

CLIMATE CHANGE LITERACY UNIT

Grades 6-10 | 4-Week Unit

20 Lesson Plans - Data Analysis - Research Project
Myth-Busting Cards - Assessment - Action Pledge

A Non-Partisan, Science-Grounded Unit on
Causes, Evidence, Impacts, Solutions, and Climate Anxiety Support

Includes a Student Climate Action Project

UM Printables

Premium Educational Resources for Teachers

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MYTH-BUSTING DISCUSSION CARDS

- Cards 1-20: Myth, Fact, Discussion Prompt

CLIMATE SOLUTION RESEARCH PROJECT

- Project Overview & Timeline
- Topic Selection Guide
- Research Organizer
- Presentation Rubric

CLIMATE ACTION PLEDGE POSTER

- Pledge Template & Design Activity

UNIT ASSESSMENT & ANSWER KEY

- Summative Assessment (40 points)
- Answer Key with Scoring Guide

MS-ESS3-5	Ask questions about factors that determine climate and its changes	1-5
MS-ESS3-4	Construct an argument supported by evidence for how human activities affect the environment	3, 6-10
HS-ESS3-5	Analyze geoscience data to make claims about how changes in climate affect Earth systems	4, 6, 10
MS-ETS1-1	Define criteria and constraints of a design problem with sufficient precision	15-17
RST.6-8.7	Integrate quantitative information expressed in words with text visuals	4, 6, 10, 12
WHST.6-8.1	Write arguments focused on discipline-specific content	14, 17, 20

Unit Materials & Technology

Required Materials

- Student notebooks or science journals
- Access to internet for data analysis activities and research
- Graph paper or graphing software (Google Sheets, Excel)
- Colored pencils or markers for pledge posters
- Printed myth-busting discussion cards (included)
- Data analysis activity handouts (included)
- Project presentation materials (poster board or digital tools)

Optional / Recommended

- Climate data visualization tools (NASA Climate, NOAA)
- Documentary clips (preview first)
- Guest speaker (local climate scientist or sustainability professional)
- School energy audit equipment for extension activities

Assessment Overview

Assessment Type	When	Weight	Description
Exit Tickets	Daily	10%	Brief formative check at end of each lesson
Data Analysis	Lessons 4, 6, 10, 12	25%	Five dataset interpretation activities
Myth-Busting Discussion	Lesson 14	10%	Evidence-based discussion participation
Climate Solution Research Project	Lessons 15-16, 20	30%	Research, presentation, and reflection
Summative Assessment	End of Unit	25%	Written assessment with multiple choice, short answer, and essay

Suggested Pacing Guide

Week	Theme	Lessons	Key Activities
1	The Science of Climate Change	1-5	Greenhouse effect, carbon cycle, Data Analysis #1
2	Evidence & Regional Impacts	6-10	CO ₂ data, sea level, regional case studies, Data Analysis #2 & #3
3	Solutions & Responses	11-15	Renewable energy, policy, myth-busting, project launch, Data Analysis #4
4	Action & Empowerment	16-20	Research project, action plans, climate anxiety, pledge, Data Analysis #5

Notes for the Teacher

Creating a Safe Learning Environment

- Climate change can be an emotionally charged topic. Establish ground rules for respectful, evidence-based discussion at the start of the unit.
- Acknowledge that students come from diverse political and cultural backgrounds. Focus on the scientific evidence and avoid partisan framing.
- Some students may experience anxiety about climate change. Lesson 18 is specifically designed to address this; however, be attentive to student well-being throughout the unit.
- Use 'could' and 'projected' when discussing future scenarios, and pair every impact with a corresponding solution or adaptation strategy.
- Celebrate student agency: emphasize what individuals and communities can do and are already doing.

Lesson 16: Research Project Work Session

50 min

Learning Objectives

- Synthesize information from multiple credible sources
- Organize research findings into a coherent presentation structure
- Evaluate the feasibility and impact of a chosen climate solution

Materials: Research organizer, student notebooks, access to internet/library, project rubric

Direct Instruction (10 min)

Model how to move from research to outlining. Show a sample completed research organizer. Explain that a good presentation answers: (1) **What** is the solution? (2) **How** does it work? (3) What is its **potential impact**? (4) What are the **barriers or trade-offs**? (5) **Why** did you choose it?

Independent Practice (25 min)

Students work independently or in pairs to complete their research organizer and begin drafting their presentation outline. The teacher circulates, checking for source credibility, depth of research, and helping students who are stuck. Students should aim to have their outline completed by the end of class.

Exit Ticket

- 1. What is the most important thing you learned about your solution today?
- 2. What is one question you still need to answer before your presentation?

Lesson 17: Individual & Community Action

50 min

Learning Objectives

- Differentiate between individual actions and systemic/community-level changes
- Identify specific, measurable actions that reduce carbon emissions
- Design a personal or community climate action plan

Materials: Whiteboard/projector, action scale handout, student notebooks, Data Analysis Activity #5

Direct Instruction (12 min)

Level	Examples	Impact
Individual	Reducing food waste, eating less meat, conserving energy at home, walking/biking	Small direct emissions reduction; builds awareness and habits
Community	School composting, local tree planting, community solar, advocating for bike lanes	Multiplies impact; shifts local norms and infrastructure
Systemic	Voting for climate policy, supporting clean energy standards, corporate accountability	Largest scale; changes the rules for everyone

Guided Practice (10 min)

Students complete Data Analysis Activity #5 (National CO₂ Emissions by Country). This dataset highlights that while individual action is crucial, national policy and industrial shifts in top-emitting countries have the largest quantitative impact. Briefly discuss how policy changes in one country can influence global markets.

Independent Practice (12 min)

Students draft a Personal/Community Climate Action Plan. They choose: (1) one individual action they will commit to this month, (2) one community action they will participate in or advocate for, and (3) one systemic action (e.g., writing a letter to a representative). For each, they must state the action, how it reduces emissions, and how they will measure success.

Exit Ticket

1. Explain the difference between an individual action and a systemic action.
2. Name one action you can take at the community level.
3. Why do individual actions matter even though systemic change is needed?

Lesson 18: Understanding & Managing Climate Anxiety

50 min

Learning Objectives

- Define climate anxiety and recognize it as a normal, valid response
- Identify at least three healthy strategies for coping with climate-related stress
- Reframe anxiety into constructive action and hope

Materials: Whiteboard/projector, coping strategies handout, student notebooks. *Note: Be prepared to direct students to school counselors if needed.*

Warm-Up (8 min)

Anonymous check-in: Provide slips of paper. Students write one word describing how learning about climate change makes them feel. Read them aloud. Common responses: worried, helpless, angry, sad, motivated, scared. Validate all feelings: *'These are normal reactions to a real problem. Today we learn how to carry this weight without being crushed by it.'*

Direct Instruction (15 min)

Define **climate anxiety** (also called eco-anxiety): chronic fear of environmental doom. It is not a mental illness - it is a rational response to an existential threat. However, when it leads to paralysis or despair, it becomes counterproductive. Present healthy coping strategies:

- **Focus on what you can control:** You can't stop a hurricane, but you can prepare, advocate, and reduce your own footprint. Action is the antidote to despair.
- **Connect with others:** Join a climate club, talk to friends, find community. Isolation fuels anxiety; solidarity fuels resilience.
- **Spend time in nature:** Reconnect with the natural world you are fighting to protect. Joy and appreciation are powerful motivators.
- **Balance your news diet:** Stay informed, but don't doomscroll endlessly. Seek out stories of solutions and progress.
- **Practice self-care:** Exercise, sleep, hobbies, and mindfulness are not distractions - they fuel you for the long run.

Independent Practice (8 min)

Students create a personal 'Resilience Plan': one strategy they will use when they feel overwhelmed, one person they can talk to, and one action they will take to channel their feelings productively.

Exit Ticket

1. What is climate anxiety?
2. Name two healthy strategies for coping with climate anxiety.
3. Why is taking action an effective way to manage anxiety?

Lesson 19: Climate Action Pledge

50 min

Learning Objectives

- Commit to a specific, measurable, and achievable climate action
- Design a Climate Action Pledge Poster to communicate commitment
- Explain how individual pledges contribute to collective impact

Materials: Pledge poster template (included) or poster board, markers/colored pencils, student notebooks, SMART goal worksheet

Direct Instruction (10 min)

Introduce **SMART goals** for climate pledges:

- **Specific:** 'I will bike to school' (not 'I will travel greener')
- **Measurable:** '3 days per week'
- **Achievable:** 'I live within 3 miles of school'
- **Relevant:** 'This reduces my transportation emissions'
- **Time-bound:** 'For the next 4 weeks'

Independent Practice (20 min)

Students write their SMART climate pledge and then create their Climate Action Pledge Poster (see the poster template section). The poster must include: their SMART pledge, a visual representation of the action, and one fact about why this action helps. This is a creative, empowering activity.

Exit Ticket

1. Write your climate pledge in SMART format.
2. How does your specific action reduce greenhouse gas emissions?
3. Why is it important for pledges to be measurable and time-bound?

Lesson 20: Project Presentations & Unit Reflection

55 min

Learning Objectives

- Communicate research findings clearly and persuasively
- Evaluate peers' presentations using evidence-based criteria
- Reflect on personal growth and understanding of climate change across the unit

Materials: Presentation materials (posters, slides, etc.), peer evaluation forms, unit reflection handout

Presentations (30 min)

Students present their Climate Solution Research Projects. Audience members complete brief peer evaluation forms (one thing they learned, one thing the presenter did well). Keep time to ensure everyone gets a turn (3-5 minutes each).

Unit Reflection (12 min)

Students complete a written reflection answering the following prompts:

1. How has your understanding of climate change changed over the past 4 weeks?
2. What was the most surprising thing you learned?
3. Which solution gives you the most hope, and why?
4. What is one action you will continue to take after this unit ends?

Closure (5 min)

Close the unit by returning to the essential questions. Celebrate what students have learned and accomplished. Remind them: *'You are now among the most climate-literate people in your community. Use that knowledge wisely, act with courage, and remember that the future is not fixed - it is shaped by the choices we make together.'*

CLIMATE ACTION PLEDGE POSTER

Print this page for students to design their Climate Action Pledge (Lesson 19). They should fill in each section and add visuals to make it inspiring!

MY CLIMATE ACTION PLEDGE

MY SMART GOAL

Specific:

Measurable:

Achievable:

Relevant:

Time-bound:

WHY THIS MATTERS

Fact about why this action helps:

MY VISION

[Draw a picture of your action in practice]

Signed, _____ **Date,** _____

UNIT ASSESSMENT

Climate Change Literacy Unit - Summative Assessment

Name: _____ Date: _____ Score: _____ / 40

Part 1: Multiple Choice (10 points - 1 point each)

Circle the best answer for each question.

1. Which of the following best describes the difference between weather and climate?
 - a) Weather is local; climate is global.
 - b) Weather is short-term; climate is long-term average.
 - c) Weather involves temperature; climate involves precipitation.
 - d) Weather occurs in the troposphere; climate occurs in the stratosphere.
2. What is the primary function of the natural greenhouse effect?
 - a) To block harmful UV radiation from the sun.
 - b) To cool the Earth's surface by reflecting sunlight.
 - c) To trap outgoing infrared radiation and keep Earth warm enough for life.
 - d) To create clouds that produce rain.
3. How do human activities primarily disrupt the carbon cycle?
 - a) By removing too much CO₂ from the atmosphere.
 - b) By moving carbon from slow reservoirs (fossil fuels) to the fast reservoir (atmosphere) rapidly.
 - c) By stopping the natural process of photosynthesis.
 - d) By increasing the amount of carbon stored in the deep ocean.
4. The Keeling Curve measures which of the following?
 - a) Global temperature anomalies over the past million years.
 - b) The thickness of Arctic sea ice.
 - c) Atmospheric CO₂ concentrations at Mauna Loa Observatory.
 - d) Sea level rise in coastal cities.
5. Which two factors are the main causes of current sea level rise?
 - a) Melting sea ice and thermal expansion.
 - b) Thermal expansion of ocean water and melting land ice.
 - c) Increased rainfall and melting land ice.

ASSESSMENT ANSWER KEY & SCORING GUIDE

Part 1: Multiple Choice (10 points - 1 point each)

#	Ans	Rationale
1	b	Weather is short-term; climate is long-term average.
2	c	To trap outgoing infrared radiation and keep Earth warm enough for life.
3	b	By moving carbon from slow reservoirs (fossil fuels) to the fast reservoir (atmosphere) rapidly.
4	c	Atmospheric CO ₂ concentrations at Mauna Loa Observatory.
5	b	Thermal expansion of ocean water and melting land ice.
6	a	When ice melts, it exposes darker surfaces that absorb more heat, causing more ice to melt.
7	c	They only generate electricity when the sun is shining or the wind is blowing.
8	b	To keep global temperature rise well below 2 C and aim for 1.5 C.
9	b	Taking constructive action and connecting with others.
10	c	Systemic action (e.g., carbon pricing and clean energy policy).

Part 2: Short Answer (20 points - 5 points each)

Scoring: Award full credit (5 pts) for complete, accurate answers in 3-5 sentences. Deduct 1 point for missing scientific vocabulary, 1 point for incomplete explanations, and 2 points for significant factual errors.

1. Natural vs. Enhanced Greenhouse Effect:

The natural greenhouse effect is the process where naturally occurring greenhouse gases (like water vapor and CO₂) trap some of the Sun's outgoing infrared radiation, keeping Earth's average temperature at a habitable 15 C (59 F). The enhanced greenhouse effect is the additional warming caused by human activities that increase greenhouse gas concentrations beyond natural levels (e.g., adding more CO₂ from burning fossil fuels). The enhanced effect is a problem because it is trapping too much extra heat, causing global temperatures to rise rapidly.

2. 1998 Data Cherry-Picking:

The classmate is cherry-picking data by choosing a single starting point (1998) to make a short-term comparison. 1998 was an exceptionally hot year due to a strong El Niño event, which creates natural year-to-year variability. Climate is determined by long-term trends over decades, not single years. When looking at the full dataset from 1880 to the present, the long-term upward trend is clear and accelerating, regardless of short-term fluctuations.

3. Ice-Albedo Feedback Loop:

The ice-albedo feedback loop begins when rising temperatures cause sea ice and snow cover to melt. Ice has a high albedo (reflects sunlight), but the dark ocean water or land exposed underneath has a low albedo (absorbs sunlight). The absorbed heat warms the area further, causing more ice to melt. It is

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