name:_____ period:_____ Unit 2: Combustion

Lesson 2.1 Computing the Energy in Food

- The modern metric unit of energy is the ___**joule**___.
- An older unit of energy is the ___**calorie**___.
- To convert use: ___**1**___ calorie = ___**4.2**___ joules
- A food calorie = 1000 energy calories = 1 kilocalorie = 1 kcal

Find the **grams per serving**

Find the food **calories per serving** on the label - remember that these are actually kcal of energy.

Compute the kcal per gram:

$$calories\ per\ serving = \underline{\textbf{300}}\ kcal$$

$$grams\ per\ serving = \underline{\textbf{102}}\ g$$

$$\frac{calories\ per\ serving}{grams\ per\ serving} = \underline{\textbf{2.9}}\ kcal/g$$

Nutrition Facts

Serving Size 1/2 cup (102g)
Servings Per Container 4

Amount Per Serving	
Calories 300	Calories from Fat 160
	% Daily Values*
Total Fat 18g	**28%**
Saturated Fat 9g	**45%**
Trans Fat 0g	
Cholesterol 45mg	**15%**
Sodium 250mg	**10%**
Total Carbohydrate 33g	**11%**
Dietary Fiber 1g	**4%**
Sugars 30g	
Protein 7g	
Vitamin A 15% •	Vitamin C 0%
Calcium 15% •	Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet.

Lab Safety

1. You should always plan for the ___**best**___, but prepare for the ___**worst**___
2. What should you do **first** if you get chemicals in your eyes? **call for help**
3. What should you hold open while rinsing your eyes? ___**eye lids**___
4. How long should you rinse your eyes? **15 - 20 minutes**
5. What should you do if you get chemicals on your skin? **rinse with water**
6. How long should you rinse in the shower? **15 minutes**
7. What are the three parts of the fire triangle? ___**fuel**___, ___**oxygen**___, ___**heat**___
8. What should you do to a small lab fire? **smother it**
9. What do you do if your clothing is on fire? ___**stop**___, ___**drop**___ and ___**roll**___
10. What is the cardinal rule in an emergency?

Lesson 2.2 Bio-fuel Lab

Materials

Procedure

Measurements

	Variable	value (unit)
1	Volume of water (ml)	100 ml
2	Initial mass of food and paper (g)	
3	Final mass of food and paper (g)	
4	Δm line 2 - line 3 (g)	
5	Final temperature of the water (°C)	
6	Initial temperature of the water (°C)	
7	ΔT line 5 - line 6 (°C)	

Error Analysis

Human Errors

1. Human errors are caused by mistakes people make. What do you think could be a human error that would affect the data obtained in this lab?

Experimental Errors

1. Experimental errors are caused by the equipment or material being used. What do you think could be an experimental error that would affect the data obtained in this lab?

Lesson 2.3 Combustion Conference

1. What happened to the atoms and molecules in the food when it burned?

2. Where did the energy for the fire come from and where did it go?

3. What happened to the water molecules when the water temperature increased

Lesson 2.4 Combustion Video

Watch the YouTube What is Combustion? and answer the questions below:

1. **wood** is a fuel used a lot in the past, and even today.
2. The three most widely used fuels today are **coal**, **oil**, and **natural gas**.
3. A newer fuel often used in rockets is **hydrogen**.
4. When a fuel is burned it always combines with **oxygen**.
5. Other products released during combustion are **carbon dioxide** and **water** that are emitted as a **gas**.
6. A very fast combustion reaction is called an **explosion**.
7. We use fast reactions in **car engines**.
8. Combustion reactions are used for: **cooking**, **manufacturing**, **produce electricity**, **heating water**, **motor vehicles**, and **heating**.

Word Bank

car engines	carbon dioxide	coal
cooking	explosion	gas
heating	heating water	hydrogen
manufacturing	motor vehicles	natural gas
oil	oxygen	produce electricity
water	wood	