What Is This Module About?

Imagine a kind of life when you could not see anymore, hear the sounds around you, taste the food you are eating, smell the flowers and the aroma of cooked food, and touch and feel the things that surround you.

What a dark and empty world it would be, right?

The different sense organs (eyes, ears, nose, tongue and skin) and their corresponding senses (sight, hearing, smell, taste and touch) will be tackled in this module. How these organs function, their structure and importance will also be discussed.

Some diseases, their prevention and cure are also included in the topics to be studied.

This module is divided into 3 lessons:

Lesson 1 — *The Organs of Sight and Hearing*

Lesson 2 — *The Organs of Smell, Taste and Touch*

Lesson 3 — *Diseases and Prevention*

What Will You Learn From This Module?

After studying this module, you should be able to:

- identify the various sense organs and their corresponding senses;
- describe the structure and function of the sense organs and their importance; and
- cite different diseases and ailments related to the sense organs and their respective symptoms.

Let See What You Already Know

Before you start studying this module, take this simple test first to find out what you already know about the topic.

A. Multiple Choice. Encircle the correct answer.

1. Our eye is our organ for _____.

   a. smell
   b. hearing
   c. vision
   d. touch

2. A thin layer of tissue that lines your eyelids and nasal cavity is called _____.

   a. lining
   b. mucous membrane
   c. skin
   d. dermis

3. The innermost layer of cell inside your eye is called the _____.

   a. mucous membrane
   b. conjunctiva
   c. retina
   d. choroid

4. The visible part of your ear is called _____.

   a. ear
   b. auricle
   c. flaps
   d. shell

5. You hear sounds through _____.

   a. vibration
   b. music
   c. noise
   d. light

6. The smallest bones of your body are found in your _____.

   a. eyes
   b. nose
   c. mouth
   d. ears

7. Olfaction pertains to your sense of _____.

   a. smell
   b. touch
   c. sight
   d. taste

8. _____ are groups of cells inside your mouth that detect the taste of the food you eat.

   a. tongue
   b. teeth
   c. taste buds
   d. saliva

9. The biggest sense organ of your body is your _____.

   a. nose
   b. lips
   c. skin
   d. eyes

10. Your sense of touch is also called _____ sense.

    a. olfaction
    b. vision
    c. balance
    d. tactile

B. Write the corresponding sense organ affected by the following disorders or diseases. Write eye, ear, nose, tongue, or skin on the space provided before each number.

_____ 1. Carbuncle
_____ 2. Otitis Media
_____ 3. Rhinitis
_____ 4. Sty
_____ 5. Aguesia

Well, how was it? Do you think you fared well? Compare your answers with those in the *Answer Key* on page 50 to find out.

If all your answers are correct, very good! This shows that you already know much about the topics in this module. You may still study the module to review what you already know. Who knows, you might learn new things as well.

If you got a low score, don't feel bad. This only shows that this module is for you. It will help you to understand some important concepts that you can apply in your daily life. If you study this module carefully, you would learn the answers to all the items in the test and a lot more! Are you ready?

You may go now to the next page to begin Lesson 1.

The Organs of Sight and Hearing

Have you ever wondered what will happen to you if you lost your eyes and ears? How will you ever see the beauty of life and hear the sound of music?

We learn with our senses… we learn from what we feel, taste and smell. More importantly, we learn from what we see and hear. These two are the most developed among our senses. We can easily identify our surroundings through the use of our eyes and ears.

You will learn more about your eyes and ears as you study this lesson. This lesson will discuss the functions and structures of your eyes and ears.

After you finish studying this lesson you should be able to:

- explain how the eyes and ears function;
- identify the parts of your eyes and ear; and
- explain the functions of the parts of your eyes and ears.

Let's Think About This

Go outside and take a short walk for a while. Observe your surroundings. Where are you now? What do you see? What do you hear?

_____

_____

What if you can't see, will you still be able to know what is happening around you? How?

_____

_____

Maybe you'll answer YES, right? Even if you can't see you can learn what is happening through the sounds that you hear. But what if it' s the other way, you can see what is happening around you but you can't hear a sound from your surroundings? Do you think you will be able to understand what is happening around you? Explain your answer.

_____

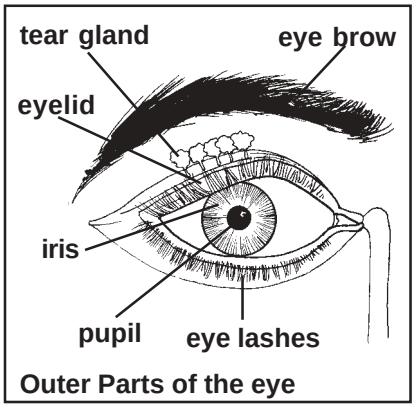
_____

If you answered yes, that's correct. You can still understand your surroundings by looking at them. However, it would be more difficult if you can't hear a sound. For example, you saw your sister coming and she is telling you something, it is difficult to understand her if you can't hear what she is saying.

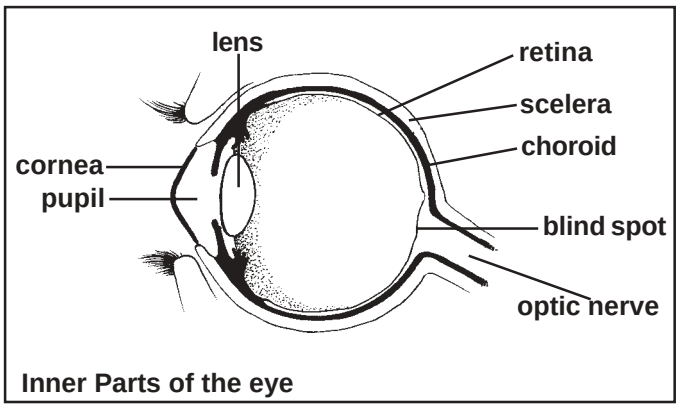
We find out about the world we live in through our senses. We learn with our senses. We see with our eyes, and sight tells us about things that are outside of our bodies. Our eyes give us pictures, or images, or the way things look. Your eyes show you light, color, shape and size. The eyes and ears receive messages from the outside world and transmit them to the brain. Our eye is our organ for vision. Our ear, on the other hand is our organ for hearing.

Let's Study and Analyze

How does our eyes see?



Outer Parts of the eye



Inner Parts of the eye

Our eye has many parts and each one of them helps you see.

Try blinking one of your eyes in front of a mirror. Can you see the skin that covers your eye every time it closes? The skin that covers your eye is called your **eyelid**. It protects your eye from tiny objects that might enter your eye. Below your eyelid is a thin layer of tissue called the **mucous membrane**. It is always wet because on top of your eye, behind the eyelids are **tear glands** that produce tears. The tears help clean your eyes every time you close your eyelid. The short hairs on the tip of your eyelid are called **eyelashes**. They brush away tiny objects and dirt from entering your eye.

Inside our eyeball are three layers or linings of cell. They are the:

a. **Scelera**. This is the white part of your eye. In front of the sclera, on top of the colored part of your eye (**iris**), is a transparent covering called the **cornea**. The cornea protects the lens of your eye. It also allows light rays to enter the eye and helps to focus them. A thin layer of transparent tissue covers the scelera. This tissue is known as **conjunctiva**.

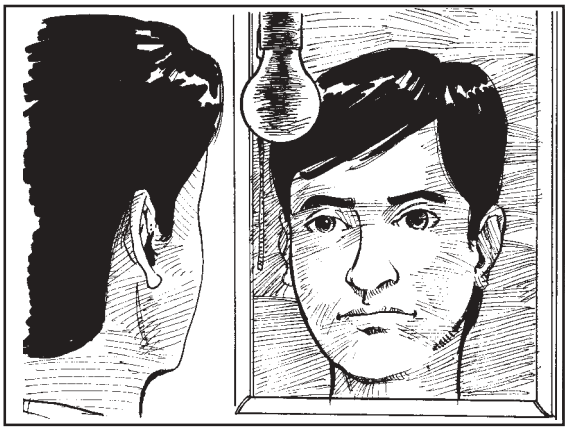
b. **Choroid**. This is the middle layer of the wall of your eyeball. It absorbs excessive light and gives rise to the **iris**, which surrounds an opening called the **pupil**.

c. **Retina**. This is the innermost layer of your eye where light sensitive cells are found.

Let's Try This

To learn more about how your eye and its parts function, do the activity below.

Stand near a mirror in a dimly lit room just below a source of light. Observe the movement of your eyes.



What happened to the black dot in the middle of your eye? Did it widen (dilate)? Or did it narrow (contract)?

_____

_____

_____

Then ask someone to turn on the light. Observe the movement of one of your eyes.

What happened to the black dot in the middle of your eye? Did it widen (dilate)? Or did it narrow (contract)?

_____

_____

_____

What do you think is the reason for this movement?

_____

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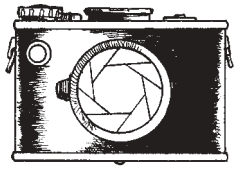
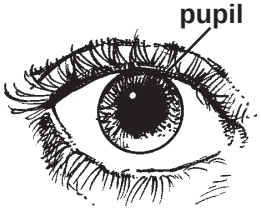
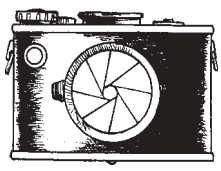
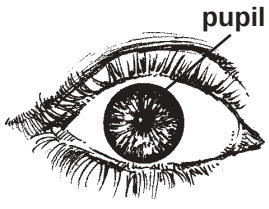
The activity tells you how the pupil works. To learn the answers to the questions, study the illustrations below.

Dim Light		
Opening of camera widens	Pupil widens	Camera n

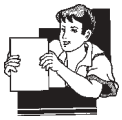






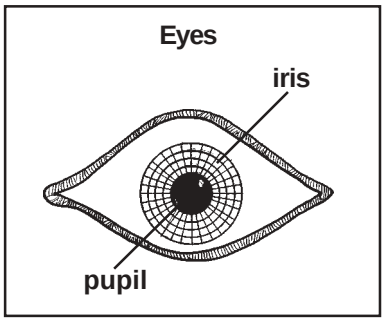


Our eye is like a camera. It reacts to light. Can you see the black dot in the middle of the colored part of your eye? That is called the **pupil**.



Let's Learn

The pupil is like an opening of a camera. In a dim light, the opening widens. In a bright light, it narrows. The pupil controls the amount of light that enters the eye. If it is too bright, the pupil narrows to protect the eyes from too much light. If it is dim, the pupil widens so that more light can enter into our eyes.



Our eye receives light rays that are reflected from an object. The light goes in through the pupil.

The colored part that surrounds the pupil is called the **iris**. Its color comes from a substance called **melanin**. Melanin absorbs strong light that might shock the eye. Strong light could cause blurred vision.

Let's Review

Why does a welder in a welding shop use a dark protective eyewear or a welding mask while working?

_____

_____

_____

Compare your answer with the answer found in the *Answer Key* on page 50.

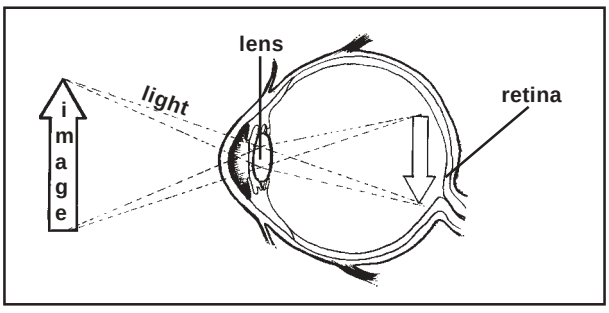
Let's Study and Analyze

You have just learned how the pupil works. Consider that stage as just a door or an entrance. A lot of things still happen after the light enters the door and the door closes.

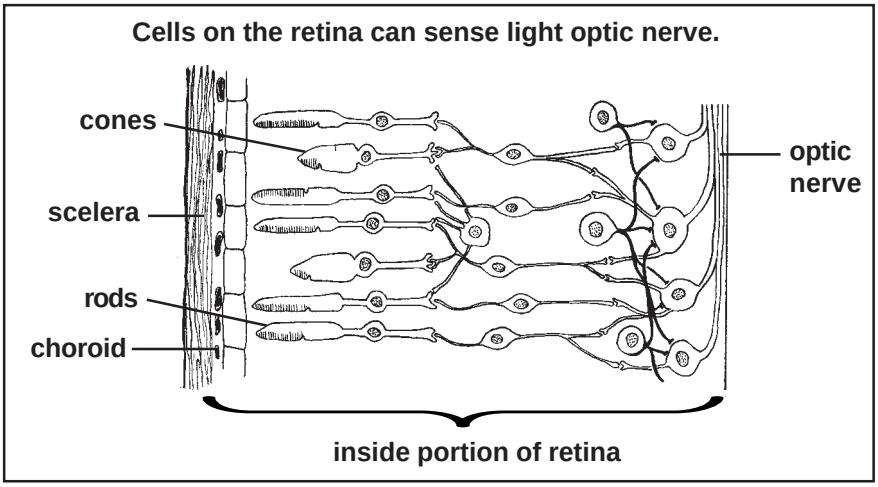
As the light enters the eye, it passes through the lens.

Refer to the illustration on page 5. Were you able to find the lens of the eye? If so, let's continue…

The lens helps at focusing the image to make it clearer. As the light goes through the lens, it turns the light upside down. The lens focuses the light rays or the inverted image on the back of your eye or on the **retina**.



As stated earlier, retina is the innermost layer of the wall of the eyeball. Light sensitive cells absorb light rays (inverted image), changing them into electrical signals.



There are two types of light-sensitive cells inside the retina, the **rods** and the **cones**. Do you know what are they for?

_____

_____

_____

a. Rods - there are 120 million rods. These enable the eyes to see different shades of gray and to see in the dark. They detect black and white.

b. Cones - 6 million cones. These enable the eyes to see colors and sharp images in bright light. They detect color.

These cells turn the inverted image into electrical signals that travel along the **optic nerve** to the brain. It is important to note that there are NO rods and cones at the area where the optic nerve enters your eye. This is the **blind spot** (refer to the illustration on page 5) of your eye. The optic nerve carries the message to your brain. The brain then decodes the electrical signals, seeing the object the right side up.

Let's Review

Give the function of the following parts of your eye:

Structures in the eye	F
1. Scelera	
2. Cornea	
3. Choroid	

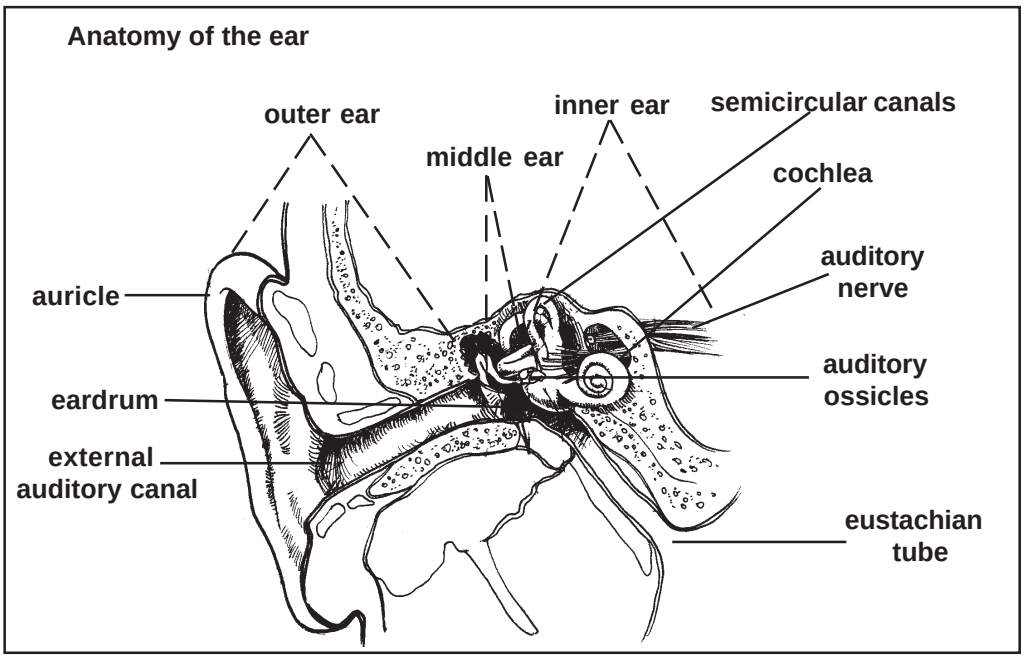
Structures in the eye	F
4. Pupil	
5. Iris	
6. Retina	
7. Lens	
8. Optic nerve	

Compare your answers with those found in the *Answer Key* on page 50.

Let's Study and Analyze

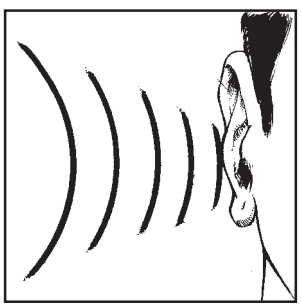
How does our ear work?

Our ear, just like our eye, has many parts that make us hear.



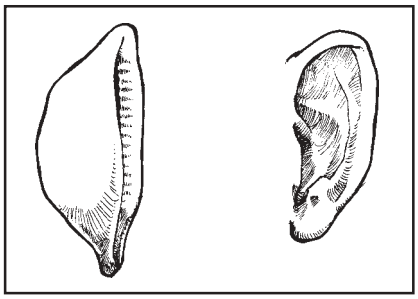
Read the discussion below on the parts of our ear to familiar yourself with how the ear functions.

Our ear is divided into three regions: The outer ear, middle ear and inner ear.



Outer Ear. This is the visible part of our ear. It is composed of **auricle** and the **external auditory canal**.

Try touching the curved flaps beside your head, which you call your 'ear.' That part is called the **auricle**. The auricle, or outer portion of your ear, is the one that collects sounds from your surroundings.



Why are your ears shaped like seashells?

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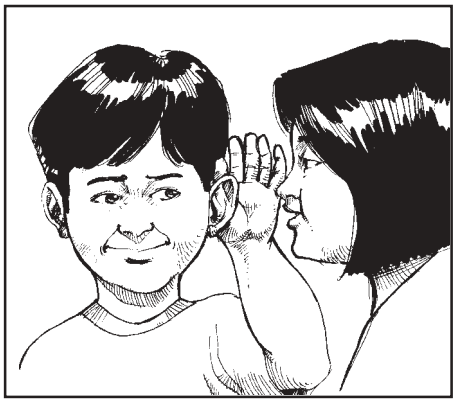


Ears are shaped like seashells because that's the best way it can collect sounds from your surroundings. Isn't it that when somebody is whispering to you, you place your hand in your ear like the child in the picture? Why do you do so?

_____

_____

Placing your hand beside your ear makes you hear what your friend is saying clearer, right? This happens because your hand helps your ear pick up the sounds coming from your friend.

Get a mirror and place it beside your head. Can you see a canal or a tube? It is where the sound then passes. It is called the **external auditory canal**. It is the opening of the ear. That tube goes inside your ears until it reaches the **eardrum**.

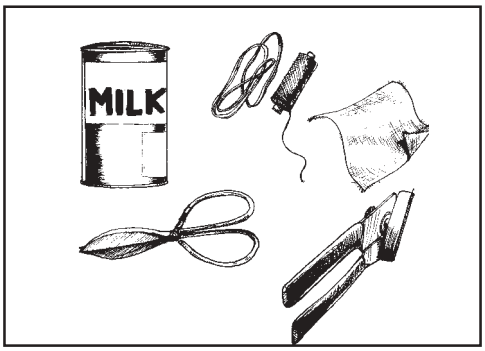
The **eardrum** is a very thin membrane or tissue, only .004 of an inch (0.1 mm) thick stretched along the opening of the external auditory canal. Sound that passed through the external auditory canal strikes the eardrum causing it to vibrate. Can you find the eardrum in the illustration on page 9? After you finish identifying where the eardrum is, continue with the activity below.

Let's Try This This

Inside our ear is a drum that produces vibrations, which the brain would interpret as sounds. To learn about how your eardrum works, do the activity below.

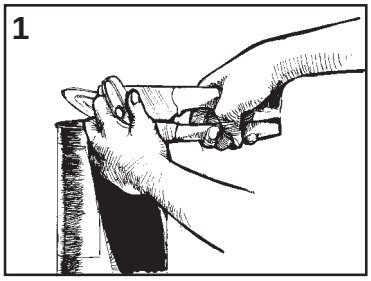
Get the following materials:

- a big can of milk
- strings or rubber bands
- a piece of cloth that is enough to cover the top of the can
- a pair of scissor
- a can opener

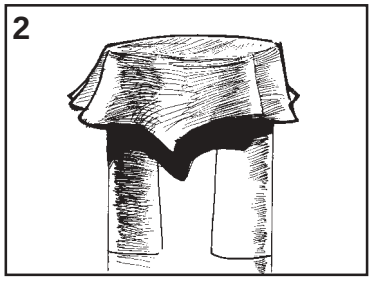


Procedure:

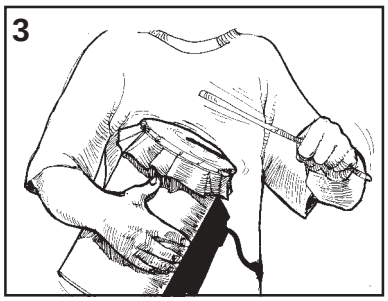
Step 1. Open both ends of the can using the car opener.



Step 2. Get the piece of cloth and cover one end of the can.



Step 3. Cover the end of the can by tying the cloth tightly.



Have you followed the procedure well? What do you have know? A drum isn't it? Now, try tapping the top of the drum slowly. Can you hear music? ___ Yes ___ No

Can you feel a vibration? ___ Yes ___ No

If you can't feel anything, try covering your drum tighter. Now repeat tapping your drum. You can feel vibrations, right? Try tapping harder. As the sounds become louder, the vibrations become stronger, right? Try tapping it harder than the second time. Will you agree that if you tapped it too hard, your drum might break? ____ Yes ____ No

What if you listen to a very loud sound or music, will your eardrum break too? Why do you say so? _____

_____

_____

If you answered yes, you are correct! What happens inside our ear is almost the same with the tapping of the drum you made. We hear sounds through vibrations. We can hear the music or the voice coming from the radio because it is vibrating — it is making the air vibrate or move back and forth. If the sounds we hear are too loud, it cause our eardrums to vibrate too strong. If this happens, the eardrums could break.

Let's Think About This

How do you take care of your ears?

_____

_____

_____

Do you think it is important to keep them clean always? Why?

_____

_____

_____

Have you finished answering the questions? If you take care of your ears by keeping them clean always, very good! If your auricles are dirty, dirt and bacteria could enter into the inner portion of your ear. Dirt and bacteria could cause ear infections that could lead to deminished hearing or a total loss of hearing. You will learn more about ear disorders in Lesson 3.

You can keep your ear clean by using cotton buds. Put some oil on the tip of the cotton bud and gently clean your auricles. You can also insert it a little bit in your external auditory canals to clean them. Be careful not to insert the cotton bud too deep. You might damage your eardrum. Do not use sharp objects when cleaning your ears. You might damage the skin the lines the external auditory canal.

Let's Study and Analyze

You learned that our auricle collects sounds that pass through our external auditory canal. As they travel in the ear canal, they strike the eardrum, and make it begin to vibrate. These vibrations make the other parts of the ear, called the ***Middle Ear***, to vibrate too.

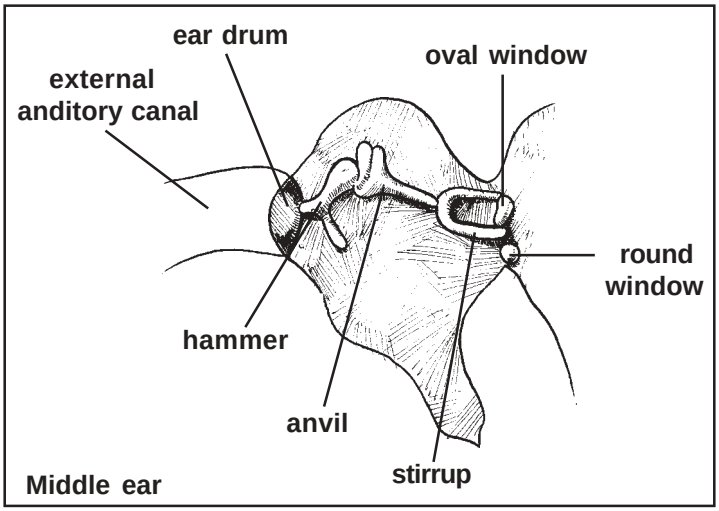
A very small cavity or pocket in the skull bone, immediately inside the eardrum, forms the Middle Ear. Inside this small pocket is a chain of three small bones, called the **auditory ossicles**. This chain of small bones stretches from the eardrum to the **oval window**. The oval window is the entrance to the inner ear, which you will learn later.

Do you know that the three small bones found in your middle ear are the smallest bones of your body?

The three bones occur in the following order:

- **hammer** (malleus) - This bone is the largest auditory ossicle. It connects the eardrum to the anvil. It is attached to the **tympanum**.

- **anvil** (incus) - This bone is the bone in between the hammer and the stirrup.
- **stirrup** (stapes) - This bone is attached to a thin sheath of tissue or a membrane called the **oval window**.



Let's Think About This

What do you think happens when the eardrum vibrates?

_____

_____

_____

If you answered that the chain of bones in the Middle Ear vibrates too, you are correct!

When the sound vibrations that passed through the external auditory canal hits the eardrum, the eardrum vibrates. As it vibrates, the vibrations that are produced in the eardrum cause the **tympanic membrane** of the **tympanum** to vibrate. Since the hammer lies in between the tympanum and the anvil, the rest of the auditory ossicles vibrate too.

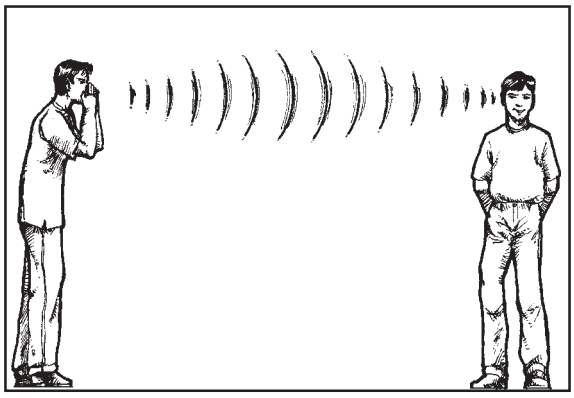
What do you think will happen to the vibrations when they pass through the small pocket in the Middle Ear where the auditory ossicles lie? Will they increase or decrease? Explain your answer.

_____

_____

_____

Ask one of your friends to go outside with you. Ask him to stand 10 meters or more from you like the picture on the right. Tell him how beautiful that day is. Does he hear you? ___ Yes ___ No

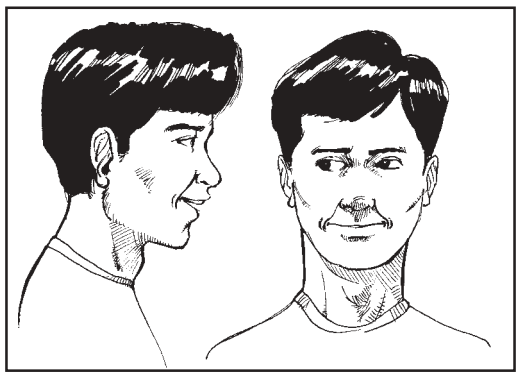


Why? _____

_____

_____

Maybe he did, but did he hear you clearly? May be not, right? He may even ask you to repeat what you have just said.



Try telling him the same words inside a small room. Does he hear you clearly? ___ Yes ___ No

Why?

_____

_____

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_____

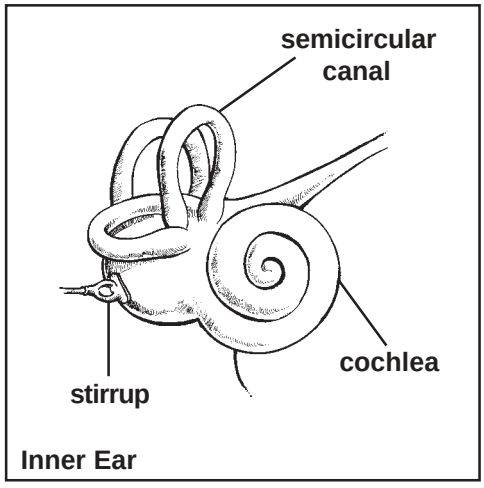
The correct answer is Yes. The same principle applies to the way your ear works. Since the vibrations pass from a relatively large part of the eardrum through the chain of bones, which have a smaller area, their force is concentrated. This concentration amplifies, or increases, the vibrations.

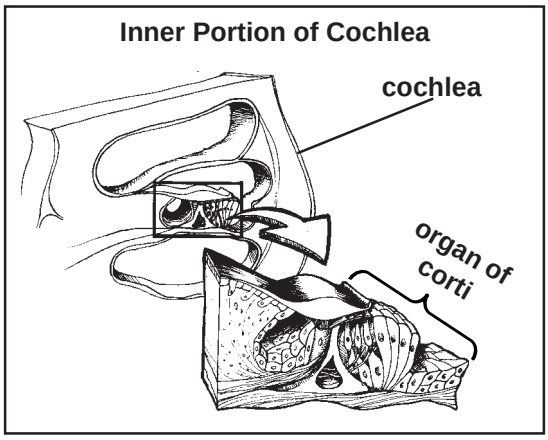
When the vibrations reach the stirrup, the stirrup pushes in and out of the oval window, will begin the function of the **Inner Ear**.

Let's Study and Analyze

Inner Ear. The Inner Ear consists of a **cochlea** and **three semi-circular canals**. The structures of the ear are filled with fluid.

The **cochlea** is the coiled structure or the shell-like structure inside your ear. It is a small bone shaped like a seashell that is filled with liquid. Its function is to convert sound waves to impulses that are transmitted by the **auditory nerve** to the brain.





You learned that when the sound vibrations reach the stirrup, the stirrup pushes in and out of the oval window. Thus, as the middle ear begins to vibrate, the cochlea begins to vibrate too. As the cochlea begins to vibrate it makes the liquid inside it vibrate too. The vibrations of the liquid tickle tiny hairs that line the cochlea, causing them to vibrate and send a message to the auditory nerve. The nerve also acts like an electrical wire and sends the message to your brain. The tiny hairs are part of the **organ of corti**.

Remember, we hear through vibrations. When the brain receives the sound message, again it figures out what the sound is, what is making the sound and what you should do about it.

Do you have any idea what makes you keep your balance?

_____

_____

_____

Deep in your ear are three tubes that connect to a chamber. These tubes are called the **semi-circular canals**. These canals are not involved in hearing but are involved in maintaining balance. They lie in three different planes and are arranged at right angles to one another which helps control balance. The canals are sensitive to changes in movement and direction.

Why do we get dizzy when we ride a vehicle or a boat?

_____

_____

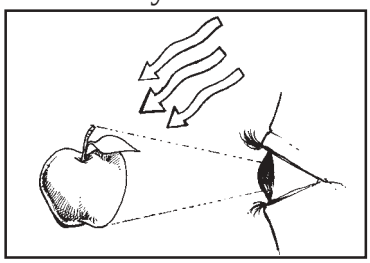
_____

As the vehicle or boat moves, its motion tends to upset our balancing system. Thus, making us feel dizzy. Changes in the tilt of the angle of the body are sensed by the chamber. Irregular motions can disturb the normal functions of the semi-circular canals and might result to motion sickness.

Let's See What You Have Learned?

Describe what happens in the illustrations below. Afterwards, arrange them in order. Number the illustrations from 1-6 according to their occurrence.

A. Eyes



_____ a.

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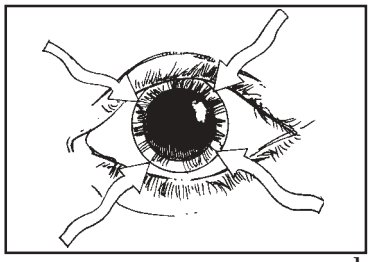

_____ b.

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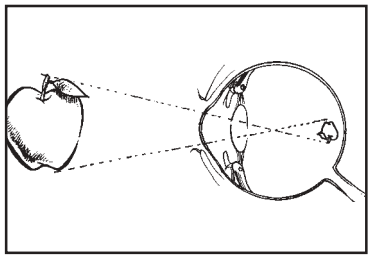

_____ c.

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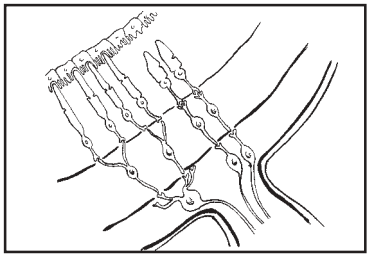

_____ a.

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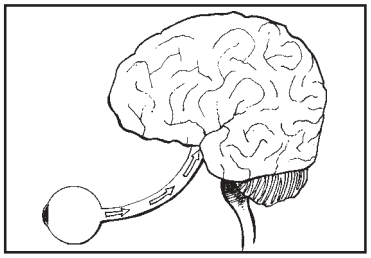

_____ b.

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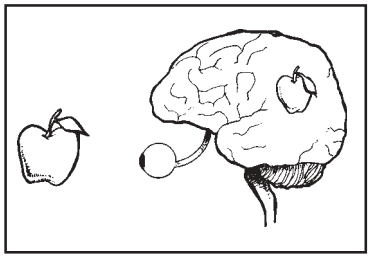
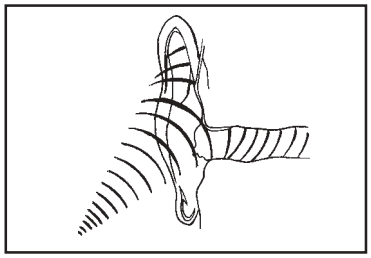


_____ c.

_____

_____

B. Ears



_____ a.

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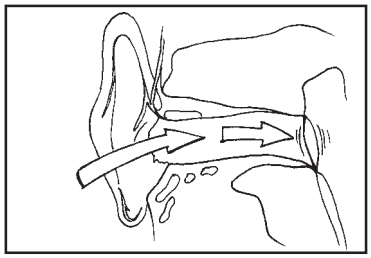

_____ b.

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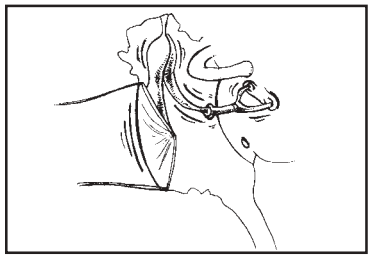

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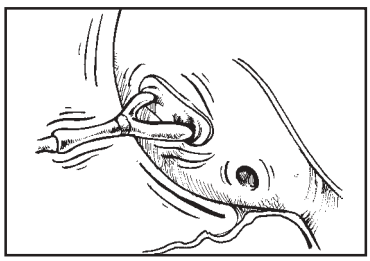

_____ a.

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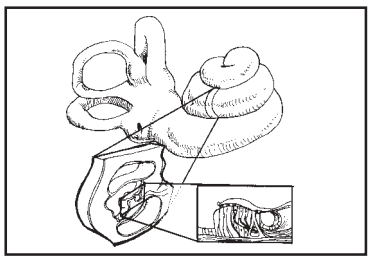

_____ b.

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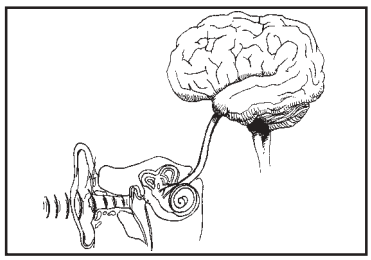


_____ c.

_____

_____

Compare your answers with those found in the *Answer Key* on page 51.

Let's Remember

- Our eye is our organ of vision and light perception. The sense of sight helps us recognize each other and learn about the things that we see around us.
- Our ear is our organ for hearing and balance. The sense of hearing helps us recognize sounds.
- Our eye is composed of many parts. It has three layers of cells: the scelera, choroid and retina.
- Our eye functions through a series of steps.
  - First, light rays that are reflected from objects enter our eye through an opening called pupil.
  - Then, the lens focuses the inverted image at the back portion of the eye that is called retina.
  - Inside the retina are light sensitive cells - the rods, which identify black and white colors, and cones, which are sensitive to bright light and can identify other colors.
  - These cells transforms light rays into electrical signals.
  - These electrical signals will then pass along the optic nerve to our brain.
  - When the cells reaches our brain, it will interpret these electric signals, thus making us identify the objects that we see around us.
- Our ear is composed of many parts too. It has three regions: The outer, middle and inner ear.
  - The outer ear is composed of the auricle and the external auditory canal that extends up to the eardrum.
  - The middle ear is composed of a small bone pocket that contains the three smalles bones of our body — the hammer, incus and stirrup.
  - The auricle collects sounds from the air. The sound travels along the external auditory organ and strikes the eardrum.
  - When the eardrum vibrates, so will the three small bones in the middle ear. The vibrations will then pass through the oval window to the cochlea.
  - Inside the cochlea are short hairs or the organ of corti. The vibrations will stimulate the hairs. The cells in the hairs will transform the vibrations into nerve impulses.
  - These nerve impulses are transmitted to the brain. The brain interprets these impulses, thus making us recognize sounds.

The Organs of Smell, Taste and Touch

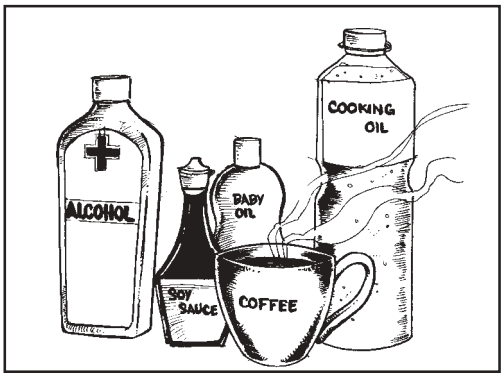
You learned in Lesson 1 about the organs of sight and hearing. In this lesson you will learn about your other sense organs — smell, touch and hearing. You will also learn their different parts and how they function.

After you finish studying this lesson you should be able to:

- identify the different parts of your nose, tongue and skin; and
- explain how they function.

Let's Try This

Do the activities with a partner.



Get any of the following groups of liquids.

- clear liquids (water and alcohol)
- colored liquids (soy sauce and coffee)
- Two kinds of oil (baby oil and cooking oil)

Ask you partner to pour the liquids in a clear container or glass.

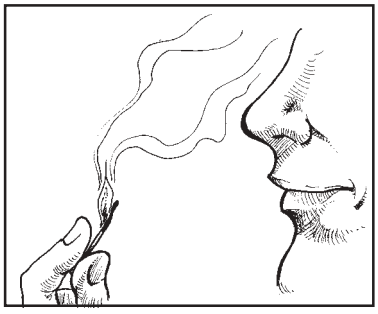
How would you identify the liquids? What part of your body will you use in identifying them?

_____

_____

_____

If you answered that you identified the liquids by smelling them with your nose, you are correct!



Let's try another one. Get a matchstick (*posporo)*. Light the matchstick.

Describe what happens.

_____

_____

_____

Did you smell something? How does the matchstick smell?

_____

_____

The matchstick burns, right? And as it burns, you can a smoke. As the smoke enters your nose you can smell the matchstick burning. The matchstick produces a burnt odor. Were your answers similar with mine? If so, very good.

Let's Study and Analyze

Can you name some things or objects with pleasant odors? If so, list them below.

_____

_____

Now, list things and objects that you do not want to smell because they stink or they smell bad.

_____

_____

The sense of smell is very important to a person. Our nose helps us know more about the world we live in than we do when we just touch things and people or just see them. It helps us recognize odors.

Do you have any idea how our nose works? If so, write your idea below.

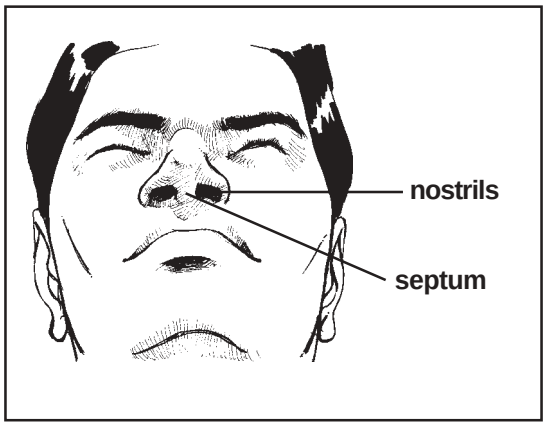
_____

_____

Our nose, like our eyes and ears, has parts that make us smell many things.

The sense of smell starts with your nose, but it includes other parts of your head and your brain.

Nose is both a sense organ for smell and a respiratory organ (organ for breathing) of our body. It is located between our eyes.



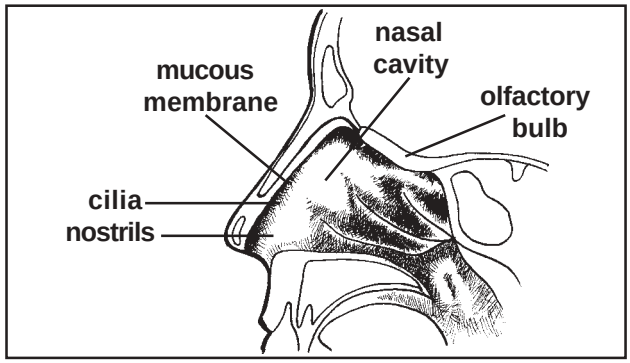
The outer portion of our nose is composed of bone and cartilage - a tough flexible tissue attached to the bone. The inner portion is hollow. It is called the **nasal cavity**. A wall divides the nasal cavity. Thus, we see two holes in our nose. The two holes are called our **nostrils** and the wall that divides the nasal cavity is called the **septum**.

The nostrils are the openings of our nose. These are the parts of our nose where the air we breathe passes.

Have you ever wondered why there are short and tiny hairs inside our nose? What do you think these hairs are for?

_____

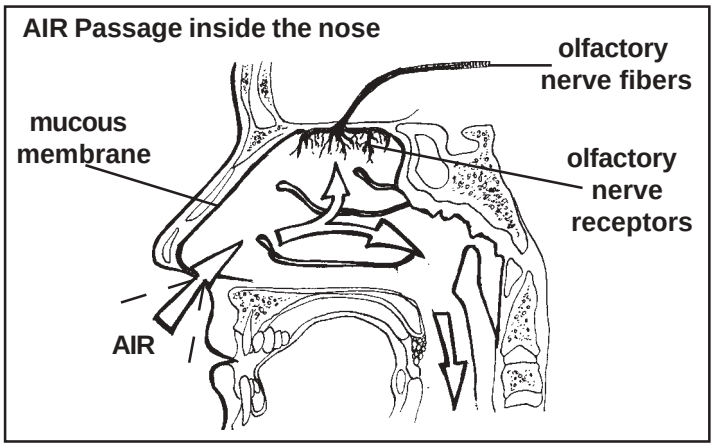
_____



The inner portion of our nose is always wet because of mucus or the sticky liquid inside our nose. Inside our nose is a thin and wet lining of tissue called the **mucous membrane**. The mucous membrane is where the fine hairs known as **cilia** are found. These fine hairs help filter dust and other impurities that enter our nose through the air we inhale as we breathe. Thus, they help ensure that the air we breathe in is clean or free from impurities when it enters our lungs. The air is also moistened as it passes over the sticky nasal membrane.

How can our nose detect odors?

We know that our nose is our organ of smell. The organ of smell actually lies in the mucous membrane of the upper portion of the nasal cavity near the septum.



It is made up of **olfactory cells** (olfaction is the other name of smell). These cells are actually nerve cells that function as receptors for the sense of smell.

These cell receptors are called the **olfactory nerve receptors**. The olfactory nerve receptors generate nerve impulses in response to chemicals in the air. These impulses are brought to the brain by the **olfactory nerve fibers**.

The olfactory nerve fibers are the free ends of the olfactory nerve receptors. These fibers are buried in the mucus that coats the inner surface of the nasal cavity. They are stimulated by various odors carried by the air we breathe.

Nerve fibers extend from the olfactory cells to an area of the brain called the **olfactory bulb**. From there, the impulses are brought to the other parts of the brain where they are made into sensations of smell.

Let's Think About This

Let's go back to the burning of the match or candle. Explain how you were able to smell the burning of the matchstick using what you just learned about your sense of smell.

_____

_____

_____

Compare your answer with mine below.

Using the burning matchstick as an example, you can understand more how your sense organ of smell works.

When the matchstick started to burn, tiny little particles of ash that came form the match floated through the air. These small pieces of material are too small for us to see, but the nose is sensitive to them and can smell them as they travel through the air into your nose.

When the small pieces of ash "tickle" the nerve endings of the olfactory nerve, the olfactory nerve carries the message to your brain telling it that you are smelling a burning matchstick.

Let's Review

When you have cold, and your nose is all stuffed up, why do you think you can't smell something like perfume?

_____

_____

_____

Compare your answer with the answer in the *Answer Key* on page 51.

Let's Study and Analyze

The **tongue** is the main body part we use for tasting food. It carries messages about what you are eating to the brain.

It is a muscle inside your mouth that is covered with many small bundles called **taste buds.** Taste buds are groups of sensory cells that have many nerve endings just like the nerve fibers in your nose. They detect the taste of the food you are eating or drinks that you are drinking.

Taste buds are stimulated by chemicals that dissolve in the saliva of the mouth. The main tastes are salt, sour, sweet and bitter.

Let's Try This

Get a pinch of salt, sugar, coffee, calamansi

Do you know how each one tastes? If so, write their taste below.

a. salt = _____

b. sugar = _____

c. coffee = _____

d. calamansi = _____

Dry your tongue with a clean towel. Put a small amount of salt in your tongue.

Did you taste anything? ___ Yes ___ No

Try doing it again, this time with sugar, then coffee, then calamansi.

Were you able to taste anything? ___ Yes ___ No

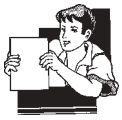
Not very much, right? What could be the reason for this?

_____

_____

_____

There is another important thing to remember about the sense organ of taste. It is the saliva or the sticky fluid in your mouth that helps you taste your food. The saliva mixes with the food and spreads the flavors all over the tongue. The different taste buds then begin their jobs and you can tell if the candy is sweet, sour, salty or bitter. If your tongue is dry or if there is no saliva in your mouth, this process will not take place. As a result, you don't taste anything from the food that you eat.



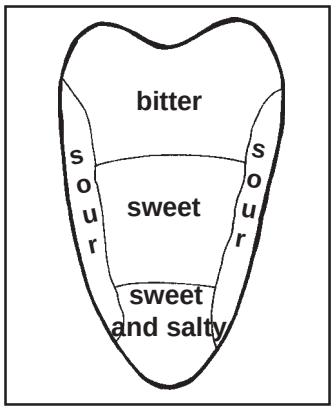
Let's Learn

Do you know that specific tastes are perceived or "tasted" only at certain areas of the tongue?

You learned that on the surface of your tongue are small bundles of nerve endings or taste buds, right? The taste buds are grouped into four regions on your tongue. Each region perceives a certain taste, be it sweet, sour, salty and bitter. The regions are as follow:

- Sweet tastes are perceived in the middle and tip of the tongue.
- Salty tastes are perceived at the tip and edges of the tongue.

- Sour tastes are perceived on the sides of the tongue.
- Bitter tastes are perceived at the back of the tongue.



Will you able taste a green mango if it only makes contact with the middle of your tongue? Explain your answer. _____
_____
_____

If you answered NO, you are correct! You won't be able to taste the sourness of the green mango if it only makes contact with the middle portion of your tongue. It should make contact with the back part of your tongue for you to be able to taste it.

Let's Think About This

Is the smell of your food important to you? If you have colds, can you taste your food that well? ___ Yes ___ No

Why do you say so?

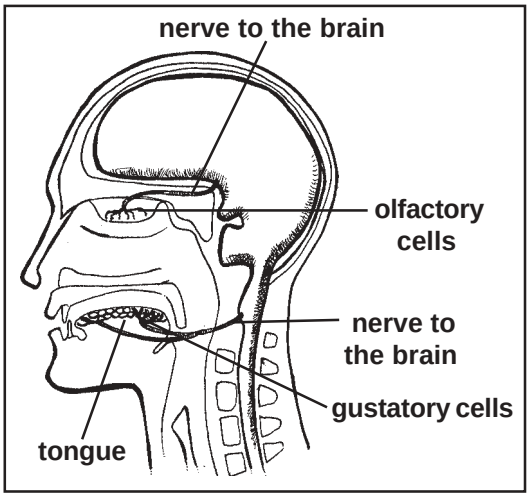
_____

_____

_____

If your answer is no, well you are correct!

Look at the illustration on the right. The sensations of taste and smell often function together. If the nose is blocked we have a difficulty in distinguishing certain flavors that we smell rather than taste.



Your sense organs of smell and taste are also known as **chemosensory** organs. The olfactory cells that detect odors and the **gustatory cells** (cells found at the nerve fibers in our taste buds) that perceive tastes are both sensitive to chemicals that we inhale(or smell) and taste.

Our surroundings including the foods we eat, or the liquids we drink all release a certain amount of chemical particles in the air. The tiny particles of chemicals that enter our nose stimulate the sensory cells, specifically the olfactory cells of our nose. These cells transmit the messages to our brain where specific smells are identified. Same thing applies to our sense of taste. The taste buds on the surface of our tongue are sensitive to chemicals that come from our food. The gustatory cells detect taste.

Let's Review

Are you tempted to eat something that smells good, a spaghetti, for example? Why?

_____

_____

_____

When we smell a food, we can easily recognize how it tastes especially if we have tasted it before. When we smell the spaghetti, we already now that its taste is a little bit sweet, sour and salty.

Let's Try This

Do you think our sense of touch is important? Why?

_____

_____

_____

If you answered that it is important, very good! Our sense of touch is very important because it enables us to do a lot of things.

What could possibly happen to you if you can't feel anything? Will you still be able to do the things that you usually do, like drinking water, eating, doing household chores, etc.? How will you be able to hold the glass, spoon, or the fork, if you cannot feel that you're holding it right?

Do you know what your sense of touch is and how it works? Do the following activities and answer the question after each one.

1. Place your palm on the table and stand on the floor barefooted. Be sure to stand firmly on the ground. Can you feel anything? Describe how you feel.

   _____

   _____

   _____

2. Put your bare foot into a washbasin (*palanggana*) with water at room temperature. What do you feel? Can you feel touching something wet and something rough at the same time? Explain why.

   _____

   _____

   _____

3. Ask your partner to collect stones and objects of different sizes and shape. Tell him/her to put them inside a bag or a box. After your partner finishes his/her task, try reaching into the box or bag to find an object and identify it without looking at it. Were you able to identify all the contents of the bag? How were you able to identify the objects if you can't see them?

_____

_____

_____

Compare your answers with those found in the *Answer Key* on page 51.

Let's Study and Analyze

Can you identify an object by mere touching it? How about the blind, how can they read if they cannot see what they are reading?

The sense that gives you notice of contact with an object is the sense of touch, also called the **tactile sense**. Through this sense, you know the shape, hardness or temperature of objects. You can also feel pain and pressure through the sense of touch.

The sense of touch is very important because we use it in several ways. Its main organ is our skin. Our nails and hair are also organs of touch.

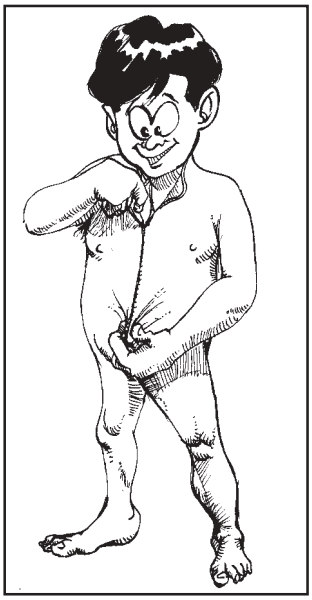
Can you list down below all the uses of skin that you can think of?

_____

_____

_____

Do you know that the skin is the largest organ of your body? For an adult, the skin could measure up to 20 square feet. It is a giant, stretchable, washable, and waterproof covering of your body that keeps your internal organs in!



Our skin covers all of our body. It protects us from disease causing bacteria, heat and cold. It also gives us information about what is around and outside our body. When we touch something our skin tells us if that thing is wet or dry, hot or cold, rough or smooth, hard or soft.

It can give us messages about our surroundings all at the same time. Remember what you did with earlier. When you touched the top of the table and stood on the ground barefooted, your can feel the roughness or smoothness of the table and floor, isn't it? You can also tell if the table and floor are warm or cold, right?

Let's Think About This

Will you touch a hot object or not? Why?

_____

_____

_____

How will you know that it's hot?

_____

_____

_____

Most probably you will not touch an object that you know is hot. Or if you do not know that the object is hot, as soon as you touch it, you will remove your finger or any part of the body immediately from the hot object.

The sense of touch provides a warning when there is a threat to the body. Pain is a signal that we need to act immediately so that we could avoid damaging our body. Without your sense of touch you might burn yourself without knowing it. Without your sense of touch accidents might happen.

Can you list some accidents that might happen if you loss your sense of touch? If so, list them below.

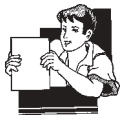
_____

_____

_____

Here are some of the accidents that could happen if you loss your sense of touch:

- The things you're holding always drop because they slip from your hands
- You can't feel pain, even if you wound yourself
- You can burn different parts of your body



Let's Learn

You feel different sensations when you come in contact with objects because of your touch organs. There are many kinds of touch organs in the skin and mucous membranes. These touch organs are found near hairs, another kind in hairless areas and another in deeper tissues.

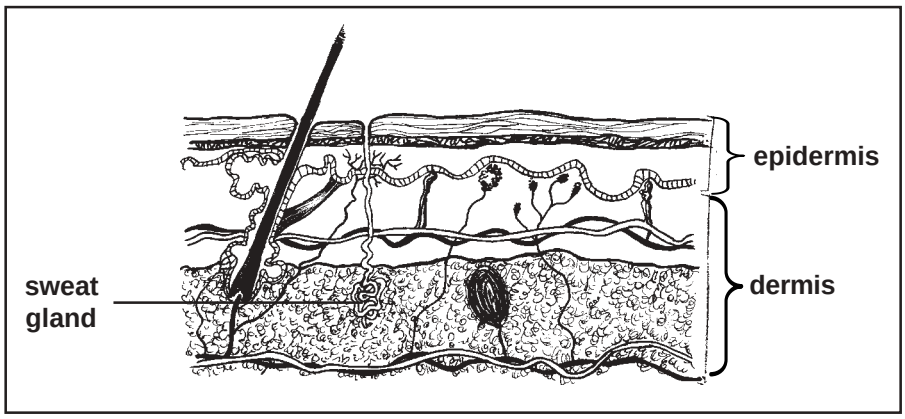
You learned that our senses of smell and taste are made possible because of nerve endings that act as **receptors**. These nerve endings send messages to our brain. It is the same with our skin. Below our skin are intricate networks of nerves that send messages to our brain too.

Have you ever experienced numbness on your feet when you sit on your feet for a long time?

Sensations are measured below the skin by the nerve fibers or nerve endings that act as receptors. They tell your brain how to respond.

When you sit on your feet for a long time, the weight of our upper body squashes your nerves and blood vessels. When you feel the tingling sensation it just means that your nerves wanted you to know that they are numb.

Below our skin are layers of tissue, namely, epidermis and dermis.



The **epidermis** is the outermost layer of the skin. It is the visible part of our skin.

The next layer of skin is the **dermis**. This is made up of blood vessels, nerve endings.

If you look closely at the illustration of the skin you will see that there are different kinds of nerve endings or receptors. These nerve endings respond to differently. Some receptors respond to pressure, temperature and pain.

Let's See What You Have Learned

A. Solve the puzzle. Look for the words that correspond to the sentences below the puzzle.

N	A	S	A	L	C	A	V	I	T	Y	R	S	T	R
T	S	D	F	D	T	S	D	C	X	Z	X	A	E	U
A	D	J	K	E	I	O	K	E	R	G	H	C	V	B
C	F	H	E	E	C	V	B	I	I	J	E	H	D	N
T	G	W	L	J	K	P	O	I	N	P	P	J	E	O
I	S	D	U	B	E	T	S	A	T	T	I	U	R	I
L	M	N	J	K	L	O	P	O	R	F	D	I	S	T
E	Y	T	E	A	S	D	R	R	I	G	E	P	Z	C
W	M	U	T	P	E	S	D	F	B	H	R	O	D	A
S	H	J	O	T	R	F	A	D	E	R	M	I	S	F
A	I	U	N	Y	F	I	P	L	N	M	I	L	A	L
I	O	P	G	Y	U	I	O	G	I	L	S	K	S	O
L	K	L	U	P	L	K	J	H	B	V	K	J	D	I
I	M	R	E	T	T	I	B	N	N	N	A	M	F	H
C	H	E	M	O	S	E	N	S	O	R	Y	S	G	B

1. _____ is the outermost layer of our sense organ of touch.
2. _____ is another term for smell.
3. _____ is a sticky fluid in our mouth that dissolves the food we eat. It spreads the flavor of the food we eat all over our sense organ of taste.
4. _____ is the inner portion of the nose. It is hollow.
5. _____ are nerve endings or fibers that send messages to our brain.
6. _____ is our organ for taste.
7. _____ is the wall that divides the hollow portion of the nose.
8. _____ is another term for our sense of touch.
9. Your sense organs of smell and taste are also known as _____ organs because the are sensitive to the chemicals that we both inhale and taste.
10. _____ is the taste perceived in the middle and tip of our sense organ of taste.

11. _____ are the fine hairs found along the mucous membrane.
12. _____ is our main organ for our sense of touch.
13. _____ are groups of sensory cells that have many nerve fibers that detect the taste of the food we eat.
14. _____ is the inner layer of our sense organ of touch. Nerve fibers and blood vessels are all around this layer.
15. _____ is the taste perceived at the back of our sense organ of taste.

Compare your answers with those found in the *Answer Key* on page 52.

Let's Remember

- Our nose, tongue and skin have many parts that make us smell, taste and feel.
- When odors enter our nose, nerve sensors (nerve endings buried in the mucous membrane) inside our nose are stimulated. They send messages to the brain.
- On the surface of our tongue are thousands of taste buds that detect the taste of the foods we eat. On each taste bud are nerve endings that send messages to our brain.
- Our tongue is divided on four regions. Each region detects one of the four flavors: sweet, sour, salty and bitter.
- Our skin is the outer covering of our body.
- It has layers, namely; epidermis (outer layer) and the dermis (inner layer).
- On the dermis are nerve endings that detect pressure, temperature and pain.

Diseases and Prevention

You learned in the previous lessons the importance of our sense organs to our daily life. Our sense organs help us do so many things. It has been said a couple of times that we learn about the outside world through our senses. A loss of any one of our senses would affect they way we live, move and interact with people immensely. If any disease affect our senses, it would be very hard for us to go about our usual activities.

In this lesson, you will learn about the different diseases that may affect your sense organs. If the parts and functions of the sense organs discussed in the previous lessons are not clear to you, I suggest you review them first before studying this lesson. It is important that you are familiar with how your sense organs work before you start this lesson.

After studying this module, you can:

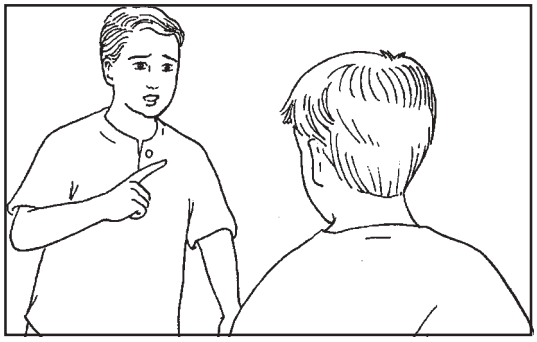
- cite some of the common diseases related to the sense organs;
- enumerate the signs and symptoms connected with each disease; and
- cite prevention and cure of these diseases.

Let's Read

Our eyes play a very important role in our lives. They make us see the world where we belong.

Read the dialog below. Maybe you had the same experience with the character.

On the way home from the farm, Jerry meets his friend, Tony.



Jerry : What happened to your eyes, Tony?

Tony : I contracted an eye disease called *conjunctivitis*. It is more popularly known as sore eyes.

Jerry : Isn't that contagious?

Tony : Yes, it is.

Jerry : How did you get sore eyes?

Tony : The doctor said that you can get sore eyes anywhere. I think I got this from the market where there are a lot of people. Someone who has sore eyes may have rubbed his/her eyes and touched something that I also touched. I rubbed my eyes without washing my hands, and there, I got the disease.

Let's Try This

Answer the following questions based on what you learned from the dialog that you have just read.

1. What is *conjunctivitis*? _____
2. How did Tony acquire *conjunctivitis*? _____

   _____

   _____
3. How can *conjunctivitis* be prevented? _____

   _____

   _____

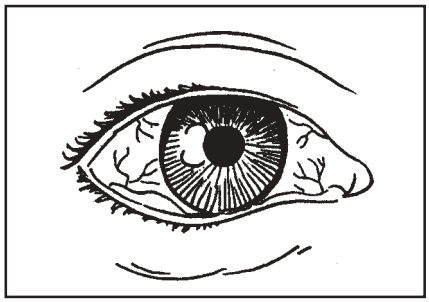
Compare your answers with those found in the *Answer Key* on page 52.

Let's Study and Analyze

Have you ever had an eye disorder?

Nowadays, if you are not careful, you may get eye diseases. Some eye diseases that are not treated immediately and properly may even lead to blindness.

Listed below are some common eye diseases that need early treatment:



1. ***Conjunctivitis*** (*sore eyes*). It is commonly known as "pinkeye" because of the inflamed or swollen tissues or mucous membrane that line the back of the eyelid. It is the most common infectious disease that affects the eye, especially the eye of the children.

Have you ever had *conjunctivitis*? ___ Yes ___ No

If yes, can you still remember its symptoms? List them below.

_____

_____

Its symptoms are as follow:

- The first symptom of conjunctivitis is discomfort or itching and excessive watering of the eye.
- This is followed by redness and inflammation (swelling) of conjunctiva and the inner surface of the eyelids. There may be some pain that will accompany the inflammation, but the person who has conjunctivitis might probably complain more on the discomfort in the eye. Mostly because of the discomfort and itchiness in the eye, the person who has conjunctivitis rubs the eye.
- After a day or two, a white, yellow (sometimes light green) discharge from the eyes may occur (*pagmumuta*).

If so, how did you treat it?

_____

_____

What could possibly happen to your eye if you rub it?

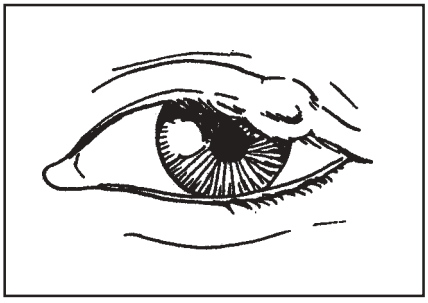
_____

_____

If you did not rub your eye, very good! When a person has a sore eye or *conjunctivitis*, he/she should not rub his/her eye because the disease may transmit to the other eye. He/She should also wash his/her hands often and use separate towels so as not to spread the disease to other people. Although most types of conjunctivitis are contagious, it usually causes no danger to the eye or to your vision. However, conjunctivitis caused by bacteria is infectious. The discharge (*muta*) will somehow be thicker. If this happens, consult your doctor immediately because bacterial conjunctivitis could also cause ear infections.

2. ***Sty*** (*kuliti*). It is another common disease of the eye. It is a small abscess of the tissue in the eyelids near the root of an eyelash. A person may get more than one sty at a time. Have you ever heard the myth or old belief about sty?

   Have you ever had one? ___ Yes ___ No



If yes, did your friends laugh at you? If yes, why? _____

_____

It is believed that a person acquires a sty as a punishment for peeping on a naked person (*namboso*).

However, to be more accurate, a sty is caused by bacterial infection cause by *staphylococcus* bacteria.

Its symptoms include swelling, redness and pain. When the inflammation bursts, pain is relieved. There is immediate improvement.

To treat the sty, bathe it with a clean cloth soaked in hot water repeatedly. If it does not drain by itself, visit your nearest health center for assistance.

3. Sometimes, a foreign body is lodged in the eye *(puwing)*. If the foreign body is soft, instruct the victim to close his/her eyes. Lead him/her to a bright place and tell him/her to open the eye his/her eye gently.

Look for the object that lodged in the eye. When it is located, get it out of the eye by lifting the particle with the moist corner of a handkerchief.

If the foreign body is stuck in the white of the eye, seek professional help at once. Do not try to remove the object by yourself.

Aside from the diseases mentioned, there are more disorders that may affect the eye. Some are listed below:

- Farsightedness (*hypermetropia*) — distant things are seen clearly while objects at close range are blurred. Corrective glasses or contact lens are prescribed to correct the disorder.
- Nearsightedness (*myopia*) — distant objects are blurred while objects at close range are seen clearly. Eyeglasses or contact lens can also correct this eye disorder.
- Night Blindness (*ocerphthalmium*) — This disorder may occur if there is a dietary deficiency of Vitamin A. Vision is not clear in dim light or at night. Night blindness also occurs in patients with eye disorders called *coroidoretinetis* and *glaucoma*.

Let's Review

Answer the questions below.

1. One of your brothers/sisters has conjunctivitis. What must she and all of you do to prevent the spread of the disease?

   _____

   _____

   _____

2. Lina has a sty. Should she prick her sty with a needle to drain all the pus (*nana*) inside it? Explain your answer.

_____

_____

_____

Compare your answers with those found in the *Answer Key* on pages 52–53.

Let's Read

You learned in Lesson 1 the importance of your ears. They make you hear the sounds all around you. Imagine that you don't have one? Do you think you will be able to do the things you used to do?

Our ears, if not taken cared of properly, could easily be damaged. It is a very important and sensitive sense organ. To learn more about ear disorders, read the dialog below.

At the health center . . .

Jun: Good Morning, Doctor.

Doctor: Good morning, Jun. What can I do for you?

Jun: Doc, last week I had a very bad cold. This morning, I woke up with a very painful left ear.

Doctor: Let's take a look at it.

Doctor: You have *otitis media* in your left ear. It's good that you came at once to consult me.

Jun: What's *otitis media*, doc?

Doctor: *Otitis media* is an inflammation of your middle ear. If not treated immediately, it can lead to deafness.

Jun: So how is it treated?

Doctor: I'll give you a strong antibiotic and an antihistamine to relieve the blockage.

Jun: Thank you very much, Doc. I've got to go now.

Doctor: Anytime, Jun.

Let's Think About This

From what you have just read, what is *otitis media*?

_____

_____

_____

How did Jun acquire *otitis media*? What are its symptoms?

_____

_____

_____

How is it treated?

_____

_____

_____

Have you finished answering the questions? If so, you can compare your answer in the discussion below.

Otitis is an inflammation of the ear. For the outer ear, or the auricle, it is called *otitis externa*. For the middle ear the inflammation is known as *otitis media*; and inflammation of the inner ear is called *labyrinthitis*.

1. *Otitis Externa*. More commonly known as a "swimmer's ear". It is an infection of the ear canal (external auditory canal). The ear canal is naturally acidic. The acid prevents bacteria from living in your ears.

   When a person swims frequently, the water enters the ear and washes out the acid in the canal. This allows bacteria to strive in your ear. It can be caused by a combination of bacterial and fungal infections because of scratching the ear, swimming, or excessive sweating.

Symptoms	Treatment/ Prever
Itching, pain in the ear, slight discharge, deafness. An abscess (boil) may form.	1. Use of earplugs while sv 2. Use of doctor-prescribed 3. Avoid scratching your ea

2. *Otitis Media* are infections in the middle ear. Otitis media occur very frequently in children especially those under five years old.

Middle Ear infections occur when the tube that connects the back of your nose to the middle of your ear does not function well. The job of this tube is to allow air to pass from your nose to the middle ear. When it is not working well, a build up of fluid may occur in your middle ear. If this happens, the fluid that has accumulated in the middle ear will then serve as an excellent environment for bacteria to grow and an infection to occur. The middle ear is supposed to stay dry.

Did you ever experience having a whooping cough that is painful in your throat? ___ Yes ___ No

If it happened to you, was your ear painful afterwards? If so, what could be the reason for this? _____

_____

If that happened to you it is possible that you acquired otitis media. The eustachian tube could have been swollen. The swelling of the tube could block the air from entering into your middle ear. Then fluid builds up in the middle ear, instead of draining out into the throat.

Symptoms	Treatment/
Severe earache, decrease hearing, fever, pus Young children may have diarrhea, stomach pain, vomiting.	1. Doctor to prescribe antib painkillers. 2. Keep ear clean and dry, ruptured.

3. *Labyrinthitis* is an inflammation of the semicircular canals in the inner ear. Can you still remember what you learned in Lesson 1? The semicircular canals are fluid-filled chambers that help us keep our balance, right? Just imagine if you damage them, it would be really difficult to maintain your posture, wouldn't it?

Labyrinthitis is a bacterial infection from otitis media, or meningitis or after an ear operation.

Symptoms	Treatment/
- Among the symptoms of labyrinthitis are: - Extreme dizziness that begins gradually and peaks in 48 hours - Involuntary eye movement - Vomiting - Loss of balance - Hearing loss - Ringing inside the ears	1. If you experience the sy medical treatment imm 2. Don't take a medication ear specialist.

Let's Review

Identify what ear disorder was described in the following sentences:

_____ 1. A person hears ringing inside his/her ear, which is accompanied by dizziness and sometimes, vomiting.

_____ 2. This ear disease is acquired when a person suffers from severe colds. Earache and fever could accompany this disease.

_____ 3. This ear disease makes a person loss his/her balance.

_____ 4. This ear disorder develops from an infection caused by bacteria when fluids build up inside your ear.

_____ 5. This ear disease develops when the natural acids of your ear are washed away, thus giving disease causing bacteria a chance to live in your ears.

Compare your answers with those found in the *Answer Key* on page 53.

Let's Try This

Can you still remember what you did in Lesson 2, when you covered your nose and you can't smell anything? Your sense of taste did not function very well too, right?

Imagine yourself to be permanently incapable of smelling the things around you and tasting the food you eat? Will you still be able to enjoy your life and do the things that you are used to? Explain your answer.

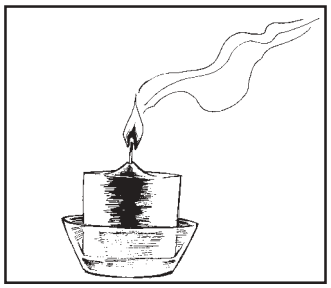
_____

_____

_____

There's a lot of things that you will not be able to do if you loss your senses of smell and taste, right? You won't be able to taste what you're eating. You won't know whether the food you're eating tastes good or not. Much worse, you might be eating a spoiled food without knowing it. This is because you can't taste and smell your food.

Smell and taste problems can have a big impact on our lives. These senses contribute substantially to our enjoyment of life, our desire to eat, and the way we deal with people. Smell and taste disorders can be serious. When smell and taste are impaired, we eat poorly and socialize less.



What's the first thing that you do when you smell something burning?

_____

_____

_____

Most probably the first thing you do is to find where the odor comes from, right? Our sense of smell and taste also warn us about dangers, such as fire, poisonous fumes, and spoiled food.

What could be the possible causes of the loss of smell and taste?

_____

_____

_____

Loss of smell and taste may result from *polyps* — similar to lumps — in the nasal cavity, hormonal disturbances (especially for female because of the menstrual cycle), or dental problems and diseases of the tongue.

Have you entered a newly painted room? If so, what's the first thing that you did?

_____

_____

_____

More or less, the first thing you did was to cover your nose, right? Do you know why we automatically cover our nose if we smell something bad? This is because our nose easily get irritated with foul odor, especially toxic chemical substances.

What do you think will happen to your sense of smell if you inhaled too much chemicals like solvents (liquids mixed with paints)?

_____

_____

_____

Prolonged exposure to certain chemicals such as insecticides and solvents can result to loss of smell.

Let's Learn

Disorders of smell can be classified as either **hyposmia** (a decrease in sensitivity) or **anosmia** (the complete absence of smell).

There are many causes of smell malfunctioning besides the ones mentioned in the earlier activity. Other causes of smell malfunctioning are:

- Respiratory disorders such as nasal infections and constant allergies and colds. The conditions can block the flow of air.

Isn't it that when you have a cold you have a difficulty in breathing? Why was this so?

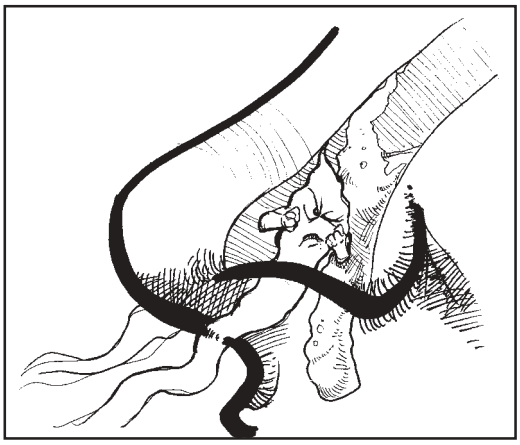
_____

_____

_____

When you have a cold, the mucous membranes inside your nose swell (*namamaga*) and the amount of mucus produced increases. When this happens, your sensitivity to odor decreases. Allergies and *rhinitis* (an infection in the olfactory membrane) may also cause a loss of smell.

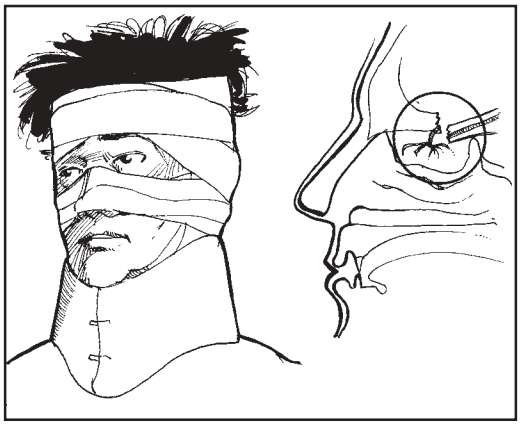
You learned in Lesson 2 that your nose has tubes in it right? If these tubes are stuffed up from a common cold, you will have a difficulty in smelling simply because odors are prevented from reaching the smell receptors or nerve fibers. Because the ability to smell affects taste, food often doesn't taste right when you have colds.



- Viral infections or toxic destruction (solvents and gases). Heavy metals and various kinds of industrial dust damage our sense of smell. This kind of disorder is rarely cured.

- The most common cause of permanent loss of sense of smell is head trauma. Fibers of the olfactory nerves that send messages to our brain are damaged.

- Smoking damages our ability to identify odor and reduces our sense of taste.



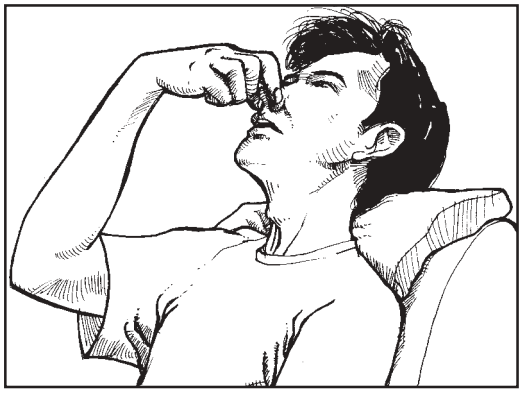
Let's Study and Analyze

Another common nose disorder that could cause temporary loss of smell is nosebleed. One or both nostrils may bleed. This usually occurs as a result of a local injury or disturbance inside your nose.

Most nosebleeds are not serious and occur when one of the small veins of the septum ruptures. These will usually stop without treatment or when pressure is applied to the nose.

Bleeding may also be caused by an infection (like the common cold), a blood disorder (leukemia or hemophilia); frequent picking of nose with untrimmed fingernails; high blood pressure or abrupt change in temperature. Persistent nosebleeds should be brought to the attention of a physician.

When the nose bleeds, tell the victim to sit down with the head tilted his head upward while pinching his/her nose. Hold it for five minutes until the bleeding stops. If bleeding does not stopped within 30 minutes, seek professional help. Place a gauge pad or any clean cloth in each nostril. The victim should breathe through the mouth.



Let's Try This

Write the answers on the space provided below.

1. What are some of the disorders usually affecting our sense of smell?

   _____

   _____

   _____

2. How can smell disorders be prevented?

   _____

   _____

   _____

Compare your answer with those found in the *Answer Key* on page 53.

Let's Study and Analyze

You have just learned that your sense of smell is very connected with your sense of taste. If you have a smell disorder, more or less, you also suffer from taste disorder. If the sense of smell has disorders like hyposmia and anosmia, the taste too can suffer from disorders like **ageusia** (reduced or lost of taste) and **dysgeusia** (distortion of taste).

If a person has *ageusia*, he/she usually cannot taste food that much, or worse, he/she cannot taste food completely. It is usually caused by conditions that affect the tongue. Examples of these conditions are: very dry mouth, heavy smoking, radiation treatment to the head, or side effects of medicines and drugs.

Can you still remember what you learned in Lesson 2 about your tongue? Isn't it that it's always wet? What's the reason for this again? What will happen if our tongue is dry?

_____

_____

Our tongue is always wet because our saliva spreads helps dissolve the food we eat and spread the flavor to the rest of our tongue, right? If our tongue is dry we can't taste the flavor of the food we eat.

A person who has *dysgeusia*, on the other hand, has a difficulty of tasting food correctly. For example, a candy may taste sour for a person who has this disorder.

Dysgeusia may be caused by the same conditions that result in loss of taste.

Do you think smoking will harm our sense of taste? Explain your answer.

_____

_____

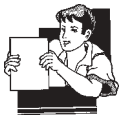
If your answer is YES, you are correct! Smoking and radiation may burn the taste receptors in our tongue. Burns to the tongue may temporarily destroy taste buds.

What will happen if our taste buds are destroyed?

_____

_____

In lesson 2 you learned that our taste buds are the reason why we can taste the flavor of the food we eat. They are the taste receptors of our tongue. If our taste buds are destroyed, we cannot taste the food correctly. For example, if our taste buds for sweet are damaged, we will not be able to detect sweet flavors.



Let's Learn

There are different disease that affect our tongue, which affects our sense of taste too. Listed below are some of the common diseases that may affect our sense organ of taste.

- *Singaw* is called herpes simplex. It is also called cold sore or fever sore. It is one of the diseases of the tongue. It results when another infection occurs, like the common cold. Other causes of singaw are stress or exposure to wind, sunlight, certain foods or drugs; and for women, the menstrual cycle.

  Herpes symplex has no symptoms. It usually appears around the lips and nose as a small blister and becomes an ulcer later on. Alum (*tawas*) or aluminum hydroxide (for stomach ulcers) can treat herpes simplex.

- *Glossitis*, the inflammation of the tongue. The symptoms of glossitis include pain, sometimes an ulcerated tongue; sticky and thick saliva; and difficulty swallowing. It can be treated with antiseptic mouthwashes. To reduce pain the patient may be given an anesthetic solution.

Let's Think About This

Do you think our sense of touch is as important as our other senses? Why?

_____

_____

_____

If loss of smell and taste can already make things difficult and inconvenient for you, what more if you can't feel anything, do you think you can still do the things that you are used to? Our sense of touch is very important. Without it how will you know if your hands got stuck on a door? Or somebody pinched you and pulled your hair? How will you be able to hold something? You might break a glass if you hold it too firm, or you might drop it if you hold it too loose? How will you know if you're holding it right?

Because our sense of touch is very important to our everyday lives, we need to take good care of our sense organ of touch. That is, we need to take care of our skin.

How do you take care of your skin?

_____

_____

Among the many things you can do are:

- Take a bath everyday.
- Change clothes regularly.
- Trim your nails regularly.
- Avoid being exposed to too much heat.
- Avoid insect bites.

What would happen if you do not take care of your skin?

_____

_____

If you do not take good care of your skin, you become susceptible to skin diseases such as allergies, right? Read the next activity below to learn more about skin diseases.

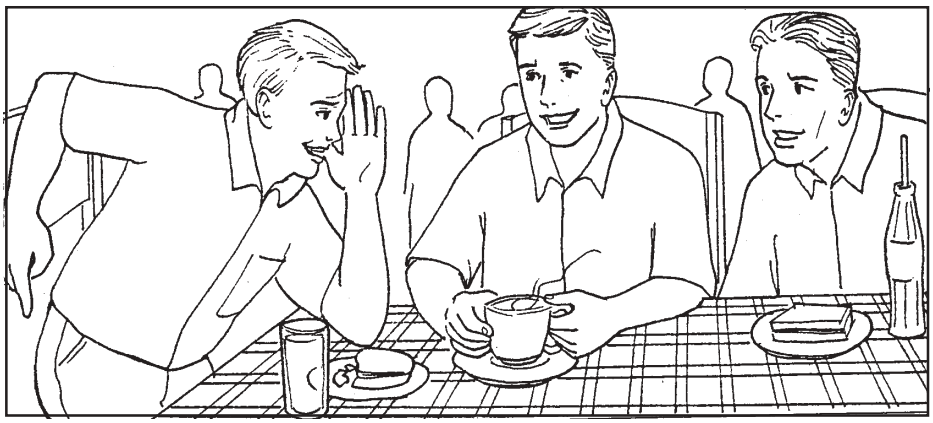
Let's Read

Have you ever had a skin disease before? If so, can you list them on the spaces below?

_____

_____

Read the dialog below about skin diseases.



Ben : Hey, Oscar, why don't you sit properly?

Oscar: (whispering) Pare, I have a boil on the left part of my butt.

Bernie, Ben, Paul: Ha-ha-ha!

Ben: What actually causes the boils?

Oscar: The doctor said that boils are caused by bacteria called *staphylococcus*. The bacteria infect the hair roots or the glands where our sweat comes from.

Bernie: Boils are painful. I once had a boil under my arms. It really hurts.

Paul: Where else can boils develop?

Oscar: My doctor said that boils develop in areas where skin is constantly rubbed. Like at the back of the neck, around the groin, at the top of the thigh and behind the knees.

Ben : So, what did the doctor tell you to do?

Oscar: He told me to soak a clean cloth in warm water and apply it repeatedly to the boil.

Paul: What will that do?

Oscar: It will hasten the development of the head of the boil. When the boil is ripe, it will drain on its own.

Paul: My brother had a boil once, our doctor told us not to cut open the boil because the infection will spread. Since my brother's boil was on the face, the doctor prescribed an antibiotic. Antibiotics are also given for boils on the nose.

Ben: What other skin disorders might we get?

Bernie: There are a lot of germs in the air we breathe and in the water we use for bathing and drinking. We can contract skin diseases like *carbuncle*.

Paul: What's a *carbuncle*?

Bernie: It's like a boil. The skin is inflamed by the bacteria called *taphylococcus aureus*.

Oscar: Stappp—illo-coc… what? Ah okay, carbuncle. So how do you treat a carbuncle?

Bernie: If the carbuncle is acute, the doctor has to make an incision to drain the pus. Antibiotics are given by the doctor.

Ben: When I was a kid, I had scabies.

Paul: Wasn't that very itchy?

Ben: Indeed, it was. I even cried because of the itch.

Bernie: How was the scabies removed?

Ben : My mother brought me to the doctor. He prescribed a scabicide that was applied all over my body after taking a bath. It was done twice a day. I was so relieved when the scabies was treated.

Paul: What makes scabies itchy?

Bernie: I can answer that. I read it in a magazine only a year ago. Scabies is caused by the itch mite called *Sarcoptes scabiei*.

Oscar: That's another Latin name to add to our vocabulary.

Paul: Go on, Bernie. Oscar, stop interrupting.

Bernie: Okay. The female mite burrows beneath the skin, lays eggs and forms and tunnel-like nests. The eggs turn into larvae that mature and mate. The victim, like me, suffers an allergic reaction in the form of a very itchy rash. Scabies is very contagious.

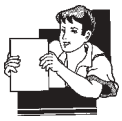
Paul, Ben, Oscar: Yuck!

Let's Review

From the dialog that you have just read, complete the table below by providing the causes, symptoms and treatment of the skin diseases discussed in the dialog. Write your answers inside the table.

Diseases	Causes	Symptoms
1. Boils		
2. Carbuncle		
3. Scabies		

Compare your answers with those found in the *Answer Key* on page 53.



Let's Learn

The friends discussed a lot of sin diseases or disorders. Listed below is another type of skin allergy that you might want to add to your knowledge

Atopic Dermatitis. This skin disease is more popularly known as *eczema*. It is an itchy, dry, inflammation of the skin. It is the most common type of skin disease in children. It usually occurs on a person with sensitive skin. It usually occurs on the face, elbows, back of the knee, limbs and trunk.

Although eczema is not an infectious disease, the skin may be severely affected because of too much scratching. Crusting on the surface of the skin may be present when the eczema becomes infected (especially when a person rubs his/her skin with untrimmed and dirty fingernails).

There are many external factors, which may worsen the eczema. Among these are:

- Sudden changes of room temperature, strenuous exercise and hot, humid weather.
- Synthetic or woolen clothing. Children should be dressed in cotton.
- Emotional upsets
- Smoke of the cigarette. In an enclosed room, smokes and fumes will irritate the skin.
- All furry pets will aggravate eczema. Avoid keeping cats and dogs in the house. Avoid keeping cats and dogs in the house.

How is eczema treated? Eczema can be treated by avoiding the factors stated above. A person can also use ointments and lotions prescribed by a dermatologist. A dermatologist is a doctor that specializes on skin.

Let's See What You Have Learned

Complete the table below. In Column 1 you can see the different diseases that may affect our sense organs. On the succeeding columns write the following:

Column 2 - Sense organ affected

Column 3 - Causes and Symptoms

Column 4 - Treatment and Prevention

Diseases	Sense Organ	Causes/ S
1. Conjunctivitis		
2. Otitis Media		
3. Dysguesia		
4. Hyposmia/ Anosmia		
5. Eczema		

Compare your answers with those found in the *Answer Key* on page 54.

Let's Remember

- Some examples of common diseases of the eye are conjunctivitis and sty;
- Conjunctivitis is an inflammation of the mucous membrane at the back of your eyelid. It is a viral infection.
- Sty is an inflammation of the tip of the eyelid. It may result from dust and dirt particles.
- To treat conjunctivitis and sty, avoid rubbing your eyes and wash your eyes with warm water.
- Some examples of the diseases of the ear are: Otitis externa, Otitis Media and Labyrinthitis.
- As a rule, always keep your ear dry because fluid inside your ear may cause infection.
- Loss of sense of smell may result from nasal disease such as common colds, too much exposure to toxic chemicals, and head trauma.
- Loss of sense of taste may result from burns on our taste buds, hormonal imbalances and diseases of the tongue and mouth.
- Always keep our body clean to prevent any skin diseases.
- Some common skin diseases are boils, carbuncle, scabies and eczema.
- As much as possible, avoid rubbing your skin when itchy.
- If symptoms persist consult a doctor.

Congratulations! This is the end of the module. So how was it? Did you learn a lot from this module? If there are some parts of the module that are not clear to you, I suggest that you go back to those parts again and review them.

But before you close this module, here are some important points to remember.

Let's Sum Up

- We learn about the world we live in because of our senses. We learn from what we see, hear, smell, taste and feel.
    - Our eyes function like a camera. We see objects through the light reflected from the object. When light rays enter our eyes, the cells at the back of the retina transform them to electrical impulses. These impulses are carried to the brain, which will interpret these impulses to objects seen.

- Our ears collect sounds from our surroundings. We hear because of the vibrations produced by our eardrum.

♦ The nose, tongue and skin have cells on them that act as receptors. These receptors are on the nerve fibers that are scattered all around our sense organs.

♦ When chemicals, as in the case of nose and tongue, come in contact with the receptors or nerve fibers, these nerve fibers send the message to the brain. The brain interprets the message as odors and tastes.

♦ In the case of the skin, the nerve fibers scattered all around our dermis are sensitive to pressure, temperature and pain.

♦ A loss or a damage of any of our senses would mean a great loss to us. Life would not be complete because we will not be able to the things we want and we used to. Thus, our eyes, ears, nose, tongue and skin are very important parts of our body that we must take care.

What Have You Learned?

A. Explain how each of your organ works.

1. Eyes

_____

_____

2. Ears

_____

_____

3. Nose

_____

_____

4. Tongue

_____

_____

5. Skin

_____

_____

B. Answer the following:

1. Why should you not rub our eye? _____

   _____

2. Why should you keep our ear dry? _____

   _____

3. Why should you avoid being exposed to toxic chemicals?

   _____

   _____

4. Why should you not smoke? _____

   _____

5. Why should you always keep your body clean? _____

   _____

Compare your answers with those found in the *Answer Key* on pages 54–55.

Answer Key

A. Let's See What You Already Know *(pages 1–3)*

A. 1. c
2. b
3. c
4. b
5. a
6. d
7. a
8. c
9. c
10. d

B. 1. skin
2. ears
3. nose
4. eyes
5. tongue/taste

B. Lesson 1

Let's Review (page 7)

A welder uses a dark protective eyewear or welding mask to protect his eyes from too much light. Too much light can cause blindness.

Let's Review (pages 8–9)

1. The scelera protects the eye. It is responsible for the form of the iris.
2. Cornea protects the lens of the eye.
3. Choroid absorbs excessive light.
4. Pupil functions as the opening of the eye. It is where the light enters.
5. Iris controls the amount of light that enters the eye.
6. Retina is where the light rays are focused. Inside it are light sensitive cells that transform light rays to electrical signals.
7. Lens focuses the light rays on the retina.
8. Optic nerve transports the electrical signals from the cells of the retina to the brain.

Let's See What You Have Learned (page 16)

A. a. Our eye receives light rays that are reflected from an object.

b. The pupil widens to let the light enter to the inner part of the eye.

c. The lens focuses the image to make it clearer. An inverted image appears on the retina.

d. Light sensitive cells absorb light rays and change them to electrical signals.

e. Electrical signals travel along optic nerve to the brain.

f. The brain decodes the electrical signals. Thus, enabling us to see the object.

B. a. Sounds are collected by the auricle and travel along the external auditory canal.

b. Sounds hit the eardrum causing it to vibrate.

c. Eardrum vibrates, causing the auditory ossicles to vibrate to.

d. The stirrup pushes the vibration to the oval window.

e. The fluid within the cochlea begins to move. The hair or nerve endings of the organ of corti are tickled by the movement of the cochlea.

f. Nerve impulses are transmitted to the brain. The brain interprets the impulses as sound.

C. Lesson 2

Let's Review (page 21)

When you have a cold, your nose is stuffed up with fluid and mucus. The mucus covers the nerve endings of the olfactory nerves that are buried in the mucous membrane. Because the odor cannot reach the nerve endings, the nerve endings cannot detect the odor you smelled.

Let's Try This (pages 24–25)

1. Answers may vary. The surface of the table may be smooth or rough, warm or cold.

2. Answers may vary but the preferable answer is: Yes. I can feel something wet and rough at the same time. Our sense of touch can feel pressure, temperature and pressure at the same time because sensory nerves are scattered all throughout our skin.

3. We can identify objects even if we don't see them by touching them. Our familiarity with their features (texture, edges) help us identify them.

Let's See What You Have Learned (pages 27–28)

N	**A**	**S**	**A**	**L**	**C**	**A**	**V**	**I**	**T**	**Y**	R	S	T	**R**
T	S	D	F	D	**T**	**S**	D	C	X	Z	X	A	**E**	U
A	D	J	K	**E**	I	O	**K**	E	R	G	H	**C**	V	B
C	F	H	**E**	E	C	V	B	**I**	I	J	**E**	H	D	**N**
T	G	**W**	L	J	K	P	O	I	**N**	**P**	**P**	J	E	**O**
I	**S**	**D**	**U**	**B**	**E**	**T**	**S**	**A**	**T**	T	**I**	U	R	**I**
L	M	N	J	K	L	O	P	**O**	R	F	**D**	I	S	**T**
E	Y	T	E	A	S	D	**R**	R	I	G	**E**	P	Z	**C**
W	M	U	**T**	P	E	**S**	D	F	B	H	**R**	O	D	**A**
S	H	J	**O**	T	R	F	**A**	**D**	**E**	**R**	**M**	**I**	**S**	**F**
A	I	U	**N**	Y	F	I	P	**L**	N	M	**I**	L	A	**L**
I	O	P	**G**	Y	U	I	O	G	**I**	L	**S**	K	S	**O**
L	K	L	**U**	P	L	K	J	H	B	**V**	K	J	D	I
I	M	**R**	**E**	**T**	**T**	**I**	**B**	N	N	N	**A**	M	F	H
C	**H**	**E**	**M**	**O**	**S**	**E**	**N**	**S**	**O**	**R**	**Y**	S	G	B

1. Epidermis
2. Olfaction
3. Saliva
4. Nasal Cavity
5. Receptors
6. Tongue
7. Septum
8. Tactile
9. Chemosensory
10. Sweet
11. Cilia
12. Skin
13. Taste buds
14. Dermis
15. Bitter

D. Lesson 3

Let's Try This (page 31)

1. Conjunctivitis is the reddening of the eye. It is an inflammation of the mucous membrane that lines the inner portion of the eyelid. It also irritates the conjunctiva.

2. Tony acquired conjunctivitis from the market, according to the doctor. He rubbed his eye without washing his hand.

3. Conjunctivitis can be prevented by keeping our hands clean always. We should also avoid rubbing our eyes. As much as possible we should also avoid going to a crowded place.

Let's Review (pages 33–34)

1. My brother or sister must not rub his/her eye that is infected with conjunctivitis. He/she must limit him/herself from touching things other than his/her belonging. Conjunctiva can easily spread because it is a viral infection. If we touch something that is touched be a person who has a conjunctiva, we can also acquire the disease if we touch our eyes with our hands.

2. Lina should not prick the sty in her eye. An infection might happen if she do so. A sty will drain the pus by its own. She should be patient because it will disappear after a few days.

Let's Review (page 37)

1. Labyrinthitis
2. Otitis Media
3. Labyrinthitis
4. Otitis Media
5. Otitis Externa

Let's Try This (page 40)

1. Some of the disorders that affect our sense of smell are:

   - Hyposmia or a decrease in sensitivity of smell
   - Anosmia or a complete absence of smell

   This two disorders can result from common colds and nosebleeds. Common colds and nosebleed, if not taken cared of properly, can damage the sensitive nerve endings in your nose. This can result to loss of smell.

2. Smell disorders can be prevented if you take necessary care for our nose. You must avoid damaging the inner portion of your nose. This can be done by:

   - Covering your nose when we are in industrial areas like construction sites. Dust particles and chemical substances can enter your nose and may damage it.
   - Avoid inserting objects, including your fingers, inside your nose. You may damage the mucous membrane that lines your nasal cavity.

Let's Review (page 45)

Causes	Symptoms
1. Boils are caused by *staphylococcus* bacteria. This bacteria infect the hair roots and sweat glands.	1. Boils are painful lumps that can be found on the armpit, neck, groin, thigh and at the back of the knee.
2. Carbuncle are caused by *Staphylococcus aureus* bacteria.	2. Inflammation of the skin similar to a boil.
3. Scabies are caused by an itch mite called *Sarcoptes scabiei*.	3. Itchy on different parts o the skin.

Let's See What You Have Learned (page 46)

Sense Organ	Causes/Symptoms
1. eyes	- Redness in the inner eyelid and scelera; - Excessive watering of th eyes; - Yellow, green discharge - Itchiness in the eye
2. Otitis Media	- severe earache - decrease hearing - pus - caused by a build up of fluid in the middle ear
3. Dysgeusia	- distortion of taste - caused by smoking and radiation - burns in the tongue
4. Hyposmia/ Anosmia	- decrease in ability to sm - complete absence of sm - caused by damage in the nose - colds - nasal infections
	- dry inflammation of the skin - scaling of the skin - itching

E. What Have You Learned *(pages 48-49)*

1. Our eye function like camera. It lets light rays enter our eye through an opening called pupil. The lens on top of the iris focuses the light rays on the retina. Inside the retina are light sensitive cells (rods - detect black and white colors and are sensitive to dim light, cones - detect other colors and are sensitive to bright light). These light sensitive cells transforms the light rays to electrical signals, which will pass along the optic nerve to the brain. The brain decodes the messages, thus, making us recognize the objects that we see.

2. The outer part of our ear - auricle - captures sounds from the surroundings. Sounds pass through the external auditory canal and strike the eardrum. Then the eardrum produces vibrations that will

make the other parts of the ear vibrate. When this happen the stirrup sound vibrations travel to our inner ear. The fluid within the cochlea tickles the tiny hairs or nerve endings of the organ of corti. The organ of corti transform these vibrations to nerve impulses that the brain will interpret as sounds.

3. Small particles of chemicals from our surroundings enter our nose through the air we breathe. Inside our nose is a hollow portion called nasal cavity. The cavity is covered by a thin wet tissue called mucous membrane. Nerve endings that detect odors are buried in the mucous membrane. When the particles touch the nerve endings, the nerve endings identify the odor of these substances. They will transport the message to our brain.

4. When we eat our food it is dissolved by our saliva. The flavor will then be spread all over our tongue. On the surface of our tongue are small bundles of nerve receptors called taste buds. They detect the taste of the food we eat. The nerve receptors will send the message to our brain, which it will interpret as sweet, sour, bitter or salty.

5. Our skin is very sensitive to touch, pressure, temperature and pain. This is because beneath our skin is an intricate network of nerve endings that send messages to our brain.

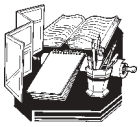
B. 1. You should not rub your eye because you might irritate it especially if your hands are dirty. You may bring in bacteria in your eye that may cause eye infection. Our eye is a very sensitive organ.

2. You should keep your ear dry because fluid in your ear may cause infection. If the inside portion of your ear is moist, bacteria may live there. Also, fluid inside the ear may block the air passage. When this happen, you may suffer from decrease in hearing, or worse, lost of it.

3. You should avoid being exposed to toxic chemicals because they may irritate your nose and skin. When toxic chemicals enter your nose they might damaged the sensitive nerve endings that detect odor. Also, if toxic chemicals come in contact with your skin you may develop skin allergies and irritations.

4. You should not smoke because it damages the sensitive nerve endings in your nose and in your tongue. You may damage your taste buds. These may result to diminished ability to taste and smell, or worse, the complete loss of them.

5. You should always keep your body clean to protect your body from disease causing germs and bacteria. This is one way of protecting your skin from allergies and diseases.



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Glossary

Abscess A swollen part of the body in which a thick yellowish liquid (pus or *nana*) has collected

Ageusia Reduce or loss of taste

Anesthetic Substance that makes a person or animal unable to feel pain

Anosmia Complete loss of smell

Atopic Dermatitis Skin disease popularly known as eczema; itchy, dry inflammation of the skin

Auditory ossicles Smallest bones of your body; hammer; anvil; stirrup

Auricle The visible part of your ear

Blood Vessels Tubes through which blood flows in the body

Cartilage A tough flexible tissue attached to the bone; e.g. cartilage of the nose

Cilia Fine hairs inside our nose that trap or filter dust and dirt

Chemosensory organs Organs that are sensitive to chemicals

Choroid Middle layer of the wall of your eyeball

Cochlea Coiled structure inside your ear; converts sound waves to impulses

Conjunctiva A thin layer of transparent tissue that covers the scelera

Conjunctivitis Eye infection; commonly known as sore eyes or pinkeye

Cornea Protects the lens of the eye

Dermis Inner layer of skin; made up of blood vessels and nerve endings

Epidermis Outer layer of skin

Dysgeusia Distortion of taste

External auditory canal Passage through which sounds travel

Eardrum Thin tissue that is stretched along the opening of the external auditory canal

Gustatory cells Chemical sensitive cells that detect taste

Impurities Dust and dirt

Inflammation A condition in which a part of the body is red, swollen and sore (because of infection)

Iris Colored part of the eye, protects the eye

Hyposmia Decrease in sensitivity of smell

Labyrinthitis Inflammation of the semicircular canals in the inner ear

Lens Transparent part of the eye behind the pupil; focus light to retina

Melanin Colored substance in the iris; absorbs strong light that might shock the eye

Membrane A piece of thin tissue that connects, covers or lines parts inside the body

Mucous Membrane Thin and wet layer of tissue

Mucus Sticky liquid inside our nose that mucus membrane produce

Nasal Cavity Inner and hollow portion of the nose

Nostrils Two holes or openings at the bottom of the nose where air passes

Olfaction Another term for smell

Olfactory cells Chemical sensitive cells that detect odor

Optic nerve Passage through which electrical signals pass from the retina to the brain

Organ of Corti Tiny hairs along the cochlea;

Otitis Inflammation of the ear

Otitis externa More commonly known as 'swimmer's ear'; infection of the ear canal

Otitis medina Inflammation of the middle ear

Polyps Any several types of abnormal growth in the nose e.g. pimples, lumps, boils, ulcers, abscess

Pupil Opening of the eye through which light enters

Receptors Receives stimuli and detects them

Retina Innermost layer of the eye where light sensitive cells are located

Saliva Sticky fluid in the mouth that dissolves food and spreads flavor through out the tongue

Scelera White part of the eye

Semicircular canals Tubes that control our balance; are sensitive to changes in movement and direction

Sensations The ability to feel through the sense of touch

Septum Wall that divides nasal cavity that forms the nostrils

Sty A small abscess of the tissue in the eyelids near the root of an eyelash

Tactile Using the sense of touch

Taste buds Small bundles of sensory cells that perceive taste

Tear Glands Glands that produce tears

Transparent See through; allows light to pass through so that objects behind can be seen clearly

Viral infections Infections caused by viruses