Climate Impacts Graph Matching

From the Center for Science Education

<https://scied.ucar.edu/activity/climate-impacts-graph-matching>

Grade level: Middle School and High School

Time: Preparation time: 20 minutes to print and organize graph and statement cards. Class time: 30-45 minutes for activity and discussion.

Students match graphs showing aspects of observed climate change with statements that describe the observations.

**Learning Goal**

Students interpret graphs of data that convey the impacts of climate change over the past century.

**Materials**

One set of Climate Impacts Graph Matching Cards for each pair of students. Only one key is needed for each educator.

(See downloadable material)

## Preparation

* Print Climate Impacts Graph Matching Cards in color and cut apart.
* Keep each set of cards together with a clip or bag.

## Directions

1. Introduction:
   1. Ask students if they have heard conversations about climate change (e.g.,there is less snow and ice in winter than there used to be) and wondered if statements were true?
   2. Have students discuss this question with their partner, and take notes about climate change statements that they have heard. Have a few pairs share the statements that they have noted with the rest of the class.
   3. Explain that we can check whether the measurements scientists have made over the past century support these statements.
   4. Tell students that in this activity they are going to look at data (graphed) and assess which statements from the collection are supported by the data and which are not.
2. Have students lay all their Climate Impacts Graph Matching Cards out where they can be seen and try to make matches. Remind students that statements that don’t match any of the graphs might not be false. They just aren’t supported by the data we have in this activity.

## Assessment

1. Once all groups have made their matches, have each group discuss one graph-statement pair they made and why they think it’s a good match. Explanations can be indicative of a student's ability to critique reasoning and translate between information that is expressed in graphs and information expressed in words. Guide students by asking what the graph shows, what the axes of the graph mean, and whether the information in the graph supports the statement.
2. To grade student work based on the matches they have made, take a photo of each match with the students' names on a piece of paper. Notice that in the key (the first page of the PDF), letters of graphs correspond to numbers of statements. (Or, you may wish to have students grade their own matches by providing the key.)
3. As an extension, challenge students to determine whether statements that did not match graphs are false, or whether there is not enough data to decide. Have students write a conclusion for each of the statements that did not match a graph.
4. Wrap up: Ask students to look at only the graphs. Tell them that these graphs come from a 2013 report that was written and reviewed by hundreds of climate scientists that are a part of the [Intergovernmental Panel on Climate Change](https://www.ipcc.ch/). This report was shared with governments around the world. Ask students to be reporters coving the news about this report and write a headline that sums up the main message based on the data. Have students work individually or in small groups and then share their headlines with the class.

## Background

The graphs in this activity are from the Intergovernmental Panel on Climate Change (IPCC) [Fifth Assessment Report of Working Group 1](https://www.ipcc.ch/report/ar5/wg1/) (published in October 2013).

Climate change over the past century is well-documented thanks to innovations in instrumentation, increased numbers of monitoring locations worldwide, and satellite observations since the mid to late 20th Century. Observations show that, worldwide, temperature has increased over decades although there is variability year to year. Some of the heat has made its way into the ocean. Sea level rise, due to melting glacial ice and thermal expansion of seawater, has been documented as well.

For more information:

* The [climate section](https://scied.ucar.edu/learning-zone/how-climate-works) on their website provides more context for this activity.
  + https://scied.ucar.edu/learning-zone/how-climate-works
* The [Impacts of Climate Change](https://scied.ucar.edu/learning-zone/climate-change-impacts/water-cycle-climate-change) article provides an overview of some of the changes we have seen over the 20th Century.
  + https://scied.ucar.edu/learning-zone/climate-change-impacts/water-cycle-climate-change

The [Intergovernmental Panel on Climate Change (IPCC)](https://www.ipcc.ch/) is an international organization that includes scientists and government representatives from around the world. While the IPCC includes hundreds of climate scientists in the writing of reports, and thousands more who review the reports, they are not responsible for science research as part of their work with the IPCC. Instead, every six or seven years, IPCC scientists are asked to review and survey our current understanding of climate change, its risks, its impacts, and strategies for mitigation and adaptation based on the scientific literature during the latest six- to seven-year period. The World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the IPCC in 1988.