Recitation Activity: PE and Interactions between atoms

In this activity you will be providing explanations. Remember that there are three parts to an explanation: what the explanation is about (the claim), what scientific principle or evidence you are using, and the reasoning that links the two.

1. Draw a molecular level picture to show what happens as two Neon atoms approach each other and use it to help you explain why the two atoms are attracted to each other.

2. As the atoms get very close together their electron clouds overlap. Draw a picture and use it to help you explain why the potential energy rises as the atoms get very close.

3a. Draw a graph showing how the potential energy changes as the atoms move from far apart to where they are smooshed together (a technical term!).

3b. Describe the forces that are present and their respective strengths at the potential minimum.

3c. What information does the depth of the potential well tell you about the strength of the interaction?

3d. What information can you get from the position of the potential minimum along the x-axis (the distance between the atomic nuclei).

4. Now draw a PE curve for the interaction of two Ne atoms, and then on the same set of axes draw a curve for the interaction of two Xe atoms. Explain the relative depths of the potential wells and the relative positions of the minima along the x-axis.

5. Draw a picture of solid Xe and liquid Xe. Use it to explain why you need to add energy to change a solid to a liquid.

6. Now use the graphs from Q4 and the picture from Q5 to:

   a. Explain the relationship between the strength of the interaction between particles and the boiling point.

b. Predict and explain the relative melting points of Ne and Xe.