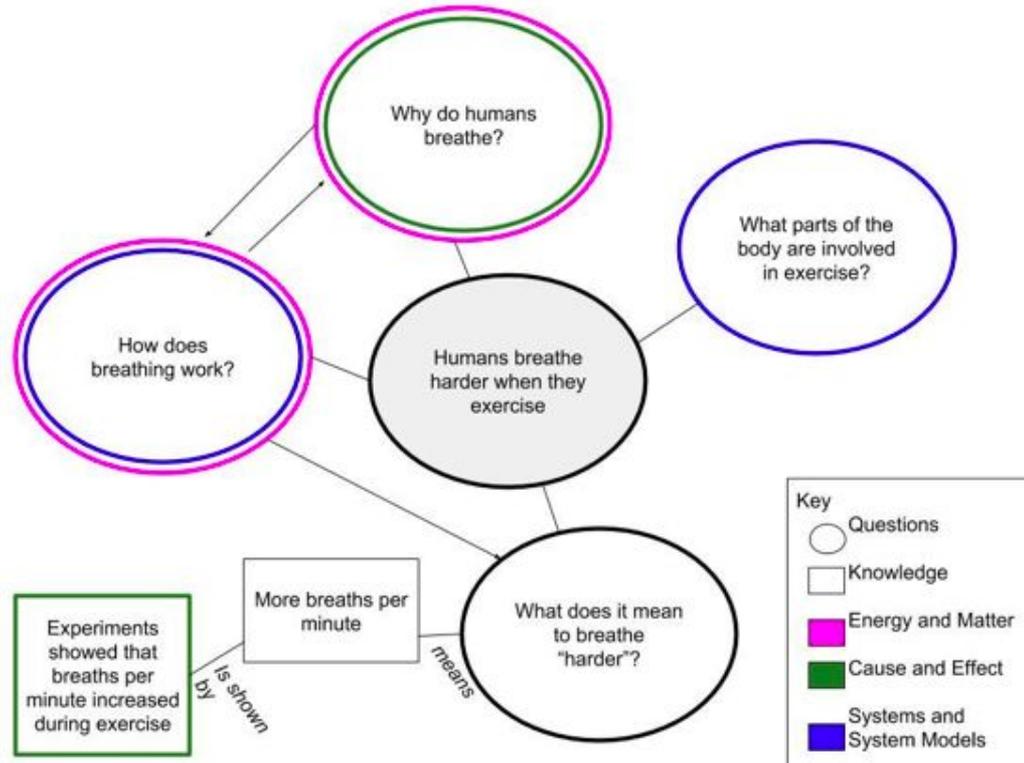
- Questions your group members had in common (circles)
- Possible answers to some questions (squares)
- Connections between related questions (lines)



Class Concept Map

As a class, create a concept map that shows:

- Key questions (circles)
- Possible answers to some questions (squares)
- Connections between related questions (lines)
- Crosscutting concepts used (trace in color)



Introduction to the Culminating Project

Design a Method to Monitor and Minimize the Impact of Global Warming on a Specific Plant or Animal

Group Project - Create an Advocacy Video That Describes the Human Impact On Your Chosen Organism and Gives a Potential Solution

Individual Project - Create a Solutions Evaluation That Compares and Evaluates the Different Solutions Presented



List of Organisms to Choose From

- Magpie Lark
- Shorbird
- Finnish Farm Bird
- Salmon
- Whooping Crane
- Hummingbird
- Caribou
- Lilac
- Spider Orchid
- Glacier Lily

Connecting to the Culminating Project

You have been asked to create an advocacy video that describes the human impact on an organism and gives a potential solution. Based on your discussion in groups today,

- Make a hypothesis: What do you think is causing the bee population to decrease?
- Do you think other organisms around the world might also be affected by the same cause?

Complete this **individually** in your Project Organizer.

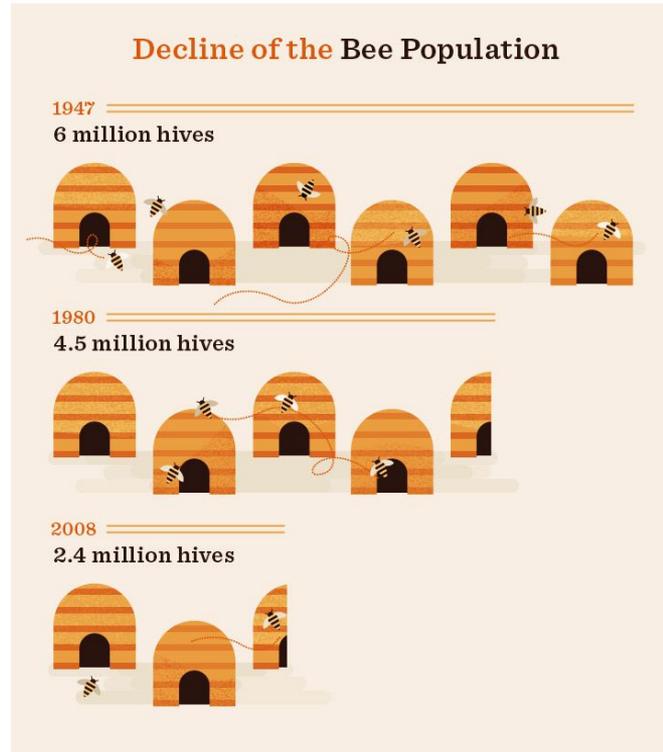
Reflection

Complete the questions at the end of your student guide to reflect on what you have learned in the Lift-Off Task.

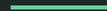
Heating Up

Task 1

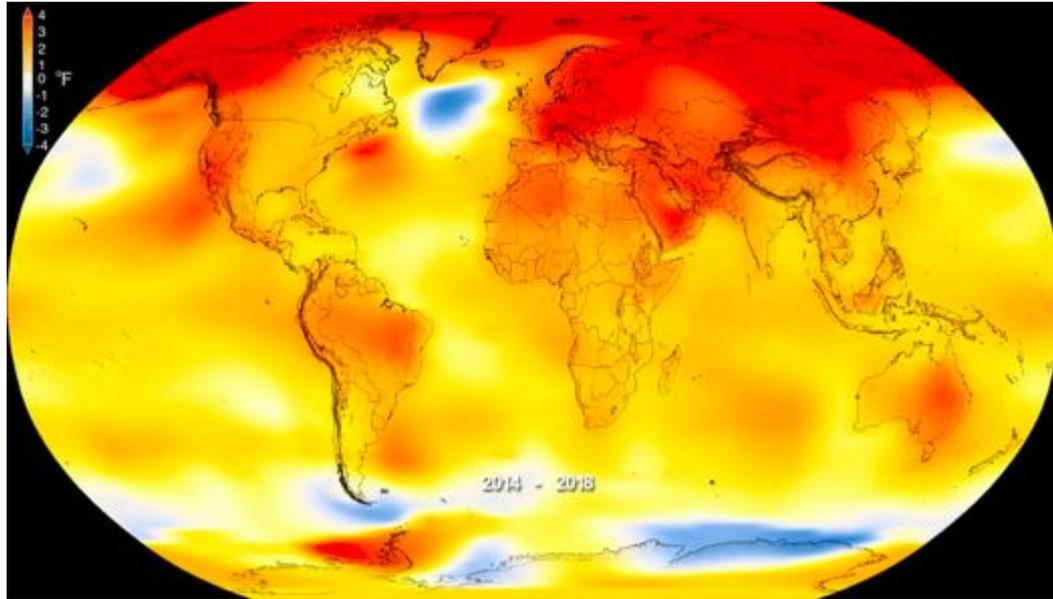
What questions do you still have?



Engage

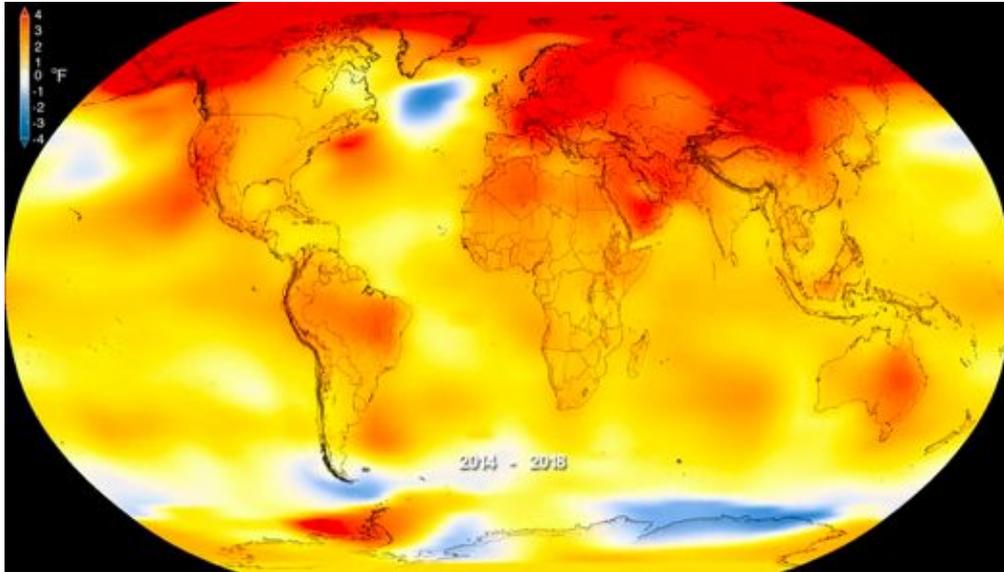


How are environments changing around the world and why?



https://climate.nasa.gov/climate_resources/42/video-temperature-puzzle/ (0:00 - 1:00)

Make Hypotheses



What do you think is causing these rising temperatures?

Why do you think rising temperatures might affect organisms?

What questions could you ask in order to find out more about rising temperatures?



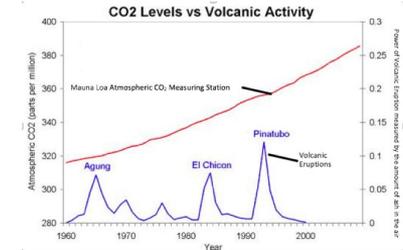
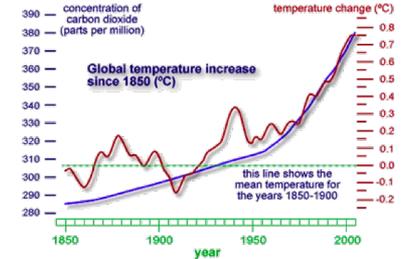
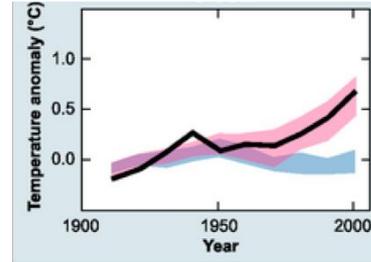
Explore



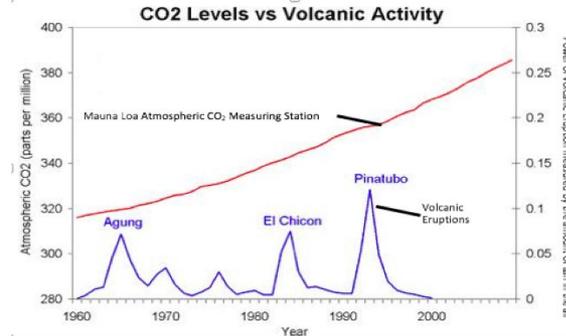
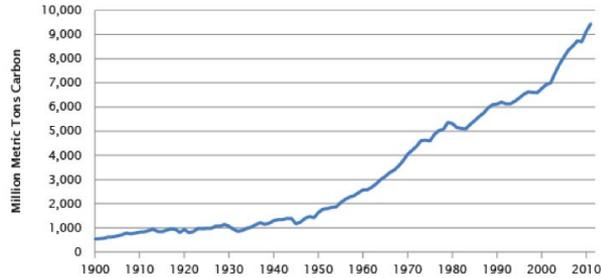
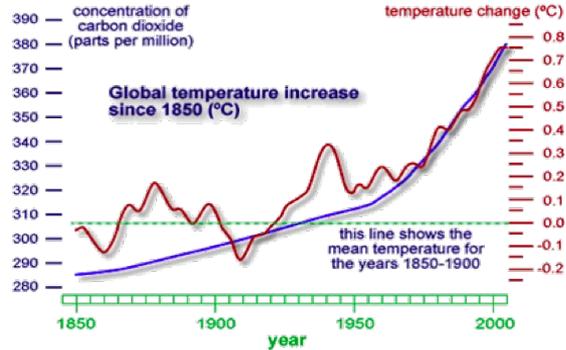
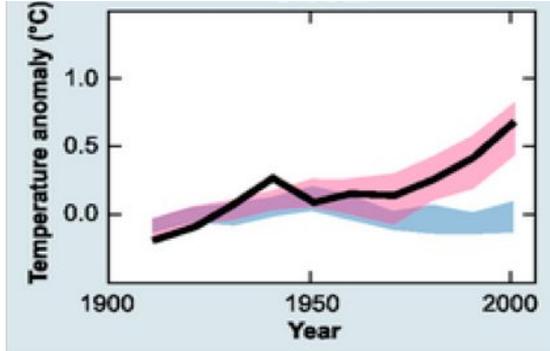
Asking Questions

You will get one piece of evidence at a time. For each piece of evidence, discuss with your group and record:

- What you think the evidence tells you
- Any questions you have about the evidence or things the evidence makes you want to know more about



Class debrief

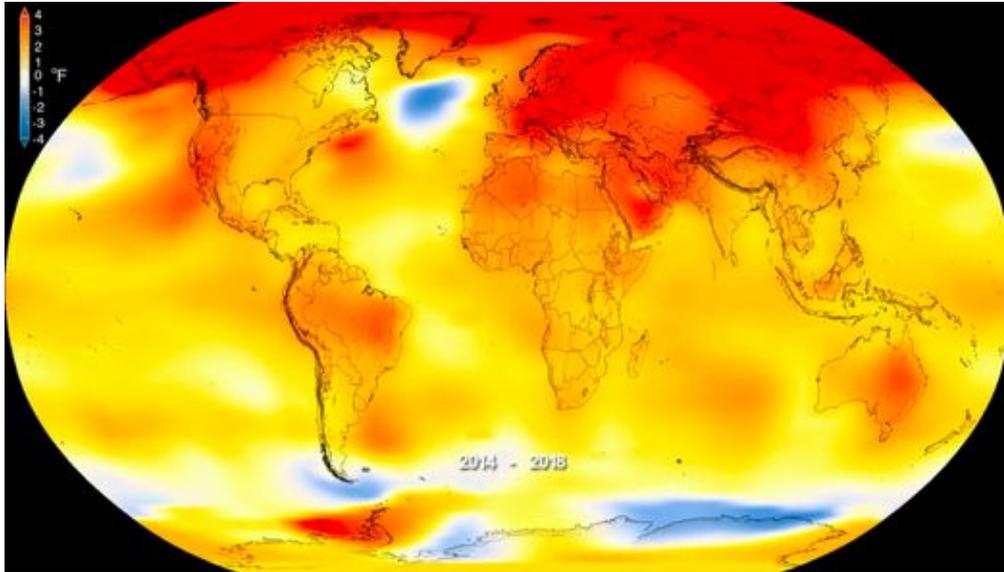


Are global temperatures actually rising? If so, why?

Explain



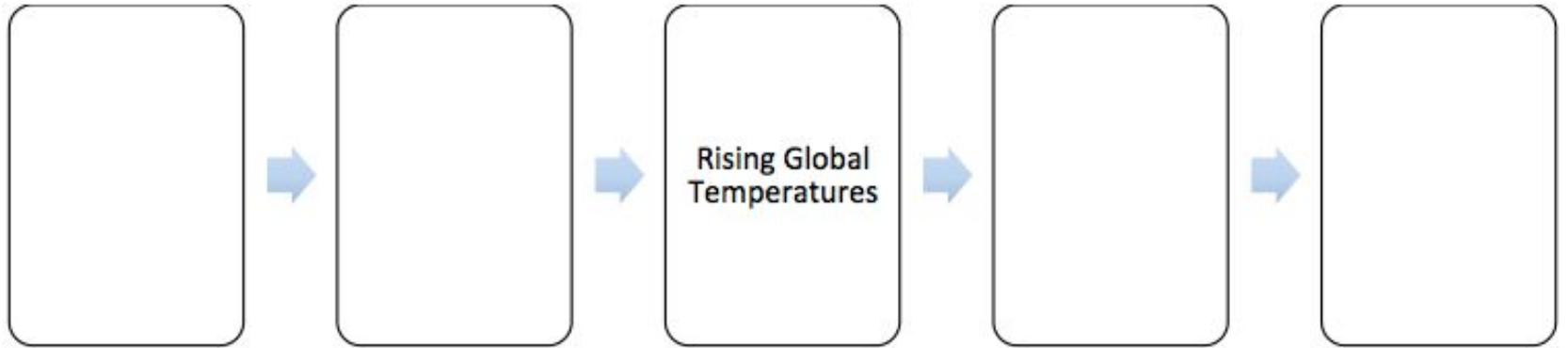
Return to the *Engage* Questions



What do you think is causing these rising temperatures?

Why do you think rising temperatures might affect organisms?

Complete the Cause-and-Effect Flowchart



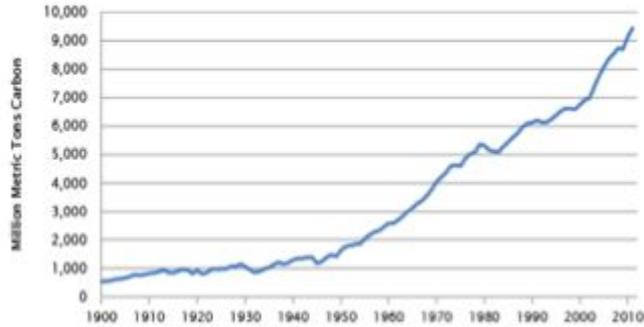
Label the arrows with the resource from the *Explore* that allowed you to make the connection.

Elaborate



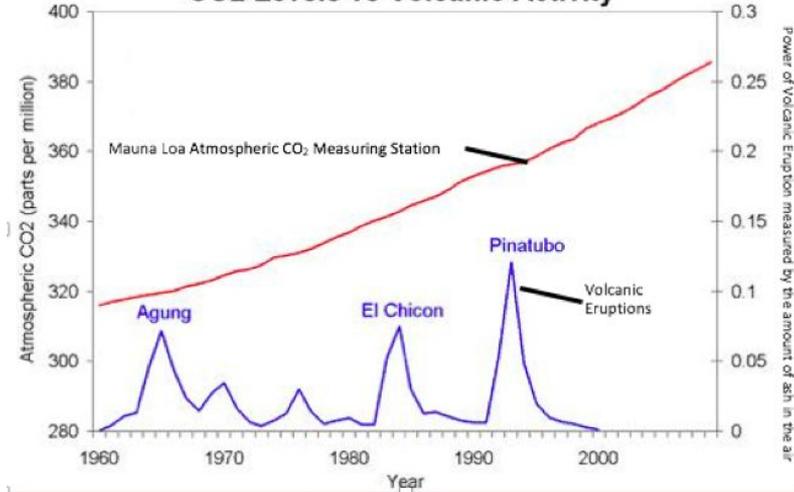
Stability and Change

Graph: Carbon Emissions From Fossil Fuels
Evidence 4



"Carbon Emissions" refer to the carbon dioxide released into the atmosphere
"Fossil Fuels" are fuels made from a natural resource like coal, oil, and natural gas

CO2 Levels vs Volcanic Activity

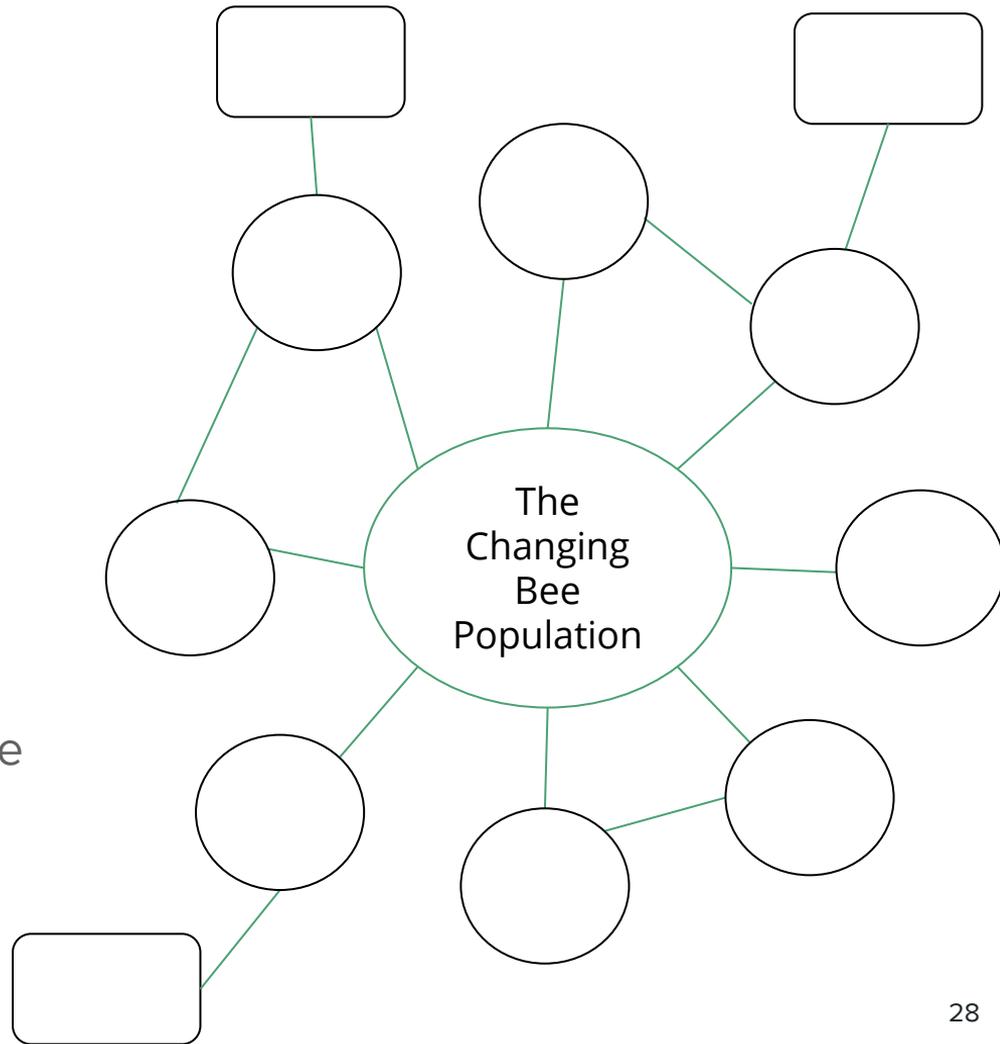


1. Which graph represents a sudden change? Which one represents gradual changes that have accumulated over time? Explain
2. Which cause seems to have more of an impact?

Class Concept Map

Add to your class concept map:

- New questions (circles)
- New ideas learned (squares)
- New connections (lines and connector words)
- Crosscutting concepts used (trace in color)
 - Stability and Change



Evaluate



Connecting to the Culminating Project

You have been asked to create an advocacy video that describes the human impact on an organism and gives a potential solution. You have been provided with a list of organisms that are affected by rising temperatures. As a group, select an organism from the list to focus on for your culminating project and research your organism. Individually,

- Define the **problem**: What is happening to global temperature and why might it be a problem?
- Identify the **criteria** for a successful solution: How will you know if a solution addresses the problem?
- Identify the **constraints** of solving this problem: What might make it hard to solve this problem?

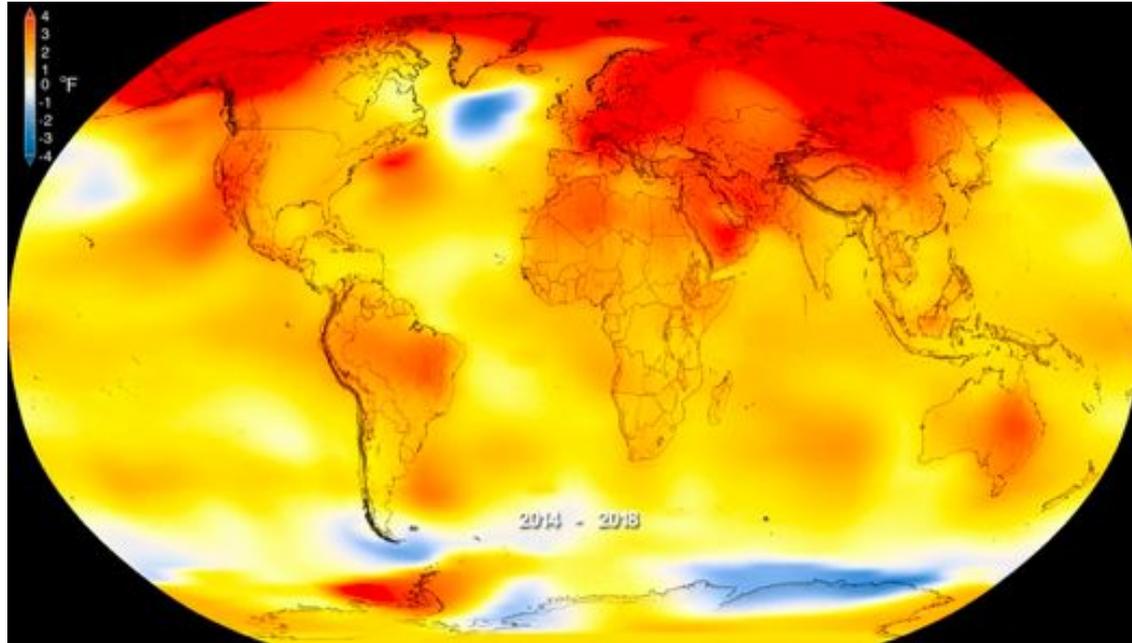
Reflection

Complete the questions at the end of your student guide to reflect on what you have learned in Task 1.

It Takes Two

Task 2

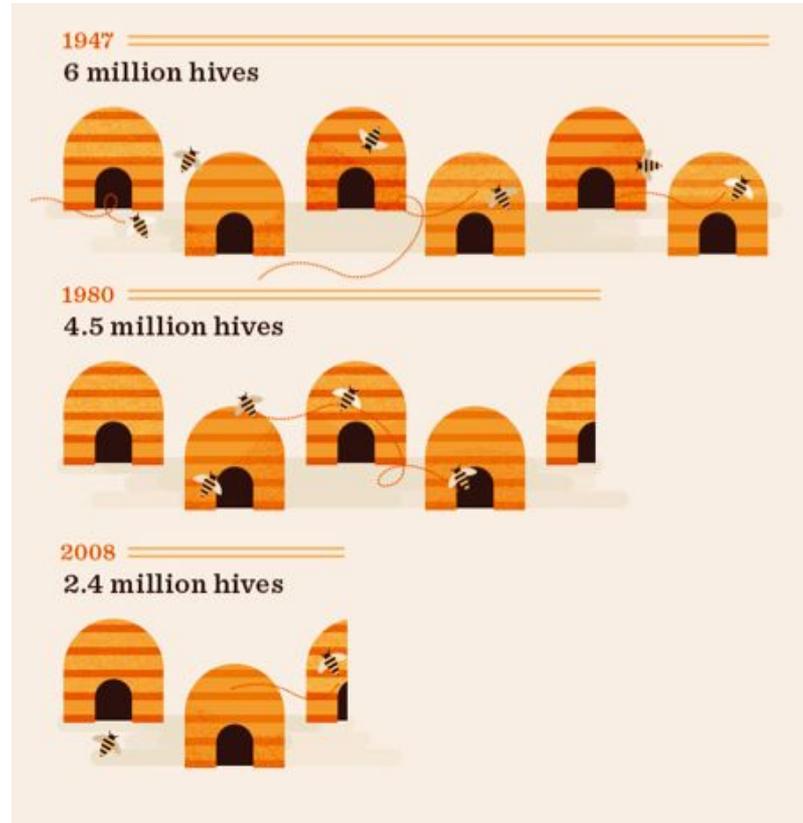
What questions do you still have?



Engage



What did you learn in the Lift-Off Task?



The Bee Population Is Declining



Scientists say that bees and flowering plants rely on each other, so this could be a huge concern. In partners, discuss:

What do you think scientists mean when they say bees and flowering plants rely on each other?

Explore



How Do Animal Behaviors and Plant Structures Help Organisms To Survive and Reproduce?



With your group,

1. Visit the stations.
2. Record your evidence in the table in your Student Guide.

Class Debrief - In what examples did animal behaviors and plant structures seem related?



Explain



Engaging in Argument from Evidence



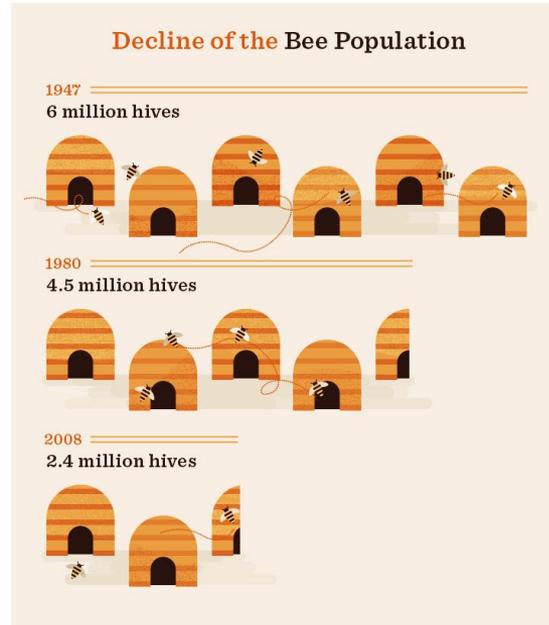
Now that you have seen the different characteristics that help plants and animals survive and reproduce and how these are related, let's return to the *Engage* scenario: Scientists say that bees and flowering plants heavily rely on each other.

Individually, write an argument that supports or refutes this statement using evidence from the *Explore* stations and your own scientific reasoning.

Elaborate



What do you think is likely to happen to plants if the bee population continues to decline?

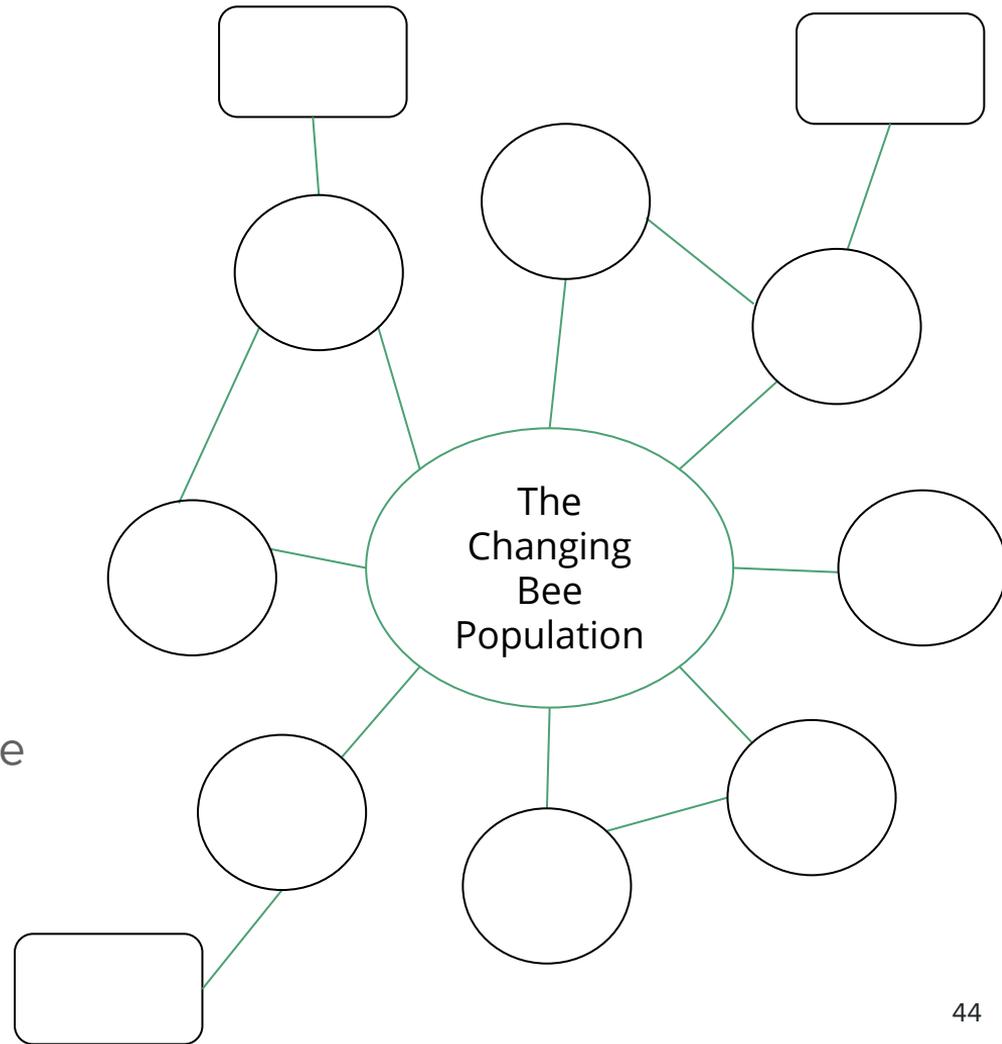


Discuss with a partner and record your prediction and reasoning in your Student Guide.

Class Concept Map

Add to your class concept map:

- New questions (circles)
- New ideas learned (squares)
- New connections (lines and connector words)
- Crosscutting concepts used (trace in color)
 - Cause and Effect



Evaluate



Connecting to the Culminating Project

You have been asked to create an advocacy video that describes the human impact on an organism and gives a potential solution. Consider your chosen organism and do additional research, as necessary:

- What specialized structures OR behaviors does your organism have that help it survive and reproduce? Describe how these characteristics specifically help with survival and/or reproduction.

Complete this **individually** in your Project Organizer.

Reflection

Complete the questions at the end of your student guide to reflect on what you have learned in Task 2.

Feeling the Impact

Task 3

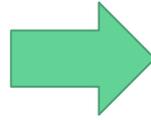
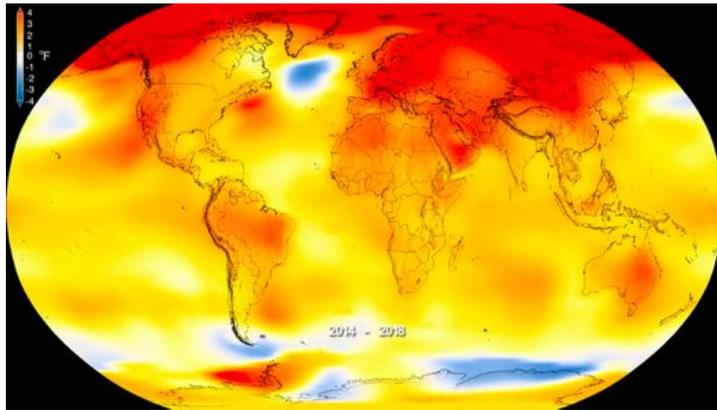
What questions do you still have?



Engage



What happens if an organism's environment changes in a way that affects their behaviors and structures?



How Does Global Warming Affect Organisms?

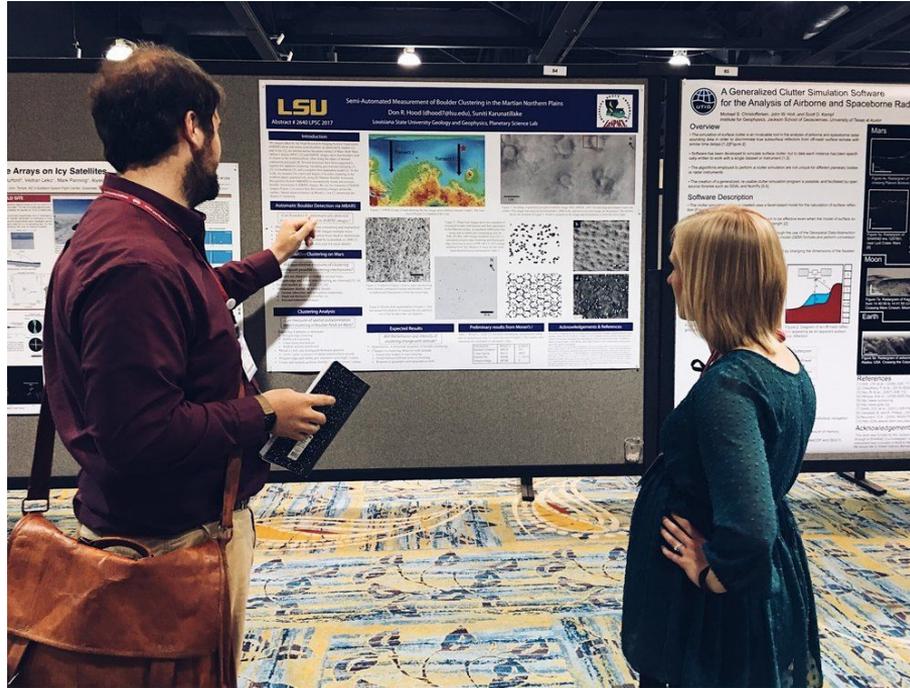


In partners, brainstorm a list of plants and animals you've heard are being affected by rising temperatures. If you know how they are being affected, add a description!

Explore

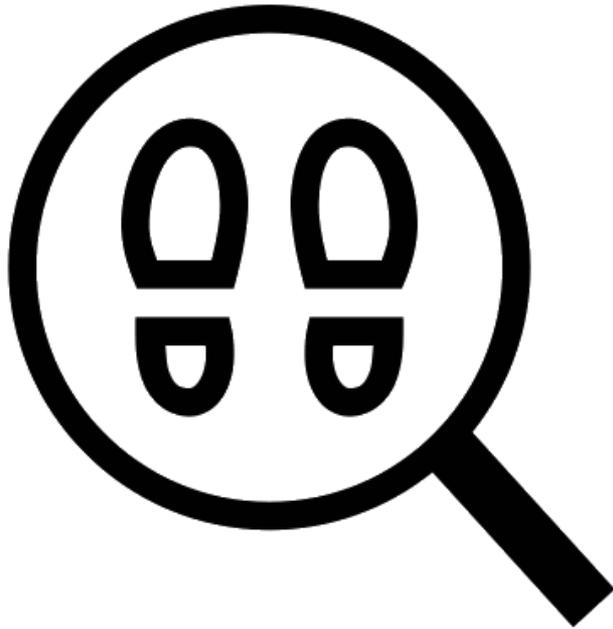


You will present a poster at a Science Conference!



How Is Global Warming Affecting Organisms Around the World?

To make your scientific poster, you need to do more research!



In groups,

- Research the organism you chose for your Culminating Project to figure out how it is being impacted by rising global temperatures
- Record notes in your Student Guide

Explain



Create Your Scientific Poster!

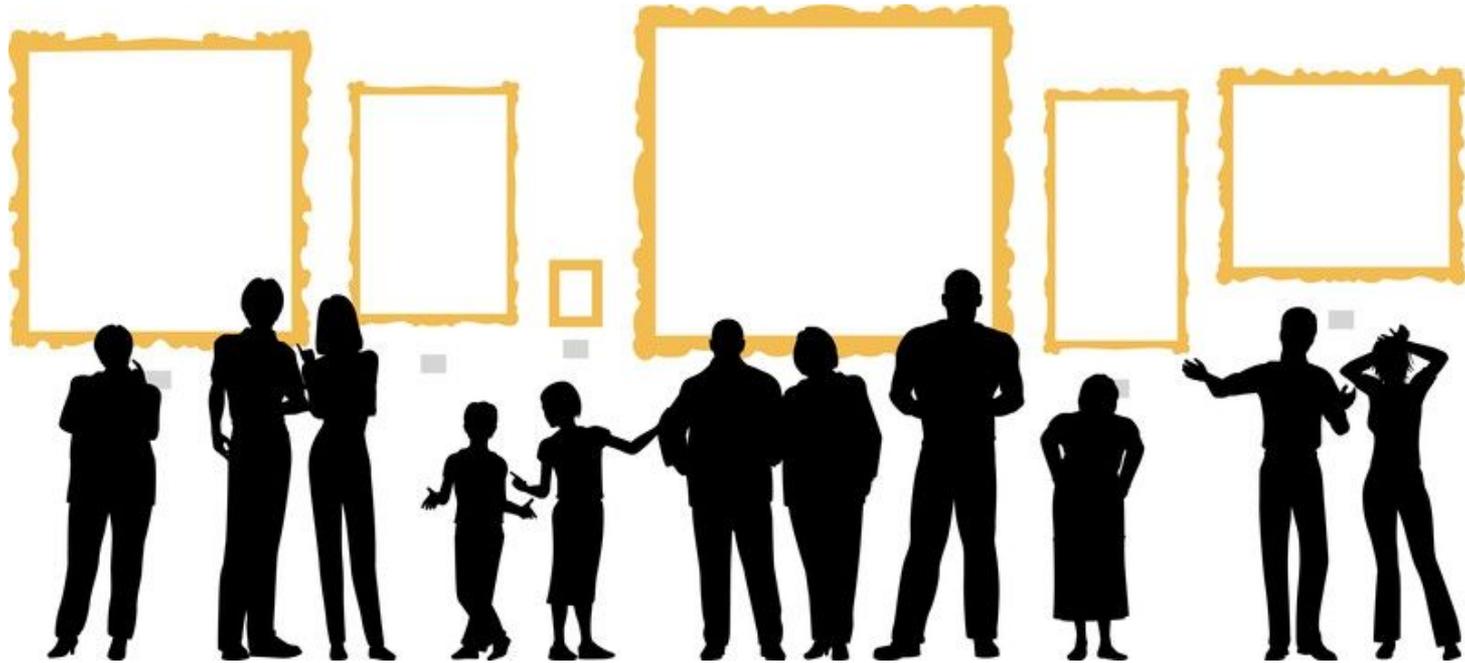


Your poster should include:

- A description of your organism
- A description of the plant structure or animal behavior that helps it survive and/or reproduce
- An explanation for how it is affected by global warming
- Visuals and headers to get your audience interested!

Prepare to present your poster to your classmates!

Gallery Walk



Give feedback to your peers!

Elaborate



Brainstorm: What can we do about it?



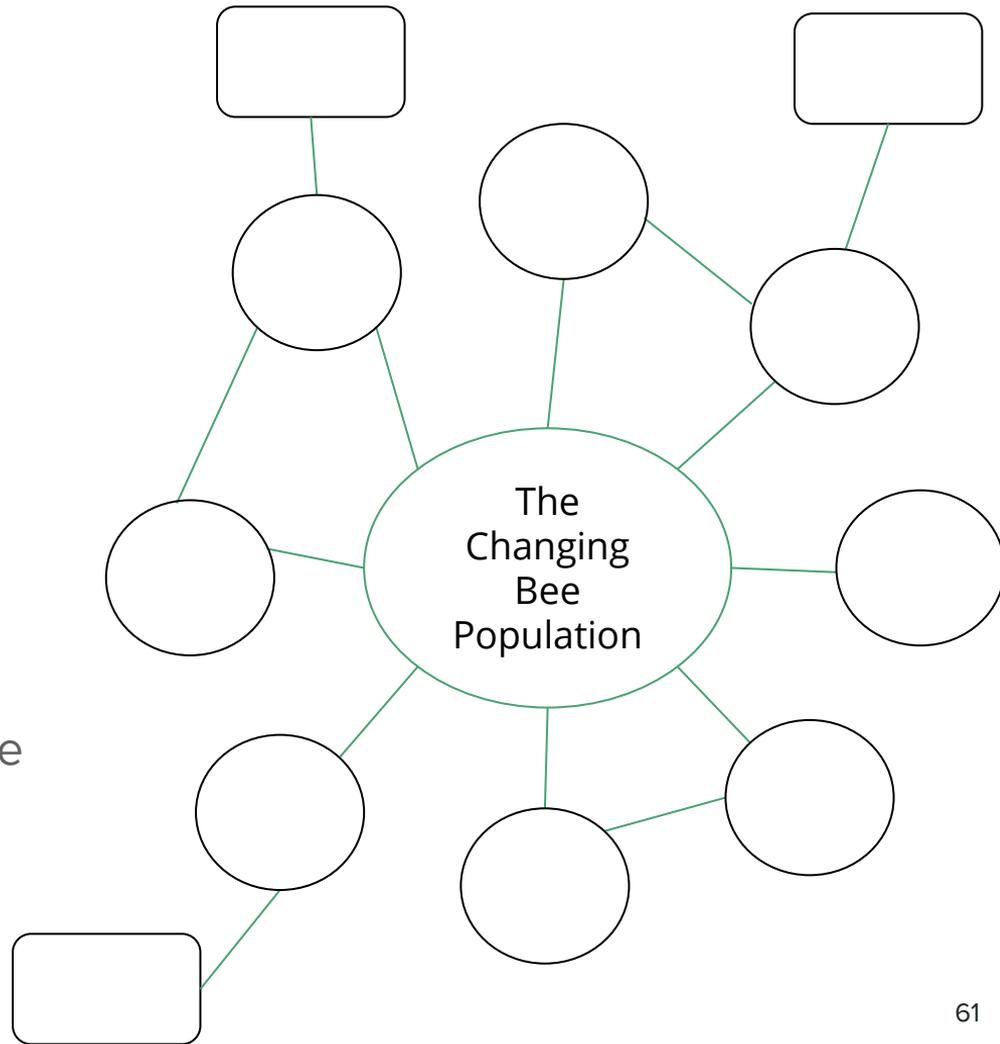
Design Thinking Post-It Method:

1. Individually, write down as many ideas for solutions as you can.
2. Place post-its on the poster. Make sure to share everyone's ideas!
3. As a group, cluster similar post-it ideas into groups.
4. Discuss and record your top ideas in your Student Guide.

Class Concept Map

Add to your class concept map:

- New questions (circles)
- New ideas learned (squares)
- New connections (lines and connector words)
- Crosscutting concepts used (trace in color)
 - Cause and Effect



Evaluate



Connecting to the Culminating Project

You have been asked to create an advocacy video that describes the human impact on an organism and gives a potential solution. In this task, you learned about how humans are impacting your chosen organism through global warming and you are well on your way to coming up with a solution!

- Summarize the ideas from your poster here.
 - Describe the feedback you received from peers and how you plan to revise it based on that feedback.
- Return to your criteria and constraints that you identified after Task 1. Based on what you have learned about your organism so far, how can you revise them or add to them?

Complete this **individually** in your Project Organizer.

Reflection

Complete the questions at the end of your student guide to reflect on what you have learned in Task 3.

Culminating Project

Design a Method to Monitor and Minimize the Impact of Global Warming on a Specific Plant or Animal

Group Project - Create an Advocacy Video That Describes the Human Impact On Your Chosen Organism and Gives a Potential Solution

Individual Project - Create a Solutions Evaluation That Compares and Evaluates the Different Solutions Presented



Don't forget to use your checklist of criteria!

Group Project Criteria for Success

Your advocacy video should include:

- ✓ A description of the problem
 - How is your chosen plant/animal affected by global warming, and why is it a problem?
 - What are the criteria for solving this problem?
 - What are some constraints in solving this problem?

- ✓ An explanation of your method to monitor or minimize the impact on your plant/animal

- ✓ The pros and cons of your solution
 - How does it meet the criteria and constraints of the problem?
 - What are some challenges in meeting the criteria and constraints?

- ✓ Quality Video Structure
 - Grabs the audience's attention
 - Is organized logically
 - Includes relevant visuals
 - Persuades your audience

Take Notes On Other Groups' Videos

Advocacy Video Notetaker

	Organism	Notes	How well does the solution meet the criteria and constraints of the problem? Could this solution work for my organism?
1			
2			
3			

Design a Method to Monitor and Minimize the Impact of Global Warming on a Specific Plant or Animal

Group Project - Create an Advocacy Video That Describes the Human Impact On Your Chosen Organism and Gives a Potential Solution

Individual Project - Create a Solutions Evaluation That Compares and Evaluates the Different Solutions Presented



Don't forget to use your checklist of criteria!

Individual Project Criteria for Success

Your solutions evaluation should include:

- ✓ A description of the problem facing all of the organisms, including:
 - The criteria and constraints for solving this problem for all of the organisms

- ✓ Scientific background to help your audience understand the problem, including:
 - The cause of the problem and the evidence that supports this cause-and-effect relationship
 - Whether you think this problem was caused by a sudden change or gradual changes that have accumulated over time and why

- ✓ An argument for why global warming poses a threat to organisms, including:
 - How all the organisms' behaviors or structures affect their probability for successful reproduction, and
 - How these behaviors or structures are being affected by rising temperatures
 - For both bullets above, remember to include descriptions of examples from other groups' projects as evidence

- ✓ An explanation of your method to monitor or minimize the impact on your plant/animal

- ✓ An evaluation of solutions:
 - Which solution do you think will have the most impact (best meets the criteria)? Why?
 - Which solution seems to be the most feasible (best meets the constraints)? Why?
 - Based on your evaluation, which solution would you recommend and why?

