**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Design a Pot Lab**

Guiding Task: Design your own pot for efficient heating of food. Identify which metals transfer heat the best.

Pre-lab Questions:

1. Explain what a calorimeter is used for.
2. If you place a sample of a room temperature metal in boiling water in a beaker on a hot plate, what would happen to the temperature of the metal after several minutes?
3. If you place a sample of hot metal in room temperature water, what will happen to the temperature of the water and metal?

Procedure Planning:

Variables:

Constants:

Procedural Steps:

Data Collection:

Analysis Questions:

1. Calculate the change in temperature of water when you tested your metal sample.
2. Calculate the change in temperature of water of the other team’s metal sample.
3. Which metal increases the temperature of the water more?
4. Calculate the amount of heat absorbed by the water when you tested your metal sample.
5. Calculate the amount of heat absorbed by the water by the other team’s metal sample.
6. Which metal delivered more heat to the water?
7. Which metal seems to heat food to a higher temperature?
8. When your metal sample was placed in the water it transferred all the heat that was absorbed by the water. Therefore, the heat (q) value of the water calculated above is equal to the heat (q) value of the metal. Draw a model to show this exchange of heat between the metal and water.
9. Calculate the specific heat of your metal sample.
10. Calculate the specific heat of the other teams’ metal sample. 
11. Which metal has a higher specific heat?
12. What does it mean that the metal has a higher specific heat? Did it heat the food up more or faster?
13. Does the number of particles or mass of a sample of a substance influence the specific heat of that substance? Explain your answer.

Conclusions: Read the information below.

| Material | Specific Heat (J/g°C) |
| --- | --- |
| Ceramic | 0.324 |
| Copper | 0.385 |
| Stainless Steel | 0.420 |
| Iron | 0.449 |
| Glass | 0.840 |
| Clay | 0.878 |
| Aluminum | 0.902 |
| Wood | 1.76 |

**Baking Casseroles and Stove Top Foods**

Before cooking a casserole many recipes state to heat the pan first and then add the food and heat again. Glass pans are recommended because the glass requires more energy to heat than metal and prevents water in the casserole from boiling off too quickly (and drying out the food). Sometimes the pots and pans have wooden handles to avoid heating up when they are cooked, allowing people to handle the pots easier. Pots in particular can have different materials not only on the handle, but on the bottom of the pot versus the sides. We cover pots and pans with lids or aluminum foil to help contain the heat as it is transferred to food and to contain moisture so it doesn’t leave the food. Some chefs want their pots and pans to heat up (and cool down) quickly in order to cook food for their restaurants in a quick time frame so they use All-Clad pots made mostly of aluminum based pans. Cast iron pans are also well known for their very heavy composition and ability to maintain high temperatures to cook food more slowly but evenly throughout.

1. Design a pot that would heat the food the best. Use evidence from the lab data and reading above. Consider that your pot can be made of any materials tested or explained above and you can use more than one material for parts of the pot. You may choose to include a drawing of your pot. Explain your reasoning for the materials you choose using the following terms: **heat transfer, specific heat, temperature change**

