

CLUE into CLIMATE^o



Student Workbook

Name

Class

School

Date

www.kqed.org/ClueintoClimate

KQED
education network

Science
ready to EXPLORE

VOCABULARY

climate change

a change in long-term average weather patterns; can be natural or the result of human activities

climate model

a mathematical model based on data from global cycles that drive Earth's climate system that helps scientists predict changes in our planet's climate over time

ecosystem

a system made up of a community of living things interacting with their environment

global warming

an average increase in Earth's temperature, which in turn causes changes in climate

CLIMATE OVERVIEW

Fill in the blanks using the words provided

Climate Change

_____ describes the average patterns of weather for an area over a long period of time. _____ describes the temperature, wind, and precipitation in an area at a particular time. Over the past century, the climate has changed on Earth. Temperatures have gone up 1.2 to 1.4 degrees Fahrenheit and are expected to continue to rise. You probably won't notice this warming on any particular day. Over long periods of time, however, it causes many changes around the world.

The Greenhouse Effect

There are many factors that influence how climate changes. One factor is the amount of _____ in Earth's atmosphere. These gases trap the heat from the sun, causing the greenhouse effect and warming Earth. Without these gases, Earth would be too cold to support life. These gases include _____ and _____.

Greenhouse Gases

People have been producing a much greater amount of these gases in the past 100 years. We produce greenhouse gases whenever we burn gas in our cars and burn coal to make electricity. With more greenhouse gases in the atmosphere, the _____ is stronger. This makes temperatures on Earth go up.

Ecosystems

Climate change affects _____, or the living and nonliving parts of a particular environment. When the climate changes, animals and plants may change as well. Sometimes they have _____ that allow them to survive in the new conditions. Sometimes they will move, or migrate, to another ecosystem. And sometimes, animals and plants will not be able to survive in the new climate, and they may become _____.

Word bank:

adaptations

carbon dioxide

climate

ecosystems

extinct

greenhouse effect

greenhouse gases

methane

weather

VOCABULARY

greenhouse effect

Energy (radiation) from the sun passes through the atmosphere, where most of it is absorbed by Earth. Some infrared radiation (heat) is reflected back into space. Greenhouse gases act like a blanket, trapping some of this infrared radiation and warming Earth and its atmosphere, a process called the greenhouse effect.

hydrologic cycle

the continuous process by which water is circulated throughout Earth and its atmosphere; another term for the water cycle

suitable habitat

an area where a given species can live because the area's temperature and precipitation levels meet the survival needs of the species

CLIMATE OVERVIEW CONTINUED

Fill in the blanks using the words provided

The Water Cycle

Climate change affects the water cycle in many ways. First, when the temperatures are warmer, _____, or water entering the atmosphere, happens more quickly. In some places, this can cause the land to dry out and can cause a _____. Warmer air contains more _____. In some places, this leads to more _____, or rain or snow falling. When this happens, storms can be bigger than normal, and flooding may occur.

Warmer temperatures also affect how water gets stored in its frozen form in _____ or _____. When more snow and ice melt, sea levels can rise, and _____ may occur. In addition, many people rely on melting snowpack to provide their _____ during summer months. If climate change alters how much snow falls and when the snowpack melts, the amount of water that gets stored in _____ will change too.

Word bank:

drought

evaporation

flooding

fresh water

glaciers

precipitation

reservoirs

snowpack

water vapor

Energy

Nonrenewable energy comes from **fossil fuels** like _____, _____, and _____ and from uranium, which is used in _____. Fossil fuels are created over millions of years. When these are burned to release energy, they also emit carbon dioxide into the atmosphere. This adds to the greenhouse effect, which makes Earth warmer.

Renewable energy is energy created from resources that people cannot use up. The most common renewable resources are:

- _____ = comes from the sun
- _____ = turns turbines to make electricity
- _____ = comes from moving water
- _____ = comes from _____, or plant and animals parts
- _____ = comes from Earth's heat

Word bank:

bioenergy

biomass

coal

geothermal energy

hydropower

oil

natural gas

nuclear power

solar power

wind



Once an experiment is done, the work of science isn't over. Other scientists look at what has been done, a process called **peer review**. They check to make sure that the experiment was well designed and that the data were analyzed correctly. For the **findings** to be accepted, other scientists need to get the same results when they do the experiment. In other words, they need to **replicate** the results.

Review one of your classmate's experiments. Do you think their experiment and findings make sense? Why or why not?

Selected Parts of the Scientific Process:

- Scientists develop a **question** about how the world works.
- Scientists make a **hypothesis**—an educated guess or proposed explanation—about how something works.
- Scientists design an **experiment** to test their hypothesis.
- Scientists collect **data** from their experiment.
- Scientists analyze the **results** from their experiment and **revise** their experiment if necessary.
- Scientists draw **conclusions** from their experiment and **communicate** their results.

Design Your Own Experiment

Question:

Hypothesis:

Data and Observations:

Results:

Conclusions:

Notes

SCIENCE MEDIA

Make a list of types of science media.



MEDIA LITERACY

How reliable are your sources about science? Pick an article, radio story, video, or website to analyze below:

Media:

Who made this?

Why did they make it?

What information or perspective is not included?

Who benefits from this piece? Who could be harmed?

Notes

TAKING ACTION



CLIMATE CAREERS

Here are some examples of ways to reduce your impact on climate change:

- Travel by foot, bike, or skateboard instead of car.
- Replace your old lightbulbs with compact fluorescent lights (CFLs) that use less energy.
- Recycle your paper, metal, and plastic.
- Bring your own bags to the grocery store.

I'm a science journalist. I write about climate change.

I'm a paleoclimatologist. I study ice cores in the Arctic to find out about what Earth's climate was like long ago.

I'm a botanist. I study how different plants move when the climate changes.

I'm a meteorologist. I study hurricanes.

I'm an atmospheric chemist. I study how gases interact in the atmosphere.

I'm an oceanographer. I study how climate change affects ocean ecosystems.

I'm a biologist. I study climate change and the rain forest.

I'm a geologist. I look for sources of geothermal energy.

I'm a computer scientist. I create climate models.

I'm an economist. I predict how climate change affects trade and economic development.

I'm an astronomer. I study the sun's effects on climate.

I'm an agricultural scientist. I study how climate affects the growth of crops.

Here are some examples of climate careers. Which of these careers is most interesting to you? Why?

TAKING ACTION

Here are some other examples of ways to reduce your impact on climate change:

- Plant trees in your yard.
- Use a power strip for your TV and chargers, and turn it off when you don't need it.
- Use public transportation or carpool.
- Teach others what you've learned, so they can make informed choices.



GLOBAL IMPACT

How will climate change affect different parts of the world? Use this space to record notes about changes around the globe.

Notes

CLIMATE PLEDGE

Pick three things you plan to do to reduce your impact on climate change. How will you help?

In order to reduce my impact on climate change, I pledge to:

1. _____

2. _____

3. _____

Your Signature