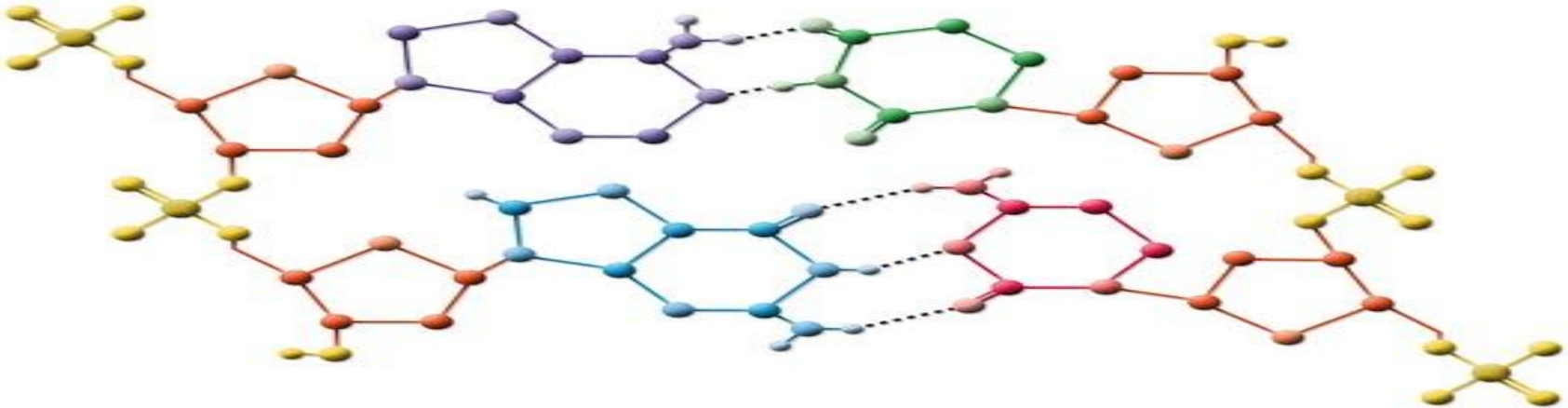


# Molecular Biology



# Molecular Biology

**8.L.5 Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms.**

8.L.5.1 Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms (to include plants).

8.L.5.2 Explain the relationship among a healthy diet, exercise, and the general health of the body (emphasis on the relationship between respiration and digestion).

# Nutrient Power

## What are the six classes of nutrients?

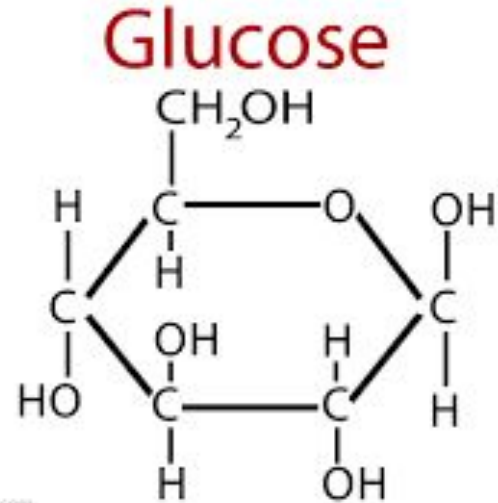
- **Nutrition** is the study of food and the ways in which the body uses food.
- **Nutrients** are substances that provide energy or help form body tissues.
- The six classes of nutrients are carbohydrates, proteins, fats, vitamins, minerals, and water.

# What are the six classes of nutrients?

- Simple carbohydrates, such as sugar and honey, give you quick energy. They are made up of one or two sugar molecules.
- Complex carbohydrates, such as bread and grains, are made up of many sugar molecules. They give you long-lasting energy.

# Carbohydrates

- **Elements:** C, H, O
- **Function:** main source of energy
- **Monomer:** monosaccharide (glucose)
- **Examples:** pasta, sugar

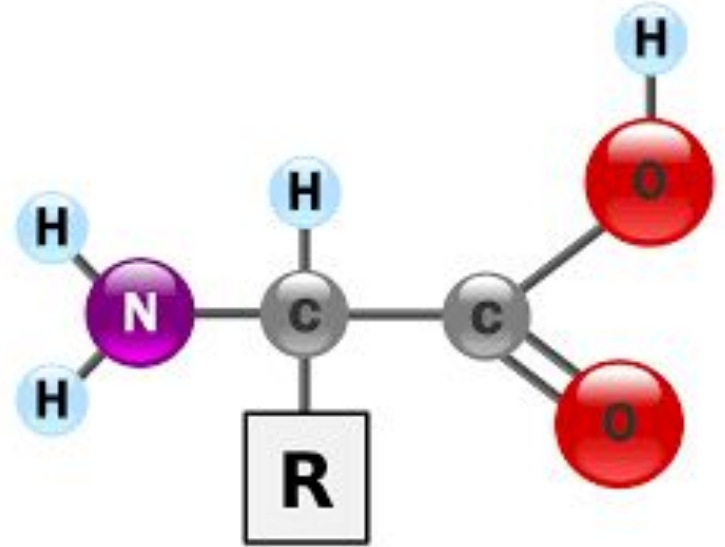
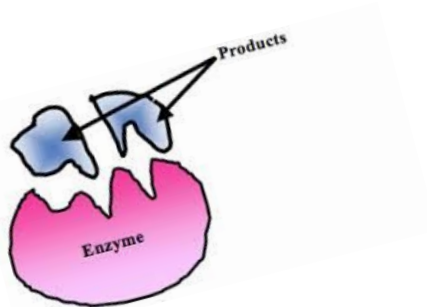


# What are the six classes of nutrients?

- Proteins are nutrients used to build, regulate, and repair your body.
- Skin, muscles, blood, and all tissue contain proteins.
- Proteins are made up of amino acids.
- Common proteins are poultry, fish, milk, beans, and eggs.

# Proteins

- **Elements:** C, H, O, N
- **Functions:** repair tissue, build muscle, fight disease, regulate chemical reactions
- **Monomer:** amino acid (20)
- **Examples:** chicken, peanuts, enzymes



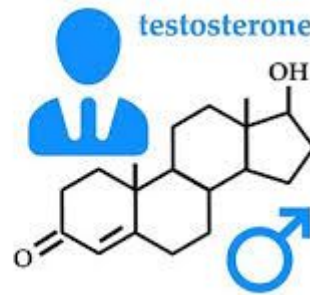
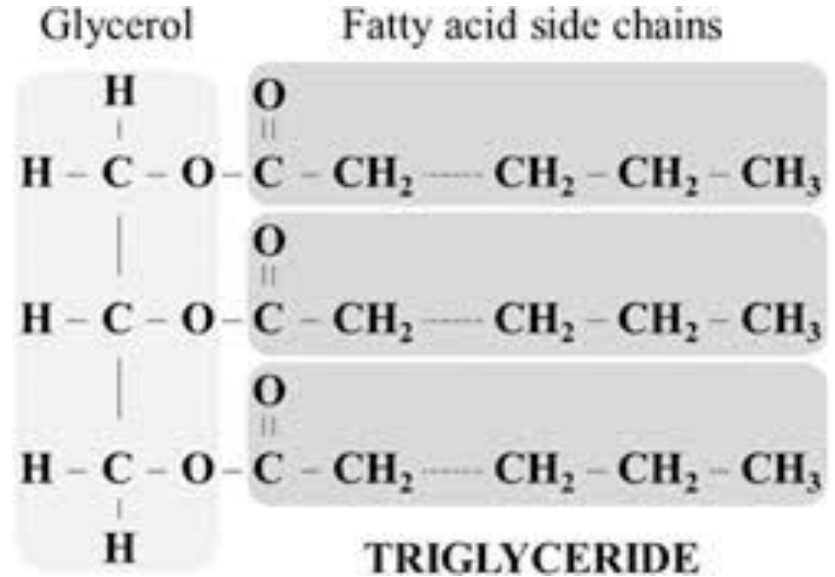
# What are the six classes of nutrients?

- Fats are used by the body as a source of energy and as a way to store energy.
- Fats contain more energy than carbohydrates and proteins contain.
- Fats also store and transport some vitamins, produce hormones, and make cell membranes.
- Meat, dairy products, vegetable oils, and fish all are sources of fat.



# Lipids

- **Elements:** C, H, O
- **Functions:** store energy, important in biological membranes
- **Monomer:** triglyceride (most common)
- **Examples:** fats, waxes, oils, steroids



# What are the six classes of nutrients?

- Water makes up 60% of the body.
- Water is found inside and around cells.
- Water is needed for nearly all of the life processes.
- Juices, soups, milk, fruits, and vegetables are additional sources of water.



# What are the six classes of nutrients?

- Vitamins are nutrients that help the body carry out specific functions, such as chemical reactions in the body.
- The body can make some vitamins. Other vitamins are obtained through food.
- Minerals are chemical elements not made by the body.
- They are required for nervous system function and form important parts of many cell structures.

# Let's Eat!

## What can you use to choose a healthful diet?

- A person's **diet** is the type and amount of food a person eats.
- A healthy diet includes a balance of all the essential nutrients.
- The levels of nutrients depend on age, sex, and how active a person is.
- The amount of energy a person gets from food is measured in calories.

# What can you use to choose a healthful diet?

- Nutrition Facts labels show the amounts of certain nutrients in one serving of food. Packages sometimes contain more than one serving.
- The U.S. recommended daily allowances (RDAs) are the recommended nutrient intakes that will meet the needs of most healthy people.
- These are based on a diet consisting of 2,000 calories per day.

<b>Nutrition Facts</b>	
Serving Size 2 cookies (29g)	
Servings Per Container about 15	
<b>Amount Per Serving</b>	
<b>Calories</b> 140	Calories from Fat 60
<b>% Daily Value*</b>	
<b>Total Fat</b> 7g	<b>11%</b>
Saturated Fat 2g	<b>10%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 90mg	<b>4%</b>
<b>Potassium</b> 35mg	<b>1%</b>
<b>Total Carbohydrate</b> 21g	<b>7%</b>
Dietary Fiber Less than 1g	<b>2%</b>
Sugars 13g	
<b>Protein</b> Less than 1g	
Vitamin A 0%	• Vitamin C 0%
Calcium 0%	• Iron 6%
*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
Potassium	3,500mg    3,500mg
Total Carbohydrate	300g    375g
Dietary Fiber	25g    30g

## What can you use to choose a healthful diet?

- What kind of information can you find on a Nutrition Facts label?

<b>Nutrition Facts</b>	
Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
Calories 260	Calories from Fat 120
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 5g	25%
Trans Fat 2g	
Cholesterol 30mg	10%
Sodium 660mg	28%
Potassium 700mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	15%
Iron	4%

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

Check the calories.

Check the % Daily Values.

Limit saturated and trans fats, cholesterol, and sodium.

Get enough potassium, fiber, and vitamins.

# What can you use to choose a healthful diet?

- The United States Department of Agriculture created MyPyramid as a tool to help people make healthy food choices.
- It shows the amount of food from the 6 food groups that people should eat each day.



# Let's Stay Healthy!

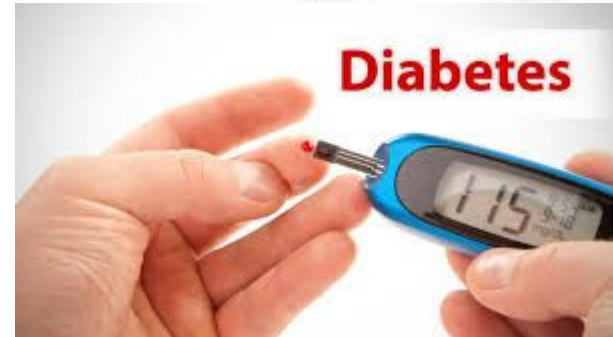
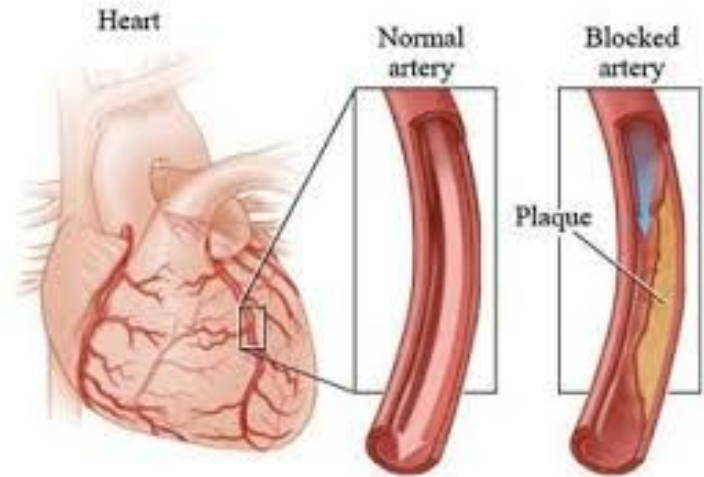
## What are the health consequences of poor nutrition?

- Health problems result from eating too much food, not enough food, or not enough specific nutrients.
- Being **overweight** means a person is heavy for his or her height and has excess stored fat.



# What are the health consequences of poor nutrition?

- **Obesity** happens when a person weighs more than 20% above his or her recommended body weight.
- Obesity increases the risk of health conditions like high blood pressure, cardiovascular disease, and diabetes.



# What are eating disorders?

- People who do not get enough calories can suffer from starvation or malnutrition.
- *Malnutrition* comes from a diet that lacks certain nutrients. A body suffering from malnutrition will not be able to perform certain function, and may be exposed to serious illnesses.
- An **eating disorder** is a disease in which a person has an unhealthy concern for his or her body shape and weight.

# What are eating disorders?

- *Anorexia nervosa* consists of self-starvation and an intense fear of gaining weight.
- *Bulimia nervosa* consists of binge eating followed by induced vomiting or the use of laxatives or diuretics. This damages teeth, the kidneys, and the digestive system.
- Both disorders cause weak bones, low blood pressure, and heart problems. These diseases can become fatal.

# What is the relationship between nutrition and health?

- Good nutrition can lead to good health.
- By eating a balanced diet, drinking water, and getting the right amount of calories, a person can lower cholesterol levels and prevent some diseases.
- Good nutrition helps to maintain a healthy weight and to increase energy.

# Let's Get Fit!



## What are the health benefits of exercise?

- The ability to perform daily physical activities without becoming short of breath, sore, or overly tired is called **physical fitness**.
- Exercise is any physical activity that helps keep you physically fit.
- Exercise helps build muscle, strengthen bone, raise metabolism, and develop cardiovascular and respiratory endurance.



# What are two types of exercise?

- Aerobic exercise raises the heart and breathing rates.
- This increases the level of oxygen in the muscles and allows energy to be released from food.
- Aerobic exercises strengthen the heart, lungs, muscles, bones, and immune system.
- Walking briskly, running and swimming are aerobic exercises.

# What are two types of exercise?

- Anaerobic exercise involves intense muscle activity for a short time.
- Oxygen levels are not increased, so muscle cells release energy without oxygen.
- Weightlifting, wrestling, and sprinting are anaerobic exercises.
- Anaerobic exercises build muscle mass and strength.









# Aerobic vs. Anaerobic Training



**Aerobic activity**

## Types of Aerobic Exercise Include:

Cardio Machines, Spinning, Running, Swimming, Walking, Hiking, Aerobics Classes, Dancing, Cross Country Skiing, and Kickboxing. There are many other types.






-  Requires the presence of oxygen.
-  Primarily works type I muscle fibers.
-  Increases muscle endurance and capillary size
-  Heart muscle to pump blood more efficiently
-  Sustain for an extended period of time
-  Heart rate between 120 and 150 BPM



**Anaerobic activity**

## Types of Anaerobic Exercise Include:

Heavy Weight-Lifting, Sprints (running, biking, etc.), Jumping Rope, Hill Climbing, Interval Training, Isometrics

-  Does not require the presence of oxygen
-  It works the type II muscle fibers, which leads to greater size and strength of muscles.
-  You exercise till you gas out
-  Oxygen builds up, lactic acid builds up, and you start to feel the burn
-  You can't sustain this kind of activity for extended time