Name _____ Date _____ Period _____ 80

EARTH'S AMAZING ATMOSPHERE

Activity 1 – Atmosphere Video

1. Describe what Earth would be like if there was no atmosphere.

2. The atmosphere protects Earth from _____ and _____.
3. It is mainly from the _____ that our atmosphere was formed.
4. At Death Valley in California, the air pressure is _____, meaning there is more air over your head.
5. Why do your ears always pop on an airplane?

6. The thermosphere blocks deadly _____ radiation.
7. The _____ is responsible for the weather, rain or snow.
8. We live in the _____, a level of the atmosphere.
9. Why are mountain tops colder than the temperature in the city?

10. Why does it become harder to breathe as you go higher into the troposphere?

Activity 2 – Engineer a Hot Air Balloon

Design Challenge
Purpose –Create a **working, small scale** hot air balloon to observe gases in the atmosphere when heat is added or taken away.
Materials Per Group

1 - Small Garbage Bag	1 meter String	Meter Stick	Hot Glue	Calculator
4 - Straws	Tin foil	Tape	2 - Candles	

Build a Model Hot Air Balloon

Procedure:

1. Use a meter stick to measure the length of the top of an open garbage bag in cm.

2. Creating a working hot air balloon is all about physics and ratios, so you need to be very careful with your calculations. To find the length the straws need to be, simply multiply the length of the top of the bag (cm) and multiply it by 0.7.

Top of Bag Length (opening) (cm)	Length of Straws (cm)
---------- X 0.7	= ----------

** create 2 straw lengths that match exactly.

3. Connect the 2 straw lengths by crossing them to form a large "+" then use a piece of tape to keep them in place. Be careful adding too much tape will add weight and the hot air balloon will not fly.

4. In the center of the straws, "+", place a small piece of tinfoil and attach to the straw base using 2 small pieces of tape.

5. Take 2 birthday candles and cut them evenly in half, make sure on the new piece to uncover some of the wick (piece of string).

6. Put a dot of hot glue onto the tinfoil and place a candle on it. Do this for all 4 candles. When placing a hot glue dot, use the spaces between the straws otherwise it will melt. Place just enough for the candles to stick, add too much the balloon will not fly.

7. If the base is too heavy, the hot air balloon will not rise. To help reduce the weight of the base, try trimming off as much tinfoil and tape as possible.

8. Use 4 pieces of tape to connect the straw base to the garbage bag. **Make sure the candles are facing inside the garbage bag, just as the heat source does in a real hot air balloon.**

9. Tie a piece of string at the end of one of the straw ends (away from the candles) to hold the hot air balloon.

Test Model

Hot Air Balloon models will be tested outside. We will go out as a class to test.

Evaluate Model

Answer the following questions using complete sentences

10. What challenges did you have as a group?

11. How is energy being transferred between the gas molecules inside the garbage bag?

12. Why do you think it is important to have exact and careful measurements to make the hot air balloon?

13. Why do you think the bag stayed filled with air while the candles were burning?

14. Why do you think the bag did not stay filled with air when the candles burned out?

15. Why do you think you had to measure the straws to a certain length?

16. What change could you make to this hot air balloon model to make it better?

17. Draw a diagram in the space below to show how energy is transferred inside a hot air balloon and explain how it works. Make sure to include labels, arrows and descriptions to show your understanding.