

Global Precipitation Measurement Mission

Name- _____ Date- _____ Period- _____

Weather and Climate IQuest: Student Capture Sheet

Go to this url: <http://pmm.nasa.gov/education/interactive/weather-climate-iquest> and use the links to help you explore the wild and changing world of weather and climate. Record your answers on this capture sheet. Before you get started, take a few minutes to think about what you already know about weather and climate. Use your background information to answer the questions below to the best of your ability. After you finish the IQuest, you can look back at your responses and see if your knowledge has changed.

- 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?

Go to <http://www.weather.gov> and take a look at today’s weather in the United States.

- What are some of the different kinds of hazardous weather that are listed in the map key?
- Click on the blue tab above the map that says “forecast maps”. Then look down at the orange headings that show various types of forecast maps. By looking at these categories, **list five of the types of data** that meteorologists collect related to weather:
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
- Take a few minutes to explore some of these maps to see the different types of data that collected in order to forecast the weather. Explain why it is difficult for weather forecasters to be accurate when they are making predictions about the weather for the next few days.

Find out the difference between a “warning” and a “watch” in this short video clip that explains the differences:

<http://www.youtube.com/watch?v=x3V3HZBs1Y4>.

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Use the information to answer the questions below:

- What is issued when weather is about to strike?
- What does a “watch” tell you about the potential danger weather
- What should you do when a “watch” is issued?

The video, NASA Connect’s “Plane Weather” (7:09) discusses the basics of meteorology and the impact of weather forecasting on aviation. *Watch the video at <http://www.youtube.com/watch?v=y0-uVQOc4oU&feature=relmfu>* and use the information to answer the questions below:

- What types of weather do we experience in the U.S.?
- Why is aviation impacted by weather conditions more than other forms of transportation?
- What is solar radiation
- Why doesn’t the sun warm all parts of the Earth equally?
- Why don’t land and water absorb solar radiation evenly?
- In which layer of the atmosphere does most weather take place?
- What type of pressure system is associated with low air pressure?
- What makes wind flow?
- What determines what type of precipitation will fall during the winter?

We will now move on and look at one of the variables that we collect data on when we are looking at the weather: temperature. Before we visit the next website, answer these questions to the best of your ability:

- What do you think “temperature” is?
- What causes the temperature to change during the day?
- What causes the temperature to change throughout the year?
- Where do you think the hottest place on Earth is? Why?

You can see the dynamic motion of the oceanic and atmospheric flow patterns in the data set animation at this link: <http://pmm.nasa.gov/education/videos/water-cycle-watering-land>.

- In the second animation, what direction do the clouds appear to be moving in at the equator?
- Does the wind direction appear to follow a consistent pattern?
- How do you think these weather patterns may affect the climate in a location such as northern Africa?
- What do you think the climate might be like in Central America, based on its geographical location and the atmospheric flow patterns

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Now we will take a closer look at climate. Watch this video called “Melting Ice, Rising Seas” <http://pmm.nasa.gov/education/videos/melting-ice-rising-seas>

- Why is the sea level rising? It is rising because of global warming.
- What is happening to the ice sheets and glaciers in Greenland?
- What types of consequences would sea level rise have for people across the globe?
- Why is it hard to predict the exact amount the sea level will rise in the future?

Read this article called “Global Warming vs. Climate Change” at

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

- What does the term, “global warming” describe to a scientist?
- What is the definition of “climate change”
- Other than an increase in global surface temperature, what other variables are expected to occur with climate change?
- Why is the more scientifically accurate term, “global climate change” and not “global warming”?

Go to this site: “Global Climate Change: Vital Signs of the Planet”-

<http://climate.nasa.gov>

- What are some of the “vital signs” that a doctor might take on a patient?
- What are the five “vital signs” that NASA is monitoring on Earth?

Hover over each of the vital signs (in blue), and look at the pop-ups that appear. For each of the vital signs below, write the information that appears in that pop-up box.

- Arctic sea ice minimum:
- Carbon dioxide:
- Sea level:
- Global temperature:
- Land ice:

Select **one** of these vital signs to learn more about. Use the information under the tab, “Key Indicators” to answer the following questions about the vital sign you select.

- Vital sign:
- Why is this a “vital sign” for Earth? How will its change impact us?
- What type of data is being collected on this vital sign?
- Use the data to explain, both qualitatively and quantitatively, how this vital sign is changing over time?

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Look at the [time series map](#) for your data.

- What time period does it cover?
- What variable is being measured over time?
- Describe the changes you note occurring as you move the slider from the past toward the present.

Click on “Evidence” on the menu bar to the left.

Now let’s take a look at the evidence for each of the vital signs that scientists have determined are changing. Use this information to answer these questions.

- When did the last ice age end?
- What were most of the climate changes before human civilization caused by?
- How have technological advances allowed us to learn more about climate change?

Select **one** of the pieces of evidence for rapid climate change and use it to answer the following:

- Evidence for rapid climate change:
- Qualitative and quantitative data that describes this change:

Click on “Causes” on the menu bar to the left, and use that information to answer these questions.

- What are the “greenhouse gases”?
- What is the impact of the layer of greenhouse gases to Earth?
- Is the greenhouse effect a good thing or a bad thing? Explain your response.
- Could we survive on Earth without the greenhouse gases?
- What kinds of human activities are increasing the carbon dioxide concentration?
- What four consequences are most likely to occur as a result of changing the natural balance of the greenhouse gases?

Go to the “Climate Change Machine” at <http://climatekids.nasa.gov/time-machine/>

- Approximately what percent of the Arctic sea ice has melted just since satellites started observing around 30 years ago?
- Name two cities that will be under water if sea level rises by 20 feet?
- How many parts per million has the greenhouse gas carbon dioxide increased in the air between 2003 and 2009?
- About how much has temperature risen in the western US in just a little over 100 years?