

Big Chem: Unit 17 Liquids

PRINT Name _____ Period _____

1. You have a sample of H₂O with mass 23.0 g at a temperature of -46.0°C. How many joules of heat energy are necessary to:

a) heat the ice to 0°C?, b) melt the ice?, c) heat the water from 0°C to 100°C?, d) boil the water?, e) heat the steam from 100°C to 109°C? The energies are as follows:

To warm ice (specific heat of ice) = 2.06 J/g•C°.....

To melt ice (the heat of fusion) = 334 J/g.....

To warm water (specific heat of water) = 4.18 J/g•C°.....

To evaporate water (heat of vaporization) = 2260 J/g.....

To warm water vapor (specific heat of steam) = 2.02 J/g•C°

..Ans: a = 2180 J, b = 7680 J, c = 9610 J, d = 52000 J, e = 418 J.

2. Draw the *Warming Curve for Water* and label the FIVE parts.

3. Using the Warming Curve of Problem 2 and the *Sample Problem* found in your notes or at *Sample Problem* from the on-line notes, calculate the **Total number of calories** needed to change 20.0 grams of ice at -15.0°C to water vapor at +125.0°C. See the *Table of Heat Values for Water* in your notes. Ans: 14,760 calories.

For Temperature Conversions:

Use the formula, $K = C + 273$, so $C = K - 273$.

4. Convert the following temperatures from Celsius to Kelvin:

a) 87°, b) 16°, c) 59°, d) -68°, e) 73°. *Hint: watch your signs!*

5. Convert the following temperatures from Kelvin to Celsius:

a) 86°, b) 191°, c) 533°, d) 318°, e) 894°.

6. Discuss TEN of the "Shocks" of Boiling Point and Vaporization.