Phase Change Worksheet

1) A 12 oz. can of soda weighs about 450 grams. How many joules are released when a can of soda is cooled from 25 degrees Celsius (room temperature) to 4 degrees Celsius (the temperature of a refrigerator). **The heat capacity of liquid water is 4.18 J / gram x ^{o}C.**

2) How many joules are required to heat 250 grams of liquid water from 0^{0} to 100^{0} C ?

3) How many joules are required to melt 100 grams of water? **The heat of fusion of water is 6.01 kJ / mole.**

4) How many joules are required to boil 150 grams of water? **The heat of vaporization of water is 40.67 kJ / mole.**

5) How many joules are required to heat 200 grams of water from 25 ^{0}C to 125 ^{0}C? **The heat capacity of steam is 1.84 J / g $\cdot$ ^{0}C**

6) How many joules are given off when 120 grams of water are cooled from 25 ^{0}C to -25^{0}C? **The heat capacity of ice is 2.09 J / g $\cdot$ ^{0}C.**

7) How many joules are required to heat 75 grams of water from -85 ^{0}C to 185^{0}C? **The heat capacity of steam is 1.84 J / g $\cdot$ ^{0}C.**

8) How many joules are required to heat a frozen can of juice (360 grams) from -5 ^{0} C (the temperature of an overcooled refrigerator) to 110 ^{0}C (the highest practical temperature within a microwave oven)?

9) How many joules are released when 450 grams of water are cooled from 4 x 10^{7} ^{0}C (the hottest temperature ever achieved by man) to 1 x 10^{-9} ^{0}C (the coldest temperature achieved by man).

10) How many joules are required to raise the temperature of 100 grams of water from -269 ^{0}C (the current temperature of space) to 1.6 x 10^{15} ^{0}C (the estimated temperature of space immediately after the big bang)?

Phase Change Worksheet – Answer Sheet

1) A 12 oz. can of soda weighs about 450 grams. How many joules are released when a can of soda is cooled from 25 degrees Celsius (room temperature) to 4 degrees Celsius (the temperature of a refrigerator). **The heat capacity of liquid water is 4.18 J / gram x ^{o}C.** **39.5 kJ**

2) How many joules are required to heat 250 grams of liquid water from 0^0 to 100^0 C ? **104.5 kJ**

3) How many joules are required to melt 100 grams of water? **The heat of fusion of water is 6.01 kJ / mole.** **33.4 kJ**

4) How many joules are required to boil 150 grams of water? **The heat of vaporization of water is 40.67 kJ / mole.** **338.8 kJ**

5) How many joules are required to heat 200 grams of water from 25 ^{0}C to 125 ^{0}C? **The heat capacity of steam is 1.84 J / g $\cdot$ ^{0}C** **523.9 kJ**

6) How many joules are given off when 120 grams of water are cooled from 25 ^{0}C to -25^{0}C? **The heat capacity of ice is 2.09 J / g $\cdot$ ^{0}C.** **63.9 kJ**

7) How many joules are required to heat 75 grams of water from -85 ^{0}C to 185^{0}C? **The heat capacity of steam is 1.84 J / g $\cdot$ ^{0}C.** **250.9 kJ**

8) How many joules are required to heat a frozen can of juice (360 grams) from -5 ^{0} C (the temperature of an overcooled refrigerator) to 110 ^{0}C (the highest practical temperature within a microwave oven)? **1094.46 kJ**

9) How many joules are released when 450 grams of water are cooled from 4×10^7 ^{0}C (the hottest temperature ever achieved by man) to 1×10^{-9} ^{0}C (the coldest temperature achieved by man). **3.31×10^{10} J**

10) How many joules are required to raise the temperature of 100 grams of water from -269 ^{0}C (the current temperature of space) to 1.6×10^{15} ^{0}C (the estimated temperature of space immediately after the big bang)? **2.94×10^{17} J**