Chemistry

Unit 1: Combustion

Section 1

Name: _____ Period: _____

Guiding Question:

Do Now:

Important Definitions and Equations:

Notes:

Calorie - A measure of _____; how much _____ is required to raise _____ by _____.

Energy Breakdown:

- Fats – _____ Calories/gram
- Carbohydrates – _____ Calories/gram
- Proteins – _____ Calories/gram

We will also discover that the not all fats, carbohydrates, or proteins are created equal. Some are more _____ than others.

_____ are the body's main source of _____

3 Types:

- Refined and Natural Sugars – _____
  - Found as glucose, sucrose, lactose, maltose, fructose
  - Come from sugar cane, beets, fruit, and other sources
  - These tend to be classified as _____. But we will find that you can eat anything as long as it is in _____.
- Starches – _____
  - Found in grains, legumes, rice, potatoes
  - The body must break these down into _____first before getting energy out of it.

	Fats: • _____ ○ _____at room temperature; Found in some meat and dairy products; Can raise _____; Found in butter, cheese, lard and margarine • _____ ○ Mostly _____ at room temperature; Made from _____; Found in corn oil, canola oil, olive oil, coconut oil, etc. • _____ ○ A process called _____ that makes unsaturated fats solid at room temperature; Found in shortenings and many margarines; Raises _____ • _____ ○ Need to eat those that the body _____ ○ Used to make complex molecules like _____
Response:	

1 Examine Nutrition Labels

Intro to Nutrition

Today you will start to look at the nutritional breakdown of common foods and investigate their nutritional value. You will use the website below to aid you in this (the printout below also will help you walk through some of the analysis).

- Go to this website: https://healthymeals.fns.usda.gov/hsmrs/EY/interact/interact/index02.htm
- Click through the tutorial using the arrows at the bottom. If you finish early, you may do additional practice in the web application through the menu button at the bottom.

2. look at this -

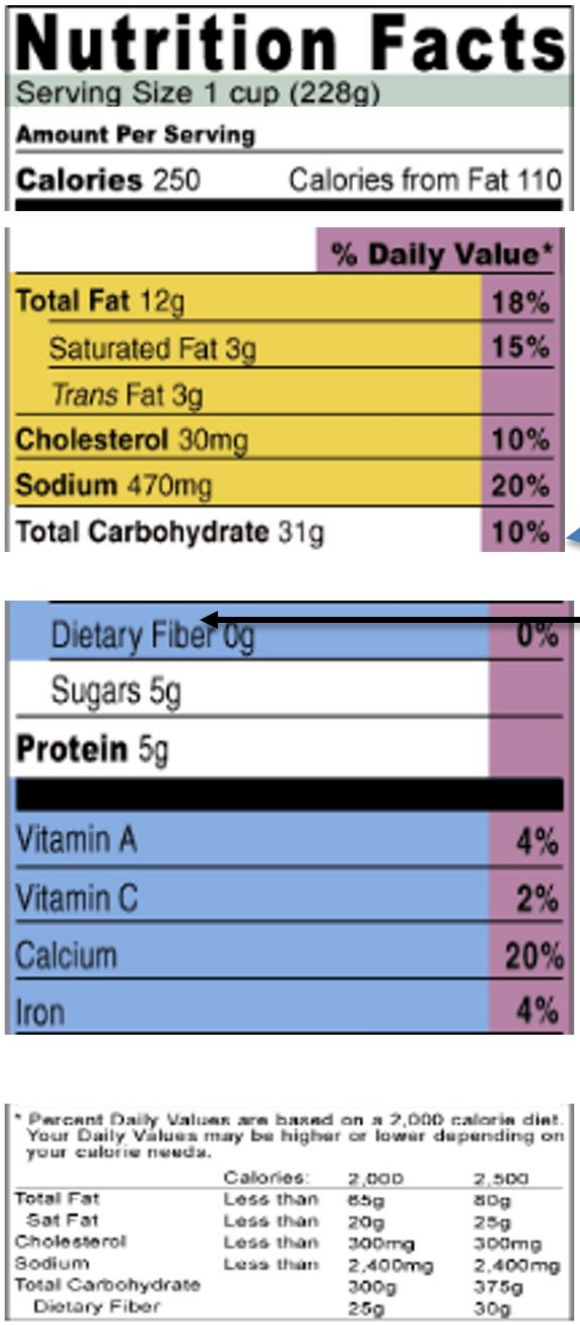
3. look at this -

look at this -

4. look at this -

5. look at this -

look at this ? -



6. Calories from Fat ÷ Total Calories

This is only if you should eat about 2,000 calories per day

7. Sugar grams ÷ Total Grams or no more than 15 gr.

This is only if you should eat about 2,000 or 2500 calories per day

IS A PRODUCT HEALTHY? HERE'S HOW YOU FIND OUT...

Choose a food label from the class box - the product must have fat and sugar in it:

1. **Write the name of your food product here:_____**
2. **Write the Serving Size of your product: _____**
3. **How many Servings Per Container?_____**
4. **If there is more than one serving per container, and you ate THE WHOLE CONTAINER, how many calories would you really be eating? (Calories x how many servings =) _____.**
5. **If there is more than one serving and you ate the whole container, how many Total Fat grams would you really be eating? (Total Fat grams x how many servings =) _____.**
6. **Is your product's serving size realistic for you to eat? YES____ or NO_____**
7. **Have they been deceptive by listing a small serving size? YES___ or NO____**
8. **What is the Total Fat listing for 1 serving of your food?_____**
9. **The two fats that are bad for you are: _____ + _____.**
10. **If your product has Saturated Fat, how many grams are in one serving?_____**
11. **If your product lists the ingredients, do you see "hydrogenated," or "partially hydrogenated" ?**

    YES _____ (If yes, THAT'S TRANS FAT!) NO _____

12. **What are the Sugars grams listed for 1 serving of your food? _____**
13. **TO BE CONSIDERED FOR OUR SCHOOL'S VENDING MACHINE AND A"HEALTHY" PRODUCT IT MUST BE LESS THAN 35 % FAT AND LESS THAN 35 % SUGAR. FIGURE YOURS:**

vending machine

FIGURE FOR FAT:

Calories from Fat ÷ total calories =_____ **% Total Fat**

Is your product's total fat under 35%? YES_____ or NO_____

FIGURE FOR SUGAR:

Sugar grams ÷ total grams (the weight of product) =_____ **Sugar**

or can be no more than 15 grams.

Is your product's sugar weight less than 35% sugar? YES_____ NO_____

14. **Is your food HEALTHY enough to be in the school's vending machine (Yes/No)? Justify your answer using the data you collected and calculated (explain why).**

Guiding Question:

Do Now:

Important Definitions and Equations:

Notes:

Carbohydrates, Fats, and Sugars are not the only thing on a nutritional label.

_____:

- A carbohydrate that your body _____
- A high fiber diet may prevent _____ and _____
- How much? The recommendation is _____ of fiber for an adult.
- Found in bran, whole-grains, raw fruits, and raw vegetables

_____

- A chemical compound found in every cell in the body
- Composed of _____
- There are some amino acids (9) that can only be supplied through diet, or eating proteins with these _____ in them.
- Need for growth, maintenance, repair of body tissues, immune system function

_____

- nutritional compounds that are essential for a body's growth and maintenance but cannot be made by the body, so they are obtained through diet

_____

- _____ substances, like calcium, that are required by the body to function, but must be gotten through diet

The nutritional density of foods impacts their effectiveness within our bodies. Thus foods are better identified by their nutritional content (calories and nutritional factors) than just their energy content (calories, energy density) alone

Response:

2 Digging Deeper
Nutrition Labels

You will examine food labels through the same digital resource as the previous activity and use what you learn to answer the questions that follow on this page.

- Go to: https://healthymeals.fns.usda.gov/hsmrs/EY/interact/interact/index03.htm
- Follow the questions below as you move through the activity to help you make the correct decision.

Comparison #1: Which is the healthier snack?

1. How much calcium is in yogurt?

2. How much calcium is in pudding?

3. Which has more calcium?

4. **Digging Deeper:** Why do we need calcium in our daily diets?

Comparison #2: Which milk is healthier to drink?

1. How much fat is in the 2% milk?

2. How much fat is in the Non-Fat milk?

3. Which has more fat?

4. Which is healthier?

5. **Digging Deeper:** Should fat content be the only deciding factor for determining the "heathiness" of a food? Explain why or why not.

Comparison #3: Which bread is healthier?

1. How much fiber is in the whole wheat bread?

2. How much fiber is in the white bread?

3. Which bread has more fiber?

4. Which bread is healthier?

5. **Digging Deeper:** How else might you compare these two breads? Compare them based on that substance content (pick something other than fiber, calcium, or fat) and determine which would be healthier. Record your process below. Which is healthier? Did you come to the same conclusion as the comparison based on fiber? Explain why or why not.

Comparison #4: You pick!

1. Select two similar foods from the choices (your teacher will direct you to the specific area). Complete the table below:

	Food 1: _____	Food 2: _____
Sugar		
Fat (show types)		
_____ (your choice)		

2. Which has more sugar?

3. Which has more fat? Is there a difference in the types of fat? Be specific as to which has more of what kind of fat.

4. Which has more _____(your choice)?

5. Based on your data, which is healthier for you?

6. Do you agree with the conclusion based on these three criteria?

7. What other criteria might you use?

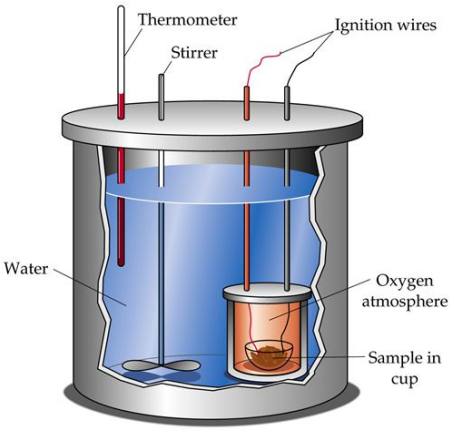
Guiding Question:

Do Now:

Important Definitions and Equations:

Notes:

_____is used to determine the amount of energy in a sample of food.



- Most calorimeters measure energy in calories, not Calories and there is a difference!

- Where 1 calorie (little c) is the amount of energy it takes to raise 1g of some substance 1°C
- The food was placed in a sealed container, ignited, and the resulting fire heated the surrounding water. The _____ was measured as the food fully combusted (burned) and converted into calories or Calories (also known as kilocalories, or kcal)

Response:

3 Professional Grade
Nutrition Labels

Close Reading: Take notes in the margin and annotate the following article

How Do Food Manufacturers Calculate the Calorie Count of Packaged Foods?

Jim Painter, an assistant professor of food science and human nutrition at the University of Illinois, explains

(1) In order to answer this question, it helps to define a calorie. A calorie is a unit that is used to measure energy. The Calorie you see on a food package is actually a kilocalorie, or 1,000 calories. A Calorie (kcal) is the amount of energy needed to raise the temperature of 1 kilogram of water 1 degree Celsius. Sometimes the energy content of food is expressed in kilojoules (kj), a metric unit. One kcal equals 4.184 kj. So the Calorie on a food package is 1,000 times larger than the calorie used in chemistry and physics.

(2) The original method used to determine the number of kcals in a given food directly measured the energy it produced.The food was placed in a sealed container surrounded by water--an apparatus known as a bomb calorimeter. The food was completely burned and the resulting rise in water temperature was measured. This method is not frequently used today.

(3) The Nutrition Labeling and Education Act of 1990 (NLEA) currently dictates what information is presented on food labels. The NLEA requires that the Calorie level placed on a packaged food be calculated from food components. According to the National Data Lab (NDL), most of the calorie values in the USDA and industry food tables are based on an indirect calorie estimation made using the so-called Atwater system. In this system, calories are not determined directly by burning the foods. Instead, the total caloric value is calculated by adding up the calories provided by the

energy-containing nutrients: protein, carbohydrate, fat and alcohol. Because carbohydrates contain some fiber that is not digested and utilized by the body, the fiber component is usually subtracted from the total carbohydrate before calculating the calories.

(4) The Atwater system uses the average values of 4 Kcal/g for protein, 4 Kcal/g for carbohydrate, and 9 Kcal/g for fat. Alcohol is calculated at 7 Kcal/g. (These numbers were originally determined by burning and then averaging.) Thus the label on an energy bar that contains 10 g of protein, 20 g of carbohydrate and 9 g of fat would read 201 kcals or Calories. A complete discussion of this subject and the calories contained in more than 6,000 foods may be found on the National Data Lab web site at http://www.nal.usda.gov/fnic/foodcomp/. At this site you can also download the food database to a handheld computer. Another online tool that allows the user to total the calorie content of several foods is the Nutrition Analysis Tool at http://www.nat.uiuc.edu.

1. In one sentence, summarize each paragraph.

(1)

(2)

(3)

(4)

2. Write down 3 questions that you still have:
   -
   -
   -

3. What are some key components of the system scientists use to determine the amount of energy in a food?

Group Share

Each person will take turns sharing one thing that they learned from the article. Then each person will respond to it. If it is new insight for you, write it in the space below. Then the person who initially shared will get to make a final comment before moving on to the next person to share out. You will repeat the process until the teacher calls time.

Guiding Question:

Do Now:

Important Definitions and Equations:

Notes:

Experimental Design:

- Always determine your _____: What problem are you trying to solve?
- Look at the _____ you have available: What can help you solve this problem?
- Decide _____ those materials could solve this problem
    - Do _____ to see how it might have been done before
    - _____ to help you visualize set up -- but remember this isn't art class
- Decide your _____ -- What are the step-by-step instructions for the procedure so someone else can do it and _____.
    - These can start out as a set of planned steps, but you need to add in or change things as you complete the lab to give the most accurate procedure.
    - _____ anything -- line out with one ~~strikethrough~~ and correct it next to it.
- Create a _____ to collect as much data as possible -- If you can measure it or observe it, write it down!
    - What can we measure?
    - What is an observation?
- Everyone collects data as they go, no one can be left out. This will give you the most accurate depiction of your results.

Response:

4 Light it Up
Calorimetry of Food

With your group, you will create a procedure to determine the amount of energy stored in a food product of your choice from a collection of possible materials. You may need to reference online resources to aid you in the development of this procedure.

Purpose:

Materials: (only include the ones you plan to use)

Procedure: (use a list format to create a step-by-step procedure; be as specific as possible)

Data: (create a data table to show the relevant information that will help you look at how much energy is stored in the food; think about how you might measure the energy; you will also want to measure as much as possible about the food and liquid in the container)

Analysis: Your teacher should have pre-determined temperature changes listed for you. Reference them. Does this match up with what you measured? Why do you think this happened? If the energy is less in your food than the pre-determined amount, explain where the energy might have gone. If it is more, where did it come from?

Conclusion: Based off of the notes for energy transfer (including diagrams) and your analysis, why does the energy from your food not match the energy from the package as determined by your teacher? You need to be specific. You will use this discussion for your poster project.