

Unit Closing

How do natural factors contribute to changes in Earth's temperature? What are 99.9% of climate scientists seeing in historical climate data that makes them so sure humans are the cause of climate change today, and why does it matter?

Performance Expectations

HS-ESS3-1,
HS-ESS3-5

Anchor Phenomenon

Time

1-3 days

Based on the investigations and learning throughout the unit, students generate a final explanation detailing how humans are causing climate change and why it matters to their community.

Anchor Phenomenon	What are 99.9% of climate scientists seeing in historical climate data that makes them so sure humans are the cause of climate change today, and why does it matter?	Based on the investigations and learning throughout the unit, students review their ideas for why scientists are sure that humans are causing climate change and why it matters.
Driving Question Board	What questions have been answered? What have we not answered yet?	Based on the investigations and learning throughout the unit, students return to the Driving Question Board to reflect on questions generated throughout the unit.
Performance Task	What are 99.9% of climate scientists seeing in historical climate data that makes them so sure humans are the cause of climate change today, and why does it matter?	Based on the investigations and learning throughout the unit, students generate a final explanation of why scientists are certain that humans are causing climate change and why it matters.

Science & Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

Anchor Phenomenon

What are 99.9% of climate scientists seeing in historical climate data that makes them so sure humans are the cause of climate change today, and why does it matter?

Based on the investigations and learning throughout the unit, students review their ideas for why scientists are sure that humans are causing climate change and why it matters.

Preparation

Student Grouping

☐ None

Routines

None

Literacy Strategies

None

Materials

Handouts

☐ None

Lab Supplies

None

Other Resources

Generating Ideas about Anchor Phenomenon

1. Students return to the anchor phenomenon and review their ideas for why scientists are sure that humans are causing climate change and why it is a problem.

Driving Question Board

What questions have been answered? What have we not answered yet?

Based on the investigations and learning throughout the unit, students return to the Driving Question Board to reflect on questions generated throughout the unit.

Preparation

Student Grouping

None

Routines

None

Literacy Strategies

None

Materials

Handouts

None

Lab Supplies

None

Other Resources

☐ Driving Question Board

Revisit the Driving Question Board

1. Students return to the questions generated throughout the unit and reflect. What questions have been answered? Are there questions that we still need to investigate?
2. Note that not all of the students' questions will be answered at the end of the unit, and students may have generated entirely new questions. Depending on student interest and instructional time, prompt students to explore some of the unanswered questions independently. Questions about reducing the impact of climate change or reversing the trend will surface again in Unit 6, Solutions for a Sustainable Future.

Performance Task

What are 99.9% of climate scientists seeing in historical climate data that makes them so sure humans are the cause of climate change today, and why does it matter?

Based on the investigations and learning throughout the unit, students generate a final explanation of why scientists are certain that humans are causing climate change and why it matters.

Preparation

Student Grouping

☐ None

Routines

None

Literacy Strategies

None

Materials

Handouts

☐ Final Performance Task

Lab Supplies

None

Other Resources

Unit Closing Task

1. Remind students of our overarching goal to disprove any skeptic who claimed that humans are not the cause of current climate change and to demonstrate why it matters.
2. Provide students with the Unit Closing Task.
3. Students should use evidence from all of the investigations to explain how we know that humans are causing climate change, how that impacts other climate variables, and how that is likely to affect members of their community. Students can use different formats for this explanation.

Standards in Unit Closing

Performance Expectations

HS-ESS3-1

Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.

Assessment Boundary: None

In NYS, the clarification statement has been edited as follows: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards could include those from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as blizzards, hurricanes, tornados, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations could include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.

HS-ESS3-5

Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).

Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.

In NYS the clarification statement has been edited as follows: Examples of evidence could include both data and climate model outputs that are used to describe climate changes...

Aspects of Three-Dimensional Learning

Science and Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

Analyzing and Interpreting Data

- Apply concepts of statistics and probability (including determining function fits to data,

ESS3.B Natural Hazards

- Natural hazards and other geologic events have shaped the course of human history;

Patterns

- Empirical evidence is needed to identify patterns. CCC1(5)
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Science and Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. SEP4(2)

Constructing Explanations and Designing Solutions

- Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. SEP6(2)

they have significantly altered the sizes of human populations and have driven human migrations. ESS3.B(1)

ESS3.D Global Climate Change

- Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. ESS3.D(1)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. CCC2(1)

Assessment Matrix

	Anchor Phenomenon	Driving Question Board	Performance Task	Unit Reflection
Analyzing and Interpreting Data			Final Performance Task	
Constructing Explanations and Designing Solutions			Final Performance Task	
ESS3.B Natural Hazards	Generating Ideas		Final Performance Task	
ESS3.D Global Climate Change			Final Performance Task	
Patterns			Final Performance Task	
Cause and Effect	Generating Ideas			

Common Core State Standards Connections

	Anchor Phenomenon	Driving Question Board	Performance Task	Unit Reflection
Mathematics	MP.2 MP.4			
ELA/Literacy	RST.9-10.1 RST.9-10.7 WHST.9-10.2 WHST.9-10.1 WHST.9-10.9 SL.9-10.4			