**Weather and Climate IQuest**

*(product reviewers: this will be posted on our site and will have an associated url to be embedded in the teacher guide and student capture sheet)*

Earth’s surface is a complex and dynamic set of interconnected systems—principally the [geosphere](http://pmm.nasa.gov/education/glossary#geosphere), [hydrosphere](http://pmm.nasa.gov/education/glossary#hydrosphere), [atmosphere](http://pmm.nasa.gov/education/glossary#atmosphere), and [biosphere](http://pmm.nasa.gov/education/glossary#biosphere).  All of the earth’s processes are the result of energy flowing and matter cycling within and among these systems. Weather and climate are shaped by complex interactions involving sunlight, the ocean, the atmosphere, clouds, ice, land, and life forms.

This IQuest has been developed to help you explore the wild and changing world of weather and climate. Before we get started, take a few minutes to think about what you already know about weather and climate. Use your background information and personal experiences to answer the questions below to the best of your ability.

* What is your definition of “weather”?
* What is the weather like today in your location?
* What was the weather like yesterday in your location?
* What is your definition of “climate”?
* What is the climate in your area like?
* How are weather and climate similar?
* How are weather and climate different?

We will begin by taking a look at today’s weather conditions across the country. Go to the National Weather Service site at <http://www.weather.gov>.

If you are in a location where severe weather is possible, there will often be “warnings” or “watches” given to help people prepare and stay safe. Watch this short (2:44) video clip from NOAA:

<http://www.youtube.com/watch?v=x3V3HZBs1Y4> to know how to prepare and respond to these potentially dangerous situations.

This video, “Plane Weather” from NASA Connect explains the causes of weather and describes how we are able to collect weather data as they explore the impact weather conditions can have on air transportation: <http://www.youtube.com/watch?v=y0-uVQOc4oU&feature=relmfu>

Ever wonder where the hottest place on Earth is? NASA’s “Earth Observatory” explains how scientists use satellites to help us answer that question at <http://earthobservatory.nasa.gov/Features/HottestSpot/page1.php>

Earth-observing satellites enable us to learn a great deal about our weather and climate. Watch how water vapor moves through the atmosphere and returns to Earth as rain and snow in the data visualizations from NASA below—first on a globe and then on a map of the entire world. <http://pmm.nasa.gov/education/videos/water-cycle-watering-land>.

As you can see, Earth’s oceans and atmosphere are constantly interacting. We have delved into some of the different types and causes of weather, and will now begin to focus on climate. In this NASA video, “Melting Ice, Rising Seas” (4:30), you will see how all four of Earth’s spheres are being affected by changes in our global climate. <http://pmm.nasa.gov/education/videos/melting-ice-rising-seas>

You have probably heard a lot about “climate change” lately. What is climate change? Doesn’t the climate always change, like the weather? How do scientists know that the climate is changing? Why would climate change cause problems? Is it called “climate change” or “global warming”? Start off by reading this article from a scientist’s perspective:

<http://pmm.nasa.gov/education/articles/whats-name-global-warming-vs-climate-change>

This website will give you an in-depth look at five key indicators that scientists monitor to determine how our global climate is changing.  On this website, you can interact with data sets and discover fascinating facts about global climate change:

“Global Climate Change: Vital Signs of the Planet”- <http://climate.nasa.gov>

Before we finish, take some time to explore how Earth’s climate has changed in the past and may change in the future by interacting with NASA’s “Climate Time Machine” at <http://climatekids.nasa.gov/time-machine/>