

Name: KEY

Date:

Class Period:

NOVA: Decoding the Weather Machine

PART 1 (VIDEO)

1. Earth's climate is set by a complex interaction between its 4 major components – land, sea, ice, and air.
2. Almost 200 years ago, in 1824, it was deduced that the atmosphere controls the planet's temperature.
3. Tyndall discovered that it was carbon dioxide, along with a few other trace gases like water vapor that trapped heat in the atmosphere.
4. Adding more greenhouse gases to the atmosphere traps more heat, acting like an extra blanket and warms the planet.
5. The instrument designed by Dave Keeling was so sensitive to atmospheric carbon dioxide that it detected the seasons – an interaction between planets and the atmosphere.
6. The changing colors in the videos over the seasons shows the breath of the forests.
7. The “Keeling Curve” shows that the CO₂ concentration in the atmosphere is rapidly increasing/rising/going up over time.
8. The deepest Antarctic ice cores are over 2 miles deep.
9. Using gas bubbles trapped in the ice, researchers can measure the CO₂ concentration of the atmosphere up to 800,000 years ago.
10. Do the ice core records of CO₂ match the Keeling Curve record? (choose one) yes no
11. How does the concentration of CO₂ in the atmosphere today compare to what it was over the past 800,000 years?

CO₂ concentrations today are much higher

12. As a clam's shell grows, it incorporates oxygen from the water into the shell material, forming annual rings like a tree. Oxygen comes in different forms – Oxygen-16 and Oxygen-18. The colder the water, the more oxygen-18 is incorporated into the shell. This information can be used to tell what the temperature was when each layer formed.
13. Fossil shells from ocean mud gives us a temperature record that goes back 10s of millions of years.
14. The temperature record from fossil shells is a near perfect match with the CO₂ record from ice cores.
15. Is Earth's orbit currently in the right phase to cause increases in CO₂ and temperature? (choose one) yes no

PART 2 (VIDEO)

16. Does the amount of carbon dioxide we are adding to the air by burning fossil fuels match up with the amount that is measured? (choose one) yes no

17. How much of what we emit stays in the atmosphere? 50% .
18. Trees are “soaking up” about ¼ (one quarter) / 25% of the carbon we are putting in the air – each year!
19. Most of the warming in our climate system is in the ocean, not the atmosphere .
20. The ocean has heated up by an average of a half degree F over the past 30 years.
21. A staggering 93 percent of the heat we are putting into our atmosphere is getting soaked up by the oceans.
22. Icebergs break off the Greenland glaciers in a process called calving.
23. What is the main trigger for calving – warming air or warming ocean water? Warming ocean water .
24. If all the ice on Greenland were to drain into the ocean and melt, sea level would rise by 23 feet.
25. Locked up in the Antarctic ice sheet is the equivalent of a 200 foot sea level rise, if it were all to melt.

PART 3 (VIDEO)

26. We have lost 50 % of the world’s coral reefs in the last 30-40 years.
27. The more we mitigate , or limit, how much our climate changes, the less we will have to adapt.
28. To do this, we will have to shift our economy away from burning fossil fuels .
29. Whirlpool switched to using wind for the energy they need at their factory in Ohio where dishwashers are built.
30. A single wind turbine can produce enough energy to power up to 400 homes.
31. Manufacturing and installing today’s solar is still relatively expensive .
32. Perovskites, similar to the silicon in solar cells, can change sunlight into electricity. They are cheaper and easier to manufacture.
33. Fossil fuels still account for more than 80 % of the world’s power.
34. One way to limit adding more carbon dioxide to the air is to capture it from coal-fired power plants and inject it deep underground for long-term storage.
35. Crop yields are as good or better using no- till methods of farming as traditional tilled fields.