Topic: Biochemistry Lab - Metabolism & Food Labels

Summary: Students will research different food labels of commonly eaten food for people their age.   Then students will decide if the food is a good meal to be a student at school.

Goals & Objectives: Students will be able to use key vocabulary in understanding how the food they eat becomes part of their body and supplies them energy.

Time Length: 60 to 90 minutes

NGSS Standards: *HS-LS1-6.* Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Materials:
Food Label printouts, Textbook, class notes, and pencil or pen

Prerequisite Knowledge: How to write a CER and the metabolism can involve breaking of one biomolecule and building a different biomolecule using those atoms.

Procedures:
1. Give the students their lecture notes.
2. Tell the students which section they are to use in the textbook. Students are then going to read the section and answer the questions on the handout using their notes and the textbook.

Accommodations: Students with an IEP can take the handout home if they need extra time.

Editable DOCX File and Answer Key:
Available at www.ngsslifescience.com

Biochemistry Lab - Metabolism & Food Labels

1) What are the four biomolecules?

a.

b.

c.

d.

Nutrition Facts

Serving Size 1 cup (236ml)
Servings Per Container 1

Amount Per Serving

Calories 80   Calories from Fat 0

	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol Less than 5mg	0%
Sodium 120mg	5%
Total Carbohydrate 11g	4%
Dietary Fiber 0g	0%
Sugars 11g	
Protein 9g	17%

Vitamin A 10%   •   Vitamin C 4%
Calcium 30% • Iron 0% • Vitamin D 25%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.
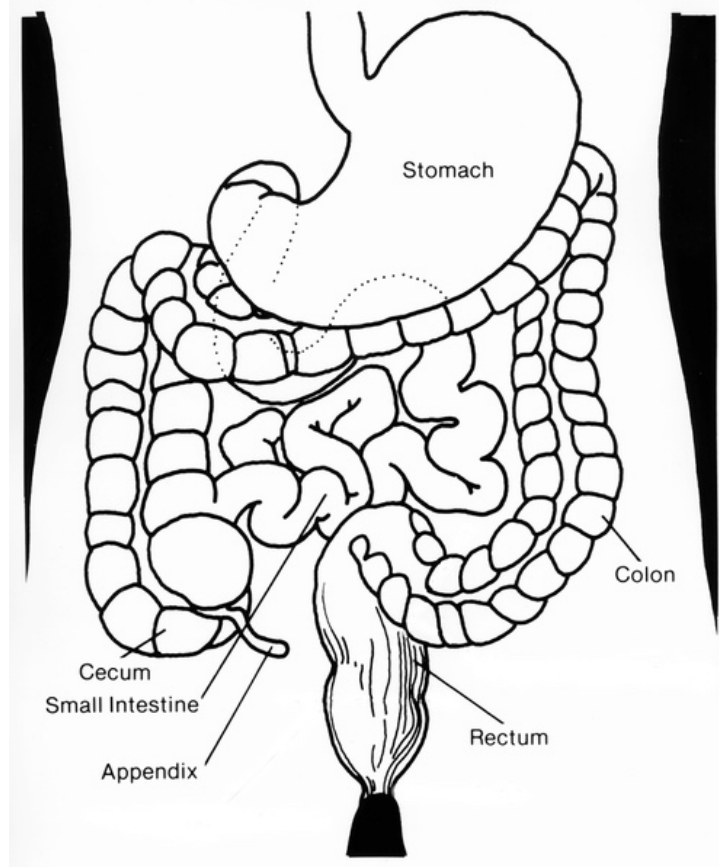
2) Use the provided food labels or look up food Labels on the Internet for 10 different foods you would eat.

3) Record in the data table below the name of the food and the total amount in **grams** of fat (lipids), proteins, and carbohydrates.

Data Table:

Name of Food	Carbohydrates	Fat	Protein
	g	g	g
	g	g	g
	g	g	g
	g	g	g
	g	g	g
	g	g	g
	g	g	g
	g	g	g
	g	g	g
	g	g	g

Your digestive system will break down the food you eat into smaller molecules called monomers.

4) What is the monomer of a carbohydrate? _____

5) What is the monomer of a protein? _____

6) The process of breaking down a larger molecule, called a polymer, into its monomers is

   called _____.

7) Draw arrows and label the hydrolysis diagram below using the following words

   (polymer, monomer).

Blood Sugar Levels and Food Type
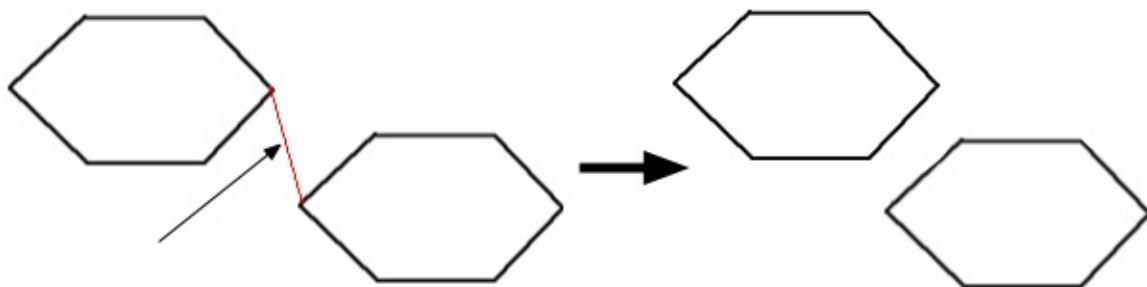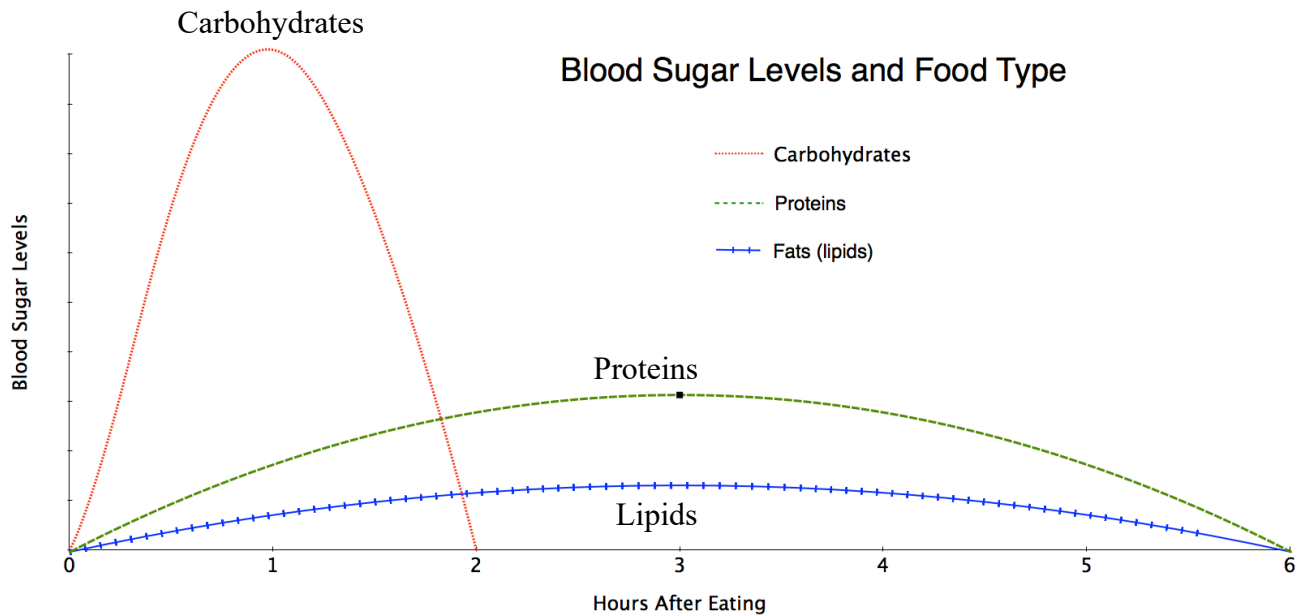
Notice in the graph that both fats and proteins can increase blood sugar levels but fat and proteins are not made out of sugars. It makes sense that when carbohydrates are broken down into sugars, but not fat or proteins. Your body uses enzymes to convert the monomers of proteins (amino acids) and fats into glucose.

8) What type of biomolecule is an enzyme? _____

9) What trend do you notice about carbohydrates in the graph above? _____

_____

_____

10) What trend do you notice about proteins and fats in the graph above? _____

_____

_____

Fat can also clog your arteries (blood vessels) and cause a heart attack or stoke if eaten in large quantities over time. The fatty acids and cholesterol can attach to the sides of blood vessels, especially when they are inflamed, and cause a blood clot.

11) What type of food (carbohydrate, protein, fat) would be best for learning in school?

_____

12) Design the most optional meal to last you all at day at school. Your goal is to avoid having a large fluctuation in your blood sugar. Your meal needs to include two foods and you need to include how many servings of each food. The first food needs to have the most calories and the second food will have less calories. *If you eat more than one serving, then you will need to multiple the number of serving for the grams of carbohydrates, fats, proteins, and calories for that food.* The meal does not have to use the food you observed on page one, but it does need to have real nutrition facts. Fill in the table table with this information and add both foods together to calculate the total on the bottom.

Type of Food	Total Carbohydrates	Total Fats	Total Proteins
Total	g	g	g

#1

#2

13) Write a Claim Evidence Reasoning three sentence paragraph by completing the paragraph.

I claim that _____ *(food #1)* would be the ideal

lunch/brunch for school.   The evidence to support my claim is that food #1 has _____

number of grams of _____ and has _____ number of grams of

_____. The reason why I chose food #1 is that _____

_____

_____

I also claim that _____ *(food #2)* would be the ideal

lunch/brunch for school.   The evidence to support my claim is that food #2 has _____

number of grams of _____ and has _____ number of grams of

_____. The reason why I chose food #2 is that _____

_____

_____