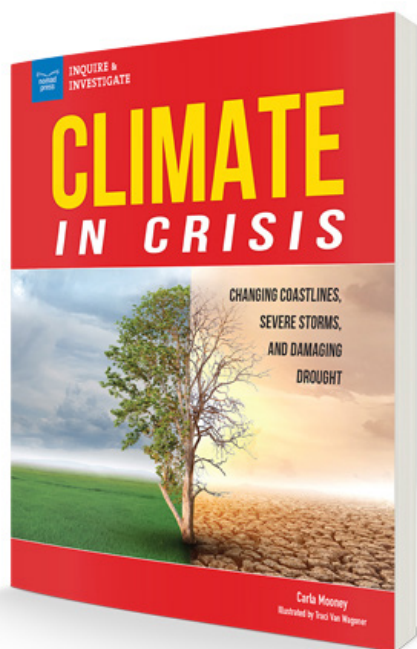


Nomad Press

CLASSROOM GUIDE



Read true stories of how climate change has affected people's lives and learn the science behind the new reality we witness every day.

In *Climate in Crisis: Changing Coastlines, Severe Storms, and Damaging Drought*, readers 12 to 15 discover how climate change is affecting the human population—from extreme weather and rising coastlines to new migration patterns and disease—through real-life stories and a deep examination of the science driving the phenomenon. As kids gain a deeper understanding of our ultimate connection to everything on and around our planet, they are also encouraged to think of innovative ways to help curb climate change, which has been called humanity's greatest challenge.

Graphic novel style illustrations, essential questions, and fascinating sidebars illuminate the topic of climate change while links to online resources engage readers on a digital level.

Learn more at nomadpress.net/nomadpress-books/climate-in-crisis

Softcover: 9781647410643, \$17.95
Hardcover: 9781647410612, \$22.95
eBook: all formats available, \$12.99
Specs: 8 x 10, 128 pages, color interior

Reading Level: Ages 12–15
Interest Level: Grades 7–10
Focus: Environmental Science
GRL: X



PS

Watch Greta Thunberg give her "Our House is on Fire" speech at the World Economic Forum 2019.

Why is it important for young people to speak out on topics such as climate change? How might their perspectives be different from those of older people?

Thunberg house fire

AN IMPORTANT TOPIC

Climate change is all over the news. Activists like Greta Thunberg organize protests and events to raise awareness about climate change. Scientists talk about global warming, greenhouse gases, and the ozone layers. Sometimes, all of the technical jargon can make climate change seem overwhelming and confusing. What is climate change? What causes it? And why is climate change important to you?

You've probably already experienced some of the effects of climate change firsthand without even knowing it. Have you noticed that seasons feel different from year to year? Does your region get stronger storms and more extreme weather than it used to? Do you have to take steps to conserve water because of drought? Is there more flooding in your area than there used to be? Are some local animals and plants losing their habitats and migrating to new regions? All of these could be signs of Earth's climate crisis.

CLIMATE VS. WEATHER

Before we dive into all of the ways climate change affects you and your fellow humans, let's first take a look at the difference between weather and climate.

Weather is what happens in the atmosphere every day.

Is it rainy or sunny outside? Is the temperature hot or cold? Weather can change minute to minute, hour to hour, and day by day. For example, it might be sunny in the morning and raining in the afternoon in your neighborhood. Weather also varies in different places in the world. On any given day, the weather in Florida is often different from the weather in Alaska. Most weather occurs in the troposphere, which is the part of Earth's atmosphere closest to Earth's surface.

Climate, on the other hand, means the usual weather or weather pattern of an area. Climate can vary from place to place. For example, Arizona's climate is typically hot and dry. Seattle's climate tends to be cooler and wetter. Climate can also vary by season in the same place. Your town might be hot and humid in the summer months and cold and snowy in the winter.

Planet Earth also has a climate. Earth's climate is the combination of all the climates around the world. If Earth's global climate changes, regional climates also change. The weather changes, too. For example, as Earth's climate warms, scientists predict more hot summer days in many regions and fewer frigid days.

SCIENTIFIC METHOD

The scientific method is the process scientists use to ask questions and find answers. Keep a science journal to record your methods and observations during all the activities in this book. You can use a scientific method worksheet to keep your ideas and observations organized.

Question: What are we trying to find out? What problem are we trying to solve?

Research: What is already known about this topic?

Hypothesis: What do we think the answer will be?

Equipment: What supplies are we using?

Method: What procedure are we following?

Results: What happened and why?

4 CLIMATE IN CRISIS | INTRODUCTION

OUR CHANGING CLIMATE

5

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SAMPLE GLOSSARY

absorb: to soak up a liquid or take in energy, heat, light, or sound.

accelerate: to change the speed of something through time.

acclimate: to adjust to a change in environment.

accretion: the gradual accumulation of layers of sediment.

accumulation: the acquisition or gradual gathering of something.

acidic: from acids, which are chemical compounds that taste sour, bitter, or tart.

activism: the policy or action of using strong campaigning to bring about political or social change.

adapt: to make a change to survive in new or different conditions.

agriculture: growing plants and raising animals for food and other products.

allergen: something that triggers an allergic reaction.

allergy: a condition in which the immune system reacts abnormally to a foreign substance.

altimeter: an instrument for measuring height above sea level.

anxiety: a feeling of fear or uneasiness about possible misfortune. In some cases, anxiety is a mental disorder.

aquifer: a layer of sand, gravel, and rock that has pores or openings through which groundwater flows.

arid: dry.

asthma: a respiratory condition marked by spasms in the bronchi of the lungs, causing difficulty in breathing.

atmosphere: a layer of gas surrounding Earth.

awareness: knowledge and understanding that something is happening or exists.

bacteria: microorganisms found in soil, water, plants, and animals that are sometimes harmful but often helpful.

beneficial: having good or helpful results.

biofuel: a fuel made from living matter, such as plants.

blood pressure: the pressure exerted by circulating blood on the walls of blood vessels.

bog: a marshy wetland made of decomposing plants.

breed: to produce offspring.

carbon dioxide (CO₂): a combination of carbon and oxygen that is formed by the burning of fossil fuels, the rotting of plants and animals, and the breathing out of animals or humans.

cardiovascular: related to the heart and blood vessels.

Celsius: a scale of measuring temperature.

chemistry: the study of the properties of substances and how they react with one another.

chronic: recurring.

climate: the average weather patterns in an area during a long period.

climate change: a change in long-term weather patterns, which happens through both natural and manmade processes.

climatologist: a scientist who studies and predicts general weather and climate during a long period of time and over a large area.

compaction: the process of crushing or compressing something so that it takes up less space.

condensation: the process of a gas cooling down and changing into a liquid.

congestion: a condition where nasal passages become swollen with excess fluid and mucus.

conservation: managing and protecting natural resources.

conserve: to save or protect something, or to use it carefully so it isn't used up.

contaminant: any pollutant or object that could harm a living organism.

contaminate: to pollute or make dirty.

coral bleaching: coral that turns white, indicating it is ill and dying.

coral reef: an underwater ecosystem that grows in warm ocean waters and is home to millions of creatures. Corals are tiny animals that build shells around themselves.

crops: plants grown for food and other uses.

ESSENTIAL QUESTIONS

BEFORE READING:

Establish Background Knowledge

- What do you already know about climate change or global warming?
- Why is it important to study environmental science?
- Have you noticed signs of climate change where you live? What are they? How do they affect your life?

Skill Introduction

- What do you do when you come to a word or phrase you do not know?
- How do photographs, videos, and maps help someone learn about a topic?

CCSS.ELA-Literacy.L.6.4c Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

CCSS.ELA-Literacy.L.6.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

DURING READING:

Check for Understanding

- How might the perspective of younger people be different from that of older people when discussing climate change? Why is it important that people of all ages work together on the problem?
- What is the difference between weather and climate? Why is this an important distinction?
- Why is balance such an important thing to consider when looking at the climate?

CCSS.ELA-Literacy.RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

CCSS.ELA-Literacy.SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

AFTER READING:

Summary and Expansion

- Do you think the study of environmental science has changed as climate change becomes a more urgent problem?
- What is the greenhouse effect? How does it affect life on Earth?
- Why is the global temperature warmer now than it was 100 years ago?
- How do scientists know what the average temperatures were in a region before humans began recording the weather?
- What are some ways people can stay safe during a heatwave? A tornado warning? A flood?
- How does climate change affect the world's food supply?
- Does climate change affect everyone in the same way or at the same rate? Why or why not? Who is most at risk because of climate change?
- What are some steps individuals can take to help solve the problem of climate change?
- What is climate advocacy? Why is this an important part of changing the climate change projectory?
- What are some things governments and corporations can do to help solve the problem of climate change?
- How does computer modeling help scientists make plans for the future?

CCSS.ELA-Literacy.RST.6-8.8 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

CCSS.ELA-Literacy.RST.6-8.8 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CCSS.ELA-Literacy.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-Literacy.WHST.6-8.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

ACTIVITY!

Inquire & Investigate



Ideas for Supplies ▼

- small glass jar
- water
- food coloring
- plastic wrap
- rubber band
- large glass jar (big enough to hold small jar)
- knife

To investigate more, repeat this activity but do not slice the plastic wrap on the small jar. What happens to the colored water? How does this model show what happens during a heat wave?

HOT AIR RISING

During the summer, does it feel hotter on a higher floor in a building than on a lower floor? When air heats up, its molecules expand and spread out. The hot air becomes less dense and rises through denser, cooler air. As the warm air molecules rise through the cool air, they cool down, move closer together, become denser, and start to sink again. This movement of air rising and falling results in current:



Usually, Earth's atmosphere moves cool, dry air (high-pressure systems) and warm, moist air (low-pressure systems) along Earth's surface. Sometimes, a high-pressure system stops moving and settles over an area, forcing air downward and trapping hot air near Earth's surface. As a result, heat builds up at the surface. A heat wave forms.

In this activity, we'll use water to demonstrate how hot air rises and cool air falls in the atmosphere.

- **Fill the small jar with very hot water.** Add several drops of food coloring to the hot water.
- **Stretch plastic wrap over the top of the jar.** Use a rubber band to secure and seal the plastic wrap to the jar top. Does the plastic wrap rise a little? Why do you think this happens?
- **Fill the large jar with cold water.** Gently place the small jar inside the large one. Use tongs if the small jar is too hot to hold.
- **Carefully use the knife to cut an opening in the plastic wrap on the small jar.** What happens? Does the colored water rise or fall? Does it stay in the jar? How does what you observed in this activity demonstrate the rise and fall of air currents in the atmosphere?

ACTIVITY!

Inquire & Investigate



CLIMATE REFUGEES

Climate change is a factor driving millions of people worldwide to move from their homes. These people, called climate refugees or environmental migrants, leave their home areas because of sudden and long-term changes to the environment. These changes include drought, extreme weather events, sea level rise, changes to seasonal weather patterns, and more. The changes threaten the people's health, security, well-being, and ability to earn a living.

- **To begin, learn more about climate refugees.** Read this 2021 article by the World Economic Forum.



- **Select an area where people are leaving.** Consider the following in your research.

 World Economic Forum climate refugees

- What was the usual climate in this area? How did people live there and make a living?
- How has climate change affected this area? How have these changes in their climate affected the people who live there? Is it still a suitable habitat for the people who live there? Why or why not?
- Why are people leaving the area? What threats do they face because of climate change? Is there an alternative to leaving? Where are they going?
- What challenges do climate refugees or environmental migrants face?
- **Present what you have learned to your family, friends, or classmates.**

To investigate more, consider what adaptations would be needed for residents to remain in the area you chose to research. Under what circumstances would adaptation be possible?

AUTHOR INTERVIEW

WITH CARLA MOONEY



HOW DO YOU TACKLE THE REVISION PROCESS?

I write a full draft of the manuscript before I start any revision. Then I go back and revise one chapter at a time. I generally go through several revisions. The first revision, I'm mainly looking at the structure of each chapter and the order

of the concepts. I'm also looking for repetition – where have I said the same thing over and over?! Are there any concepts that I missed? In subsequent revisions, I look more closely at word choice, sentence structure, etc. In the later revisions, I also look to see where I need to add more sidebars or fun facts.

HOW DO YOU COME UP WITH GREAT ACTIVITY IDEAS?

I actually write all of my activities after I've finished the first draft of the book. As I'm researching and writing, I keep a list of

possible ideas. Once I've finished the full draft, I have a much better sense of what concepts in each chapter would work well for an activity.

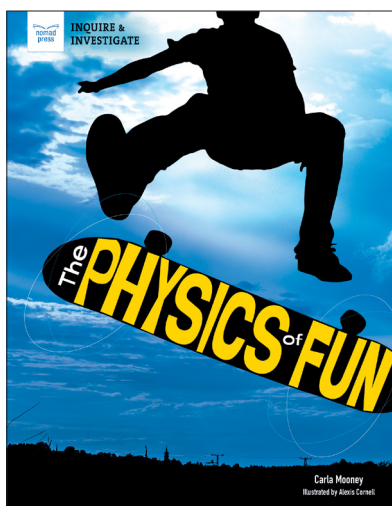
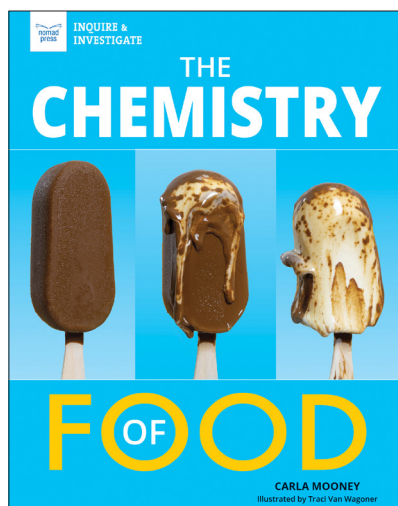
HOW DO YOU TACKLE THE REVISION PROCESS?

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WHAT DID YOU LEARN ABOUT CLIMATE FROM WRITING THIS BOOK?

The fact that climate change is not “causing” bad weather, but instead making it more intense and more frequent. Some places may experience drought, while others are drenched in rain! And I'm worried about the negative long-term ripple effects all of this has on ecosystems around the world. I think those are really important points to understand when talking about the impacts of climate change. Also, I was surprised at the projections for cities like Boston (where my in-laws live!). It really brings the climate change science home when you think about the direct impact it could have on people you know and love.

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