**Global Climate Change**

Notes outline to accompany the Global Climate Change Powerpoint

<http://www.docstoc.com/docs/69621520/Environmental-Science-Lecture-Powerpoint-Global-Warming--Climate-Change>

1. Define **weather -**
2. Define **climate -** 
   1. The four main factors that determine climate are:
3. What is the atmosphere?
   1. How thick is the atmosphere compared to the Earth?
4. The troposphere is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ part of the atmosphere.
5. Looking at the picture, list the four layers of the atmosphere starting with the one closest to Earth:



1. The troposphere is the \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ part of the atmosphere.
2. What occurs in the troposphere?
3. How does this layer relate to global warming?
4. Describe the **stratosphere -** 
   1. What does this layer contain?
5. Of all the solar radiation reaching the Earth,…
   1. 25% is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. 25% is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. 50% \_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Of the solar energy that reaches the surface…
   1. Fresh clean snow reflects \_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Dark soil reflects \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. The average reflection is \_\_\_\_\_\_\_\_\_\_\_\_\_.

**Greenhouse Effect**

1. Infrared energy that reflects off the Earth’s surface is trapped by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* 1. Why is this process normal and necessary?
  2. How is this currently changing?

1. Give the source of each of these greenhouse gases:
   1. Carbon dioxide:
   2. Methane:
   3. Water Vapor:
   4. CFCs:
   5. Nitrous Oxide:
2. Which of these two greenhouse gases are the **biggest** contributors to global warming?
3. The amount of \_\_\_\_\_\_\_\_\_\_\_\_\_in the atmosphere directly affects \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

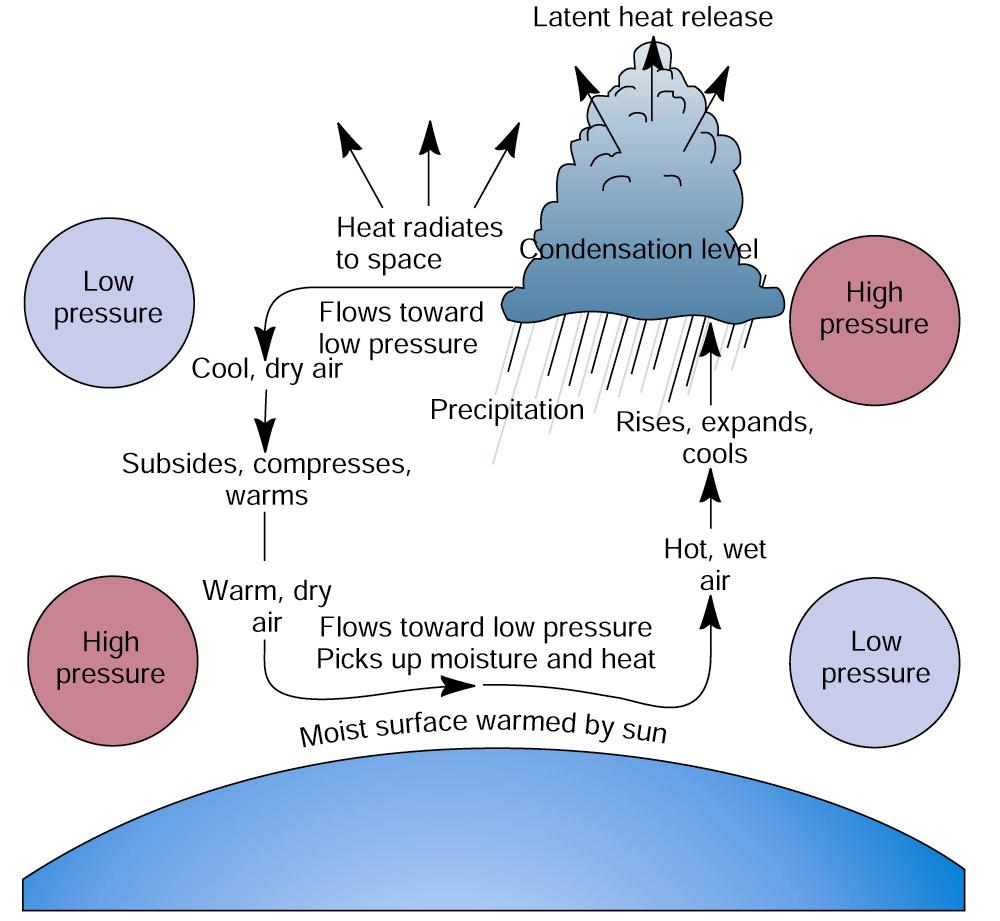
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Warm air containing water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This occurs

because warm air is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than cool air. As the warm air rises, heat is

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into the atmosphere and the water vapor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* 1. What happens to the condensed water?



1. Give three different ways that the Earth’s climate has changed throughout history:

**Evidence of Global Warming**

1. How much has the Earth surface temperature increased since 1880?
   1. How fast is the Earth warming?

* 1. When have the warmest years on record occurred?

* 1. How does this affect the Arctic?

1. What are the three observations mentioned by the IPCC 2007 report?
2. According to the IPCC 2007 report, what is the most likely cause of these observations?

**Global Warming Timeline**

19th Century:

1958:

1970:

1973:

1977:

1981:

1995:

1997:

1998:

2003:

**Day After Tomorrow (2004)**

1. What specific visuals does this movie give in regards to global climate change?

Tokyo, Japan:

Los Angeles, USA

New York City, USA

1. What three events occurred in 2005 relating to global climate change?
2. What documentary is released in 2006?

**Measuring Carbon Dioxide in the Atmosphere**

1. Where is the carbon dioxide detector located?
   1. This location allows for measurements: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* 1. Where does the air entering this area come from?

1. What was the concentration of CO2 in 1960?
2. What was the concentration of CO2 in 2000?
3. What exactly is the relationship between carbon dioxide and global temperature?
   1. Are there any areas of the graph where they do not match up?
4. All temperature data before 1880 is the result of “proxies.”
   1. What is a proxy?
   2. Give two examples of proxies:
5. The data from Antarctic ice cores only goes back \_\_\_\_\_\_\_\_\_\_\_\_\_\_ years.
   1. Why is this limited?
6. What is another source of data that goes back even farther?
   1. How can isotopes of water be used to determine global temperature?
7. What changed at the end of the end of the last ice age?
8. Describe the temperature pattern over the last 1,000 years.

**Medieval Warming Period and Little Ice Age**

1. When did the Medieval Warming Period Occur?
2. What two major effects did this have on the Western Europeean civilizations?
3. How did this affect the other continents?
   1. How does this relate to the Mayan empire?
4. When did the Little Ice Age occur?
5. What two major effects did this have on the Western European civilizations?
6. What are the three likely causes of this little ice age?



1. Describe the temperature pattern over the last 130 years.

**Hurricane Katrina**

1. When did Hurricane Katrina form?

1. Why did the hurricane become so strong so quickly?
2. What were the two main reasons why New Orleans was so badly damaged?

**Global Warming and Hurricanes**

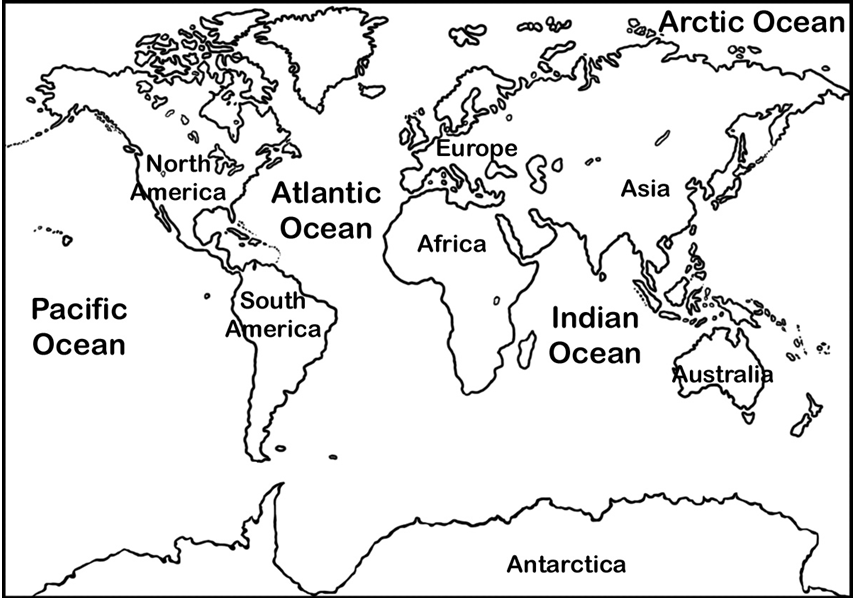
1. Is there any evidence to link climate change to frequency of hurricanes?
2. How specifically are hurricanes affected by global warming?

**El Nino and La Nina**

1. Define **El Nino**  -
   1. Where is this located?
   2. Where is it found most of the time?
   3. How often does it move, and where does it go?
2. What is the weather like during an El Nino year?
3. What is the weather like during a La Nina year?

**Great Ocean Conveyor**u

1. Draw in the warm and cold currents of the great ocean conveyor in the map below:



1. Where is the majority of the sheet ice in the world located?
2. What are the three effects of the melting of the sheet ice at the poles?
3. Why is the other 1% of the sheet ice so important to human populations?

**Global Warming, Heat, and the Water Cycle**

1. What two effects do increased surface temperatures have on the water cycle?
2. According to the map, what region will experience:

**December-February:**

* 1. The greatest decrease in precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. The greatest increase in precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**June-August:**

* 1. The greatest decrease in precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. The greatest increase in precipitation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Scientific** Consensus

1. In the 2004 survey of peer-reviewed papers, how many agreed with the IPCC’s conclusions?
2. In the 2009 survey of Earth scientists, how many agreed with the IPCC’s conclusions?

**Global Warming: Solutions**

1. Give two examples of prevention strategies:
2. Give two examples of cleanup strategies:
3. In the long run, what would be less expensive: prevention, or cleanup?
4. How would the stratoshield help reduce global warming?
   1. Would this cause acid rain or affect air quality?
   2. Why might this seem like such a positive solution by most people?
5. What is the cap-and-trade system, and how would it affect greenhouse gas emissions?

**Action vs. Inaction**

1. Fill out the table below:

|  |  |  |
| --- | --- | --- |
|  | **Significant Action** | **No Action** |
| **Global Climate Change is a fraud or is naturally occurring** |  |  |
| **Global Climate Change is real and primarily human-caused** |  |  |

1. How does the image shown summarize the dilemma faced by humanity in dealing with global warming?