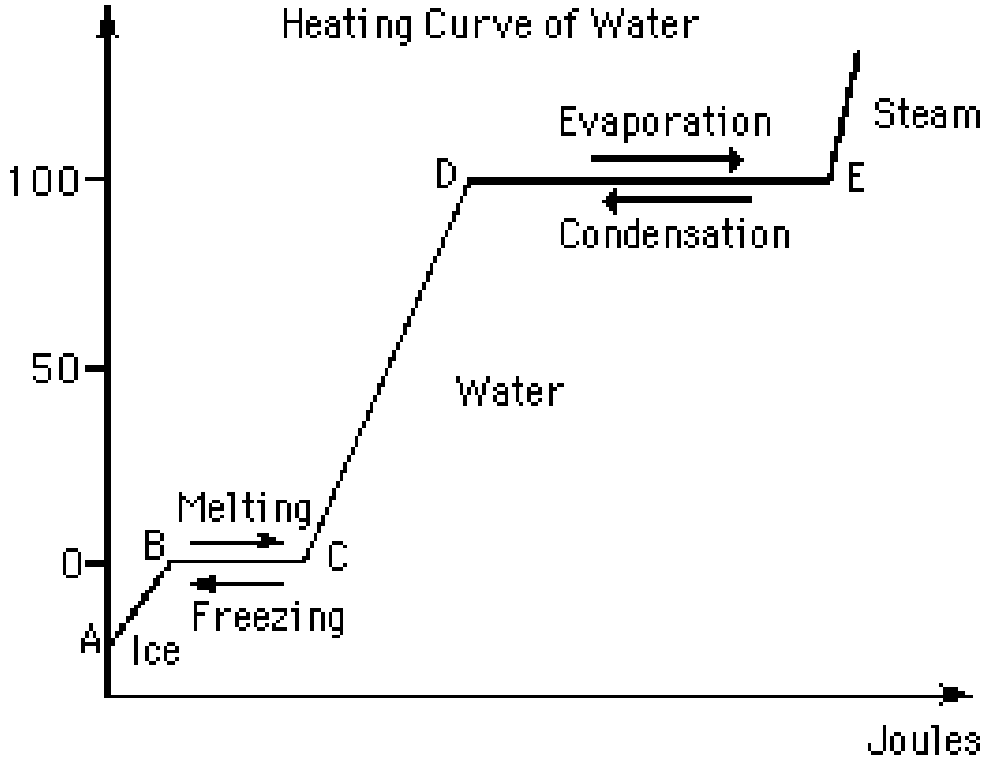
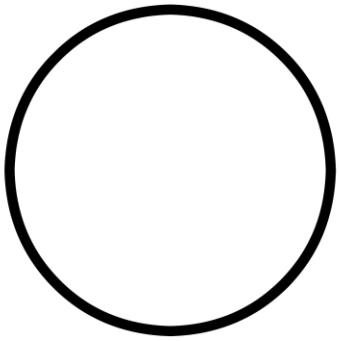
Effect of Temperature Change on Individual Particles – Teacher Document

Intro: Heating a pure solid by increasing the temperature will affect the individual particles (molecules of water in the diagram below). Think carefully about how the articles would appear in a sample and what their motion would be like as the sample of solid water is heated.



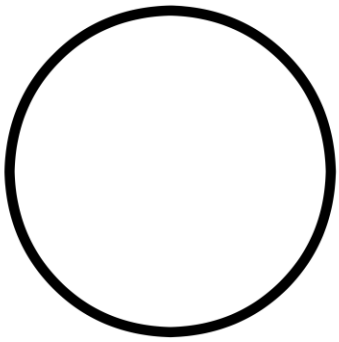
Using a solid circle to represent one water molecule, in the circles below, please draw the appearance of water at each of the areas on the graph. Please include a minimum of at least 10 molecules in each diagram. Be sure to show in your diagram a clear difference at each of the areas on the graph. It is not necessary to indicate intermolecular forces of attraction.

A to B



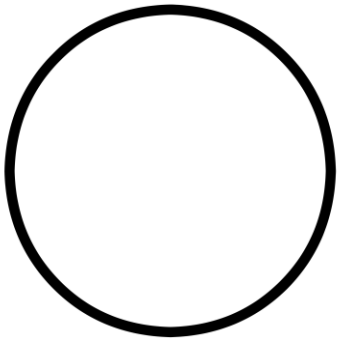
So from A to B the students should have the water particles drawn so that they are touching each other – we are ignoring IMF's and molecular geometry throughout this activity. We are just focusing on recognizing states of matter and spacing.

B to C



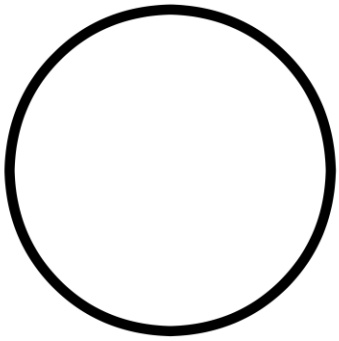
So from B to C the student should have some water particles close and touching and others spread out a bit – demonstrating that they understand that both liquid and solid are present. The number of each state of matter is irrelevant.

C to D



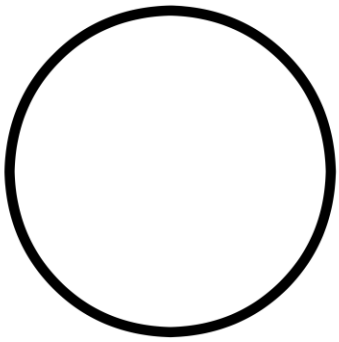
So from C to D the student should have the particles all spaced similarly and farther apart than their solid water was.

D to E



So from D to E the student should have some particles spaced out like in D to E and then some that have greater spaces between to represent the gaseous state. Again, I think we should be looking at relative spacing throughout this activity but clearly 2 states so matter here.

E to F



So from E to F the student should have the water particles with larger spaces between and rather evenly spaced so that it looks like only the gaseous state is represented here.

Get into groups of 4 and share your drawings in the group.

What similarities do you see with the others in your group?

What differences do you see with the others in your group?

Can you as a group come to a consensus as to what each drawing should look like? Complete a set of the same 5 drawings that represents that consensus.

Answers to the above questions will vary. I would circulate around the room and listen to the responses. At the end I would as a class come to a general conclusion – either actual drawings or in words – what each drawing should look like.