**Climate Change Webquest:** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_KEY\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part 1:** **Greenhouse Gases**

Use the link <https://www.youtube.com/watch?v=Pz0JBSKRhf0> to watch the video.

1) What causes the 30% of incoming solar radiation to be reflected back to space? by clouds, aerosols, ice and snow

2) What causes the 70% of incoming solar radiation to be absorbed? land, ocean & atmosphere

3) The balance between what two things determines the temperatures of the planet? incoming solar & outgoing thermal energy

4) What is making the energy budget out of balance ? Co2 and other greenhouse gases

5) What creates the greenhouse gasses? burning fossil fuels

6) What do greenhouse gasses block? the Earth’s outgoing heat

**Part 2:** **NASA: Earth Changes due to Climate Change, Satellites, Ice/Reflection, Clouds**

Use the link and watch Climate Puzzle: <http://www.nasa.gov/multimedia/podcasting/temperature-puzzle.html>

1) Last decade is the hottest ever recorded since humans started keeping track.

2) Sea levels rose over an inch and arctic summer sea ice declined by over 300,000 square miles.

**Three major pieces of the puzzle: incoming sunlight, absorption and reflection.**

3) Solar cycle seems to have a slight impact.

4) A brighter more reflective planet bounces more energy back to space.

5) Some of the brightest and most reflective parts of our plant are those covered with ice .

6) NASA data shows that the sea ice is vanishing into the dark oceans and Earth becomes less reflective and warms even further.

7) Clouds also reflect a lot of sunlight.

8) But it’s hard to know whether clouds may cause the planet to cool enough to significantly slow warming.

9) Water vapor is the world’s most abundant greenhouse gas.

10) Describe how greenhouse gasses warm earth: They create a blanket around earth, trapping heat in the atmosphere

**Part 3: Global Changes (Sea Ice, Sea Level, and Temperature)**

**Go to:** <https://climate.nasa.gov/interactives/climate-time-machine>

**A) Sea Ice: Click the tab. Read the section and use the website to answer the questions below?**

1) How has the ‘perennial’ arctic sea ice changed since the 1980’s? steadily decreasing since the satellite record began in 1979

**B) Sea Level: Click the tab**. **Read the section and use the website to answer:**

1) How many meters would the water rise if Greenland ice sheet melts completely? 5-7 meters

2) Describe what would happen to the east coast and gulf coast if the Greenland ice sheet melts completely? New Orleans and Miami would be covered in water

**C) Average Global Temperature: Click the tab**. **Read the section and use the website to answer:**

1) Write the value of the change in climate temperatures for the US for these years:

1900 \_\_\_\_\_\_\_\_ 1907 \_\_\_\_\_\_\_\_ 1924 \_\_\_\_\_\_\_\_\_ 1935 \_\_\_\_\_\_\_\_\_ 1970 \_\_\_\_\_\_\_\_\_\_ 1991 \_\_\_\_\_\_\_\_\_\_ 2005 \_\_\_\_\_\_\_

2) Using the slider, identify the areas of the planet that have had the greatest increase in temperature for the past 20 years:

3) From your own understandings, why might this area show the greatest change?

**Part 4: Ozone Hole Recovery**

Watch exploring the ozone by NASA at: <https://www.youtube.com/watch?v=qUfVMogIdr8>

1) What does the ozone do for the earth? Earth’s natural sunscreen - screens UltraViolet radiation

2) List and describe the 3 ingredients that create the ozone hole? very high levels of Chlorine and Bromine, very cold temperatures, sunlight to drive a reaction where Cl destroys Ozone molecules

**Watch :** <https://www.youtube.com/watch?v=lBu3vltczRw>

3) Describe what is happening to the ozone hole and why it is happening: it is decreasing because of the Montreal Protocol - manufactured chemicals have decreased, rising temperatures in the Stratosphere