

MADE BY DAYLE KOESTER – FIND ME ON TPT!

GRADES  
6 - 12

MACROMOLECULES

in my

**FOOD?**



BIOCHEMISTRY –  
THE CHEMISTRY OF LIFE

# Macromolecules in your Food! – Info Sheet

**Reading Nutrition Labels:** The Nutrition Facts Label tells you what nutrients (components of food your body needs to grow and stay healthy) and how much of those nutrients are in found in one serving. The Nutrition Facts label can help you make choices about the food you eat. The Nutrition Facts label is on the outside of most food packages, but isn't on most fresh foods (like fruits and vegetables). Below is an example of a Nutrition Facts label and explanations of the information found on the label.

Sample label for  
Macaroni & Cheese

1 **Start Here** →

<b>Nutrition Facts</b>	
Serving Size	1 cup (228g)
Servings Per Container	2

2 **Check Calories**

40 Calories is LOW  
100 Calories is MODERATE  
400+ Calories is HIGH

Amount Per Serving	
<b>Calories</b>	250
Calories from Fat	110

3 **Limit these Nutrients**

	% Daily Value*
<b>Total Fat</b> 12g	<b>18%</b>
Saturated Fat 3g	15%
Trans Fat 3g	
<b>Cholesterol</b> 30mg	<b>10%</b>
<b>Sodium</b> 470mg	<b>20%</b>
<b>Total Carbohydrate</b> 31g	<b>10%</b>

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**Quick Guide to % DV**

• 5% or less is Low

• 20% or more is High

4 **Get Enough of these Nutrients**

Dietary Fiber 0g	0%
Sugars 5g	
<b>Protein</b> 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

5 **Footnote**

\* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

## Macromolecules:

*Macromolecules are very large molecules, formed of smaller subunits. In this lab, we will focus on the three macromolecules that are important energy sources for biological organisms: Carbohydrates, Proteins and Lipids.*

## Carbohydrates:

A **carbohydrate** is an organic compound that consists only of carbon, hydrogen, and oxygen. Your body uses carbohydrates (carbs) to give you *energy* and helps keep everything going. Your body can use carbohydrates immediately or store it in your liver and muscles for when it is needed.

In general, the smaller carbohydrate compounds are commonly referred to as *simple sugars*, which are found naturally in foods such as fruits, vegetables, milk, and milk products. These simple sugars are broken down quickly and give you short term energy. **Starch** is a *complex carbohydrate*. Starch must be broken down through digestion before your body can use it as an energy source. Quite a few foods contain starch and dietary fiber such as breads, cereals, and vegetables.

## Proteins:

**Proteins** are part of every cell, tissue, and organ in our bodies. These body proteins are constantly being broken down and replaced. The protein in the foods we eat is digested into amino acids that are later used to replace these proteins in our bodies.

Protein is mainly found in the following foods: meats, poultry, and fish, legumes (dry beans and peas), tofu, eggs, nuts and seeds, milk and milk products, and grains. Most adults in the United States get more than enough protein to meet their needs. It is rare for someone who is healthy and eating a varied diet to not get enough protein.

There are *20 different amino acids that join together to make all types of protein*. Our bodies cannot make some of these amino acids so these are known as *essential* amino acids – it is essential that our diet provide these. A complete protein source is one that provides all of the essential amino acids, for example, meat, poultry, fish, milk, eggs, and cheese are considered complete protein sources. An incomplete protein source is one that is low in one or more of the essential amino acids.

## Lipids:

The term *lipid* is sometimes used as a synonym for *fats*, but this is technically incorrect. True fats are composed of triglycerides. Moreover, triglycerides that are solid at room temperature are called "*fats*" while those that remain liquid at room temperature are called "*oils*." Triglycerides are also composed of carbon, hydrogen and oxygen atoms, but in different ratios than in carbohydrates.

Triglycerides have long chains of carbon and hydrogen bonds, which creates the hydrophobic ("water fearing") tail. This property prevents triglycerides from mixing readily with water and causes them to separate relatively easily in solution.

### Unsaturated Fats, Saturated Fats and Trans Fats:

Most of the fat that you eat should come from unsaturated sources: polyunsaturated fats and monounsaturated fats. A fat is *unsaturated* if it contains at least one double bond. In general, nuts, vegetable oils, and fish are sources of unsaturated fats.

Saturated fats are oftentimes the "solid" fats, but other saturated fats can be more difficult to see in the foods we consume. A fat is *saturated* if it consists of only single bonds. In general, saturated fat can be found in the following foods: high-fat cheeses, high-fat cuts of meat, whole-fat milk and cream, butter, ice cream and palm and coconut oils.

## Macromolecules in my Food?!

**Introduction:** All living things need energy and materials in order to survive. Animals, such as humans, consume food in order to obtain the energy they need to power their bodies and the materials they need to produce more cells in growing bodies. Today you will examine the nutritional content of your food and determine if you are getting the energy and nutrients you need.

**Directions:** Find the food label of something you have eaten (or would consider eating) and complete the following information.

**Background Questions:** Use the macromolecule info sheet found on your desk (or your organizer) to help you.

1. What is a **macromolecule**? Identify the four types of biological macromolecules.
2. Describe the function of **carbohydrates** in your body.
3. How are *simple sugars* used for energy compared to more *complex sugars* like the starch in pasta?
4. The building blocks (smaller subunits) of **proteins** are \_\_\_\_\_.
5. Provide examples of foods high in **protein**.
6. If your body is capable of making only certain amino acids, how do we get the **essential amino acids** we need?
7. What does it mean to say a food is a *complete protein source*? Give an **example** of a complete protein source.
8. What word should you always associate with "**lipids**"? \_\_\_\_\_ Describe the function of **lipids**.



9. **Triglycerides** which are...
  - a. **Solid** at room temperature are called "\_\_\_\_\_"
  - b. **Liquid** at room temperature are called "\_\_\_\_\_"
10. Use a venn diagram to compare and contrast **saturated** and **unsaturated fats**.

Food Item # 1 : \_\_\_\_\_

11. What are the *main ingredients* of this food item?

12. Identify the TOTAL GRAMS of...

a. **Carbohydrates:** \_\_\_\_\_

b. **Fats:** \_\_\_\_\_

c. **Proteins:** \_\_\_\_\_

13. What surprised you as you read the nutrition facts for this food item?



Food Item # 2 : \_\_\_\_\_

14. What are the *main ingredients* of this food item?

15. Identify the TOTAL GRAMS of...

d. **Carbohydrates:** \_\_\_\_\_

e. **Fats:** \_\_\_\_\_

f. **Proteins:** \_\_\_\_\_

16. What surprised you as you read the nutrition facts for this food item?

Food Item # 3 : \_\_\_\_\_

17. What are the *main ingredients* of this food item?

18. Identify the TOTAL GRAMS of...

g. **Carbohydrates:** \_\_\_\_\_

h. **Fats:** \_\_\_\_\_

i. **Proteins:** \_\_\_\_\_

19. What surprised you as you read the nutrition facts for this food item?