EPS 100 Stapleton Name: _____
Quiz: Physical Properties and Air Pressure

Part I (Mass, Volume, Density, Weight) :

The objects below are mostly empty space. The circle is the edge of each object. The dots inside represent all of each object's mass. The empty space inside the objects has no air or mass of any kind. All of the objects are in similar locations on the same planet.

1. Which object has the most volume?

2. Which object has the least volume?

3. Which object has the most mass?

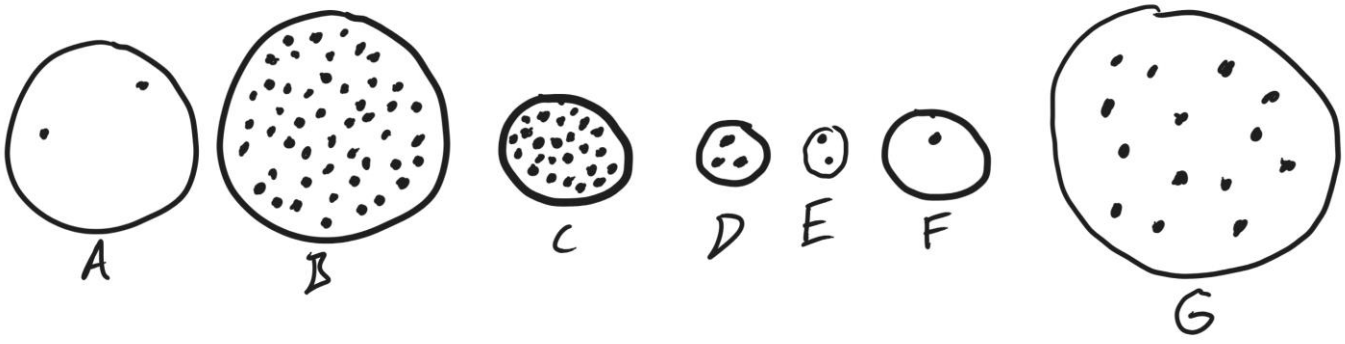
4. Which object has the least mass?

5. Which object has the most weight?

6. Which object has the least weight?

7. Which object is most dense?

8. Which object is least dense?



Part II (changes in mass, volume, density, and weight): For the following questions, tell whether each property increases, decreases, or stays the same. **Circle** the correct symbol, either +, -, or =.

9-12. An object's size increases, but the amount of stuff in it remains the same.

9. mass + - = 10. volume + - =

11. density + - = 12. weight + - =

13-16. The particles inside an object become less crowded, but the size of the object doesn't change.

13. mass + - = 14. volume + - =

15. density + - = 16. weight + - =

Part III: How heating and cooling can affect pressure, volume, and density

17-19. There is air inside a sealed jar. The jar cannot change its size, and no air can enter or leave. What will happen when the jar and the air inside are **cooled down?**

17. What will cooling do to the motion of the molecules in the jar?

18. When the jar is cooled, what will happen to the pressure inside the jar?

19. What is creating the pressure that is inside the jar?

20-24. A balloon is filled with air. No air can escape or enter the balloon. The balloon is stretch, so it can grow and shrink. Someone heats up the balloon.

20. How does heating affect the overall volume of the balloon and its air? (increase, decrease, or no change)

21. How does heating affect the overall mass of the balloon and its air? (increase, decrease, or no change)

22. How does heating affect the overall weight of the balloon and its air? (increase, decrease, or no change)

23. How does heating affect the overall density of the balloon and its air? (increase, decrease, or no change)

24. How does heating affect the pressure of the air inside the balloon? (increase, decrease, or no change)

Part IV: How compression and expansion can affect temperature

Consider a sealed 2-liter plastic bottle full of air. Air cannot enter or escape.

25. What happens to the temperature of the bottle if you squeeze it?

26. Explain why squeezing changes the temperature in this way. (What do the molecules do differently, and why?)

27. What happens to the temperature of the air in the bottle if you release it after you have been squeezing it for a while?

Bonus: Explain why the temperature changes in that way when you release the bottle after squeezing it. How and why does the motion of the molecules change?