**Heating and Cooling Curves**

This is an example of water – can be done with any substance but the temperature values and C and L values will be different. Also please note that the slope and length of lines are not drawn to scale. It is traditional to just draw the heating curve. A cooling curve would just be the opposite direction!

Cooling Curve

100°C

0°C

Q = mCsteam∆T

|  |
| --- |
| **Latent Heat Values for H2O**Lfus = 334 $\frac{J}{g}$Lvap = 2260 $\frac{J}{g}$*Freezing point**Boiling point*Q = mLvaporizationQ = mLfussionQ = mCice∆TQ = mCliquid∆THeating Gas 🡪Cooling Gas 🡨Heating Liquid 🡪Cooling Liquid 🡨Heating Solid 🡪Cooling Solid 🡨Vaporizing 🡪Condensing 🡨Melting 🡪Freezing 🡨 |

**Q = mC∆T**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Meaning** | **Common Units** |
| Q | Energy being transferred | Joules, kJ, calorie, Calorie |
| m | Mass of sample | grams, kilograms |
| C | Specific Heat | J/g°C, kJ/g°C |
| ∆T | Change in Temperature | °C |

Note:

* Temperature is in CELSIUS not Kelvins for this topic!
* Q can be positive or negative, energy absorbed or energy released
* 1 kJ = 1000 J
* 1 calorie = 4.18 J
* 1 Calorie = 1 kcal = 1000 calories
* Specific Heat values can vary a little bit from source to source. That is ok. Depends on the exact type that was measured. Feel free to add other specific heats you come across to this list!

**Common Specific Heat Values**

|  |  |  |
| --- | --- | --- |
| **Substance** | **J/g°C** | **cal/g°C** |
| Aluminum | 0.90 | 0.23 |
| Copper | 0.39 | 0.093 |
| Ethanol | 2.44 | 0.58 |
| Glass | 0.50 | 0.12 |
| Gold  | 0.13 | 0.031 |
| Graphite | 0.71 | 0.17 |
| Ice | 2.09 | 0.50 |
| Iron | 0.45 | 0.11 |
| Lead | 0.13 | 0.031 |
| Mercury | 0.14 | 0.033 |
| Silver | 0.24 | 0.057 |
| Steam | 1.87 | 0.45 |
| Water (liq) | 4.18 | 1.00 |
| Wood | 1.8 | 0.42 |