

Heating/Cooling - Phase change worksheet (Aug, 20, 2020 BES)

MW H2O =	18.016 g/mol	input values	
melting pt H2O =	0 C		
boiling point H2O =	100 C		
amount of water =	100 grams	5.55 moles	
Heat cap (s) =	2.05 J/(g C)	36.9 J/(mol C)	
Enthalpy of fusion (DHfus) =	0.334 kJ/g	6.01 kJ/mol	6010 J/(mol C)
Heat cap (l) =	4.184 J/(g C)	75.38 J/(mol C)	
Enthalpy of vap (DHvap) =	2.258 kJ/g	40.68 kJ/mol	40680 J/(mol C)
Heat Cap (g) =	2.03 J/(g C)	36.5 J/(mol C)	

starting temperature --> -20 C

total q added (J)	temp	
0	-20	
300	-18.536585	-- heating up solid
600	-17.073171	-- heating up solid
900	-15.609756	-- heating up solid
1200	-14.146341	-- heating up solid
1500	-12.682927	-- heating up solid
1800	-11.219512	-- heating up solid
4100	0	-- heating up solid
37459	0	-- melting solid
42459	11.9502868	-- heating up liquid
47459	23.9005736	-- heating up liquid
52459	35.8508604	-- heating up liquid
57459	47.8011472	-- heating up liquid
62459	59.751434	-- heating up liquid
67459	71.7017208	-- heating up liquid
72459	83.6520076	-- heating up liquid
77459	95.6022945	-- heating up liquid
79299	100	-- heating up liquid
305099	100	-- vaporize liquid
306099	104.93589	
307099	109.871781	
308099	114.807671	
309099	119.743562	
310099	124.679452	

***Colors cells below are calculated/referenced Equations

q = (mass of H2O)*(heat capacity)*DT
 DT = q/(mass of H2O * heat capacity)
 How much heat (q) required to inc T to get to melting point?
 4100 J

q = Dhfus * grams
 How much heat (q) required to melt the H2O (s)?
 33359.2362 37459 total q

q = (mass of H2O)*(heat capacity)*DT
 DT = q/(mass of H2O * heat capacity)
 How much heat (q) required to inc T get to boiling point?
 41840 79299.2362 total q

q = Dhvap * grams
 How much heat (q) required to inc T of the H2O (g)?
 225799.29 305098.526 total q

q = (mass of H2O)*(heat capacity)*DT
 DT = q/(mass of H2O * heat capacity)

