Instructions:

In Slide Show mode, go to slide #2 and click any label to jump to a slide of additional information.

- Return to the main slide by clicking “Back”
- If you have Internet access available, click “Data” to launch a browser and display an interactive graph of scientific datasets that support the statement on the slide.
How do we know the world is warming?

Click any label for information

- Air Temperature over Ocean
- Temperature of the Lower Atmosphere
- Humidity
- Snow
- Glaciers
- Arctic Sea Ice
- Ocean Heat Content
- Global Sea Level
- Sea Surface Temperature
- Air Temperature over Land

What can we do?

Credits and data sources
Measurements from satellites and weather balloons show that the lowest layer of the atmosphere—where we live, airplanes fly, and weather occurs—is warming. Greenhouse gases are building up in this layer, trapping heat radiated from Earth's surface and raising the planet's temperature.
Measurements over land and water show more water vapor in the air. The air feels stickier when it’s hot, and air conditioners have to work harder for us to feel comfortable.
Thermometers on ships and floating buoys show that air near the ocean’s surface is getting warmer, increasing its ability to evaporate water. In turn, we see an increase in heavy precipitation events and flooding on land.
Satellites and weather stations on land show that average air temperature at the surface is going up. Consequently, we see an increase in the number of heat wave events and the area affected by heat wave events.
Temperature sensors on buoys and in “floats” that move up and down through the ocean show an increase in the heat energy stored in the top half-mile of ocean water.

Warming causes water to expand, raising global sea level. Higher water temperatures can also affect marine ecosystems, disrupting fisheries and the people who depend on them.
Historical paintings, photographs, and other long-term records show that most mountain glaciers are melting away.

People who depend on water from melting glaciers for their living needs, crops, and livestock are facing potential shortages.
Satellite images show that the area of land covered by snow during spring in the Northern Hemisphere is getting smaller. Snow is melting earlier, changing when and how much water is available for nature and people.
Tide gauges and satellites that measure the distance from their orbit to the ocean’s surface both show that global sea level is getting higher. Rising waters threaten ecosystems, freshwater supplies, and human developments along coasts.
Satellite sensors and thermometers on ships and buoys show that the temperature of water at the ocean’s surface is rising.

Warm surface waters can damage coral reefs, reducing opportunities for fishing and tourism, and leave coasts vulnerable to storm surges and erosion.
Satellite images show that the area covered by sea ice in the Arctic is getting smaller.

While a decrease in sea ice may open new shipping routes and provide easier access to natural resources, it may also introduce concerns related to national security and invasive species.
Mitigation

Reducing greenhouse gas emissions or removing carbon dioxide from the atmosphere can lessen the severity of climate change impacts.

Adaptation

Taking action to minimize vulnerability to climate change impacts can smooth our transition to a warmer world.
Mitigation – Reducing CO$_2$

- Develop new habits to eliminate wasted energy
- Switch to carbon-free energy sources such as solar and wind
- Plant new trees to increase the amount of CO$_2$ taken up by forests
Adaptation –
Anticipating and adjusting to new conditions

- Protect habitat or structures threatened by sea level rise
- Develop plans to ensure adequate water supplies
- Plant different crops
- Develop new businesses

Assessing a region’s ability to handle runoff from heavier precipitation
Credits and Data Sources

References:


Interactive PowerPoint Presentation prepared by NOAA Climate Program Office. Credits for images appear in the Notes section of each slide. All comparative statements in the presentation refer to trends measured over a minimum of 30 years.

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