Phase Change Quiz

1. **Why is ice less dense than liquid water? Be specific.**

2. **Heat is energy in transit. Therefore, it must have a direction. What does it mean for heat to be negative or positive in regards to a system?**

3. **Find the energy needed to convert 5 grams of ice at 0C° to water at 0C°.**

4. **Find the energy needed to convert 5 grams of water at 0C° to ice at 0C°.**

5. **Find the energy needed to convert 2 grams of ice at -5C° to water at 50C°.**

6. **Find the energy needed to convert 1 kg of ice at 10K to steam at 600K.**

7. **Find the energy needed to convert 5 g of steam at 120 C° to water at 50C°.**

8. **It is well known that burns from steam are much more severe than burns from boiling water. To discover why this is true,**
    a. **Compute the energy released from cooling 2 grams of water from 212 F° to 98.5F°**
    b. **Compute the energy released from converting 2 grams of steam at 212 F° to water at 98.5F°.**
    c. **Compare the two energies, which one is greater in magnitude?**

9. **The hoover dam produces 4.132×10^{13} Joules of energy each day.**
    a. **Determine the amount of energy produced each minute.**
    b. **Convert this energy to calories.**
    c. **Assuming that you start with ice at 0F°, determine the amount of ice that could be melted to water at 0C° with the energy produced by the hoover dam in a minute.**
    d. **Assuming that you start with ice at 0F°,determine the amount of ice that could be converted to steam at 100 C°**

10. **A stick of dynamite produces 10^6 Joules of energy. Normally, one would expect an explosion from dynamite to melt ice. But, we know that phase changes depend on the mass of a material. How much ice would you need to have to prevent a stick of dynamite from melting it?**
    a. **Assume you start with ice at 0C°**
    b. **Assume you start with ice at -50C°**