



CLIMATE CHANGE

Trenton Public Schools, June 2021

CLIMATE CHANGE INSTRUCTIONAL PLANS,
ACTIVITIES & RESOURCES FOR KINDERGARTEN
THROUGH EIGHTH GRADE

Standards in Action: (New Jersey Department of Education NJSLS, December 2020)

Climate Change Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. Global climate change has already resulted in a wide range of impacts across New Jersey and in many sectors of its economy. The addition of academic standards that focus on climate change is important so that all students will have a basic understanding of the climate system, including the natural and human-caused factors that affect it. The underpinnings of climate change span across physical, life, as well as Earth and space sciences. The goal is for students to understand climate science as a way to inform decisions that improve quality of life for themselves, their community, and globally and to know how engineering solutions can allow us to mitigate impacts, adapt practices, and build resilient systems. The topic of climate change can easily be integrated into science classes. At each grade level in which systems thinking, managing uncertainty, and building arguments based on multiple lines of data are included, there are opportunities for students to develop essential knowledge and skills that will help them understand the impacts of climate change on humans, animals, and the environment. For example, in the earlier grades, students can use data from firsthand investigations of the school-yard habitat to justify recommendations for design improvements to the school-yard habitat for plants, animals, and humans. In the middle grades, students use resources from New Jersey Department of Environmental Protection, the National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA), to inform their actions as they engage in designing, testing, and modifying an engineered solution to mitigate the impact of climate change on their community. In high school, students can construct models they develop of a proposed solution to mitigate the negative health effects of unusually high summer temperatures resulting from heat islands in cities across the globe and share in the appropriate setting.

Standards NGGS - <https://www.nextgenscience.org/sites/default/files/3-5Topic.pdf> /

Standards NJSLS- <https://www.nj.gov/education/cccs/2020/NJSLS-Science.pdf>

Instructional Summary

Beginning in Kindergarten and continuing through Eighth Grade, students will be guided through scaffolding instruction and investigations about the changing climate patterns and impact of human interaction on the environment. It is the goal that as students progress through these series of lessons and activities they will emerge able to articulate their conceptual comprehension comparing weather and climate, awareness of changes in their environment such as the localized effects of climate change, erratic weather conditions, and the effects of climate and weather on local animal habitats. At the conclusion of this module, students will be able to:

- Identify changes in their environment (SCIENCE)
 - Understand that there are various causes to environmental changes.
 - Understand that there are various solutions to environmental changes.
- Utilize technology to gather research information and communicate (TECHNOLOGY)
- Utilize technology tools to gather data (TECHNOLOGY)
- Identify technological advances and tools that scientists use to learn about the changing environment (TECHNOLOGY)
- Explain/discuss/express concepts about changes in the environment through the development of a newsletter for the local community to report changes in the environment around the school and community. (ELA)
- Chart, graph, identify, and analyze patterns of your local weather using the symbols $> = <$ to indicate warmer, colder, etc. (MATHEMATICS)
- Sort recyclables brought in each day. Use the symbols $> = <$ to count, chart and graph [amount and weight] and compare daily tallies. (MATHEMATICS)
- Demonstrate competency in the 21st Century Skills (e.g. interdisciplinary themes and investigations; learning and innovation skills; information, media and technology literacy; life and career skills)
- Evaluate the influence changes in the environment have on culture and societies.

Grades K to 2

Topic:

Weather and Climate Change/ Recycling

Duration

2 to 4 - 15 to 20-minute class periods

Standards:

NGSS standards:

K-ESS3- Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

ESS3.C: Human Impacts on Earth Systems

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (*secondary*)

NJSLS – KESS3-1,2 and 3

Materials:

Can be used for demonstration table or sets available for each collaborative learning team

- Thermometer: measures air temperature.
- Rain Gauge: measures precipitation.
- Wind Vane: measures wind direction.
- Anemometer: measures wind speed.
- Barometer: measures air pressure.
- Hygrometer: measures humidity.
- Computer access –

Compost Container Activity

Dirt/ paper plates/ paper cup/ construction paper / plastic cup/ plastic bottle/ soda can/ biodegradable plant container.

Color Printer to download The Lorax Environment Activity Book - EPA

<https://www.energystar.gov/ia/partners/publications/pubdocs/Lorax%20Activity%20Book%206%20pages.pdf>

Paper Mache Bowl Activity – See Activity Resources
Newspapers strips, glue, scissors, water and paper plates

Essential Concepts & Questions

- Weather is observed, measured and changes daily. Climate is the average weather for a season.
- What is recycling? Why is it important?
- What is a Carbon Footprint and how can we reduce ours?
- Ways we can help protect the environment.

Pre-Class /Warm-Up Suggestion

Reduce, Reuse and Recycling Movie- time 3:39 https://www.youtube.com/watch?v=OasbYWF4_S8
The Three R Movies- time 9:53 <https://www.youtube.com/watch?v=TjnNOCbuoCA>

Possible Lesson Activity Resources

Read- The Lorax/ or watch Film

Generation Genius -Reducing our Impact (K-2)

<https://www.generationgenius.com/videolessons/reducing-our-impact-on-earth-video-for-kids/>

Weather Vs. Climate (3-5) Generation Genius

<https://www.generationgenius.com/videolessons/weather-vs-climate-video-for-kids/>

Generation Genius – Natural Resources

<https://www.generationgenius.com/videolessons/natural-resources-video-for-kids/>

Making a paper bowl- using old newspapers (time 45 minutes)

<https://www.generationgenius.com/activities/reducing-our-impact-on-earth-activity-for-kids/>

Related Resources & Activities

Scholastic Study Jams- Weather Instruments

<https://studyjams.scholastic.com/studyjams/jams/science/weather-and-climate/weather-instruments.htm>

Using Weather Instruments

<https://betterlesson.com/lesson/632259/6-weather-instruments>

Video- Science and Measuring Tools

<https://www.youtube.com/watch?v=e3inavDlwfk>

Reflection / Assessment Options

What ways can we reduce pollution and energy use?

What is recycling and how can we do that in our class ? in our homes?

Generation Genius – Lesson Review Questions, Exit Ticket and Quizziz and Kahoot

Lessons and Activities for Grades 1 and 2

LESSON 1

SWBAT define what it means to recycle

Essential questions:

- What is trash?
- What are some things we throw away?
- What happens to the bag of trash once we take it outside?

Discussion points:

1. Sometimes we throw things away in the trash can that can be used again. They can be recycled. Recycling means taking something you were going to throw in the trash, such as a piece of paper, and turning it into something new and useful like a new book. You find a new way to use that item.
2. 4 things we can recycle are: paper, glass, metal and plastic.
3. We recycle because it helps our earth in two ways:
 - Our landfills don't fill up too quickly, so it saves landfill space.
 - Recycling helps save natural resources, like trees. Remember, recycling is when we take something no longer being used and turn it into something new and useful. Some items can be recycled again and again. Two examples are glass and aluminum.

<https://www.youtube.com/watch?v=VIRVPum9cp4>

Activity

After you review with the students the most common items to recycle, inform the students you are going to place all the items on the floor. The pile on the floor represents a landfill. The landfill is full of items that can be recycled or reused, and some of the items in the landfill are trash and belong there.

1. Let each student pick one item from the landfill.
2. Each student will tell the group if the item picked belongs in the landfill or if it could be recycled or reused.
3. If it is recyclable, they can place the item in the blue recycle bin.
4. If it is reusable, have the student share with the group how the item they picked could be reused.
5. If it belongs in the trash, have them return it to the landfill. If it is a paper, plastic, glass or metal item you may need to re-explain to the student that not all items are recyclable and why. A simple answer is that different plastic items are made differently, so some are easier to recycle than others. This answer works for all items.

LESSON 2

SWBAT identify recycled paper materials

Essential questions:

- What does it mean to recycle?
- What kinds of paper items do you use?

Discussion points:

1. Show students various kinds of paper items: writing paper, paper towels, newspaper, tissue, toilet paper, paperboard, paper plate, cardboard, etc.
2. Some of these paper items can be recycled with your curbside recycling or at local drop-off bins. (Show photo of [curb-side recycle bin \[JPG\]](#) and [drop-off recycling bin \[JPG\]](#).) Let's take a look at what we can recycle and what we cannot:
 - a. Paper items that can be recycled in most curbside bins: Newspaper, paperboard, cardboard, magazines and inserts, office paper and envelopes, catalogs and some will even take telephone books.
 - b. Paper items that can be recycled in local drop-off bins: newspaper, magazines and phonebooks.

- c. Paper items that cannot be recycled: tissue, toilet paper, and paper towels.
3. All of the paper items we just looked at are made from trees! (Show [picture of tree \[JPG\]](#) or visit your local school tree.)

<https://www.youtube.com/watch?v=5lp4gnQ2j8>

Activity

How to Make Less Trash:

1. Let students know you are going to look at the items and figure out how they can make less trash to help save natural resources and save landfill space.
 - a. Hold up various items from the kit. Ask students what they can do with each item you hold up, such as a newspaper, instead of throwing it in the trash? They can recycle or reuse the newspaper. By doing this, they will help make less trash (save landfill space) and save natural resources.
 - b. You can replace newspaper with any recyclable item and show them how they will make less trash and save natural resources.
2. Buy only what you will need and use. This is a great way to make less trash.
 - . Ask them what happens if you buy too much milk and don't drink it all? It might go bad before you could drink it and then you would have to throw the milk away. Even if you recycle the milk jug the milk was still wasted.
3. Use reusable dishes instead of disposable dishes, such as cups, plates and forks.
4. Donate unused items.

LESSON 3

SWBAT identify recycled glass materials

Essential questions:

- What does it mean to recycle?
- What kinds of paper items do you use? What kinds of paper items can you think of?

Discussion points:

1. Show students various kinds of glass items: jar, window, drinking glass, plate, ornament, eyeglasses, light bulb, candle holder, etc.
2. Some of these glass items can be recycled with your curbside recycling or at local drop-off bins. (Show photo of [curb-side recycle bin \[JPG\]](#) and [drop-off recycling bin \[JPG\]](#).) Let's take a look at what we can recycle and what we cannot:
 - a. Glass items that can be recycled with your curbside recycling or in local drop-off bins: clear, brown, green or blue glass used for beverage bottles and food jars.
 - b. Glass items that cannot be recycled using your curbside recycling or local drop-off bins: all other glass items.
3. The key ingredient in making glass is sand. (Show students container of sand.)
<https://www.youtube.com/watch?v=-jAAux3g17k>

Activity

LESSON 4

SWBAT identify recycled metal materials

Essential questions:

- What does it mean to recycle?
- What kinds of metal items do you use? What kinds of metal items can you think of?

Discussion points:

1. Show students various kinds of metal items: aluminum can, steel (food) can, aluminum foil, pie pan, toys, pots and pans, baking sheets, etc.
2. Some of these metal items can be recycled with your curbside recycling or at local drop-off bins. (Show photo of [curb-side recycle bin \[JPG\]](#) and [drop-off recycling bin \[JPG\]](#).) Let's take a look at what we can recycle and what we cannot:
 - a. Metal items that can be recycled with your curbside recycling or in local drop-off bins: aluminum cans, and steel (food) cans.
 - b. Metal items that cannot be recycled using your curbside recycling or local drop-off bins: All other metal items you will need to check with your local area.

<https://www.youtube.com/watch?v=rgEEXhbar3A> (ONLY SHOW at 1:10 and on)

LESSON 5

SWBAT define water pollution and identify the effects.

Essential questions:

- What do you know about pollution?
- Why do you think we need clean water?

Discussion points:

1. We need clean water not only for drinking and bathing, but also for growing the crops we use to feed ourselves and the animals that live on earth with us.
2. Explain ways in which our air can be polluted. Give some examples of pollution seen in your area, like the exhaust from your car or a factory on the side of the highway. Explain how pollution in the air travels up into the raindrops in the clouds in the sky. This means that our rain can become polluted too, which can sometimes lead to what is known as "acid rain."

Activity

Experiment: shows what acid rain does to plants. It will also show how important it is to have clean water for plants and animals.

1. Before you begin the experiment, use your pen and the labels or masking tape to label each jar and each plant. Label the first plant and jar "a little acid". Label the next plant and jar "a lot of acid". Finally label the third jar and plant, "plain water."
2. Next, you will need to mix the water for the plants. Begin by explaining that the vinegar (or lemon juice) is an acid just like the acid that gets in the raindrops from the pollution in the air caused by the factories, cars, and trucks we have here on earth.
3. Mix the water for the plant that will get "a little acid" by measuring $\frac{1}{4}$ cup of vinegar or lemon juice and placing it into the jar labeled "a little acid" and fill the rest of the jar with tap water.
4. For the plant receiving "a lot of acid", pour 1 cup of the vinegar or lemon juice into the jar and fill the rest with tap water.
5. Fill the third jar, labeled "plain water", just with tap water.
6. Next, have student create "Observation Journal" using the spiral or composition notebook. Label the first page with today's date and have them draw a picture of each plant with each of their corresponding labels. You may want to

have them write or dictate a sentence or two describing each plant's appearance, which at this point should be the same for all three plants: green and healthy.

7. Water each plant (being sure to use only about a 1/4 of the jar each time at the most) with the water from the corresponding jar containing either a lot of acid, a little acid or plain water.
8. Every two or three days continue to water the three plants using the water from the original jars. Be sure to make note of and discuss which plant looks best. Which one looks the worst? How do the plants differ in color? Continue to have student record all observations in the journal by drawing and writing what they see after each watering.
9. Water and observe the plants for at least one week. Throughout the experiment, discuss the changes that have occurred in the three plants and ask why they think the results turned out the way they did.
10. At the end of the experiment, talk about which plant is the healthiest and which plant is the least healthy, working with them to reach a conclusion about what happened to the plants. Have student record all conclusions in journal.
11. Assist in making the connection between this experiment and our own environment and the effects of acid rain in our world.

Lessons and Activities for Grades 3 through 5

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.* [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. *

Essential Questions: How is air pollution changing Earth and all living things? How do scientists know what they know about climate change? Why is it important for people to know about climate change? What can kids and adults do to help slow down climate change?

Lesson 1:

Introduce and Engage Objectives. By the end of this lesson, learners will understand that Earth is warming because carbon dioxide and other gases in the atmosphere are keeping the sun's heat near Earth. Power plants, factories, and modes of transportation (cars, planes, etc.) are the biggest producers of these gases. Earth's warming is causing climates to change, creating unusual and severe weather in many places. Children can feel hopeful because people are beginning to take steps to slow down climate change.

Introduction Tell the learners that lots of kids are concerned about climate change. Ask them what they've heard about it already. Tell them that you're going to show them short videos to give them more background information, and then they'll write about it.

What is climate change <https://climatekids.nasa.gov/climate-change-meaning/>

Weather vs climate <https://climatekids.nasa.gov/climate-change-meaning/>

Whole Class. Show the U.S. Environmental Protection Agency's video, Climate Change Basics video (below). Let the learners know they'll be writing about the scientific information in the video at the end.

Group Work. Divide students into small groups. Give each group a piece of large chart paper and some markers. Have them divide it into two columns, labeling one column, KNOW, and the other column WONDER. Ask the groups to list the facts they remember from the video in the first column, and what else they wonder about climate change in the second column. You may want to re-play the video part way through class to see if the learners can catch more ideas to write down. Whole Class. Ask each group to share three important facts they learned with the entire class. Once a fact has been shared, it should not be repeated by another group, so everyone needs to listen carefully. As groups are sharing, individuals should feel free to continue to add to the WONDER column as they think of more ideas. Display the students' charts in the classroom to refer to during the following lessons.

Conclusion. Summarize the class by emphasizing that the science is clear. Planet Earth is warming up. The warming is caused by people putting carbon dioxide and other gases in the atmosphere. The gases are holding the sun's heat near Earth. Power plants (that make electricity), factories (that make products), and various modes of transportation (cars, airplanes, etc.), put the most carbon dioxide into the air. This is causing climates to change, which is affecting the lifestyle of many people as they try to deal with severe drought in some areas, massive flooding in other areas, and wild dangerous weather. More and more people are concerned about it, so it's important that we all know what's causing it, what the effects are, and what we can do about it. Let the kids know that they'll have the chance to discuss this important topic with other kids on the Kids Against Climate Change website.

Lesson #2:

Motivate and Explore Objectives. By the end of this lesson, learners will understand the causes and effects of increased greenhouse gases in the atmosphere. They'll see that Earth's systems (air, water, land, and living things) are all linked – a change in one is going to have an impact on the others. They'll understand how scientists know that climate change is caused by people putting carbon dioxide in the air. They'll also have a reason to be hopeful about their future.

Introduction. Introduce your learners to the Kids Against Climate Change homepage and give them a quick look at the other website pages. Explain that this interactive website allows them to discuss climate change with other kids. The site provides an opportunity to be both consumers and producers of knowledge. Remind them of the Climate Change Basics video. Why might they want to talk with other kids about climate change? Why would it be a good idea to get more background information before talking to others about climate change?

Whole Class. Introduce them to Information for Kids section of the Start Learning page. (To extend learning, there's also a section for advanced research for older students.) Here they'll gather additional information about climate change to add to their background knowledge. Give learners focus questions to research to help them understand the causes and effects of climate change. Depending on the background knowledge of your learners, you may want to use the Essential Questions above. Alternatively, you might want to begin with smaller, more specific, questions to guide their research, such as, What is carbon dioxide? Where does it come from? How does it get into the air? Why is that a problem? Another option is to have them complete this Climate Change Basics Worksheet to get started learning about climate change. (All answers for the worksheet can be found by the children on the EPA website, the first link under Information for Kids on the Start Learning page.)

Individual/Pair/Group Work. Children take notes and draw sketches in their science notebook, or complete the worksheet, as they gather important information about climate change. Remind learners that they'll be using this information in their discussions with other kids, so it's important that they have accurate information, and that they take accurate notes. Ask a volunteer from each group to add new information to yesterday's climate change charts.

Conclusion. Summarize the class by emphasizing that scientists have evidence that the rapidly warming Earth is caused by people. The carbon dioxide and other greenhouse gases that people are putting into the air are trapping Earth's heat close to the earth. This is causing the planet's air, water, and land to warm up, causing climates around the world to change. Weather is what we experience on a daily basis, but climate is the average weather over decades. Earth is beginning to experience the effects of climate change: abnormal weather patterns, glaciers melting, sea level rising, changes inside the ocean, etc. The good news is that people are beginning to take steps to slow down climate change. Assure your learners that they'll be joining the discussion on Kids Against Climate Change during the next class.

Lesson #3:

Explore & Empower Objectives. By the end of this lesson, learners will understand that many children are concerned about climate change, so they're learning as much as they can about it. Others want to hear what your learners have to say. By joining the discussion, learners are encouraging societal change. They'll feel hopeful about their future.

Introduction. Today, learners join the discussion about climate change with other kids. Introduce learners to What Do Kids Know? page. Whole Class. Point out that kids have submitted the pictures and videos for the Kids Against Climate Change website, and they can as well, once they've joined the discussion. Review the directions on the page for posting comments and replies. Note that all comments are moderated, to ensure that only appropriate comments are on the site, so they won't appear on the site until given the OK by the site coordinator.

Individual/Pair/Group Work. Learners review their climate change notes/answers on the worksheet, and add to them as needed. They then read other kids' comments on the What Do Kids Know? page. They add to the discussion by posting a comment at the bottom of the page, and adding additional information or positive comments to other kids' comments.

Conclusion. Summarize by having partners or small groups discuss what they posted on the site. During the whole class discussion, ask learners what new information they learned from other children. Are there any comments they found confusing, or that they wondered about? Ask your learners what they think the next step should be (taking steps to slow down climate change and talking to other kids about it).

Lesson #4:

Explore and Empower Objectives. By the end of this lesson, learners will know several ways they can help slow down climate change. They'll understand how actions such as recycling and turning off lights helps reduce air pollution, and that reducing air pollution slows down climate change. They'll feel empowered by the idea that there are steps they can take, and by sharing their ideas with other children. They'll commit to taking at least one new step to slow down climate change. Learners will feel optimistic about their future.

Introduction. Introduce learners to the What Can Kids Do? page, highlighting the variety of ways kids are working to help slow down climate change. Individual/Pair Work. Learners use the What Can Kids Do? section of the Start Learning page to research ways kids can help slow down climate change. In their science notebooks, or on chart paper, have children write a list of actions kids can take, and how each action reduces air pollution to slow down climate change.

Pair/Group Work. With a partner, or in a small group, have each learner share at least one specific step s/he can take today to reduce air pollution (that s/he's not already doing).

Individual/Pair Work. Half-way through the class time, have learners list their favorite ideas/actions their family already takes/actions their school already takes/their own commitment, on the What Can Kids Do? page, explaining how each action helps reduce air pollution. They can then reply to other kids' ideas.

Whole Class. Extend learner thinking by asking them why they should want to encourage other children to take steps to slow down climate change. How do the actions of people in other countries (e.g., creating lots of air pollution) affect the quality of life of all children around the world? Conclusion. Summarize by asking a few volunteers what they posted on the website. Ask the class, as a whole, if they think they'll be able to follow through on their commitment to take action themselves, because it's going to take more than just talk to slow down climate change.

Lesson #5:

Explore and Extend Objectives. By the end of this lesson, learners will know several ways adults can help slow down climate change. Kids are an important part in creating societal change by taking action themselves, but they also need the help of adults who have more power than kids. In addition to their own actions, they can keep talking to adults, helping them to understand that scientists have evidence of human-caused climate change, and that we all need to work together to slow down climate change. Learners will feel optimistic about their future.

Introduction. Introduce learners to the What Should Adults Do? page. Remind children that adults have more power than children, so kids need adult help to slow down climate change. **Individual/Pair Work.** Learners use the What Should Adults Do? section of the Start Learning page to research ways adults can help slow down climate change. In their science notebooks, or on chart paper, have children write a list of actions adults can take, and how each action reduces air pollution to slow down climate change.

Pair/Group Work. Learners explain in their own words how different adult actions can make a difference. (For example, when a company builds a wind farm the turbines generate electricity when their blades are pushed by the wind. Creating energy this way is not creating air pollution, unlike old-fashioned power plants that have to burn air-polluting coal to create energy.)

Individual/Pair Work. Halfway through class time, have learners use their notes to list their favorite ideas on the What Should Adults Do? page. Encourage them to explain online how the actions help, so other kids will understand the cause and effect. They can then reply to other kids' ideas.

Whole Class. Extend learner thinking by asking them how they could explain climate change to an adult who doesn't "believe" Earth's climate is changing (which really means s/he doesn't understand the science).

Conclusion. Summarize the class by emphasizing that climate change is a big problem, but kids AND adults are beginning to take steps to slow it down. Ask what new technology they think will have the largest effect. If we all take responsibility for taking care of Planet Earth we can have a significant impact. Encourage your learners to keep talking about it to other kids and adults.

Lesson #6:

Create and Empower Objectives. By the end of this lesson, learners will have created a product to be shared with other children for the Kids Against Climate Change website that teaches others about one aspect of climate change, or gives an idea for slowing down climate change. Learners feel empowered by their ability to communicate and take action to make a difference. Introduction. Introduce learners to the Share page. Lead a class discussion as to why it's important to communicate about climate change with other kids. How can we get kids around the world talking about, and taking action on, climate change? Challenge learners to create a way of communicating their concern about climate change, or their ideas for taking action to slow down climate change.

Individual/Pair/Group Work. Working individually, in pairs, or in small groups, learners can share their own unique perspective on climate change. What do they think is most important to communicate to other kids? They can submit a hand-drawn picture, a poem, an online picture, a photo, a video, a podcast, a song, an avatar, etc. Remind them to sign it with their first name and the name of their country. Directions for sending the products to me to post on the site are on the Share page.

Conclusion. Summarize the class by reminding your learners that if we all work together to slow down climate change, by talking about it, AND by taking action (by reducing our electricity use, by recycling, etc.), we can make a significant difference.

Additional Resources:

Benchmark "Weather Reporters on the Job" 3rd Grade Close Up Book <https://bubba-production.benchmarkuniverse.com/clever/trenton/X38535>

Arts Integration: Readers theatre (Act it Out!) Wild Weather <https://bubba-production.benchmarkuniverse.com/clever/trenton/X06712>

To integrate Math: Have students observe their local weather for 5 days (or more). Have students create bar graphs, line graphs or plots to show the changes in temperature.

Assessment: Climate change QUIZ <https://www.brainpop.com/science/weather/climatechange/>

Grades 5 or 6
Topic:
What is Climate change? /Weather Vs Climate
Duration
2 to 3 - Forty-five minute class periods
Standards:
<p>NGSS standards:</p> <p>MS-ESS2-5 (Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions)</p> <p>MS-ESS3-2 (Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects).</p>
Materials:
<p>Can be used for demonstration or sets available for each collaborative learning team</p> <ul style="list-style-type: none"> • Thermometer: measures air temperature. • Rain Gauge: measures precipitation. • Wind Vane: measures wind direction. • Anemometer: measures wind speed. • Barometer: measures air pressure. • Hygrometer: measures humidity. • Computer Access -
Essential Concepts & Questions
<ul style="list-style-type: none"> • Weather is observed, measured and changes daily. • How is weather measured? Why it is recorded? • Climate is the average weather conditions for a region over an extended period of time. • We can measure and chart daily weather conditions to notice trends and make predictions
Pre-Class /Warm-Up Suggestion
<p>Show news weather report that includes long range projection model.</p> <p>Class discussion question- How are meteorologist able to predict weather conditions days in advance?</p>
Possible Lesson Activity Resources

Moby Max- <https://www.mobymax.com/MM/SC/lessons/library/8/6#>

Grade 6 /Science /Weather / What is Weather?

Grade 6 / Science /Weather/ Predicting the Weather

Grade 6 / Science/ Climate/ What factors Affect Climate?

Grade 6/ Science / Climate/ Climate Change

Grade 6/ Science / Climate/ How Humans Are Affecting Climate

Grade 6/ Science/ Climate/ Unit Review

Grade 6/ Science/ Climate/ Test Climate Change

Weather Vs. Climate (3-5) Generation Genius

<https://www.generationgenius.com/videolessons/weather-vs-climate-video-for-kids/>

What is Climate Change – (6-8) Generation Genius

<https://www.generationgenius.com/videolessons/climate-change-video-for-kids/>

Predicting Natural Disasters (6-8) Generation Genius

<https://www.generationgenius.com/videolessons/predicting-natural-disasters-video-for-kids/>

Related Resources & Activities

Scholastic Study Jams- Weather Instruments

<https://studyjams.scholastic.com/studyjams/jams/science/weather-and-climate/weather-instruments.htm>

Using Weather Instruments

<https://betterlesson.com/lesson/632259/6-weather-instruments>

Video- Science and Measuring Tools

<https://www.youtube.com/watch?v=e3inavDlwfk>

NASA – Effects of Climate Change

<https://climate.nasa.gov/effects/>

Reflection / Assessment Options

Why is it important to track weather conditions and keep historical records?

How does the polar region's ice melting impact people in other areas?

What if any connection is there to the increasing temperatures averages and respiration? How can this impact future generations ?

Generation Genius – Lesson Review Questions, Exit Ticket and Quizziz and Kahoot

Moby Max- Grade 6/ Science/ Climate/ Test Climate Change

Grades 6 or 7

Topic

Climate Change Impacting Biodiversity

Duration

2 to 3 - Forty-five minute class periods

Standards

- MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
- MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (NCA-related content: [Many Factors Combine to Affect Biogeochemical Cycles](#) and [Biogeochemical Cycles](#))
- MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (NCA-related content: [Species Responses to Climate Change](#))

Materials :

Computer Access for each student or collaborative team
Virtual Dives of Various Coastal regions - <https://sanctuaries.noaa.gov/vr/>
Graphing Paper – if needed – activity of population predicting (CalAcademy)
Calculator
Images of Coral Reefs Healthy and Damaged / During Pandemic Lockdown and currently
Carbon in the Water Activity – See Lesson Suggestions

- One 16 oz plastic water bottle per student
- One half cup of water per student
- One ounce disappearing ink per student
- One plastic straw per student
- Safety glasses

Essential Concepts & Questions

Ecosystems rely on specific populations of organisms co-existing in a specific area. Each organism makes a distinct contribution to its sustainability. When abiotic factors are altered, damaged or destroyed that can have a devastating effect on the organisms that were dependent on that specific ecological balance.

Why it is essential to maintain biodiversity?

How has human action contributed to the destruction of some ecosystems?

What can humans do now to restore balance and biodiversity?

Why do you think some of the Coral started to grow during the pandemic lockdown?

Pre-Class /Warm-Up Suggestions

ABC News – Coral Reefs Threatened by Climate Change

<https://abcnews.go.com/International/coral-reefs-stop-growing-80-years-greenhouse-gases/story?id=77532016>

Display images of healthy coral and ask students to compare them to damaged or destroy coral.

Lesson Activity Suggestions

CBS News Story on Damages to Great Barrier Reef (time 5:31)

<https://www.cbsnews.com/news/great-barrier-reef-dying-climate-change-caused-decrease-in-new-coral-study-says/>

Maintaining Biodiversity (6-8) Generation Genius

<https://www.generationgenius.com/videolessons/maintaining-biodiversity-video-for-kids/>

Carbon Challenge Activity

<https://www.generationgenius.com/activities/climate-change-activity-for-kids/>

MOBY MAX-

Grade 6/ Climate/ How humans are affecting climate.

Grade 7/ Environmental Issues/ Humans and the Environment

Grade 7/ Environmental Issues / Water Pollution

Grade 7/ Environmental Issues / Environmental Issues and the Ocean

Grade 7/ Environmental Issues / Waste and Recycling

Related Resources

What is NJ doing about Climate Change?

<https://www.njlc.org/issues/fighting-climate-change>

Climate Change and Ocean Change- NOAA

<https://oceanservice.noaa.gov/facts/coralreef-climate.html>

Coral Reefs and Climate Change -

<https://www.calacademy.org/educators/coral-reefs-and-climate-change>

Middle School Climate Resources

<https://www.calacademy.org/educators/highlights-6th-8th-grades>

Reflection / Assessment Options

Why is what is happening in the oceans important to humans on the land?

Generation Genius – Reflection Questions, Kahoot, Quizziz and Exit Ticket

Moby Max - Environmental Issues Vocabulary review and Lesson Test

Grade 7 or 8

Topic

Hydroelectric Power

Duration

2 to 3 - Forty-five minute class periods

Standards

- ESS3.D: Global Climate Change Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.
- MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. (NCA-related content: [Adaptation](#) and the [Adaptation Planning and Implementation Framework](#))
-

Materials

Waterpower Activity – See Generation Genius
a 1 or 2 -liter bottle for each collaborative team
Plastic wrap – several rolls – depending on class size
Duct tape – several rolls- depending on class size
Twine – several rolls – depending on class size
Pack of heavy- duty card stock or 4x6 index cards – enough to give each team 6
Scissors – one pair per team
Hobby blade or box cutter – one for each collaborative team
Half inch wooden dowels – 2ft in length one for each team
2 plastic cups per team – small bathroom rinsing size

Essential Concepts and Questions

Humans must find alternative sources of fuels in order to lessen our dependency on fossil fuels. Fossil fuels are non-renewable and damage the atmosphere in various ways. Green energy or alternative fuel sources help us

Pre-Class /Warm-Up

Hydroelectricity in Ontario Video (2:11)

<https://www.youtube.com/watch?v=nV0yHztgrIs>

Lesson Activity Suggestions

MobyMax

Ecology and the Environment

Grade 7/ Science /Earth Resources / Managing Natural Resources

Grade 7/ Science/ Energy and Conservation/ Non-Renewable Resources

Grade 7/ Science/ Energy and Conservation/ Renewable Resources

Grade 7/ Science/ Energy and Conservation/ Using Energy Resources

Grade 7/ Science/ Energy and Conservation/Lesson Vocabulary Review

Grade 7/ Science/ Energy and Conservation/ Lesson Test

Force Energy and Motion

Grade 7 Science / Energy PE/KE

Grade 7 Science / Energy/ Types of Energy

Grade 7 Science / Energy/ Transformations and Conversions

Grade 7 Science / Energy Vocabulary Review

Related Resources

Responding to Climate Change -NASA

<https://climate.nasa.gov/solutions/adaptation-mitigation/>

11 Alternative Fuel Sources

<https://ecavo.com/alternative-energy-sources/>

USGS- Hydroelectric Power – How It Works

https://www.usgs.gov/special-topic/water-science-school/science/hydroelectric-power-how-it-works?qt-science_center_objects=0#qt-science_center_objects

Reflections /Assessments Options

Activity – Water Mill – Able to explain the structure and function, participation and success of final project

Generation Genius- Lesson Review Questions/ Kahoot, Quizziz and Exit ticket

Moby Max- Vocabulary Reviews

Additional Activities and Resources

Dirty Water Lab Project

<https://docs.google.com/document/d/1vxcefkhrdcONn1kkZI9BDbRjJ98EVLLmn3Iey1q9J5k/edit?usp=sharing>

K-5 Climate Change Activities - <https://www.plt.org/educator-tips/science-projects-pollution/>

Benchmark “Weather Reporters on the Job” 3rd Grade Close Up Book <https://bubba-production.benchmarkuniverse.com/clever/trenton/X38535>

Arts Integration: Readers theatre (Act it Out!) Wild Weather <https://bubba-production.benchmarkuniverse.com/clever/trenton/X06712>

To integrate Math: Have students observe their local weather for 5 days (or more). Have students create bar graphs, line graphs or plots to show the changes in temperature.

Assessment: Climate change QUIZ <https://www.brainpop.com/science/weather/climatechange/>

K-8 Climate Change Articles, Images and Class Activities

<https://www.nature.com/nclimate/>

<https://www.pblworks.org/teaching-about-climate-change-project-based-learning>

https://www.pbs.org/wgbh/nova/teachers/programs/0302_03_nsn.html

www.climatekids.nasa.gov

www.kidsagainstclimatechange.com.

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