ANALYSES AND CONCLUSIONS

Part A. Hexagonal Closest Packing
1. What is the coordination number of the central atom in the model of hexagonal closest packing?

Part B. Face-Centered Cubic Packing
2. Explain the appropriateness of this name for describing the model you constructed.

Part C. Comparison of Hexagonal Closest Packing and Face-Centered Cubic Packing
3. Compare the coordination numbers for the two types of closest packing.

4. If both a hexagonal closest-packed model and a cubic closest-packed model were constructed from spheres of the same size and mass, would the densities of the models differ?
Part D. Body-Centered Cubic Packing

5. Below 906 °C, metallic iron crystallizes in a body-centered cubic form called alpha-ferrite. Above this temperature, the stable form is gamma-ferrite, which is a face-centered cube. At 140 °C, the crystal form changes back to a body-centered cube form called delta-ferrite. What is the coordination number of iron in each of these forms?

Part E. The Sodium Chloride Lattice

6. What ions most closely surround each Na\(^+\) ion? What ions most closely surround each Cl\(^-\) ion?

7. What is the coordination number of the Na\(^+\) ions? What is the coordination number of the Cl\(^-\) ions?