

## UNIT 2

## ENGLISH: INVESTIGATING EFFECTS OF CLIMATE CHANGE IN PUERTO RICO AND THE UNITED STATES

**LESSON DESCRIPTION**

This lesson will allow students to learn about different effects of the climate change in Puerto Rico and the United States. During this lesson, student will be able to apply their reading comprehension skills through an information search process.



Source:

[http://school.phillipmartin.info/school\\_it\\_girl.htm](http://school.phillipmartin.info/school_it_girl.htm)

**APPLICATION OF THE LESSON PLAN**

The lesson plan corresponds to Unit 3.2 of English. The plan should be used like a complement to the discussion of the immigration.

**STANDARDS AND INDICATORS**

- Reading: The student describe the connection between a series of historical events, ideas or scientific concepts, or the steps in a technical process in an informational text. (3.R.3I)
- Writing: The student participate in research and collaborative writing projects. (Ex. explore books on “how to do” in a relation to a specific topic and uses them to redact a sequence instructions). (3.W.6)

**LEARNING OBJECTIVES**

- Remember the effects of climate change presented in Dorado or Cataño and in the state of Florida in United States.
- Identify the implications of the climate change in people’s daily live.

**TIMING**

- Two class sections

|       |                  |                        |                    |
|-------|------------------|------------------------|--------------------|
| Day 1 | Start 15 minutes | Development 25 minutes | Closing 20 minutes |
| Day 2 | Start 5 minutes  | Development 50 minutes | Closing 5 minutes  |

**MATERIALS**

- Computer with CD
- Video (available in the CD)
- Digital Projector
- Presentation (available in the CD)
- Brown paper
- Glue
- Tape (“masking tape”)
- Construction paper (one per student)
- White paper (one per student)
- Markers and/ or crayons

**VOCABULARY**

- Climate change: when there is a big difference in normal climate patterns over a long amount of time.

**CLASS GUIDE****DAY 1: START****Time: 15 minutes**

- The teacher will do a brainstorm to explore the knowledge of the students about the effects of the climate change.
  - The teacher will present to the students a video related to the climate change. The follow link correspond to the video *Climate Change (according to a kid)*:  
<https://www.youtube.com/watch?v=Sv7OHfpIRfU>
  - The video will be observed and discussed
- Indications:
1. The teacher with the students will construct a definition about the climate change. This will be written on the board. For this exercise, the teacher can consult Annex 1 and the definition provided in the vocabulary area.
  2. Based on what was observed in the video, the students will identify the cause of climate change.

**DAY 1: DEVELOPMENT****Instructional Activities****Time: 25 minutes**

- The teacher will explain the different effects of the climate change. The teacher will exemplify these effects with events that occurs in Puerto Rico. (Will have available file with presentation)

**DAY1: CLOSING****Time: 20 minutes**

- The teacher will explain the assignment and answer the questions asked by the students.
- Instructions:
1. The teacher will give to each student a sheet of white paper and a sheet of constructions paper.
  2. The students will identify with their families a climate change effect that is present in their community and an effect in area of the state of Florida. To do this, they will conduct a search for information in newspaper and information source on internet.

3. The student will write an informative paper using the white sheet and the construction sheet.
4. The content of the informative paper will be (see Attachment 2):
  - a. Community or sector name of Dorado (or Cataño, as appropriate to the school participating in the project). Type of climate change effect present in the community. Source of information where the effect was identified. Brief wording of the experience of a family who has been impacted by the effect.
  - b. Community or sector name of the state Florida. Type of climate change effect present in the community. Source of the information where the effect was identified. Brief wording of the experience of a family or relative who has been impacted by the effects.
5. The teacher will provide a summary of what was learned in the lesson.

## **DAY 2: START**

### **Time: 5 minutes**

- The teacher will review with the students what they learned on Day 1.

## **DAY 2: DEVELOPMENT**

### **Instructional activities**

#### Construction of a mural of experiences and presentations of them: 30 minutes

- The students will place their informative papers on the mural and decorate it.
- Each student will make an oral presentation of their informative paper.

### **Time: 20 minutes**

#### Classification and comparison of the experiences:

- The students will classify the experiences contained in the mural according to the type of the climate change effect. For this exercise, the teacher will request the collaboration of the four students to circulate the experiences that relate to a particular climate change effect. For this, each collaborative student will have a marker or crayon of a specific color, to represent a type of effect. The rest of the group will collaborate orally to classify the experiences. In this process, the teacher will question the reason why the experiences resemble or differentiate.
- The teacher will hold a discussion about the implications of the climate change effects in the persons.

#### Guide questions:

1. According to the experiences that we have know today, how the climate change effects impacted people's lives?
2. Based on what we have learned in these two classes, how can we contribute to minimize the effects of climate change?
3. According to what we learned, in what place affect the climate change?

**DAY 2: CLOSING****Time: 5 minutes**

- The students will provide a summary of what they learned in the lesson.

## Attachment

### Attachment 1. Educational resource for the teacher



The potential future effects of global climate change include more frequent wildfires, longer periods of drought in some regions and an increase in the number, duration and intensity of tropical storms. Credit: Left - Mellimage/Shutterstock.com, center - Montree Hanlue/Shutterstock.com.

Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner.

Effects that scientists had predicted in the past would result from global climate change are now occurring: loss of sea ice, accelerated sea level rise and longer, more intense heat waves.

***Taken as a whole, the range of published evidence indicates that the net damage costs of climate change are likely to be significant and to increase over time.***

- Intergovernmental Panel on Climate Change

Scientists have high confidence that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities. The Intergovernmental Panel on Climate Change (IPCC), which includes more than 1,300 scientists from the United States and other countries, forecasts a temperature rise of 2.5 to 10 degrees Fahrenheit over

the next century.

According to the IPCC, the extent of climate change effects on individual regions will vary over time and with the ability of different societal and environmental systems to mitigate or adapt to change.

The IPCC predicts that increases in global mean temperature of less than 1.8 to 5.4 degrees Fahrenheit (1 to 3 degrees Celsius) above 1990 levels will produce beneficial impacts in some regions and harmful ones in others. Net annual costs will increase over time as global temperatures increase.

"Taken as a whole," the IPCC states, "the range of published evidence indicates that the net damage costs of climate change are likely to be significant and to increase over time."<sup>1-2</sup>

## Future effects

Some of the long-term effects of global climate change in the United States are as follows, according to the [Third](#) and [Fourth](#) National Climate Assessment Reports:

## Change will continue through this century and beyond



Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases emitted globally, and how sensitive the Earth's climate is to those emissions.

[+ MORE](#)

## Temperatures will continue to rise



Because human-induced warming is superimposed on a naturally varying climate, the temperature rise has not been, and will not be, uniform or smooth across the country or over time.

[+ MORE](#)

Effects | Facts – Climate Change

## Frost-free season (and growing season) will lengthen



The length of the frost-free season (and the corresponding growing season) has been increasing nationally since the 1980s, with the largest increases occurring in the western United States, affecting ecosystems and agriculture. Across the United States, the growing season is projected to continue to lengthen.

In a future in which heat-trapping gas emissions continue to grow, increases of a month or more in the lengths of the frost-free and growing seasons are projected across most of the U.S. by the end of the century, with slightly smaller increases in the northern Great Plains. The largest increases in the frost-free season (more than eight weeks) are projected for the western U.S., particularly in high elevation and coastal areas. The increases will be considerably smaller if heat-trapping gas emissions are reduced.

[+ MORE](#)

## Changes in precipitation patterns



Average U.S. precipitation has increased since 1900, but some areas have had increases greater than the national average, and some areas have had decreases. More winter and spring precipitation is projected for the northern United States, and less for the Southwest, over this century.

Projections of future climate over the U.S. suggest that the recent trend towards increased heavy precipitation events will continue. This trend is projected to occur even in regions where total precipitation is expected to decrease, such as the Southwest.

[+ MORE](#)

## More droughts and heat waves



Droughts in the Southwest and heat waves (periods of abnormally hot weather lasting days to weeks) everywhere are projected to become more intense, and cold waves less intense everywhere.

Summer temperatures are projected to continue rising, and a reduction of soil moisture, which exacerbates heat waves, is projected for much of the western and central U.S. in summer. By the end of this century, what have been once-in-20-year

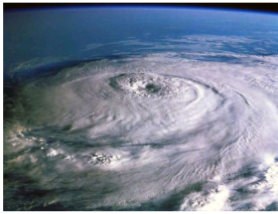


Effects | Facts – Climate Change

By the end of this century, what have been once-in-20-year extreme heat days (one-day events) are projected to occur every two or three years over most of the nation.

[+ MORE](#)

## Hurricanes will become stronger and more intense



The intensity, frequency and duration of North Atlantic hurricanes, as well as the frequency of the strongest (Category 4 and 5) hurricanes, have all increased since the early 1980s. The relative contributions of human and natural causes to these increases are still uncertain. Hurricane-associated storm intensity and rainfall rates are projected to increase as the climate continues to warm.

[+ MORE](#)

## Sea level will rise 1-4 feet by 2100

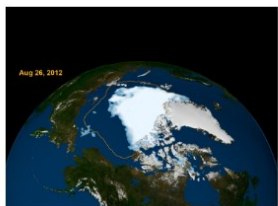


Global sea level has risen by about 8 inches since reliable record keeping began in 1880. It is projected to rise another 1 to 4 feet by 2100. This is the result of added water from melting land ice and the expansion of seawater as it warms.

In the next several decades, storm surges and high tides could combine with sea level rise and land subsidence to further increase flooding in many regions. Sea level rise will continue past 2100 because the oceans take a very long time to respond to warmer conditions at the Earth's surface. Ocean waters will therefore continue to warm and sea level will continue to rise for many centuries at rates equal to or higher than those of the current century.

[+ MORE](#)

## Arctic likely to become ice-free



The Arctic Ocean is expected to become essentially ice free in summer before mid-century.





## U.S. regional effects

Below are some of the impacts that are currently visible throughout the U.S. and will continue to affect these regions, according to the Third<sup>3</sup> and Fourth<sup>4</sup> National Climate Assessment Reports, released by the [U.S. Global Change Research Program](https://climate.nasa.gov/effects/):

**Northeast.** Heat waves, heavy downpours and sea level rise pose growing challenges to many aspects of life in the Northeast. Infrastructure, agriculture, fisheries and ecosystems will be increasingly compromised. Many states and cities are beginning to incorporate climate change into their planning.

**Northwest.** Changes in the timing of streamflow reduce water supplies for competing demands. Sea level rise, erosion, inundation, risks to infrastructure and increasing ocean acidity pose major threats. Increasing wildfire, insect outbreaks and tree diseases are causing widespread tree die-off.

**Southeast.** Sea level rise poses widespread and continuing threats to the region's economy and environment. Extreme heat will affect health, energy, agriculture and more. Decreased water availability will have economic and environmental impacts.

**Midwest.** Extreme heat, heavy downpours and flooding will affect infrastructure, health, agriculture, forestry, transportation, air and water quality, and more. Climate change will also exacerbate a range of risks to the Great Lakes.

**Southwest.** Increased heat, drought and insect outbreaks, all linked to climate change, have increased wildfires. Declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas are additional concerns.

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

**Additonal sources of information:**

- Climate Change and Puerto Rico:  
<http://academic.uprm.edu/gonzalezc/HTMLobj-924/ccimpactccypr.pdf>
- Climate change indicatros:  
<http://caribbeanclimatehub.org/resources-and-tols-2nd-draft/>
- Climate change and Florida:  
<https://www.flseagrant.org/climatechange/>

**Attachment 2. Example of informative paper**

Title of the informative paper

Type of climate change effect  
Experience in Puerto Rico

Type of climate change effect  
Experience in Puerto Rico

## REFERENCIAS

European Space Agency. (n.d.). *Climate change*. Retrieved from [https://www.esa.int/esaKIDSen/SEM2OXXTVKG\\_Earth\\_o.html](https://www.esa.int/esaKIDSen/SEM2OXXTVKG_Earth_o.html)

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