

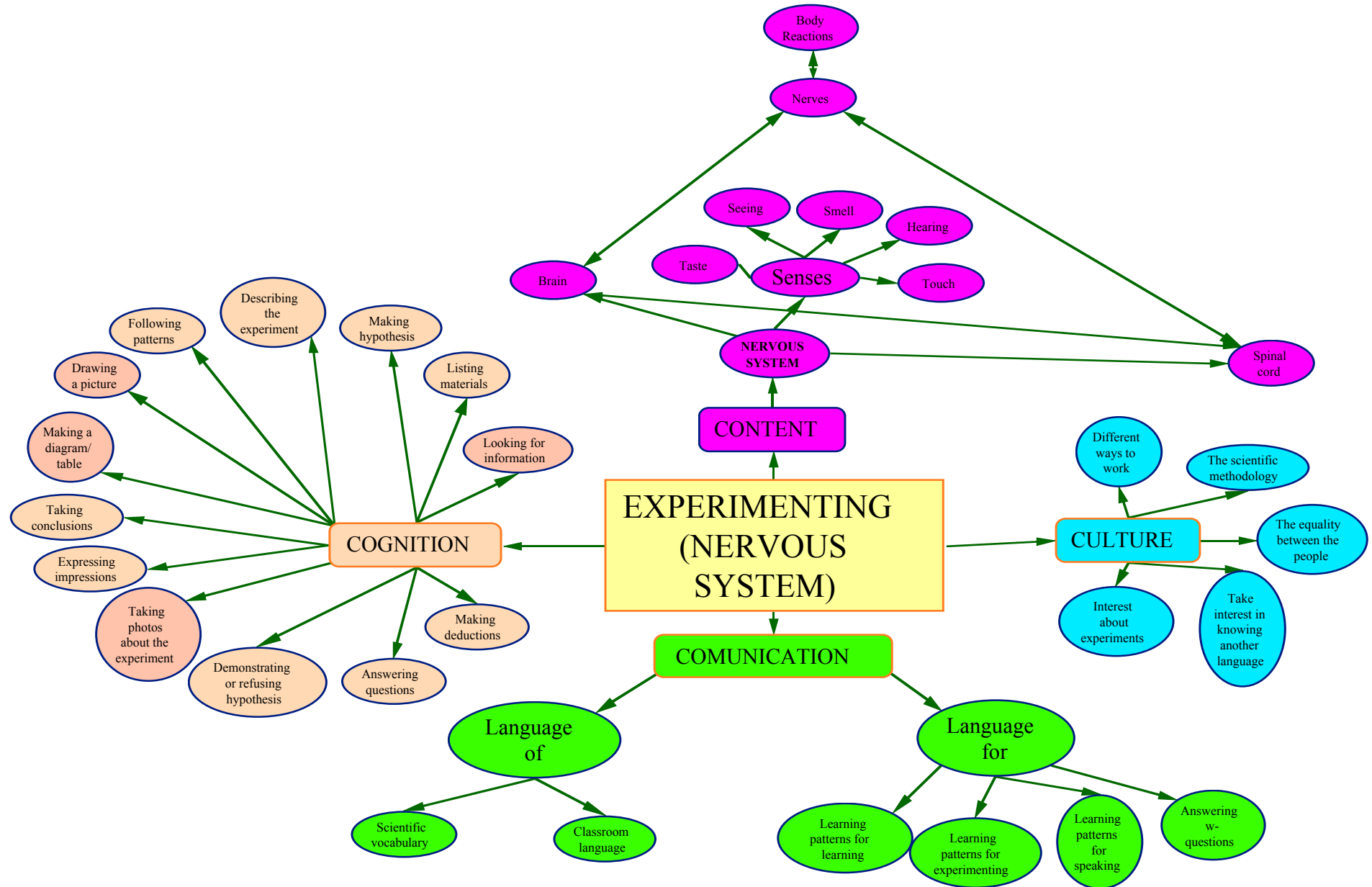
# **EXPERIMENTING**

## **The Nervous System and the Senses**

### **(Teaching Notes)**

Jordi Bassa i Esteve

Nottingham, January-April 2009



# **Lesson 1- NERVY AND THE SENSES**

**How the nervous  
system works**

**TEACHER NOTES LESSON 1****FIRST SESSION- ‘Nervy and the senses’**

I have written a story about ‘Nervy’. Nervy is an electrical impulse which is going around the body to pick up information and it sends the information from the body to the brain, and vice versa.

First, we will read this story, and after answering some oral comprehension questions, they will have to complete a wheel to demonstrate that they really know how this process works.

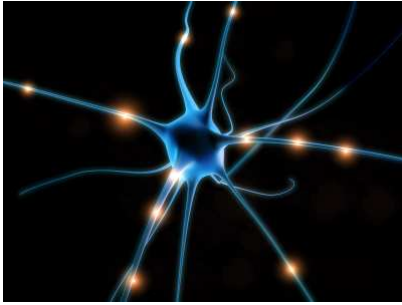
After that they have to complete a very easy picture about our nervous system, putting each name related to the topic in its correct place.

**ORAL QUESTIONS ABOUT THE READING.**

1. Who is Nervy?
2. What’s Nervy favourite sport?
3. What do the eyes see in the story?
4. Where is your brain?
5. How fast are the body’s electric impulses?
6. Information takes ..... second to go from the body to the brain and come back.
7. Can you remember the three main parts of the nervous system?
8. Can you list the steps that information takes from the eyes (what is seen) to the legs stopping?
9. Do you know what a code is? Give me more examples.
10. Do you know if there is a relation between the senses and the nervous system?

## READING TEXT

### *Hi, I'm Nervy!*



I'm going to introduce myself. I'm Nervy but I'm not something material, I'm only an electrical impulse of your body.

My favourite sport is running; running around your body to catch information and give orders.

Yes, I catch the information that a part of your body notes and quickly, at 460 km/h, I give this information to your brain.

After that, your brain interprets this information and gives me an answer. I carry this answer and at the same speed, I go to the part of the body that your brain tells me to and this part of the body does what the brain wants.

Do you understand me?

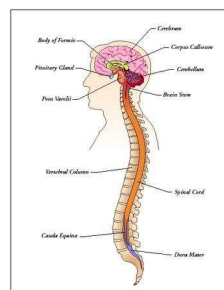
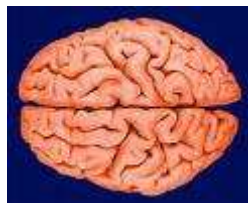
I'm afraid this is not that easy so let me give you an example.

Imagine that you are walking around the street. Suddenly a traffic light appears in front of you. The traffic light turns red and.....you stop!



This lasts only half a second, but in this short time a lot of events happen.

First your eyes see the red light and they give me the information. I get the information and following the nerves, and the spinal cord, I go to the brain and give it this information.



Then your brain interprets this code and thinks 'Red light means STOP!' and it gives me an order to the legs.

I start a new trip through the spinal cord and the nerves of the leg. I give this order to the muscles and the legs stop.

Is it clear, now? Of course, you are so clever,....

Read the text and after that, in pairs, try to complete this wheel using these sentences and words:

Numbered squares:

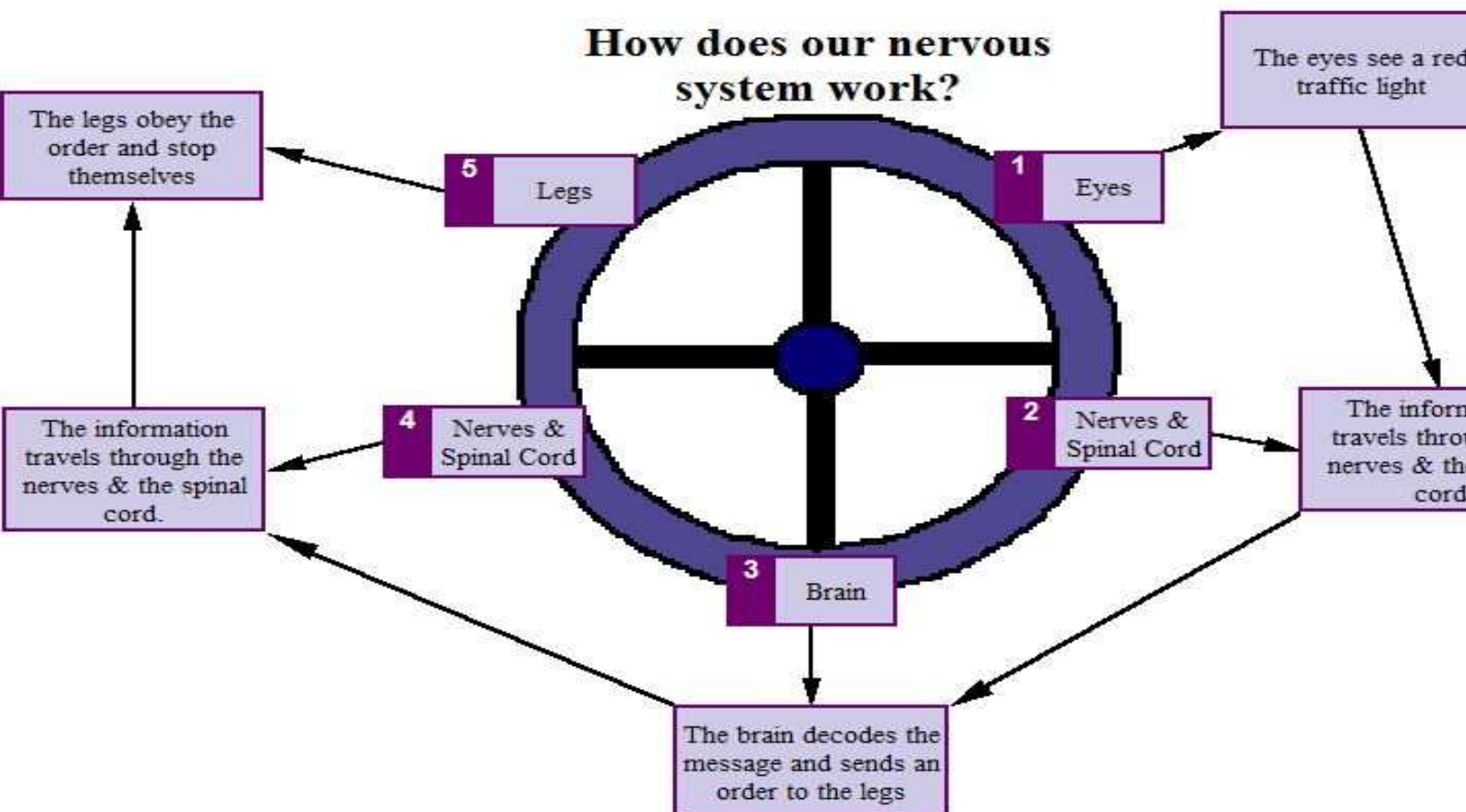
BRAIN-MOUTH-NERVES&SPINAL CORD-NOSE-LEGS-EYES-EARS

Squares:

The legs obey the order and stop themselves.

The information travels through the nerves&the spinal cord.

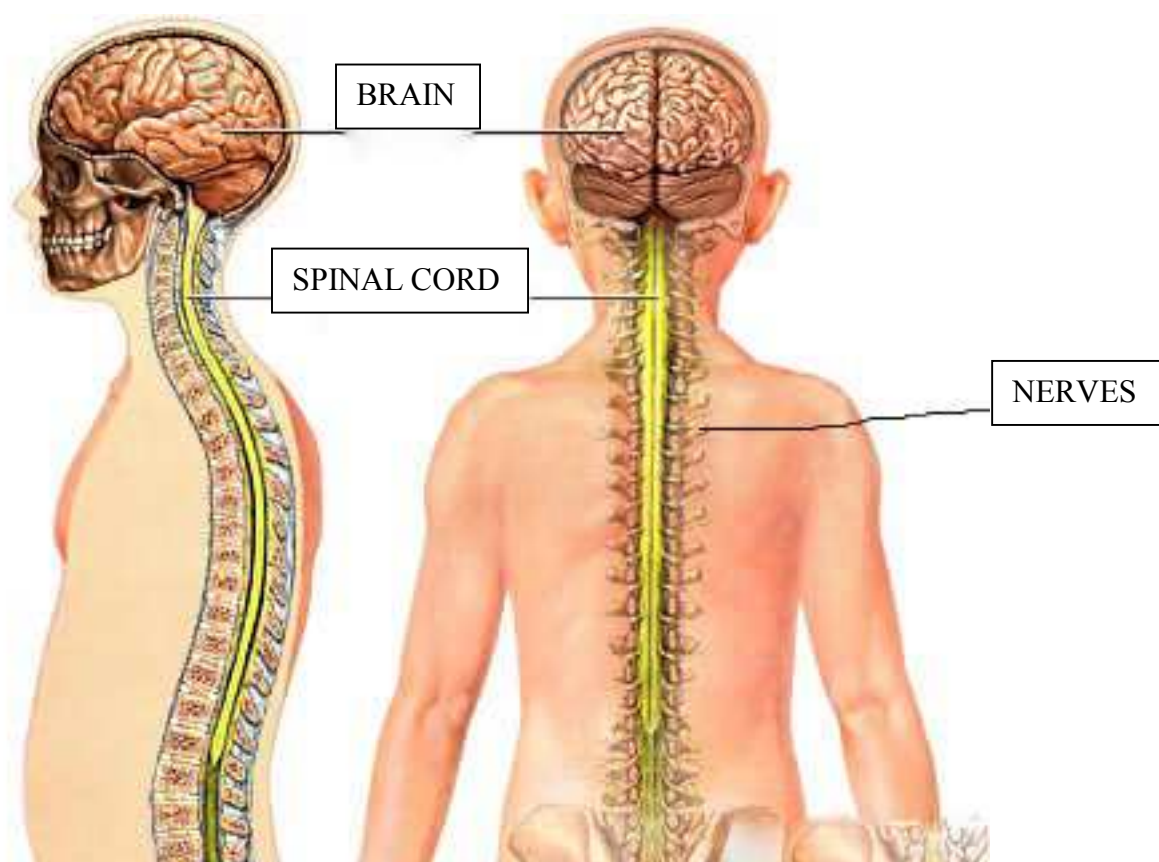
The brain decodes the message and sends an order to the legs.



### WORKSHEET THE HUMAN BODY

Write the parts of the body that are related with the nervous system in its correct place

NERVES- BRAIN- SPINAL CORD



## **SECOND SESSION**

In this session I'm going to give them some books, some web pages and some photocopies and they, working in pairs, have to read the text, summarize it and make a power-point explaining the information they found.

The power point will have only 3-4 slides. Each slide has to contain one photo and a sentence. It is "forbidden" to cut and paste. They have to write a little sentence explaining something about the content they've learnt.

### **ACTIVITY**

FIRST GROUP: The brain and its parts. How does the brain work?

Your group has to look for information about the brain. Here there are some books and some web pages that you can use to do your Power-point.

SECOND GROUP: The spinal cord and the nerves.

Your group has to look for information about the spinal cord and the nervous system. It's very important to explain how the nervous system is and how it works. Here there are some books and some web pages where you can find the information needed.

THIRD GROUP: The senses and their organs (general view)

Your group has to look for information about the senses and the parts of the body that are related with them. It's only a general view and you don't have to specify too much. Here there are some books and some web pages where you can select the information.



## **BOOKS AND WEB PAGES**

- Walker, R. *The Human Machine*. Oxford University Press. 2008
- Maynard, C. *How Your Body Works*. Knowledge MASTERS. Alligator Books Limited. London-2006
- Oxlade, C. *Why, why, why does my heart begin to race?* Miles Kelly Publishing. Essex-2005
- Bingham, C *Human Body: Enter a world of discovery*. DK Eyewonder. Penguin company. London-2003
- McMillan- Heinemann First Encyclopedia. 2008.
- <http://kidshealth.org/kid/htbw/brain.html> (brain and nervous system)
- <http://yucky.discovery.com/noflash/body/pg000135.html> ( brain)
- <http://yucky.discovery.com/noflash/body/pg000136.html> (nervous system)
- <http://www.pbs.org/wnet/brain/> (The secret life of the brain)
- <http://www.innerbody.com/image/nervov.html> (Human anatomy on-line)
- <http://faculty.washington.edu/chudler/introb.html> (Neuroscience for kids)
- <http://www.cyh.com/HealthTopics/HealthTopicDetailsKids.aspx?p=335&np=152&id=2612> (Kid's Health- The nervous system)
- [http://pennhealth.com/health\\_info/body\\_guide/reftext/html/nerv\\_sys\\_fin.html](http://pennhealth.com/health_info/body_guide/reftext/html/nerv_sys_fin.html) (nervous system)

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# **Lesson 2-**

# **TASTES GOOD!**

# **The Sense of Taste**

**TEACHER NOTES LESSON 2****LESSON 2.1.FIRST SESSION**

In this first session of the second lesson plan, we are going to do an experiment about the taste but children should not use their sense of smell.

When the experiment is finished they have to complete an experiment worksheet. This worksheet is a summary of the experiment.

It's quite important to prepare and use some substitution tables because they need some help to speak

WHAT	AM ARE IS	I YOU HE/SHE/IT WE THEY	EATING	?
I YOU HE/SHE/IT WE THEY	AM ('M) IS ('S) ARE ('RE)	EATING	A AN SOME	APPLE CARROT LEMON RIND ONION ORANGE RIND PEAR POTATO TURNIP

## **LESSON 2.2. SECOND SESSION**

In this session I'm going to give them some books, some web pages and some photocopies and they, working in pairs, have to read the text, summarize it and make a power-point explaining the information they've found.

The power point will have only 3-4 slides. Each slide has to contain one photo and a sentence. It is forbidden to cut and paste. They have to write a little sentence explaining something about the content they learnt.

### **ACTIVITY**

#### **FIRST GROUP- The sense of taste: Parts of the mouth.**

Your group has to look for information about the sense of taste. It's so important to explain the parts of the mouth and how the brain works. Here there are some books and some web pages that you can use to do your Power-point. Remember to write some questions about this part to ask your classmates

#### **SECOND GROUP- How taste works. The flavours**

Your group has to look for information about the flavours and how taste works. It's very important to explain the four flavours and how they are located in our mouth. Here there are some books and some web pages where you can find the information needed. Remember to write some questions about the flavours to ask your classmates

#### **THIRD GROUP- Taste and health. How taste and smell are related.**

Your group has to look for information about taste and health and also you have to explain how taste and smell are related. Here there are some books and some web pages where you can select the information. Remember to write some questions about how to train our taste to ask your classmates.

## **BOOKS AND WEB PAGES**

- Walker, R. *The Human Machine*. Oxford University Press. 2008
- Maynard, C. *How Your Body Works*. Knowledge MASTERS. Alligator Books Limited. London-2006
- Oxlade, C. *Why, why, why does my heart begin to race?* Miles Kelly Publishing. Essex-2005
- Bingham, C *Human Body: Enter a world of discovery*. DK Eyewonder. Penguin company. London-2003
- McMillan- Heinemann First Encyclopedia. 2008.
- Wilkes, Angela *Human Body. Question Time collection*. Kingfisher Publishers. London-2001
- Hewitt, Sally. *Tastes good!* Let's start science. QED Publishing. London-2005
- 
- <http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/T/Taste.html> (taste receptors)

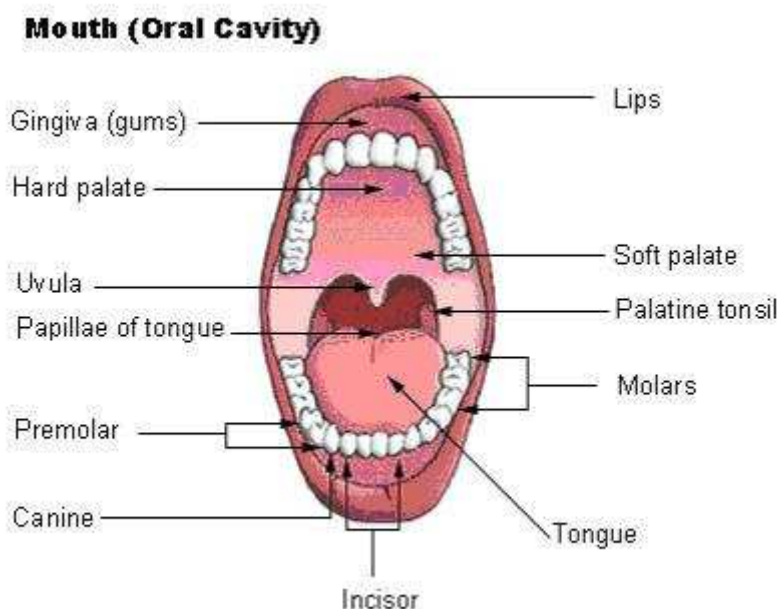
- <http://faculty.washington.edu/chudler/tasty.html> (Neuroscience for kids- flavours)
- <http://faculty.washington.edu/chudler/chtaste.html> (Taste experiments)
- <http://faculty.washington.edu/chudler/taste.html> (Taste lesson plan)
- <http://www.nidcd.nih.gov/health/smelltaste/taste.asp> (Taste disorders)
- [http://www.wisc-online.com/objects/index\\_tj.asp?objID=AP14104](http://www.wisc-online.com/objects/index_tj.asp?objID=AP14104) (Taste learning activity)
- <http://library.thinkquest.org/3750/taste/taste.html> (Taste)
- <http://www.innerbody.com/htm/body.html> (Human anatomy)
- <http://www.starsandseas.com/SAS%20Physiology/Neurology/Taste.htm> (taste)

## **LESSON 2.3.THIRD SESSION**

In this third lesson pupils have to do some exercises to complete their learning. Each group has to complete the exercises related with their part to know if they have learnt the content correctly or if they have to look for more information.

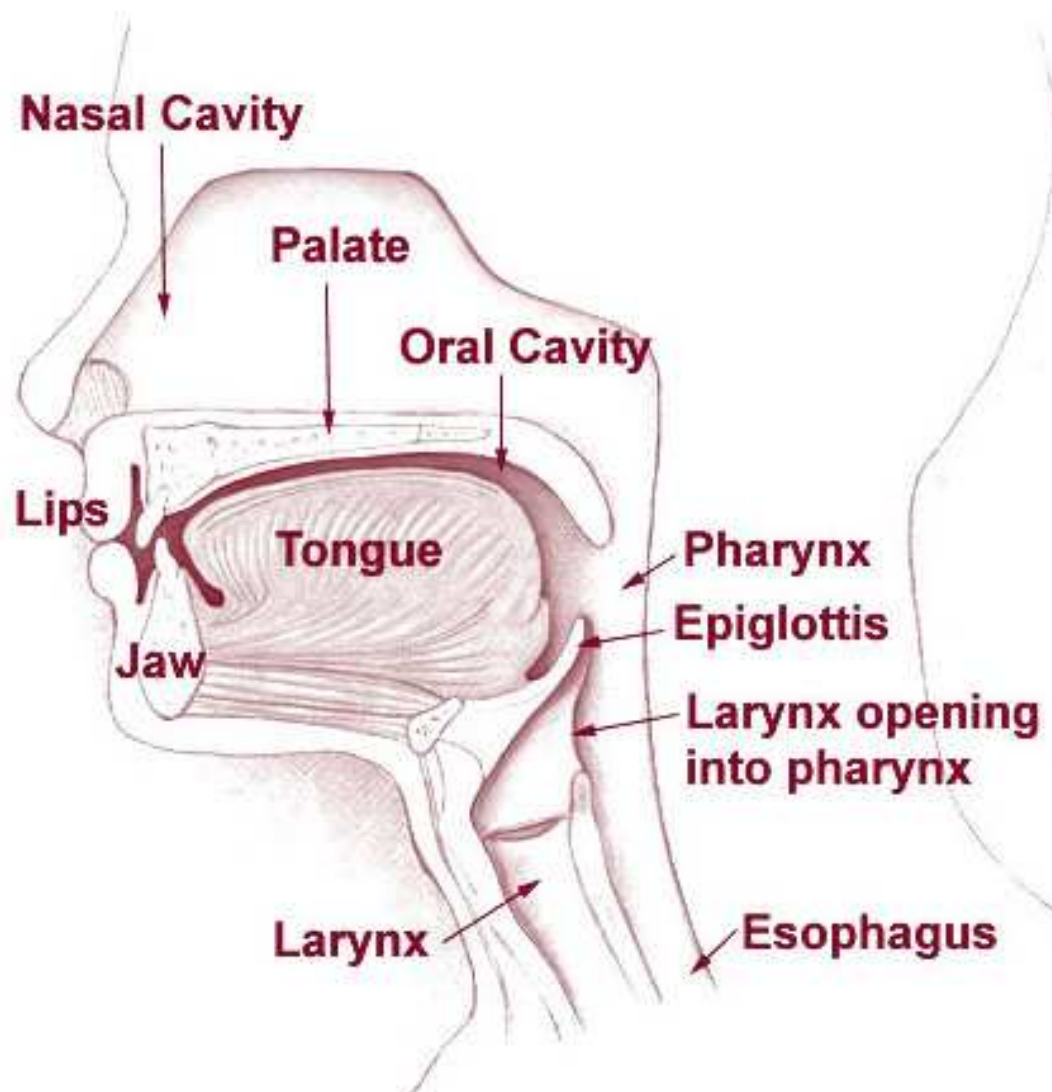
### **FIRST GROUP: THE SENSE OF TASTE. PARTS OF THE MOUTH.**

If you have paid attention you can write each name in its correct place.



CANINE TEETH- GINGIVA- HARD PALET- INCISOR TEETH-  
LIPS- MOLAR TEETH- PALATINE TONSIL- PAPILLAE OF  
TONGUE- PREMOLAR TEETH- SOFT PALATE- TONGUE-  
UVULA

Picture by <http://snore-gonomics.com/>



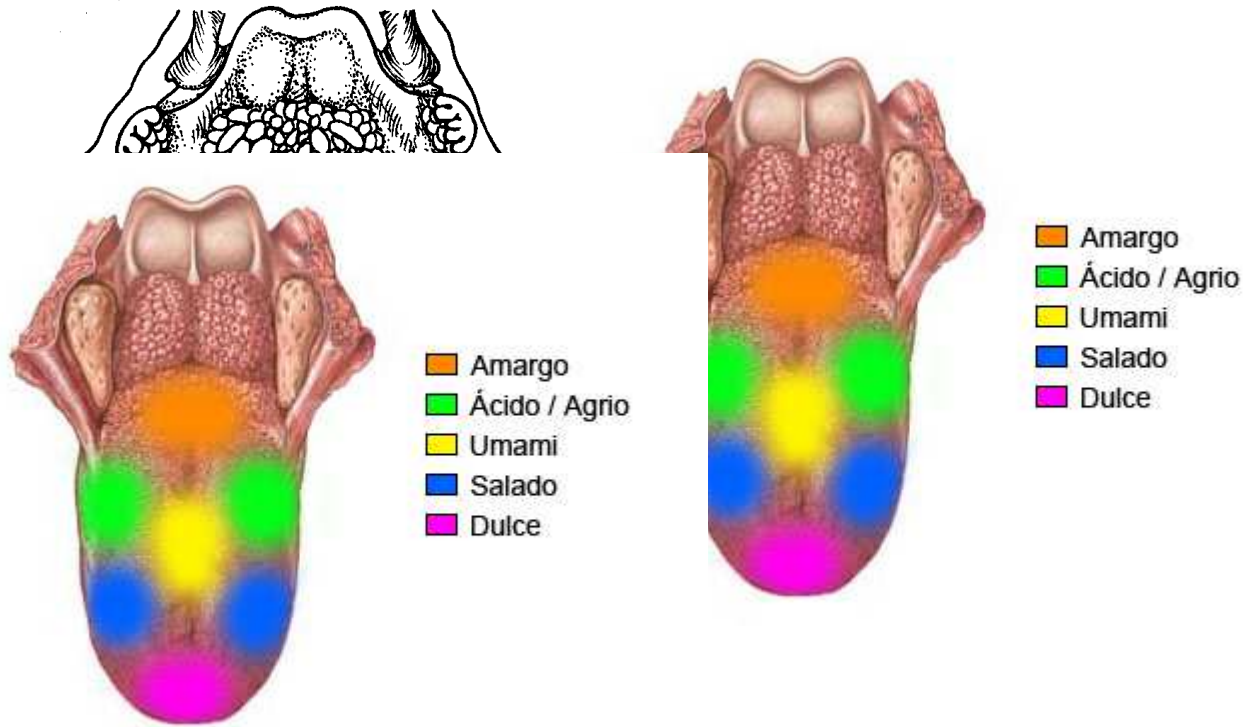
EPIGLOTIS- ESOPHAGUS- JAW- LARYNX- LARYNX OPENING INTO PHARYNX- LIPS- NASAL CAVITY- ORAL CAVITY- PALATE- PHARYNX- TONGUE

Picture from <https://healthscientechnology.wikispaces.com/The+Respiratory+System?f=print>

## **SECOND GROUP: HOW TASTE WORKS. THE FLAVOURS**

1. Can you remember how many flavours there are? Write their name on this tongue.

SWEET, SOUR, BITTER, SALTY, UMAMI



2. Can you complete this text about the taste buds or the gustative receptors?

The actual organ of TASTE is called the TASTE BUD. Each taste bud (and there approximately 10,000 taste buds in HUMANS) is made up of many (between 50-150) RECEPTOR CELLS. Receptor cells live for only 1 to 2 WEEKS and then are replaced by NEW receptor cells. Each receptor in a taste bud responds best to one of the basic tastes. A receptor can respond to the other tastes, but it responds STRONGEST to a particular taste.

### **The Taste Bud**

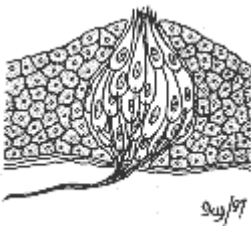


Image from Biodidac

**TASTE, TASTE BUD, RECEPTOR CELLS, WEEKS, HUMANS, NEW, STRONGEST**

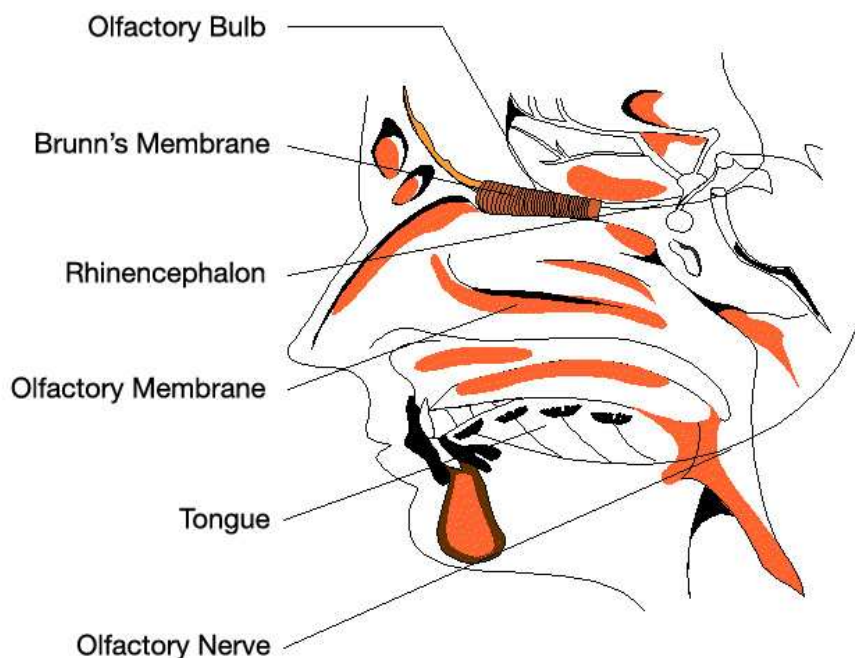


## **THIRD GROUP: TASTE AND HEALTH. HOW TASTE AND SMELL ARE RELATED.**

After looking for the information can you complete this question quiz? Sometimes more than an answer could be correct.

1. What is a taste disorder?
  - A. **Inability to perceive different flavours.**
  - B. Inability to perceive different smells.
  - C. Inability to perceive different sounds.
2. What are the tastes disorders?
  - A. **Hypogeusia: diminished sensitivity to taste.**
  - B. **Aguesia: loss of the sense of taste.**
  - C. **Amnesia: don't remember the name of the flavours.**
2. What causes taste disorders? Taste disorders may result from:
  - A. Poor oral hygiene
  - B. **Gum disease, hepatitis, or medicines and chemotherapeutic drugs.**
  - C. a very bad cold
  - D. **Taste disorders may also be neurological.**
  - E. Poor feet hygiene.
3. How are taste disorders diagnosed?
  - A. Taking a bath in a swimming pool
  - B. **Using a taste testing.**
  - C. It can't be diagnosed.
4. Are taste disorders serious?
  - A. No
  - B. **Yes**
5. Can taste disorders be treated?
  - A. **Yes**
  - B. No
  - C. I don't know.
6. What can I do to help myself?
  - A. I can go to the optician
  - B. I can go to the chemist
  - C. **I can go to the otolaryngologist.**
  - D. I can't do anything.

### Sense of Smell and Taste



Here there is a graphic about the senses of taste and smell. Can you explain if these senses are related? No. Then read this text and identify the main ideas.

‘ Smell and taste work together to help you enjoy your food. A delicious smell tells your brain that the food will taste good!

When you have a cold and can't smell very well, your food doesn't taste as strong as usual.

You use your senses of smell and sight, as well as your sense of taste, to tell you what you are eating.”

(Sally Hewitt, 2005)

The main ideas are

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# **Lesson 3-**

# **SMELL IT!**

# **The Sense of Smell**

## LESSON 3.1. FIRST SESSION

This is the experiment that we are going to do in the first session. In this activity they have to write in a grid the items that they have identified. There are 20 different items to guess, then in pairs they have to recognise 10 items each.

### **Expose Your Nose**

We can recognize a wide variety of smells. Some smells can stir up memories. To demonstrate the sense of smell (olfaction), collect several items that have distinctive smells such as:

Lemon | orange peel | cedar wood | perfume soaked cotton | banana | pine needles | chocolate | coffee | dirt | vanilla | garlic | onion | mint vinegar | moth balls | rose flowers | saw dust | ginger | peppermint | pencil shavings | potato chips

Keep the items separated and enclosed in plastic containers so that the odours do not mix. Put a blindfold on a student (or punch holes in the top of the containers to eliminate the need of a blindfold) and ask the student to:



Questions and Comparisons:

1. Identify the item by smell.
2. Rate the odour (strong, pleasant, neutral, [bad or good for young kids])
3. Tell about any memories associated with the smells.



Materials:

- Smells: lemon, orange peel, cedar wood, perfume, banana, pine, etc.
- Blindfold or container to hold the smelly items



Use only small amounts of each item and instruct students to take only small whiffs from each container. Be especially careful with perfume and mothballs.

<http://faculty.washington.edu/chudler/chsmell.html>

Children have to complete the '[Science Experiment worksheet](#)'. If you click on the link you will see the sheet.

## **SUBSTITUTION TABLES**

WHAT	IS ARE	IT THEY	?
IT THEY	IS (‘S) ARE (‘RE)	A/ AN SOME	_____

I	LIKE DON'T LIKE	THIS ODOUR	BECAUSE	IT	IS (‘S)	STRONG PLEASANT UNPLEASANT NEUTRAL ...
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## **LESSON 3.2. SECOND SESSION**

In this session I'm going to give them some books, some web pages and some photocopies and they, working in pairs, have to read the text, summarize it and make a power-point explaining the information they have found.

The power point will have only 3-4 slides. Each slide has to contain a photo and a sentence. It is "forbidden" to cut and paste. They have to write a little sentence explaining something about the content they learnt.

### **ACTIVITY**

#### **FIRST GROUP- The sense of smell: Parts of the nose**

Your group has to look for information about the sense of smell. It's important to explain the parts of the nose and how the brain works. Here there are some books and some web pages that you can use to do your Power-point. Remember to write some questions about this part to ask your classmates

#### **SECOND GROUP- How smell works. Different odours.**

Your group has to look for information about the odours and how smell works. It's very important to explain how the odours arrive in our nose. Here there are some books and some web pages where you can find the information needed. Remember to write some questions about smell to ask your classmates

#### **THIRD GROUP- Smell and health. How taste and smell are related.**

Your group has to look for information about smell and health (smell disorders) and also you have to explain how taste and smell are related. Here there are some books and some web pages where you can select the information. Remember to write some questions about how to take care our smell to ask your classmates.

Once a group has made their presentation other pupils can ask them about anything they did not understand and they can ask questions of the other pupils to know if they have understood the explanation.

## **BOOKS AND WEB PAGES**

- Walker, R. *The Human Machine*. Oxford University Press. 2008
- Maynard, C. *How Your Body Works*. Knowledge MASTERS. Alligator Books Limited. London-2006
- Oxlade, C. *Why, why, why does my heart begin to race?* Miles Kelly Publishing. Essex-2005
- Bingham, C *Human Body: Enter a world of discovery*. DK Eyewonder. Penguin company. London-2003
- McMillan- Heinemann First Encyclopedia. 2008.
- Wilkes, Angela *Human Body. Question Time collection*. Kingfisher Publishers. London-2001
- Hewitt, Sally. *Smell it!*. Let's start science. QED Publishing. London-2005

<http://library.thinkquest.org/3750/smell/smell.html> (Smell)

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=AP14004](http://www.wisc-online.com/objects/index_tj.asp?objID=AP14004) (Smell learning activity)

<http://www.cf.ac.uk/biosi/staffinfo/jacob/teaching/sensory/olfact1.html> (Smell in general)

<http://faculty.washington.edu/chudler/nosek.html> (Smell- The nose knows)

<http://www.tsbvi.edu/Outreach/seehear/summer05/smell.htm> (smell)

[http://scifiles.larc.nasa.gov/text/kids/Problem\\_Board/problems/stink/smell2b.html](http://scifiles.larc.nasa.gov/text/kids/Problem_Board/problems/stink/smell2b.html) (smell and memory)

<http://www.nidcd.nih.gov/health/smelltaste/smell.asp> (smell disorders)

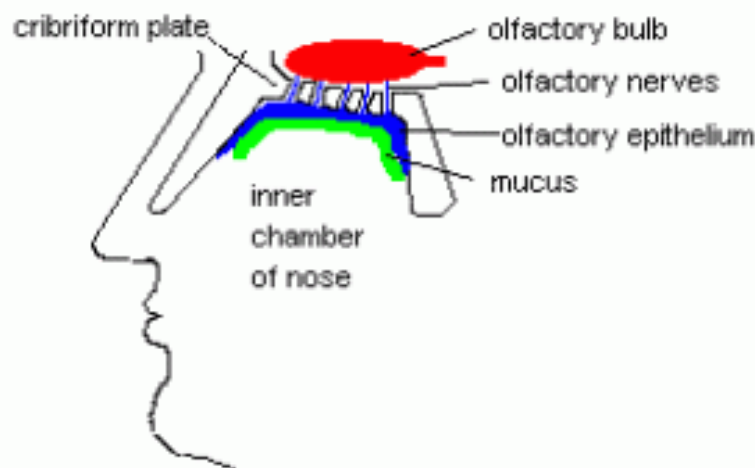
## **LESSON 3.3.THIRD SESSION**

In this third lesson pupils have to do some exercises to complete their learning. Each group has to complete the exercises related with their part to know if they have learnt the content correctly or if they have to look for more information.

### **EXERCISE 1**

Write the different organs used for the sense of smell

CRIBIFORM PLATE- INNER CHAMBER NOSE-  
MUCUS OLFACTORY BULB- OLFACTORY  
EPITHELIUM- OLFACTORY NERVES-



Picture from <http://www.catavino.net/blog/science-of-smell-can-wine-critique-really-be-objective/>



## EXERCISE 2

Can you answer these questions after looking at this web page?

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=AP14004](http://www.wisc-online.com/objects/index_tj.asp?objID=AP14004)

1. How many smells can we discern?  
- 10.000 different smells
2. How many different receptors types do we have?  
- 500 different receptors
3. Where are the olfactory receptor cells?  
- High in the nasal cavity
4. What do chemicals have to do to be ‘smelled’?  
- They have to dissolve in the fluid around the cilia.
5. Where do the sensory impulses travel along?  
- They travel along their axons through the cribriform plate of the ethmoid bone to synapse with neurons in the olfactory bulbs.
6. Where is the cortex for smell interpretation located?  
- The cortex for smell interpretation is located deep in the temporal lobe.
7. What part of our body does the right hemisphere control?  
- The right hemisphere generally controls the left side of our body.

## EXERCISE 3

How are smell and taste related? Do you remember the experiment 'The nose knows'?

### Questions

1. Which sense, taste or smell, identified the correct flavour most often?

Smell

2. How were the "taste" messages your brain received different from the "smell" messages?

(free answer)

3. How do you think sweet makers simulate fruit flavours?

Using artificial or natural fruit odours.

4. Why do you taste more flavour when you chew a jellybean than when you suck on it?

Because when you chew a jellybean the odour goes up to the nose cavity.

Do you know the smell disorders and their causes?

### Questions

1. Can you define hyposmia?

Hyposmia is when the ability to detect odour is reduced.

2. Can you define anosmia?

Anosmia is when you can't detect odour at all.

3. Can you name 3 possible causes of a smell disorder?

Polyps in the nasal cavity, sinus infections, hormonal disturbances, dental problems, radiations to cure cancer, insecticides and solvents, some medicines,...

4. What is an otolaryngologist?

It is the doctor who is specialist in nose, ears and larynx illnesses.

# **Lesson 4-**

# **HEAR IT !**

# **The Sense of Hearing**

## **LESSON 4.1. FIRST SESSION**

This is the experiment that we are going to do in the first session. In this activity we are going to make an artificial eardrum. Remember that you need all the material. At the end of the lesson we are going to fill in the experiment worksheet.



### **Model Eardrum**

Grades 1-12

It's easy to make a model of the eardrum (also called the "tympanic membrane") and see how sound travels through the air. Just stretch a piece of plastic wrap over a large bowl or pot (any container with a wide opening will work). Make sure the plastic wrap is stretched tightly over the container. The plastic represents the eardrum. Place about 20-30 grains of uncooked rice on the top of the plastic wrap. Now you need a noise maker. A tin cookie sheet or baking tray works well. Hold the cookie sheet close to the plastic wrap. Hit the cookie sheet to create a "big bang" noise and watch the rice grains jump.

The "big bang" produces sound waves (changes in air pressure) that cause the plastic sheet to vibrate which causes the rice grains to move. Sound waves vibrate the eardrum in much the same way.



Materials:

- Plastic wrap
- Container with wide opening
- Uncooked rice (any other small grain will work)
- Tin cookie sheet (or other noise maker)

<http://faculty.washington.edu/chudler/chhearing.html> 11/02/09 22:15

## **LESSON 4.2. SECOND SESSION**

In this session I'm going to give them some books, some web pages and some photocopies and they, working in pairs, have to read the text, summarize it and make a power-point explaining the information they have found.

The power point will have only 3-4 slides. Each slide has to contain one photo and a sentence. It is forbidden to cut and paste. They have to write a little sentence explaining something about the content they have learnt.

### **ACTIVITIES**

#### **FIRST GROUP- The sense of hearing: Parts of the ear.**

Your group has to look for information about the sense of hearing. It's important to explain the parts of the ear. Here there are some books and some web pages that you can use to do your Power-point. Remember to write some questions about this part to ask your classmates

#### **SECOND GROUP- How hearing works. The sound waves**

Your group has to look for information about the sound waves and how hearing works. It's very important to explain how the sound arrives in the inner ear and how it travels to the brain. Here there are some books and some web pages where you can find the information needed. Remember to write some questions about the flavours to ask your classmates

#### **THIRD GROUP- Hearing and health. The sign language.**

Your group has to look for information about hearing and health and also you have to explain how deaf people use sign language. Here there are some books and some web pages where you can select the information. Remember to write some questions about how to train our hearing to ask your classmates.



## **BOOKS AND WEB PAGES**

- Walker, R. *The Human Machine*. Oxford University Press. 2008
- Maynard, C. *How Your Body Works*. Knowledge MASTERS. Alligator Books Limited. London-2006
- Oxlade, C. *Why, why, why does my heart begin to race?* Miles Kelly Publishing. Essex-2005
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- Hewitt, Sally. *Hear this! Let's start science*. QED Publishing. London-2005
- 
- <http://www.innerbody.com/htm/body.html> (Human anatomy)
- [http://en.wikipedia.org/wiki/Sign\\_language](http://en.wikipedia.org/wiki/Sign_language) (Sign language)
- <http://www.britishsignlanguage.com/> (British Sign Language)
- <http://en.wikipedia.org/wiki/Deafness> (deafness)
- <http://faculty.washington.edu/chudler/hearing.html> (Sense of Hearing)
- <http://adam.about.com/encyclopedia/Sense-of-hearing.htm> (Sense of hearing. Very easy)
- <http://en.wikipedia.org/wiki/Sound> (sound waves)
- <http://www.youtube.com/watch?gl=GB&v=s9GBf8y0lY0> (sound waves video)
- <http://library.thinkquest.org/3750/hear/hear.html> (your sense of hearing)
- [http://www.wisc-online.com/objects/index\\_tj.asp?objID=AP14204](http://www.wisc-online.com/objects/index_tj.asp?objID=AP14204) (Learning activity)
- <http://www.cf.ac.uk/biosi/staffinfo/jacob/teaching/sensory/ear.html> (The ear)
- [http://scifiles.larc.nasa.gov/text/kids/Problem\\_Board/problems/sound/lab.html](http://scifiles.larc.nasa.gov/text/kids/Problem_Board/problems/sound/lab.html) (sound activities)
- <http://faculty.washington.edu/chudler/bigear.html> (the ear and hearing loss)
- [http://kidshealth.org/PageManager.jsp?dn=KidsHealth&lic=1&ps=307&cat\\_id=118&article\\_set=22412](http://kidshealth.org/PageManager.jsp?dn=KidsHealth&lic=1&ps=307&cat_id=118&article_set=22412) (Taken care of your ear)
- [http://www.wisc-online.com/objects/index\\_tj.asp?objID=AP1502](http://www.wisc-online.com/objects/index_tj.asp?objID=AP1502) (Anatomy of the ear)

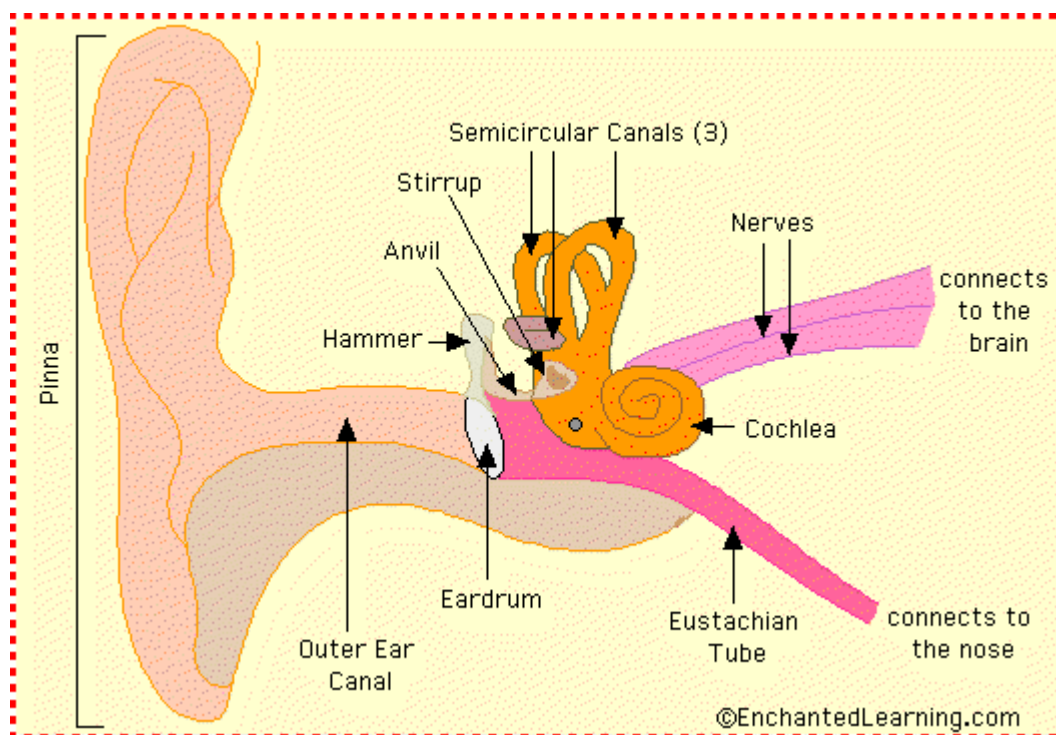
## LESSON 4.3.THIRD SESSION

In this third lesson pupils have to do some exercises to complete their learning. Each group has to complete the exercises related with their part to know if they have learnt the content correctly or if they have to look for more information.

### ACTIVITIES

#### FIRST GROUP

Can you remember the name?



If you need some help, remember that you can visit the web pages again, but here you are the words that you might use.

ANVIL- COCHLEA- EARDRUM- EUSTACHIAN TUBE- HAMMER- NERVES-  
OUTER EAR CANAL- PINNA- SEMICIRCULAR CANALS- STIRRUP (STRAPES)

## SECOND GROUP

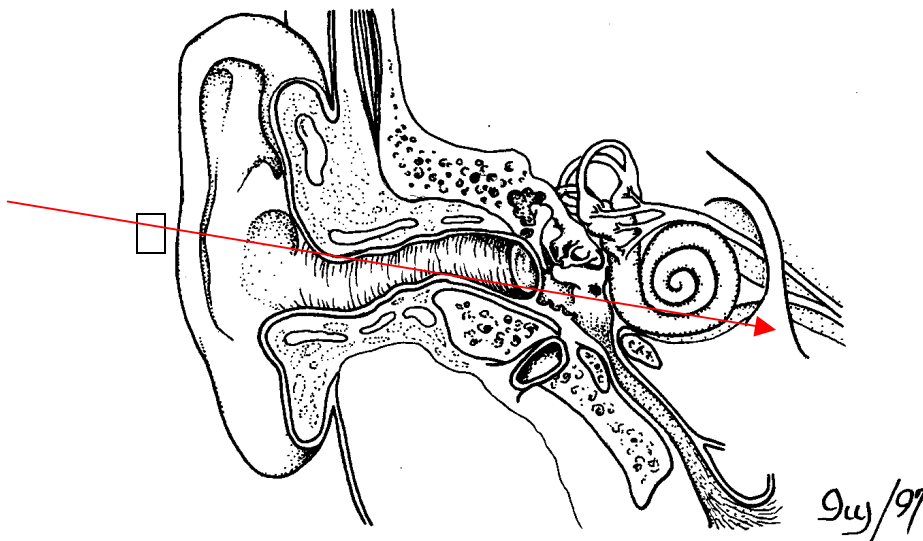
Here is a little text explaining how the sense of hearing works.  
Can you complete it?

The flap, called PINNA on your head is only a part of your ear, the OUTER ear. The hole in your ears, goes to a tiny piece of tight skin, called an EARDRUM . Sounds enter your ear and make the eardrum VIBRATE, move in and out. Here starts the MIDDLE ear. Tiny bones pass the movements to the COCHLEA, which is shaped like a snail.

The cochlea, in the INNER ear, contains thousands of tiny HAIRS. It is also full of liquid. Sounds make the liquid move. This makes the hairs wave about. Tiny sensors pick up the waving and through the AUDITORY NERVE send messages to your BRAIN so you hear the sound.

COCHLEA- EARDRUM- HAIRS- BRAIN- OUTER- MIDDLE- INNER-  
AUDITORY NERVE- PINNA- VIBRATE

Now, with a red pencil, draw the way that the sounds follow from the exterior of your ear to the auditory nerve.



Ivy Livingstone © BIODIDAC



### **THIRD GROUP**

Your work will be very easy. By surfing on the web ( <http://www.britishsignlanguage.com/> )you must learn some words using sign language.

You have to learn:

- Days of the week
- What's your name?
- Colours: red, yellow and blue.

It seems that it will be difficult but it is not!!!!. Enjoy your work, and remember that there are a lot of people that use sign language because they can't hear any sound - they are deaf.

# **Lesson 5-**

# **TOUCH THAT!**

# **The Sense of Touch**

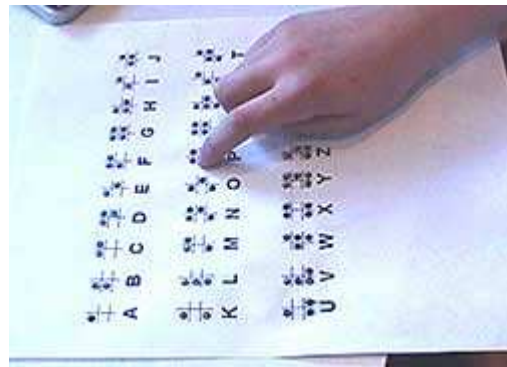
## LESSON 5.1. FIRST SESSION

This is the experiment that we are going to do in the first session. In this activity they have to make a Braille Alphabet to write their name in Braille.

### *The Braille Alphabet*

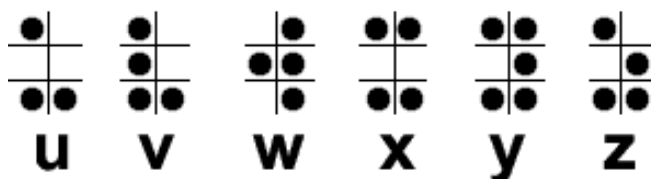
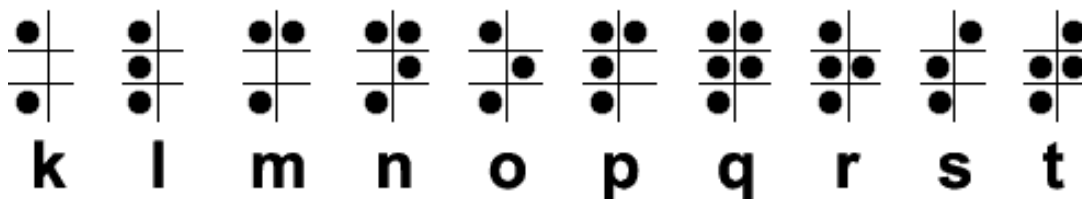
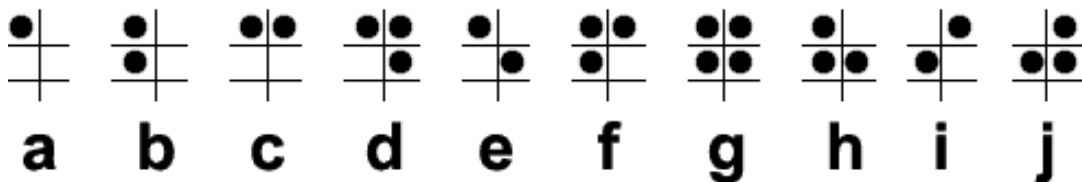
Materials:

- Braille Alphabet Sheet
- White glue
- Blindfold



Grades 3-12

The Braille alphabet was invented by Louis Braille to help people who are blind read. The Braille system uses a series of raised dots that people "read" with their fingers. To make your own set of Braille letters, print out this picture on a piece of paper. Place a small dot of white glue on the black dots of each letter. When the glue dries, you will have created large Braille letters. Cut out each letter and try to arrange the letters in alphabetical order using your sense of touch.



## **LESSON 5.2. SECOND SESSION**

In this session I'm going to give them some books, some web pages and some photocopies and they, working in pairs, have to read the text, summarize it and make a power-point explaining the information they found.

The power point will have only 3-4 slides. Each slide has to contain one photo and a sentence. It is forbidden to cut and paste. They have to write a little sentence explaining something about the content they learnt.

### **ACTIVITY**

#### **FIRST GROUP- The sense of touch: Parts, functions and characteristics of the skin**

Your group has to look for information about the sense of touch. It's important to explain the parts of the skin, its functions and characteristics. Here there are some books and some web pages that you can use to do your Power-point. Remember to write some questions about this part to ask your classmates

#### **SECOND GROUP- How touch works . Diferent receptors.**

Your group has to look for information about the different receptors that we have in our skin, and the try to explain how the sense of touch works. It's very important to explain how the receptors work. Here there are some books and some web pages where you can find the information needed. Remember to write some questions about the receptors to ask your classmates

#### **THIRD GROUP- Sense of touch and health .**

Your group has to look for information about touch and health and also you have to explain how you can take care of your skin. Here there are some books and some web pages where you can select the information. Remember to write some questions about how to take care of our skin to ask your classmates.

## **BOOKS AND WEB PAGES**

- Walker, R. *The Human Machine*. Oxford University Press. 2008
- Maynard, C. *How Your Body Works*. Knowledge MASTERS. Alligator Books Limited. London-2006
- Oxlade, C. *Why, why, why does my heart begin to race?* Miles Kelly Publishing. Essex-2005
- Bingham, C *Human Body: Enter a world of discovery*. DK Eyewonder. Penguin company. London-2003
- McMillan- Heinemann First Encyclopedia. 2008.

- Wilkes, Angela *Human Body. Question Time collection*. Kingfisher Publishers. London-2001
- Hewitt, Sally. *Touch that! Let's start science*. QED Publishing. London-2005

<http://library.thinkquest.org/3750/touch/touch.html>

<http://library.thinkquest.org/28457/touch.shtml>

[http://www.1stholistic.com/Beauty/skin/skin\\_parts-of-the-skin.htm](http://www.1stholistic.com/Beauty/skin/skin_parts-of-the-skin.htm) (parts of skin)

[http://www.pg.com/science/skincare/Skin\\_tws\\_39.htm](http://www.pg.com/science/skincare/Skin_tws_39.htm) (functions of skin)

<http://www.dermatologyinfo.net/english/chapters/chapter02.htm> (functions of skin)

<http://www.starsandseas.com/SAS%20Physiology/Neurology/Touch.htm> (touch receptors)

<http://library.thinkquest.org/05aug/00386/touch/index.htm> (All about skin and touch)

<http://www.physpharm.fmd.uwo.ca/undergrad/sensesweb/L7Touch/L7Touch.swf> (Flash learning activity)

<http://www.youtube.com/watch?v=d-IJhAWrsm0&feature=related> (Video about parts of the skin)

<http://kidshealth.org/kid/htbw/skin.html> (Skin)

[http://kidshealth.org/kid/stay\\_healthy/body/skin\\_care.html](http://kidshealth.org/kid/stay_healthy/body/skin_care.html) (Taking care of your skin)

<http://www.innerbody.com/htm/body.html> (anatomy)

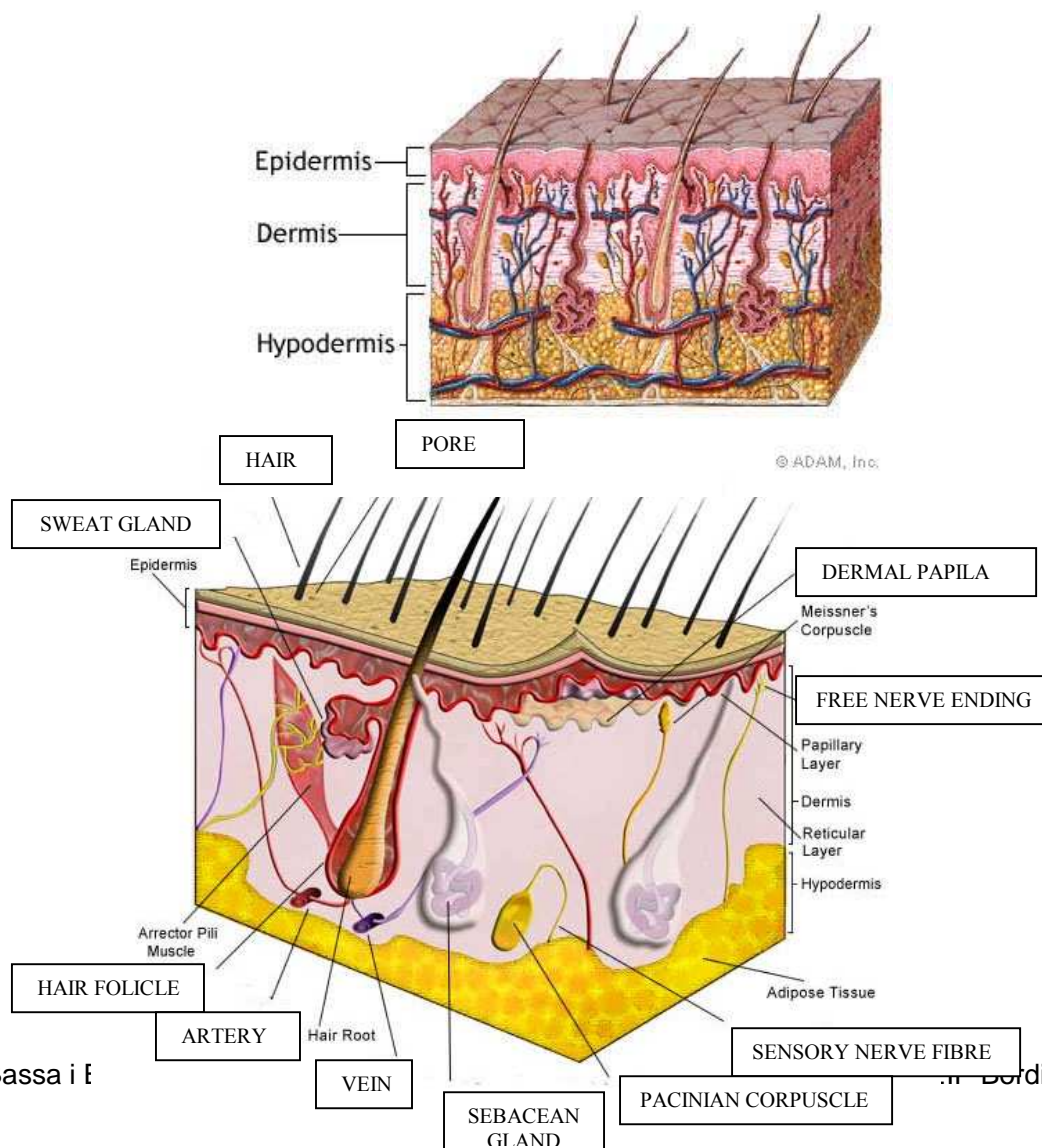
## LESSON 5.3.THIRD SESSION

In this third lesson pupils have to do some exercises to complete their learning. Each group has to complete the exercises related with their part to know if they have learnt the content correctly or if they have to look for more information.

### ACTIVITY 1

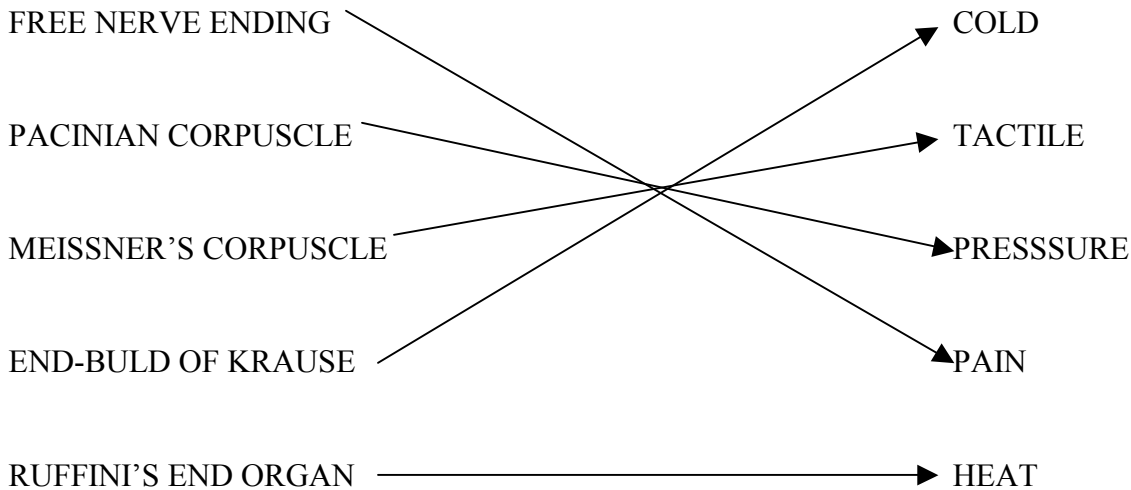
Can you complete this skin picture? Here you are the names you need in alphabetical order.

ARTERY- DERMAL PAPILLA- DERMIS- EPIDERMIS- FREE NERVE ENDING-  
HAIR- HAIR FOLICLE- HYPODERMIS- PACINIAN CORPUSCLE- PORE-  
SEBACEOUS GLAND- SENSORY NERVE FIBRE- SWEAT GLAND- VEIN



## ACTIVITY 2

Link:



## ACTIVITY 3

Choose the correct answer:

1. What is called the bottom layer of the skin?
  - a. Epidermis
  - b. Hypodermis or underdermis**
  - c. Dermis
  - d. Hair follicle
2. How do blind people read?
  - a. By instinct
  - b. By Braille Alphabet.**
  - c. By Osmosis
  - d. They don't.

3. Where is the least sensitive place on your body?
- a. Tongue
  - b. Upper leg
  - c. Finger
  - d. Middle of the back.**
4. Where is located the sense of touch?
- a. All over your body**
  - b. On your hands
  - c. In your mouth
  - d. In the spinal cord.
5. There are about \_\_\_\_\_ touch receptors in each of your fingertips.
- a. 10
  - b. 100**
  - c. 1000
  - d. 32.125
6. One of the most sensitive area of your body is...
- a. your knee
  - b. your neck
  - c. your nose**
  - d. your back
7. When your body gets warmer it starts to...
- a. run
  - b. laugh
  - c. become red
  - d. shiver**



8. What are the structures called that respond to touch stimuli and cause a nerve impulse to be generated.

- a. epidermis
- b. touch receptors**
- c. hypodermis
- d. dermis

9. Some areas of your body are more sensitive because...

- a. They have no nerve endings
- b. They have less nerve endings
- c. They have more nerve endings**
- d. They have the same number of nerve endings.

10. A touch receptor is...

- a. a hair root
- b. a neuron
- c. a blood vessel
- d. a special nerve ending.**

# **Lesson 6-**

# **LOOK HERE!**

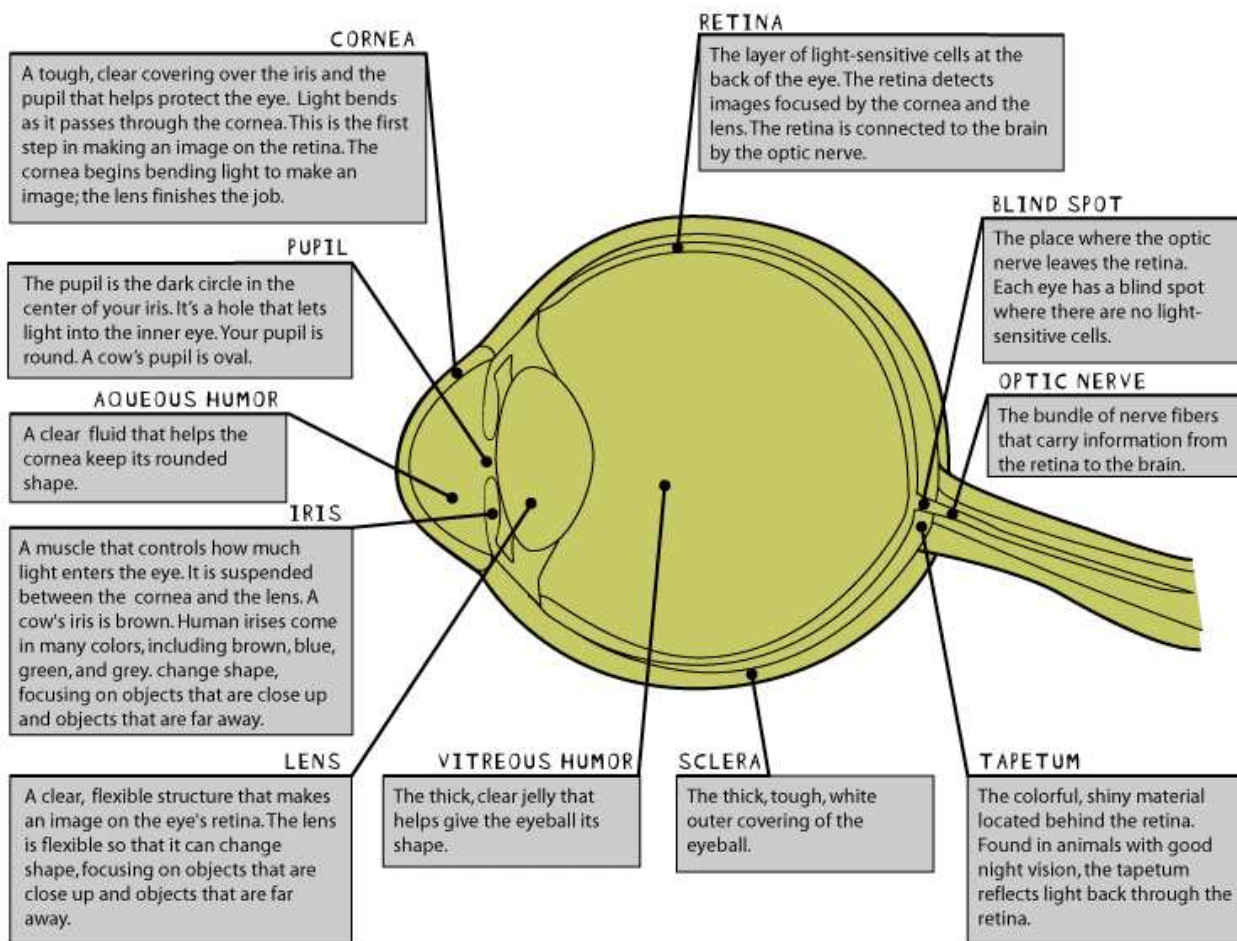
# **The Sense of Sight**

## LESSON 6.1. FIRST SESSION

This is the experiment that we are going to do in the first session. In this activity they have to look at the video about a cow eye dissection.

[http://exploratorium.com/learning\\_studio/cow\\_eye/index.html](http://exploratorium.com/learning_studio/cow_eye/index.html)

After the video they have to take notes and complete this diagram:



Adaptation of: [http://exploratorium.com/learning\\_studio/cow\\_eye/eye\\_diagram.html](http://exploratorium.com/learning_studio/cow_eye/eye_diagram.html)  
[http://exploratorium.com/learning\\_studio/cow\\_eye/eye\\_diagram\\_print.html](http://exploratorium.com/learning_studio/cow_eye/eye_diagram_print.html)

## **LESSON 6.2. SECOND SESSION**

In this session we are going to do the cow's eye dissection in groups of 2-3.

They will have a handout with the instructions and at the end they have to complete the experiment paper sheet.

You can print the handout downloading it from

[http://exploratorium.com/learning\\_studio/cow\\_eye/coweye.pdf](http://exploratorium.com/learning_studio/cow_eye/coweye.pdf)

## **LESSON 6.3.THIRD SESSION**

### **ACTIVITY**

#### **FIRST GROUP- The sense of sight: Parts, functions and characteristics of the eye**

Your group has to look for information about the sense of sight. It's important to explain the parts of the eye, its functions and characteristics. Here there are some books and some web pages that you can use to do your Power-point. Remember to write some questions about this part to ask your classmates

#### **SECOND GROUP- How sight works**

Your group has to look for information about how the sense of sight works. It's very important to explain how correct eyesight works. Here there are some books and some web pages where you can find the information needed. Remember to write some questions about the eye to ask your classmates

#### **THIRD GROUP- Protection of your eyes, imperfect eyesight and blindness.**

Your group has to look for information about blindness, imperfect eyesight and also you have to explain how you can protect your eyes. Here there are some books and some web pages where you can select the information. Remember to write some questions about how to take care of our eyes to ask your classmates.

## **BOOKS AND WEB PAGES**

- Walker, R. *The Human Machine*. Oxford University Press. 2008
- Maynard, C. *How Your Body Works*. Knowledge MASTERS. Alligator Books Limited. London-2006
- Oxlade, C. *Why, why, why does my heart begin to race?* Miles Kelly Publishing. Essex-2005
- Bingham, C *Human Body: Enter a world of discovery*. DK Eyewonder. Penguin company. London-2003
- McMillan- Heinemann First Encyclopedia. 2008.
- Wilkes, Angela *Human Body. Question Time collection*. Kingfisher Publishers. London-2001
- Hewitt, Sally. *Look here ! Let's start science*. QED Publishing. London-2005

<http://www.innerbody.com/htm/body.html> (Anatomy)

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=AP14304](http://www.wisc-online.com/objects/index_tj.asp?objID=AP14304) (Sight learning activity)

<http://library.thinkquest.org/3750/sight/sight.html> (The eye sight)

<http://faculty.washington.edu/chudler/eyetr.html> (Eye anatomy and function. ).\_\_

[http://www.sightsavers.org/learn\\_more/the\\_eye/default.html?gclid=CMLTzPmIvJkCFQ0zQgodj2136w](http://www.sightsavers.org/learn_more/the_eye/default.html?gclid=CMLTzPmIvJkCFQ0zQgodj2136w) (Eye problems, how we see, the eye in detail,etc)

[http://www.sightsavers.org/learn\\_more/causes\\_of\\_blindness/default.html](http://www.sightsavers.org/learn_more/causes_of_blindness/default.html) (Blindness)

[http://www.sightsavers.org/learn\\_more/fun\\_and\\_games/optical\\_illusions/default.html](http://www.sightsavers.org/learn_more/fun_and_games/optical_illusions/default.html) (optical illusions)

[http://en.wikipedia.org/wiki/Eye\\_protection](http://en.wikipedia.org/wiki/Eye_protection) (Eye protection)

# Lesson 7-

# THE WEB QUEST

# Teacher's page

**Introduction:**

This lesson was designed as part of my lesson plans prepared for my Postgraduate Certificate in CLIL (University of Nottingham-Spring 2009 programme).

This Web Quest is designed to teach students about the Nervous System and the five senses through the exploration of the Internet.

**Learners:**

This Web Quest is designed to be used in a CLIL science classroom. It teaches students about the nervous system and the five senses but it also allows students to develop their groupwork, writing, artistic, thinking, reading and speaking skills. At the end of the Web Quest they have to assess their own work.

Considering the grade level of the students, it is important to be sure the students have an understanding of what the five senses and the nervous system are before completing this Web Quest. We are learning and at the same time experimenting with the Nervous System and the Five Senses, so I recommend using this Web Quest at the end of the unit to solidify and to assess their learning and begin to think critically about the five senses.

**Process:**

This Web Quest is to be completed at the end of a Nervous System and Five Senses Unit. There are numerous activities to do with students to explore their five senses before completing this Web Quest. Searching the Internet for "five senses" brings up tons of lesson plans and activities to choose from

To begin the Web Quest split the students into pair groups, each group researches one part of each lesson. Since there is going to be English reading involved, make sure to include at least one average or above average reader in each group to help guide the non or below average readers along.

Once the students are in their groups at a computer they can begin the Web Quest. They have to open a folder into their own folder called 'Nervous System. They have to copy the most important ideas and the photos they would need to make a little presentation.

Once the students have completed the Web Quest they are to present their finding to the class. After all the presentations, students will vote the presentation they think is the best.



**Resources:**

In order to complete the Web Quest you will need:

A computer for each group with Internet access.

Software: Word, Paint Shop and Power Point.

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Created in Nottingham (March, 2009). Based on a template from **The WebQuest Page**

# **Teacher Assessment**

**HOW TO ASSESS THE UNIT**

Teacher takes notes about their learning, and also their use of the foreign language.

Classmates prepare some questions that the teacher can take in consideration.

The exercises of the third session of each lesson are also a way to assess them.

The self-assessment included in the Web quest has to be taken in consideration because their self-assessment is also important.

During or at the end of the unit the teacher can fill the Assessment grid.

