

1. What are the key characteristics of atoms and molecules in gases, liquids, and solids? In table 2 below, describe the characteristics of particles for each phase of matter based on Model 1 above. Be specific with regard to spacing of particles, the potential of particles for movement, and whether or not the particles will fill the containers.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solid | Liquid | Gas |
| Spacing |  |  |  |
| Motion of the particles |  |  |  |
| Filling a container |  |  |  |

1. In which phase of matter is there the least spacing between particles? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*\_\_\_*
2. In which phase of matter is there the most potential for movement? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*\_\_\_*
3. Which phase of matter does not have a definite shape yet the particles will not fill the container? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*\_\_\_*
4. What would be necessary to change from a solid to a liquid? What is this change called and how is this accomplished in terms of temperature and kinetic energy (of the molecules)?
5. What would be necessary to change a liquid to a gas? What is this change called and how is this accomplished in terms of temperature and kinetic energy (of the molecules)?
6. What would be necessary to change a liquid to a solid? What is this change called and how is this accomplished in terms of temperature and kinetic energy (of the molecules)?



1. In your own words, explain what intermolecular forces are:
2. Similar to magnets, it takes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy to move atoms that have stronger attractive forces.
3. Intermolecular forces are *(stronger/weaker)* when particles are closer together.
4. Rank the states of matter (high, medium, low) for each of the two categories below. Include a brief explanation.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solid | Liquid | Gas |
| Kinetic Energy of Particles |  |  |  |
| Intermolecular Forces |  |  |  |

1. Look at your descriptions for the spacing, movement, and ability to fill a container in Table 2. Are they consistent with what you now know about intermolecular forces? Explain why or why not, and revise any discrepancies.

**Model 3 Phase Changes**



1. Which arrows in model 3 require the addition of energy?
2. Which term, endothermic or exothermic, is used to describe the situation when energy is added into a system from the surroundings?
3. Which phase changes are endothermic?
4. Which arrows in Model 3 indicate the release of energy?
5. Which term, endothermic or exothermic, is used to describe the situation when energy is released into the surroundings by the system?
6. Which phase changes are exothermic?

Complete the table below about phase changes.

