Particle Motion Argument

Name: _____ Date: _____ Period_____

Directions: Pretend as if you were talking with your *know it all* uncle during Thanksgiving dinner about how you have learned in science that particles of solids, liquids and gasses move in various ways. Your uncle insists that particles of solids, liquids and gasses do not move. He warrants his claim by saying "you can't see the particles" moving. How could you convince your uncle that he is wrong? Follow the steps below to complete a short argumentative essay on particle movement.

1. Complete the following investigations and look for evidence of particle movement in each.

2. Choose at least two of the investigations to use as evidences for your claim that particles DO MOVE upon finishing.

3. Write at least 4 paragraphs; 1 intro, 2 body (each evidence) and 1 conclusion ON YOUR OWN PAPER please.

- State your claim
- Provide at least 2 pieces of evidence from 2 of the following investigations.
- Provide a warrant for your evidence which is to explain how the evidence supports your claim.

Investigation #1: Colorful Milk

Background: See Steve Spangler Link

What Evidence of particle movement does this demonstration provide? Explain below.

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Investigation #2: Hot and Cold Liquid Diffusion

Background: We have two 1000 mL beakers on the front table. Beaker A has cold water in it. Beaker B has hot water in it. We want to know if food coloring (solute) will spread out faster in the cold or hot water (solvent). We will experiment to find out. Remember, we need to control as many other variables that could affect the rate of diffusion as possible (i.e. shaking, boiling, levels of water, number of drops and etc.). Please see the following link for more information. Diffusion Link

What Evidence of particle movement does this demonstration provide? Explain below.

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Investigation #3: Metal Loop and Ball

Background: The metal loop and the metal ball are made of brass. The brass is a type of metal that conducts heat very well. Therefore, it heats up and cools very quickly. Can you remember what happens to the spacing and speed of atoms and molecules as the matter is heated or cooled?

What Evidence of particle movement does this demonstration provide? Explain below.

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Investigation #4: Air Freshener Diffusion

Background: Air freshener is made by the mixing of various ingredients and placing them into an air canister to be sprayed as needed in the form of a gas. We will spray a small amount in one corner of the room and observe diffusion in action.

What Evidence of particle movement does this demonstration provide? Explain below.

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Investigation #5: Marshmallow Expansion

Background:

Marshmallows are made of sugar, corn syrup, H20, and Gelatin. Would you consider a marshmallow to be a solid, liquid or gas? We will place a few marshmallows in the microwave and blast them with heat for a few minutes. What will the heat do to speed and spacing of the atoms and molecules?

What Evidence of particle movement does this demonstration provide? Explain below.

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Investigation #6: Air Freshener Diffusion

Background:

Air freshener is made by the mixing of various ingredients and placing them into an air canister to be sprayed as needed in the form of a gas. We will spray a small amount in one corner of the room and observe diffusion in action.

Observations:

What Evidence of particle movement does this demonstration provide? Explain below.

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Investigation #7: Mylar Balloon

Background:

A Mylar balloon is a balloon that is made of foil and holds the gas like helium much longer than a regular balloon. They are also very expensive compared to a regular balloon. We will heat and cool the Mylar balloon to see what it does.

What evidence of particle movement does this demonstration provide? Explain below.

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Investigation #8: Soda Can Implosion

Background:

We will put a small amount of water in an empty soda can and heat it up on the hot plate. We will heat the water until it vaporizes into steam. After the water is vaporizing we will carefully take a pair of tongs and remove the can from the hot plate, turn it over and put it upside down into a beaker of ice water. Watch what happens to the can. Does air put pressure on things? Did you know that the air pressure at sea level it about 15 psi. Link

What evidence of particle movement does this demonstration provide? Explain below.

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