**Temperature and Energy**

We relate energy and temperature by discussing a substance’s \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_.

* + ­\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ = heat required to raise temp. of an object by 1oC
		- \_\_\_\_\_\_ heat is required to raise the temp. of a \_\_\_\_\_\_\_ sample of a substance by 1oC than is needed for a \_\_\_\_\_\_\_\_\_ sample
* Specific Heat Capacity
	+ a \_\_\_\_\_\_\_\_\_\_\_ property of matter that describes matter’s \_\_\_\_\_\_\_\_\_\_\_\_ to a change in temperature. The symbol for specific heat is **\_\_\_\_.**
		- Not all substances heat up at the same \_\_\_\_\_\_. Some get hot \_\_\_\_\_\_\_\_\_\_ and some more \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Example

* If you have ever touched the metal on a car and the fabric on the car seat on a hot day, you have experienced the affect of specific heat. The metal seems much hotter than the fabric seat even if after receiving the same amount of energy from the sun. This is caused by the difference in the specific heat of each of the materials. The metal has a lower specific heat and gives up its thermal energy at a much higher rate than does the fabric which has a much higher specific heat.

**High Specific Heat and Water**

* Water has a very \_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ compared to other matter; therefore ocean water stays about the \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ throughout day and night despite the differences in temperature between \_\_\_\_\_\_\_ and \_\_\_\_\_\_. That also explains why water is used in \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ to cool the engine.
	+ **\_\_\_\_\_\_ specific heat = \_\_\_\_\_\_ energy required to change the temperature**
	+ **\_\_\_\_\_\_\_ specific heat = \_\_\_\_\_\_\_ energy required to change the temperature**

Which would get hotter if left in the sun?

* Penny vs. Water ● Plastic recycling bin vs. metal trash can
* Keys vs. soccer ball

**Specific Heat Capacity**

* Temperature change of a substance depends on three things:
	+ \_\_\_\_\_\_\_\_, m
	+ \_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_, Q
	+ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_, Cp

Write in formula

**Using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

The following problems will show you how to solve for different variables in our equation.

* How much **energy** does it take to raise the temperature of 50 g of aluminum

(cp = 0.9025J/gC0) by 10 0C?

* If we add 30 J of heat to lead (cp = 0.1276J/gC0) with a mass of 10 g, how much will its **temperature** increase?