**Heating and Cooling**

What Things Would We Heat or Cool in our House?

Heating or Cooling things can be calculated by using the formula:

$$Energy=Heat Capacity×Volume ×Change in Temperature$$

**Heating Water**

 Where would we use the most water?

 Water has a heat capacity of $4180\frac{J}{kg∙°C}$ .



 Let’s begin by estimating the energy used to heat a bath. How big is a bath?

Volume = LxWxH

There are \_\_\_\_\_\_\_\_\_\_ L of water in a bath

To find the change in temperature we need to know:

 How hot are our baths?

 How cold is water from the tap? (before it goes to the water heater)

Now let’s calculate the energy used to draw a bath.

Showers take roughly one third the amount of water a bath would take. So, a shower would take \_\_\_\_\_\_\_\_\_\_\_ of energy.

Other Water Estimates:

**Dish** **Washing**: Energy-Star rating appliances use about \_\_\_\_\_\_\_\_\_\_MJ per load

**Clothes** **Washing**: Energy-Star rating appliances use about \_\_\_\_\_\_\_\_\_\_ MJ per load

**Food**

From the ”Energy Use Estimation Worksheet”

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Electrical Device** | **Watts** | **×** | **Hours of Daily Use** | **×** | **Days Used per Week** | **÷** | **7** | **=** | **Avg. Daily Watt-Hours** |
| Fridge |  | **×** |  | **×** |  | **÷** | **7** | **=** |  |
| Oven |  | **×** |  | **×** |  | **÷** | **7** | **=** |  |
| Stove |  | **×** |  | **×** |  | **÷** | **7** | **=** |  |
| Freezer |  | **×** |  | **×** |  | **÷** | **7** | **=** |  |
|  | **Total** |  |

**Air**

During summer, we don’t use our heaters. During winter, we probably use our heaters. A personal heater uses about 1000J each second.

So, for our three big things that we heat or cool we have, each day uses:

* **Water \_\_\_\_\_\_\_\_\_\_\_\_\_MJ**
* **Food \_\_\_\_\_\_\_\_\_\_\_\_MJ**
* **Air \_\_\_\_\_\_\_\_\_\_\_\_MJ**

Total Energy use on Heating/Cooling per day \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_MJ

Or \_\_\_\_\_\_\_\_ bricks of butter.