Digestive System Tour Lab

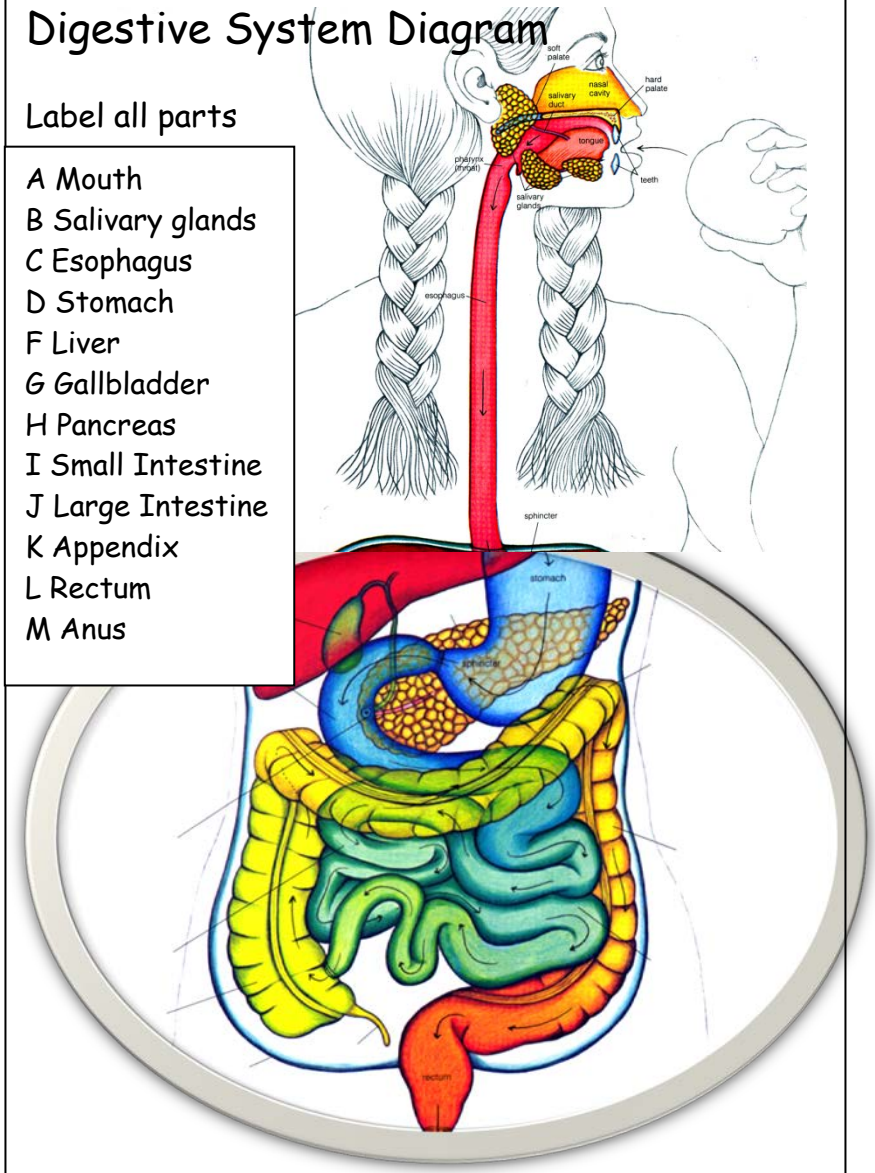
Name _____ Hour _____

The information to answer these questions begins on page 9.

Digestive System Diagram

Label all parts

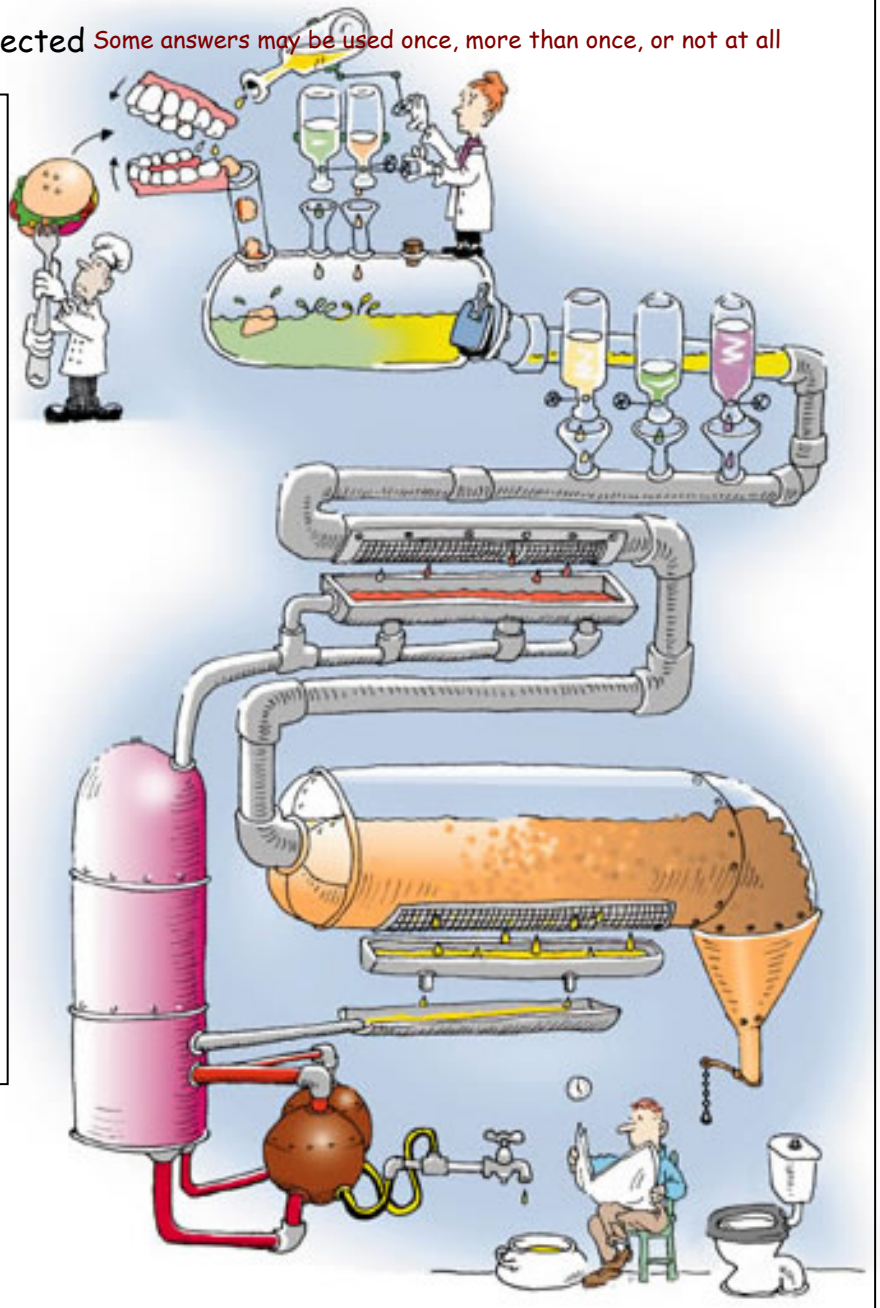
A Mouth
B Salivary glands
C Esophagus
D Stomach
F Liver
G Gallbladder
H Pancreas
I Small Intestine
J Large Intestine
K Appendix
L Rectum
M Anus



Digestive System (cartoon)

Label as directed Some answers may be used once, more than once, or not at all

A Mouth
B Salivary glands
C Esophagus
D Stomach
F Liver
G Gallbladder
H Pancreas
I Small Intestine
J Large Intestine
K Appendix
L Rectum
M Anus
N Saliva
O Hydrochloric Acid
P Pepsi
Q Enzymes from liver and pancreas
U Transverse colon
V Descending colon
W Nutrients
X Water and vitamins
Y Kidneys
Z Circulatory System



A.D.A.M. video clip: Digestion

Fill in the blanks

- Food is digested by the churning of the stomach walls and by secretion of _____ _____ and _____.
- _____ (chemicals) speed up the breakdown of food.
  - Trypsin breads down _____ found in _____.
  - Lipase breaks down the _____ found in _____ and butter.
  - _____ breaks down the sugar in milk.
- Food is moved through the small intestine where _____ are absorbed and enter the _____.
- Blood is taken to the liver where _____ are processed and _____ _____ are removed.
- The _____ _____ absorbs water and compacts the remainder of the feces. Feces are eliminated through the _____ and _____.

A.D.A.M. video clip: Peristalsis

Fill in the blanks

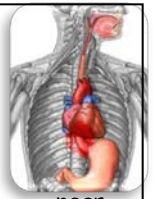
- Peristalsis is a series of _____ contractions that moves food through the digestive tract.
- _____ mixes and shifts the chime on the intestinal wall.

A.D.A.M. video clip: Ulcers

Fill in the blanks

- The stomach produces _____ that breaks down food into simpler substances.
- The _____ lining keeps the stomach from digesting itself.
- If the lining becomes too thin, an _____ may form.
- Ulcers may be caused by bacteria , not stress.
- To control the bacteria, _____ are prescribed.

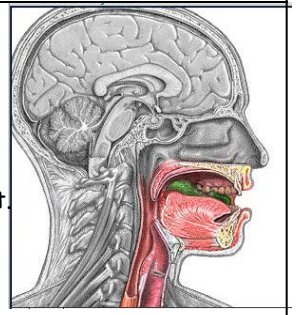
A.D.A.M. video clip: Heartburn



Fill in the blanks

- Heartburn does not involve the heart, but is felt in the _____ near the heart's location.
- The _____ has a protective lining against the acid, but the _____ does not.
- _____ relieve heartburn by making the stomach juices less acidic.

A.D.A.M. video clip: Swallowing



Fill in the blanks

- Stage 1 _____ pushes food into the throat.
- Stage 2 _____ folds over voice box at entrance of windpipe.
- Stage 3 _____ in the esophagus contract.

The Esophagus

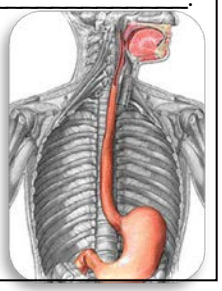
Connects the _____.

About _____.

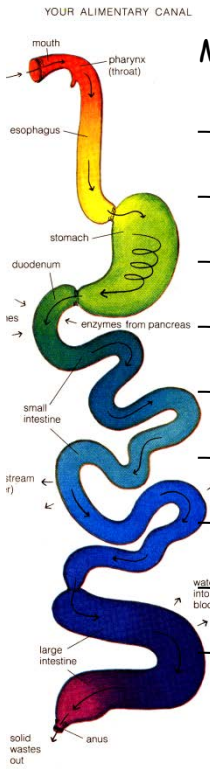
Flat when _____.

Made of several layers of _____.

_____ is the wavelike muscle contractions that force food through the digestive tract.



The Digestive System is a Giant Food Processor



Match These:

___ breaking down of food by the action of enzymes

___ stored for future use

___ broken down into glucose

___ building blocks of cells

___ broken down into amino acids

___ used by cells for energy

___ bile and enzymes from liver enter here

___ water goes back into the bloodstream

___ proteins, carbohydrates, vitamins, and minerals go into blood

(A) small intestine
(B) duodenum
(C) carbohydrates
(D) chemical digestion
(E) fats
(F) amino acids
(G) proteins
(H) glucose
(I) large intestine

The Mouth

Food is _____.

Teeth chop _____.

Saliva moistens _____.

The tongue moves _____.

The Throat:

The epiglottis _____.

Muscles _____.

The Salivary Glands:

Produce _____.

Saliva is an enzyme that _____.

Food becomes moist and "mushy". It is now called a _____.

The Stomach (match these):

___ the stomach's own acid begins to eat through the stomach

___ control the ends of the stomach

___ food enters the stomach through the _____

___ digests protein and kills bacteria

___ helps the hydrochloric acid digest proteins.

___ 3 strong layers of muscle

(A) Mucus
(B) Hydrochloric Acid
(C) The stomach
(D) Sphincter muscles
(E) Esophagus
(F) Ulcer
(G) Pepsin

Nutrients

Nutrients are absorbed through the _____ _____.

Describe the inside lining of the small intestine _____

_____.

Draw a diagram of the *villi* and label its parts. →

villi

Your Teeth are Specialized

- An adult has _____ teeth.
- Incisors are for _____ and _____.
- Canines are for _____ and _____.
- Premolars and molars are for _____.
- Another name for the 3rd molars is the _____ teeth.

Label the teeth in the diagram:

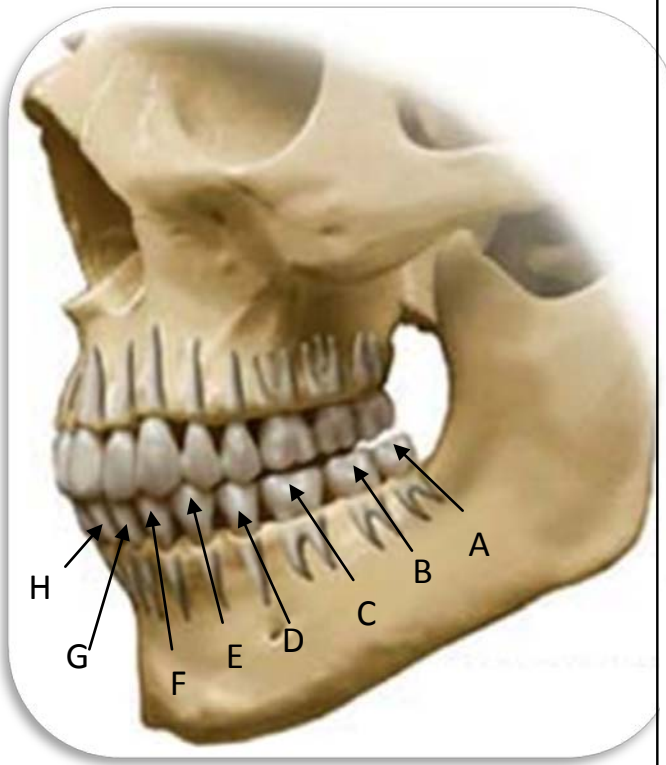
A _____ F _____

B _____ G _____

C _____ H _____

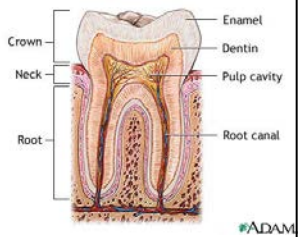
D _____

E _____



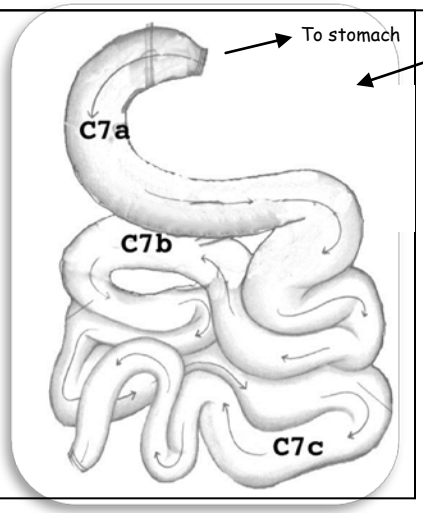
Tooth Anatomy

- Hardest part of the tooth is the _____
- _____ lies just beneath the enamel.
- _____ is a soft tissue that contains living nerve cells.



Small Intestine

- The longest _____
  _____.
- Divided into 3 parts:
  _____ first segment
  _____ second segment
  _____ third segment
- Digestive enzymes _____
  _____.
- Nutrients _____



Label the Small Intestine:

duodenum

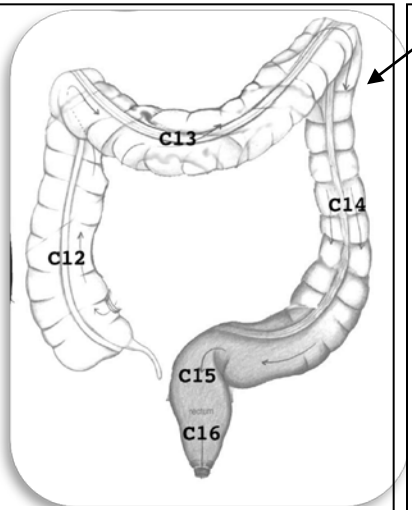
jejunum

illium

Large Intestine

- In the large intestine, _____ and _____ are absorbed back into the blood to be reused.
- What does the appendix do? _____

_____.



Label the Large Intestine:

ascending colon

transverse colon

descending colon

appendix

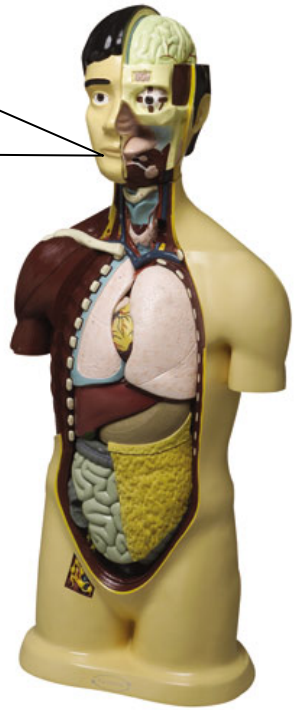
rectum

anus

Tommy Torso (match Tommy's parts with their number)

Part name	Part number
Tongue	_____
Salivary Gland	_____
Esophagus	_____
Stomach	_____
Liver	_____
Gallbladder	_____
Pancreas	_____
Duodenum	_____
Small Intestine	_____
Appendix	_____
Rectum	_____

Return all of my parts before leaving this station!!!!!



What name does Tommy prefer? _____

Check Out this X-ray

- The digestive system organ colored yellow is probably the _____.
- The digestive system organ colored pink is probably the _____.
- What is the doctor about to tell Kermit? _____.

Which Digestive System organ is shown in this x-ray?

Answer _____

The Liver, Gallbladder, and Pancreas

Match these: use answers more than once

A) Liver
B) Gallbladder
C) Pancreas

___ stores vitamins

___ produces ½ to 1 liter of enzymes daily

___ produces bile (an enzyme which breaks down fats)

___ stores bile

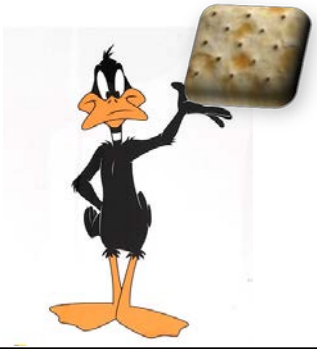
___ breaks down old red blood cells

___ produces enzymes which break down carbohydrates, fats, and proteins

___ removes poisons from the body

Your Saliva

- Saliva contains the enzyme _____.
- What does amylase do? _____.
- What should happen to the cracker if partially chewed and left in your mouth? _____
- Did it work for you? _____



Try to SwallowThis

Match these:

___ how much food your stomach can hold

___ how long it takes for food to completely digest

___ the weight of your liver

___ how much food you will process in a lifetime

___ the length of your alimentary canal

A) 15 – 48 hours
B) 27 feet
C) 3-4 pounds
D) 60,000-100,000 pounds
E) 2 ½ pints

Fetal Pig Model (match the pig part with the part number)

___ pancreas

___ small intestine

___ gallbladder

___ duodenum

___ large intestine (caecum)

___ large intestine (spiral colon)

___ large intestine (descending colon)

___ liver

___ stomach

___ esophagus

Part numbers	
3	9
4	11
5	12
6	13
7	14

- What seems to be the main difference between the pig's digestive system and that of humans? _____

Go to the Human Biology/Links page of our science website (www.myscience8.com)

Click on *Digestive System Tour Lab*

A Balanced Diet

- Fill in the seven food groups on the pie chart.

Matching:

___ red blood cell production

___ store energy, heat insulation

___ provide energy

___ the main part of cytoplasm

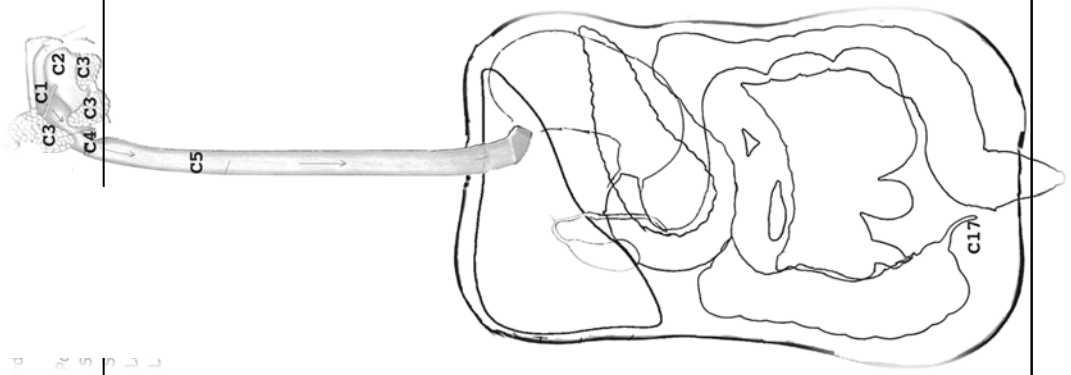
___ helps move food along the digestive system

___ strong bones, teeth, and muscles

___ growth and tissue repair

A) Protein
B) Carbohydrate
C) Water
D) Vitamins
E) Fibre (fiber)
F) Fats and oils (lipids)
G) Minerals

Paper Model of Digestive System - tape it here



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Click on *Digestive System Tour Lab*

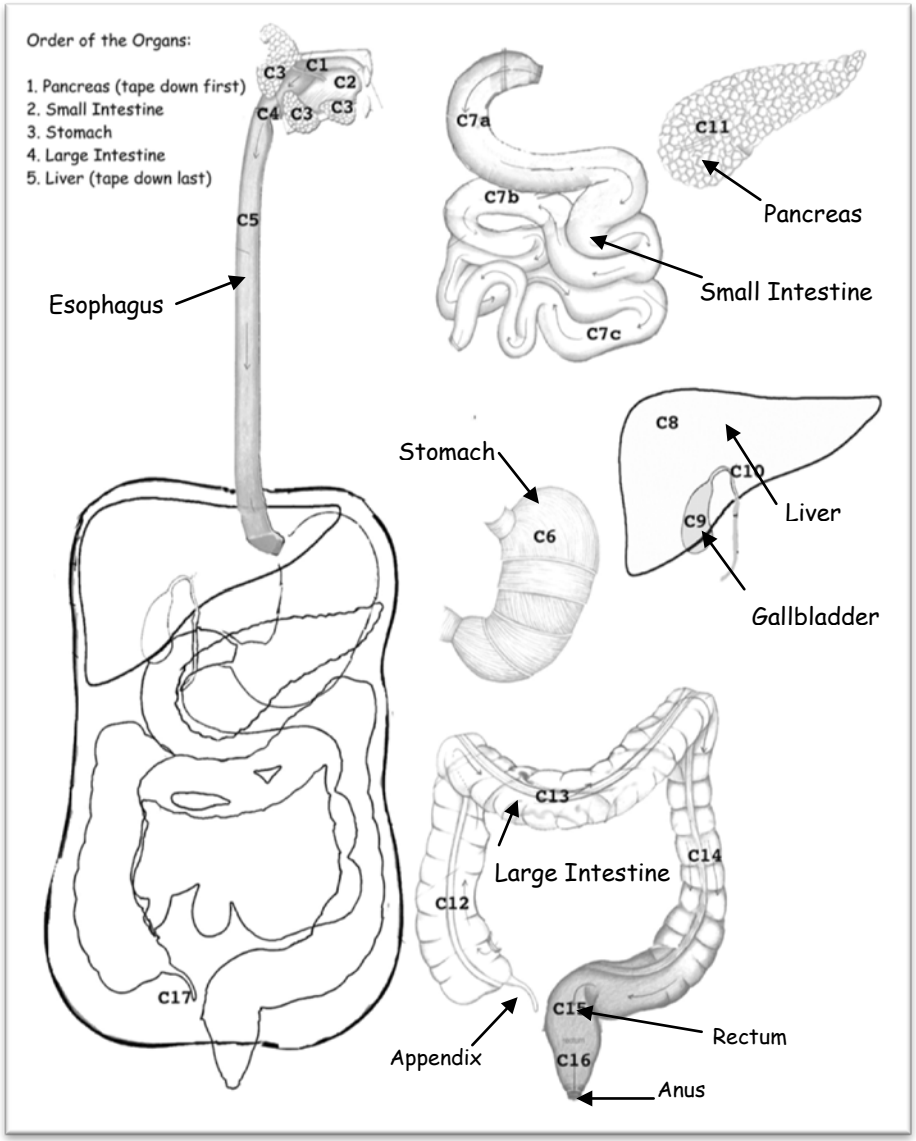
Malnutrition - fill in the chart

Cause	Symptom	Name of Disease
Too little protein	Poor growth and development	Kwashiorkor
Too little iron		
	Poor wound healing/loss of teeth	
		Osteoporosis
	Bowed and weak legs	
Too little fiber		

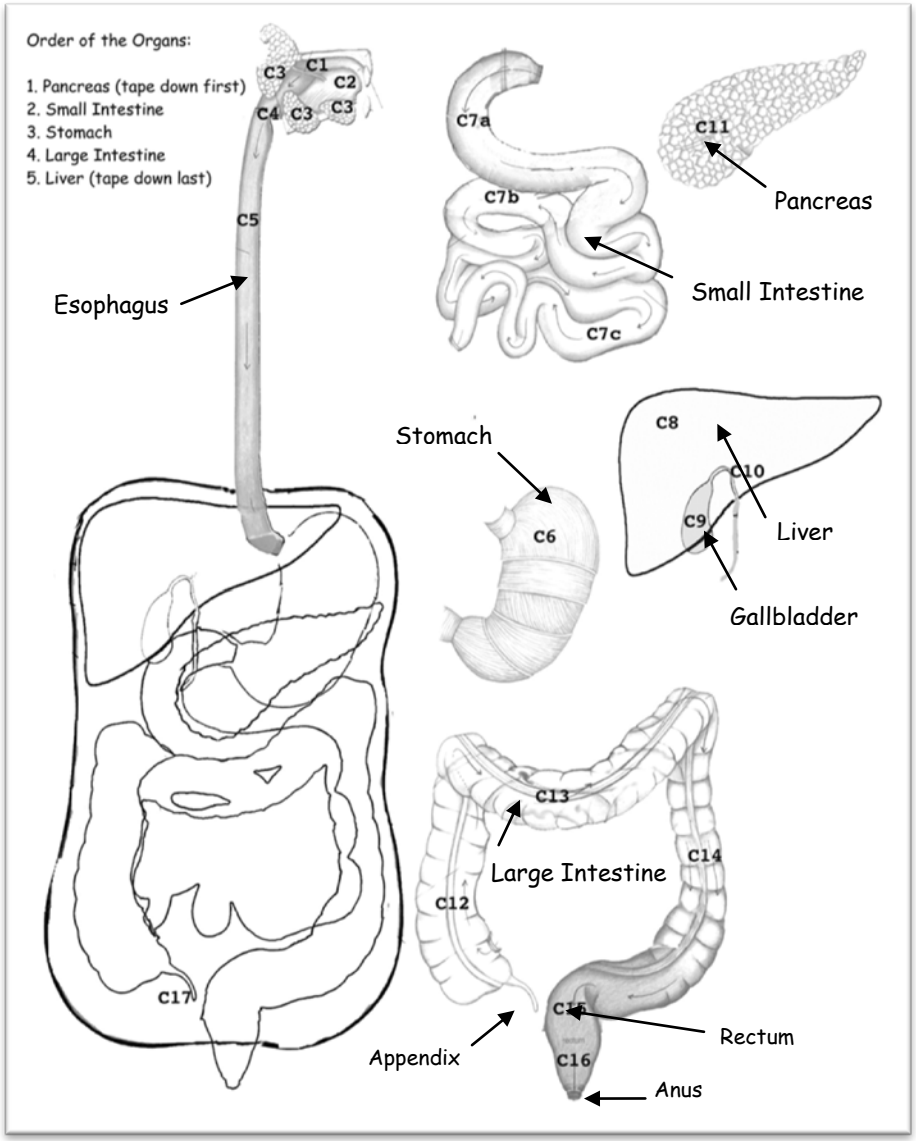
Summary of Digestion - write the steps of digestion in their proper order (use the cartoon picture of digestion from page 1)

1. Food is chopped and ground in the mouth.
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

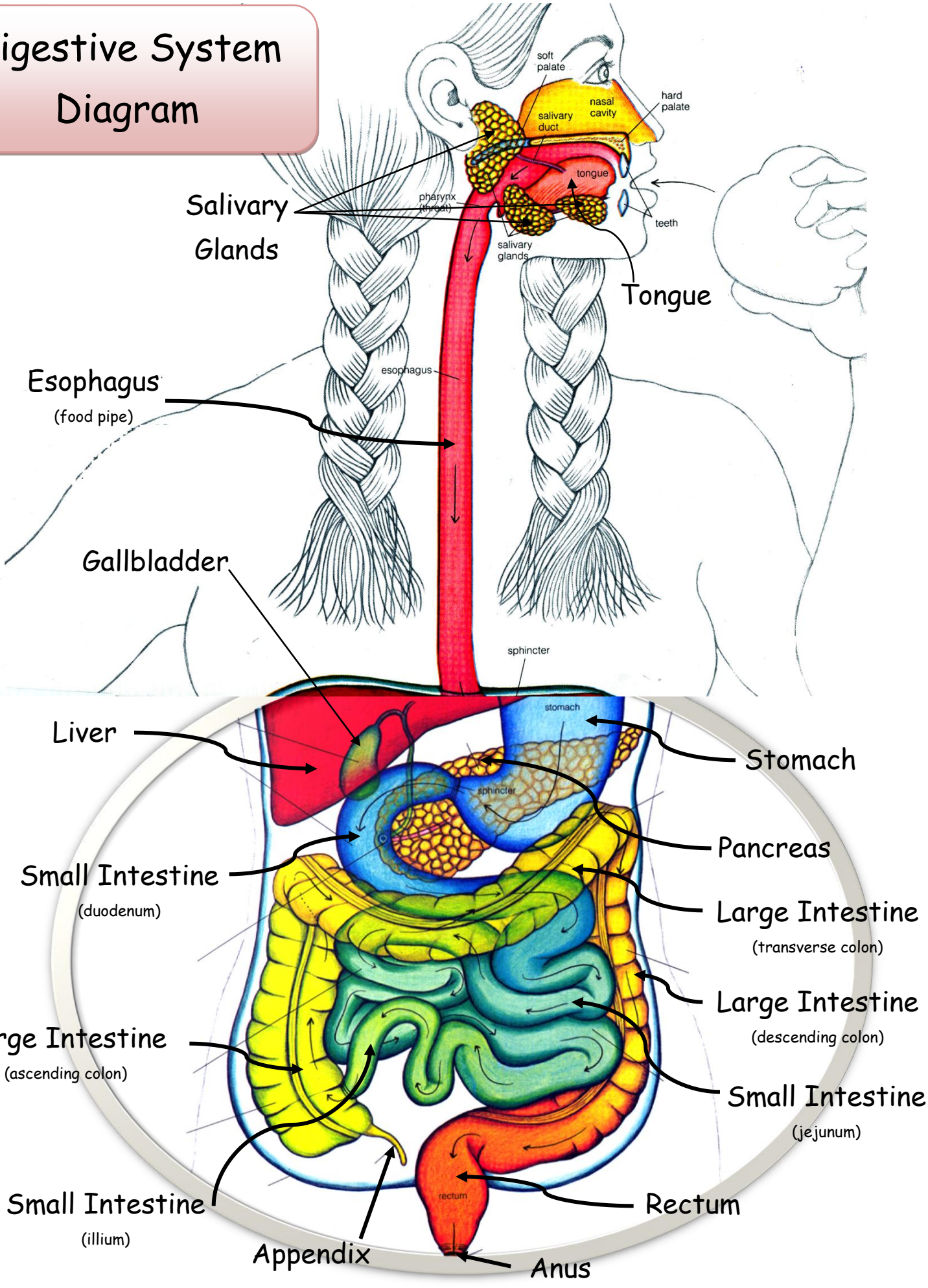
Paper Model of Digestive System



Paper Model of Digestive System



Digestive System Diagram

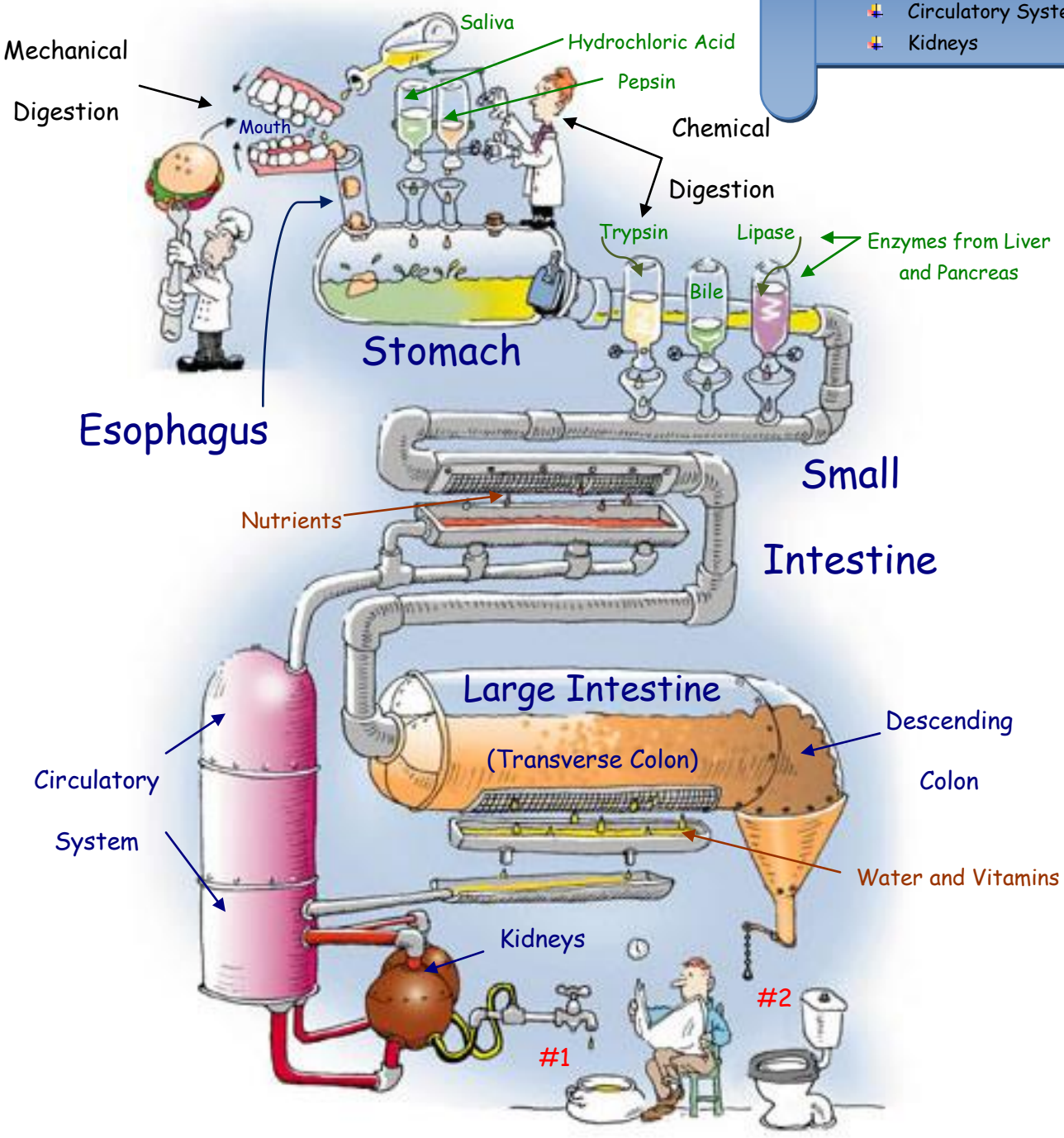


The Digestive System

On your Digestive System Cartoon …

Label these parts:

- Mouth
- Esophagus
- Small Intestine
- Large Intestine
- Circulatory System
- Kidneys

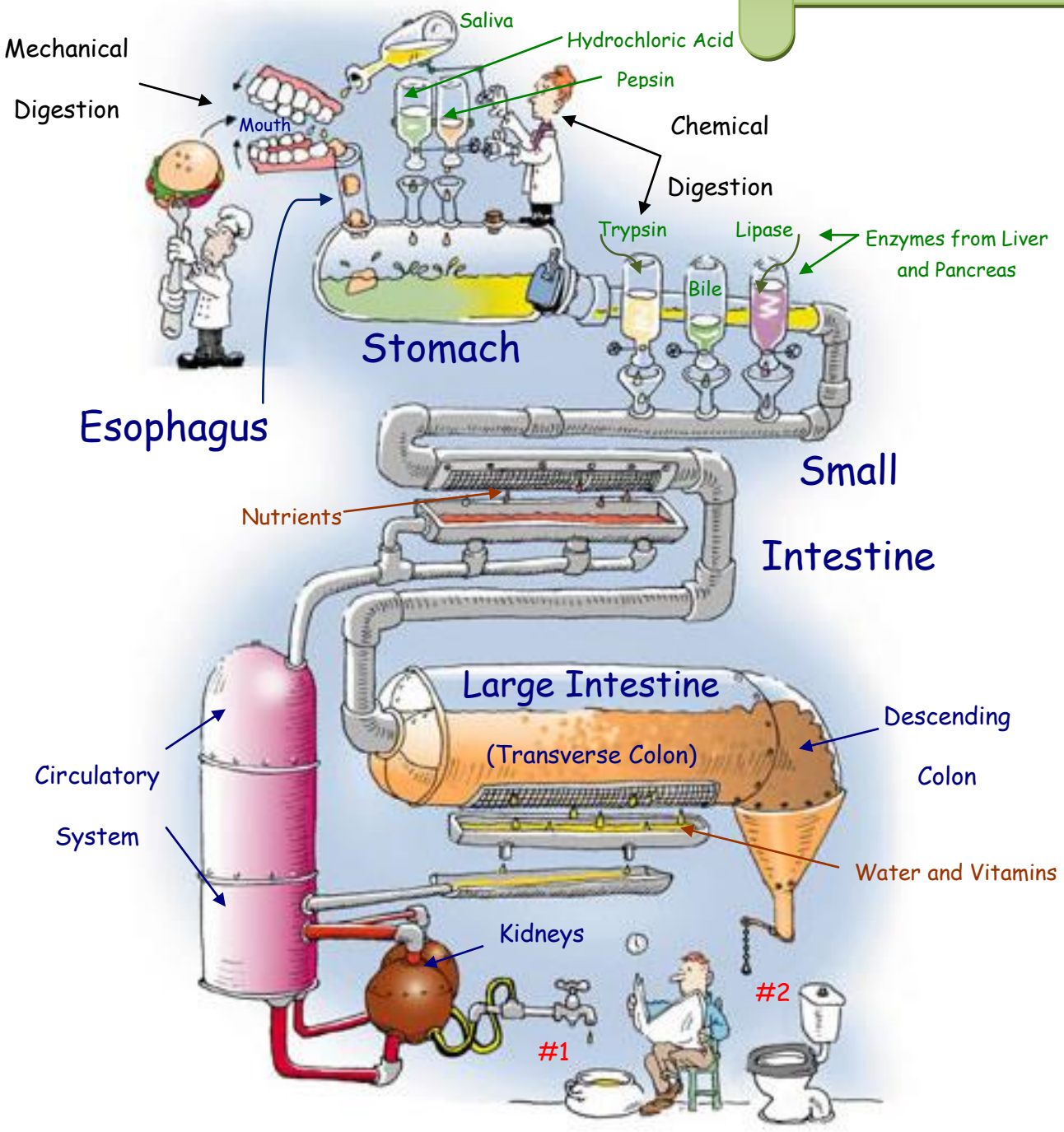


The Digestive System

On your Digestive System Cartoon …

Label these enzymes (chemicals):

- Saliva
- Hydrochloric Acid
- Pepsin
- Trypsin
- Lipase

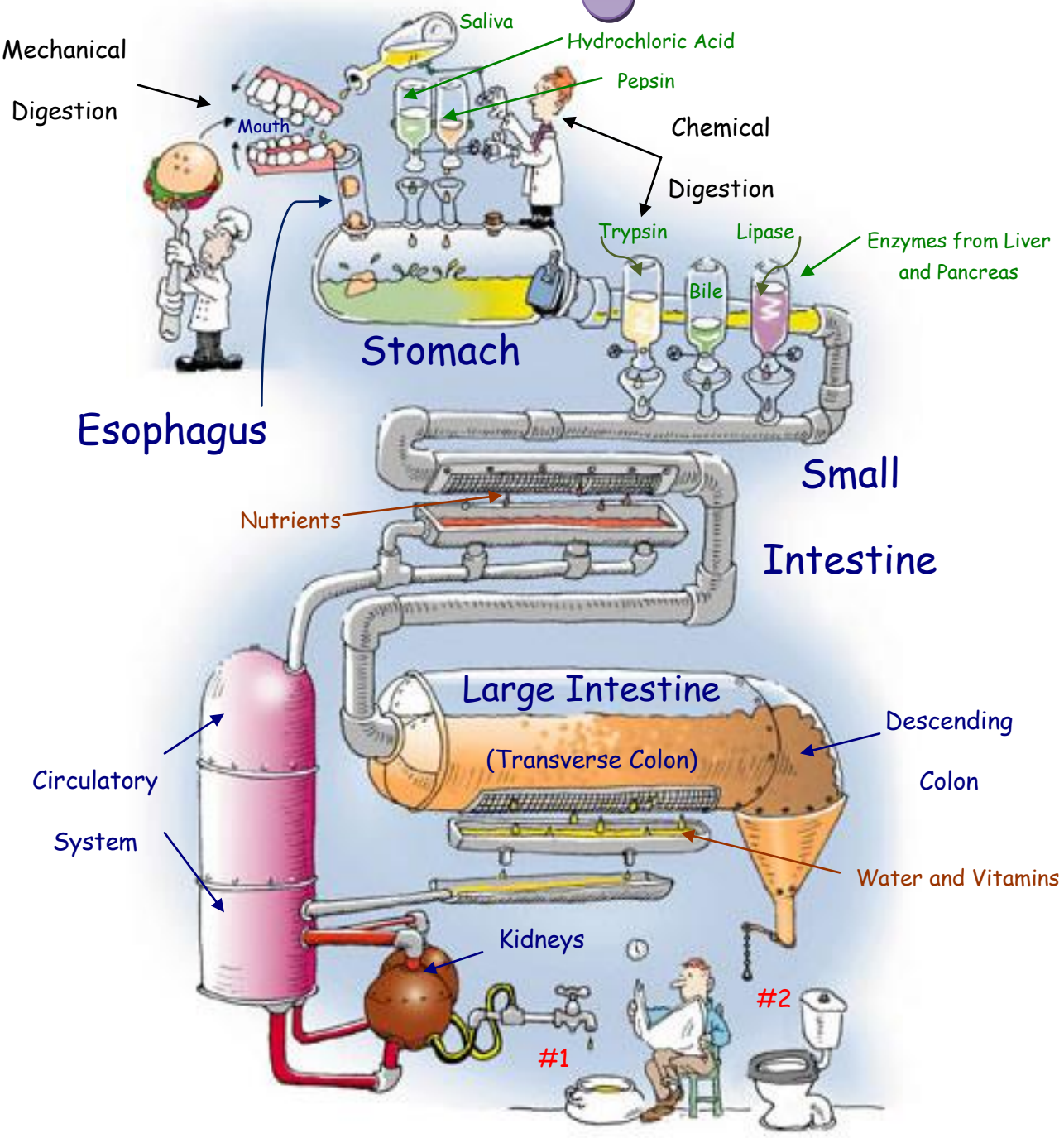


The Digestive System

On your Digestive System Cartoon …

Label these:

- Nutrients
- Water and Vitamins
- Mechanical Digestion
- Chemical Digestion

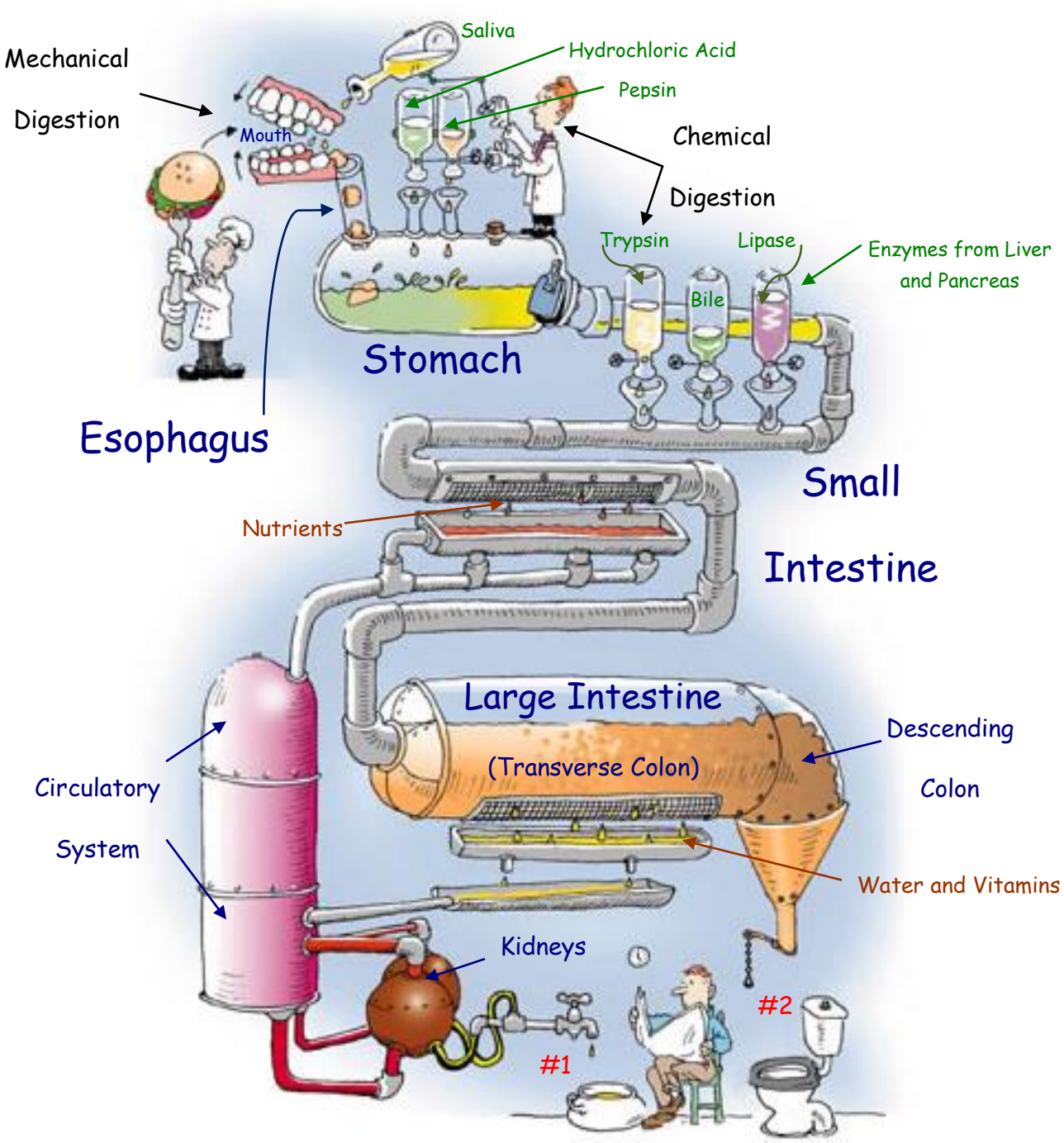


The Digestive System

On your Digestive System Cartoon …

Label these:

- #1 (Urine/pee pee)
- #2 (Solid Waste/poop)

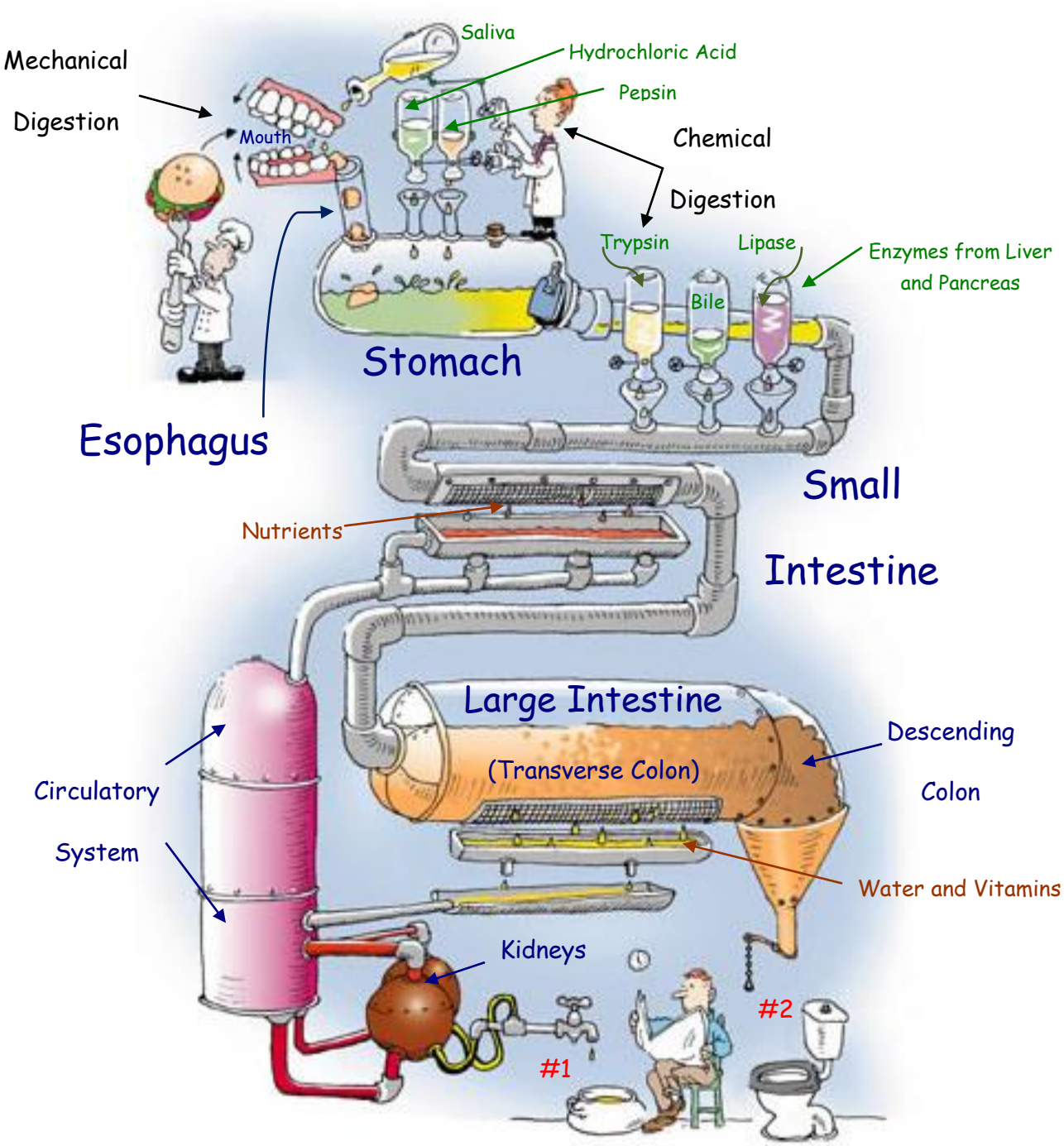


The Digestive System

On your Digestive System Cartoon …

- Color all parts
- Complete the SUMMARY of DIGESTION

(both of these can be done at home if needed)



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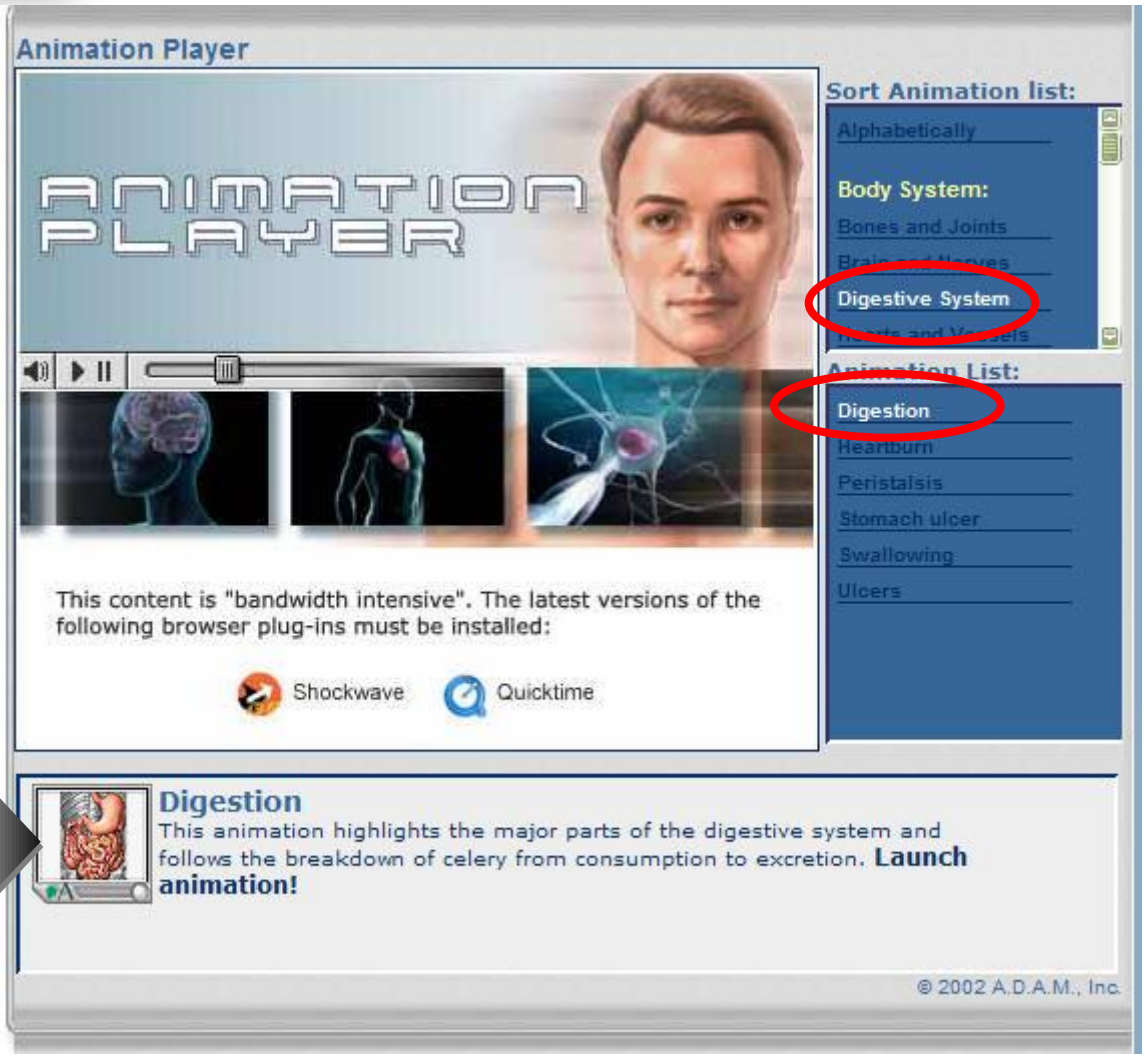
Digestion

Answer all questions on the answer sheet

Click here



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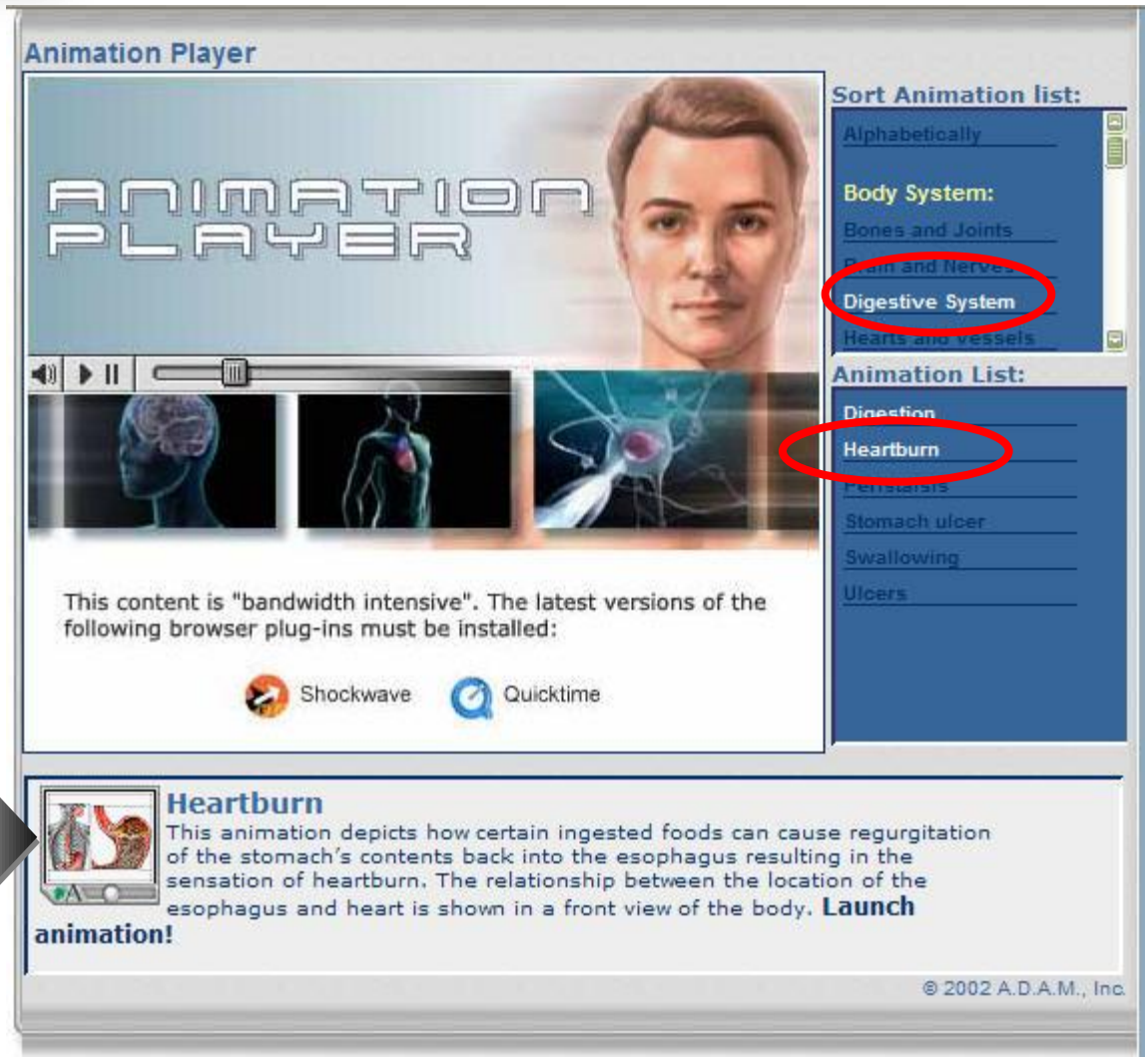
Heartburn

Answer all questions on the answer sheet

Click here



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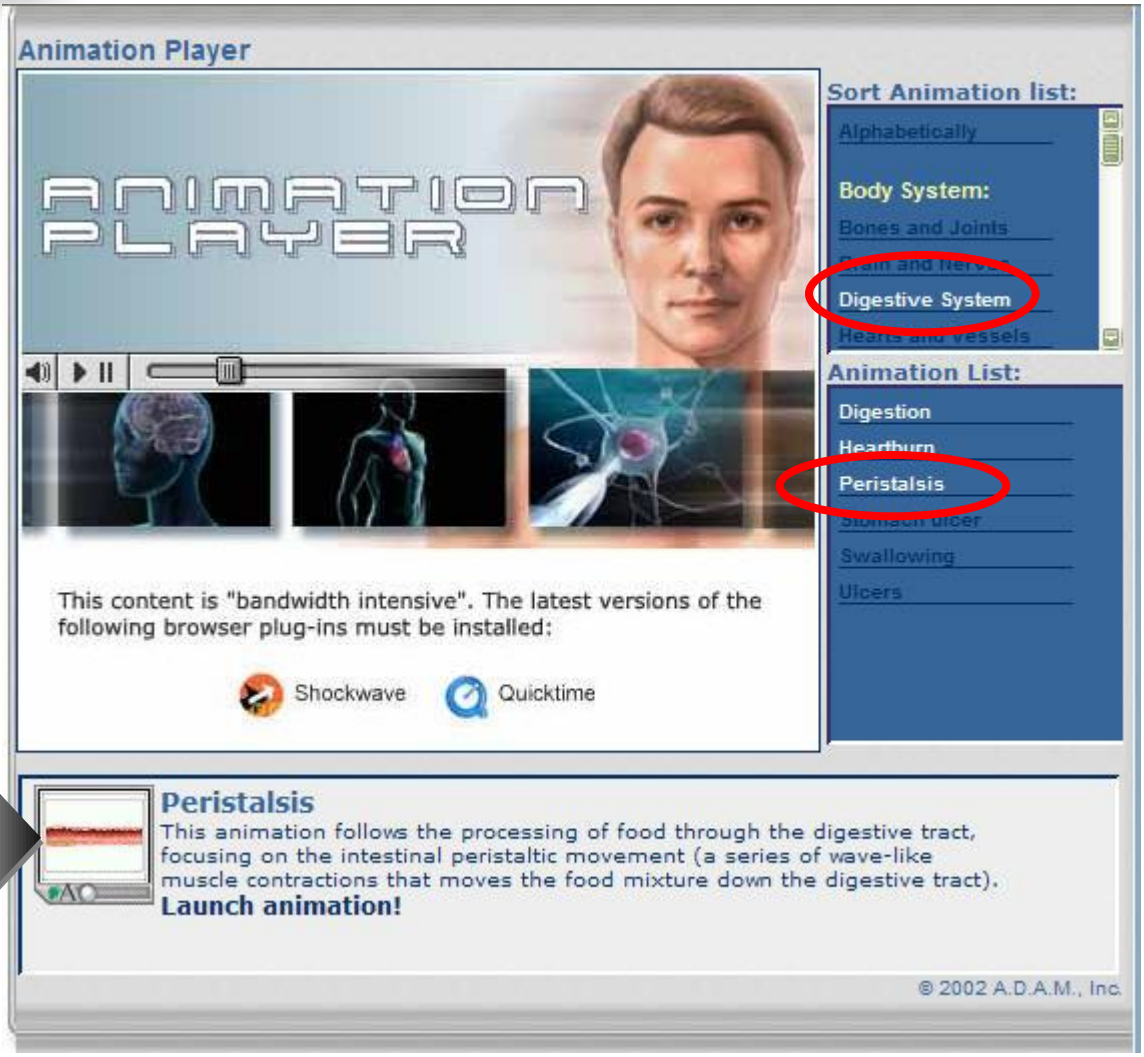
Peristalsis

Answer all questions on the answer sheet

Click here



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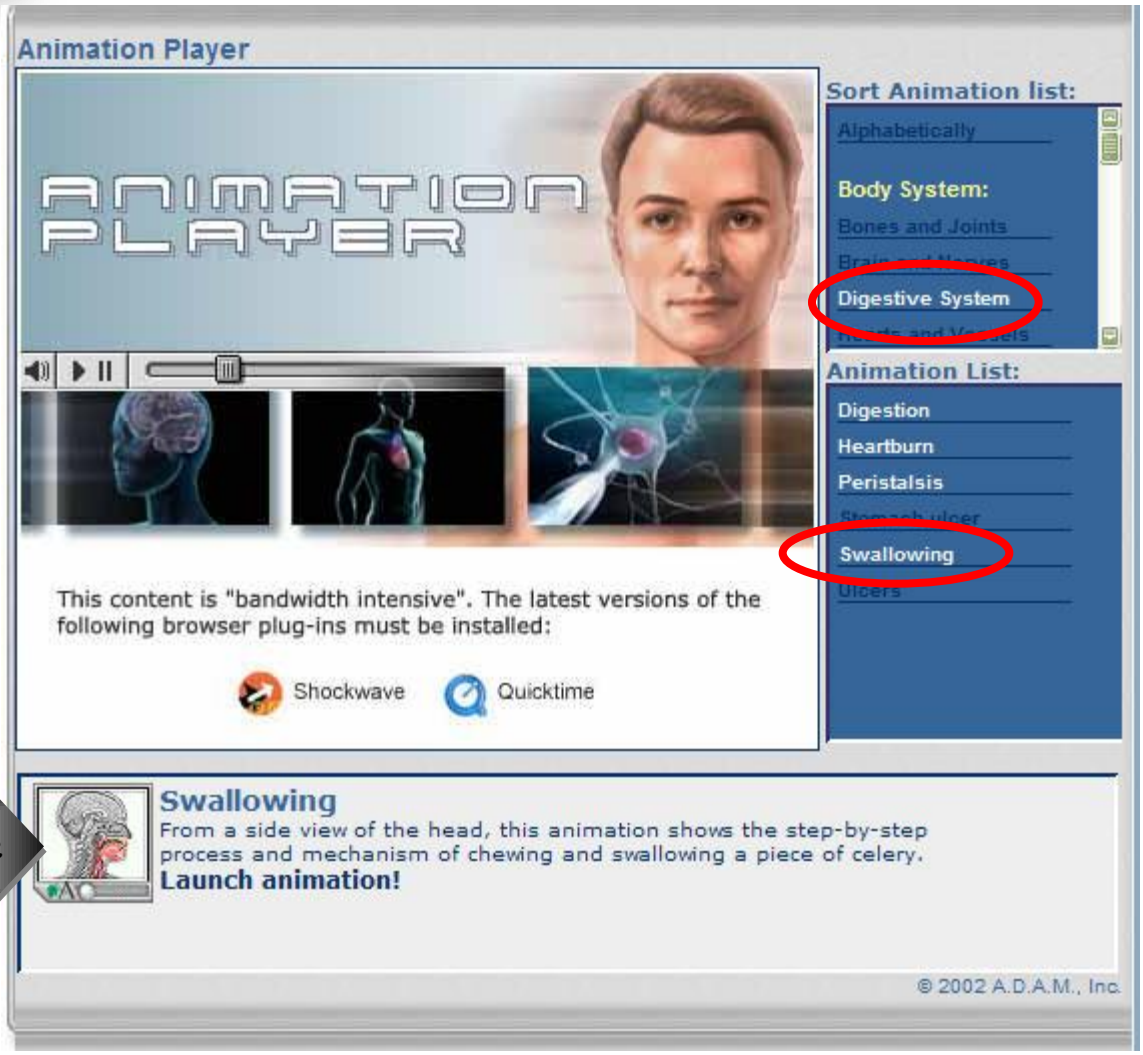
Swallowing

Answer all questions on the answer sheet

Click here



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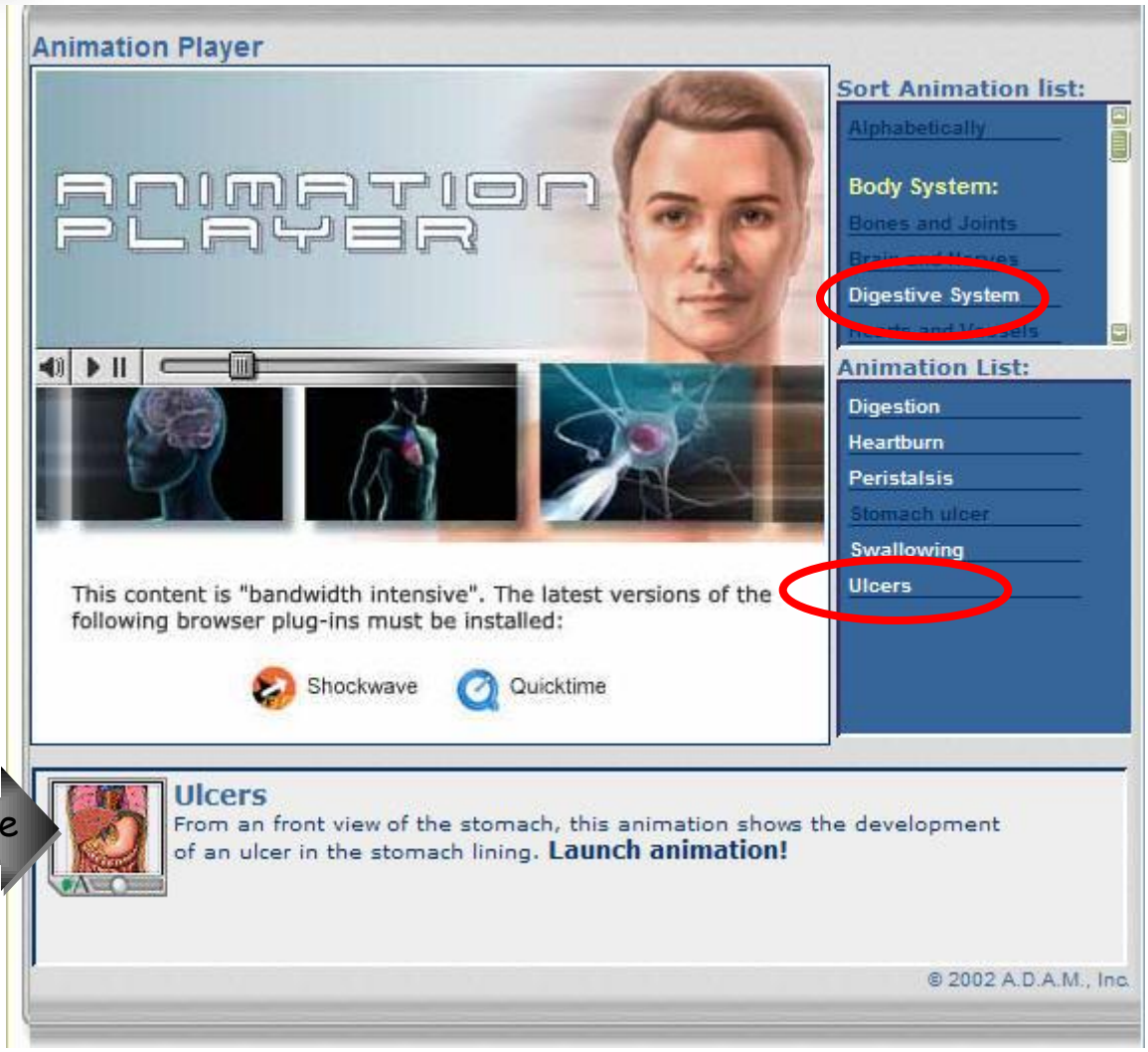
Ulcers

Answer all questions on the answer sheet



Click here

The Digestive System is a Giant Food Processor

Mechanical Digestion

Food is chopped and ground into small pieces in the mouth.

Chemical Digestion

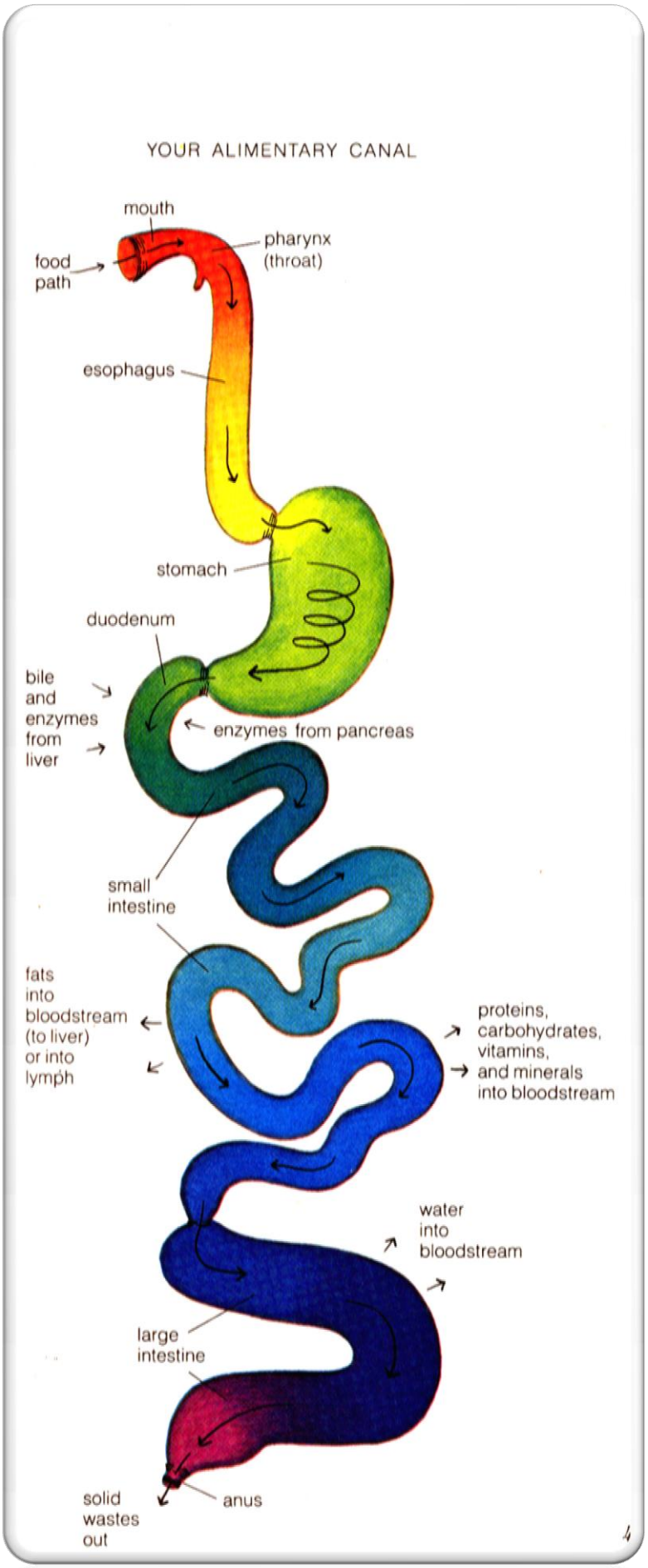
Food is broken down into simple nutrients by the chemical action of enzymes.

Nutrients

Carbohydrates are broken down into simple sugars (glucose) which is used by the cells for energy.

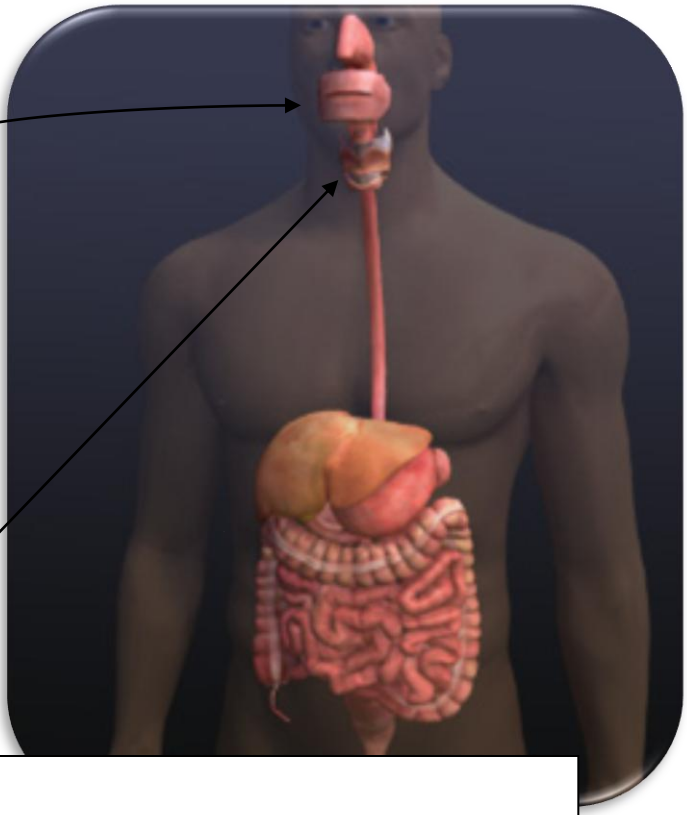
Proteins are broken down into amino acids (the building blocks of cells) which are used to repair old cells and build new cells (skin, blood, muscle, bone and nerve).

Fats are stored for future use. They contain vitamins.



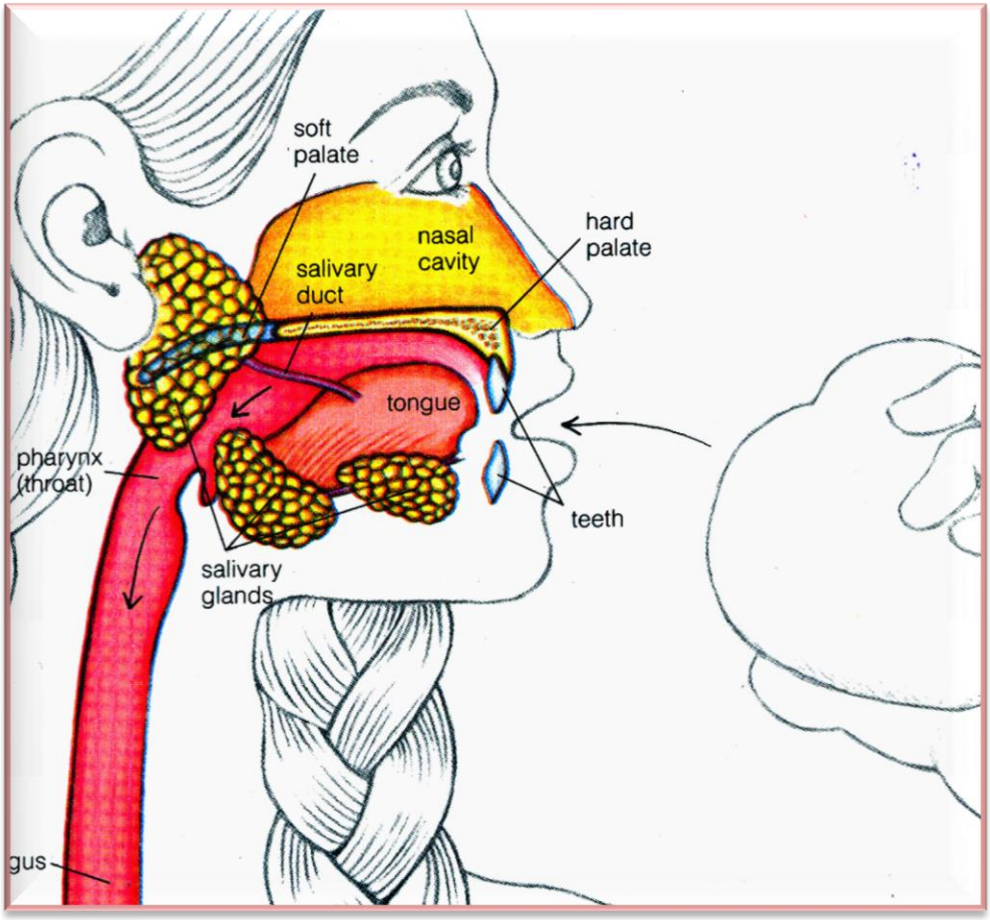
The Mouth

- Food is cooled or warmed to body temperature.
- Teeth chop and grind food and the tongue mashes the food.
- Saliva moistens the food and begins breaking down carbohydrates.
- The tongue moves the food to the back of the mouth to be swallowed.



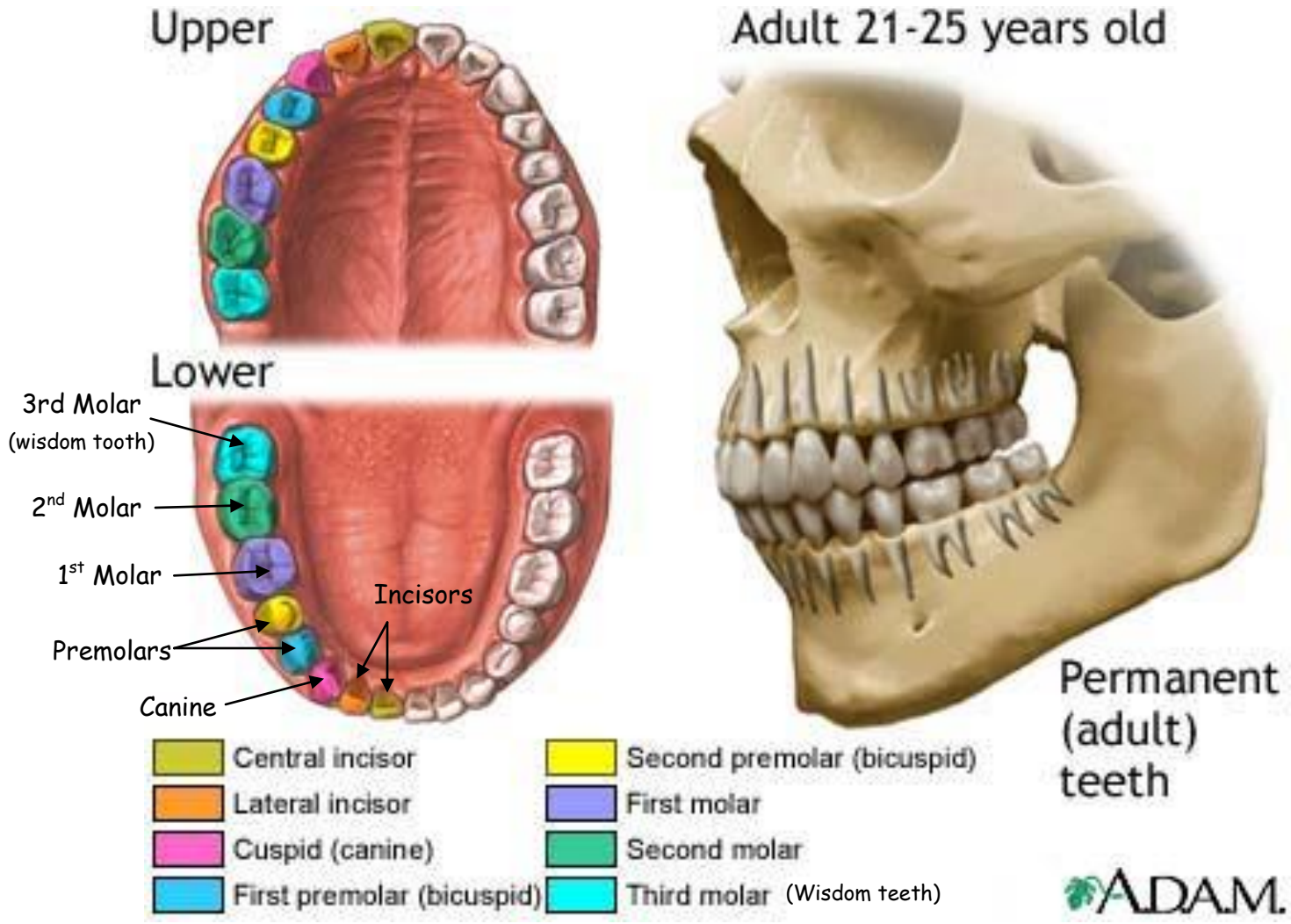
The Throat

- The Epiglottis closes off the wind pipe (trachea).
- Muscles push food into the esophagus.



The Salivary Glands

- Produce *saliva.*
- Saliva is an enzyme (chemical) that begins the breakdown of starches.
- Food becomes moist and "mushy" so that it can be easily swallowed. The food is now called a **Bolis**.

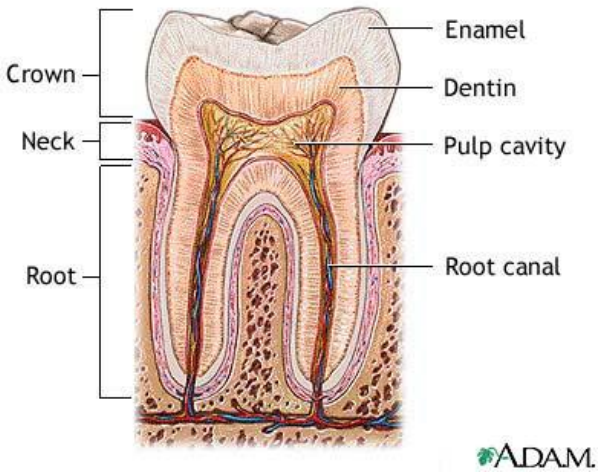


Your Teeth are specialized

- An adult has 32 teeth including 4 wisdom teeth.
- The Incisors are shaped like knives for cutting and slicing.
- The Canines have points for piercing and tearing.
- The Premolars and Molars have broad, bumpy surfaces for grinding.

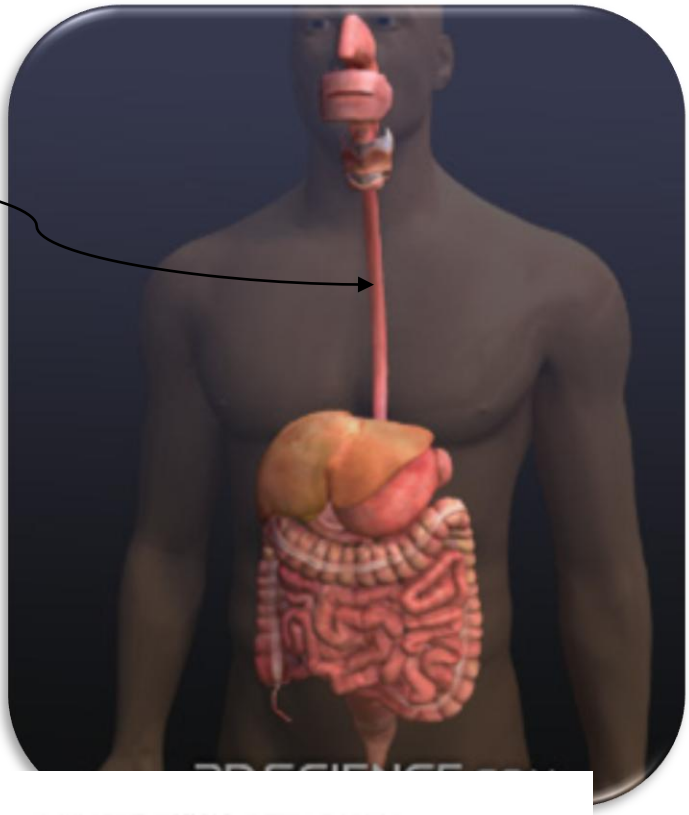
Tooth Anatomy

- Enamel is the hardest part of tooth. Made mostly of mineral.
- Dentin is softer than enamel. Contains some living cells.
- Pulp is also called the "nerve" of the cell. It is a soft tissue that contains living nerve cells.

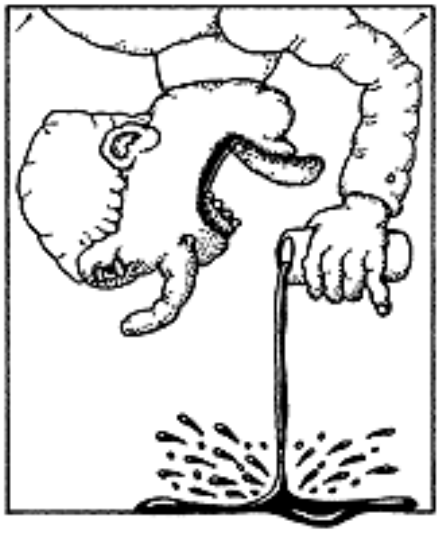


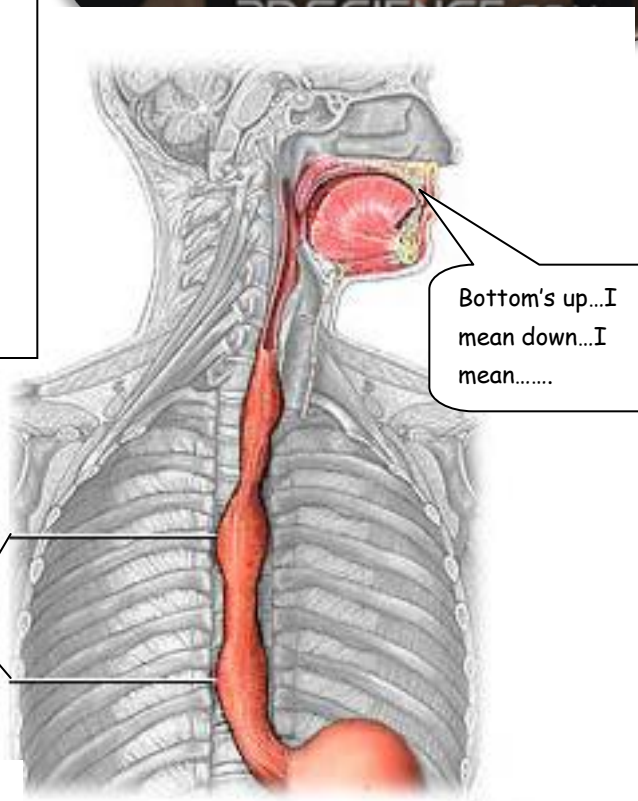
The Esophagus

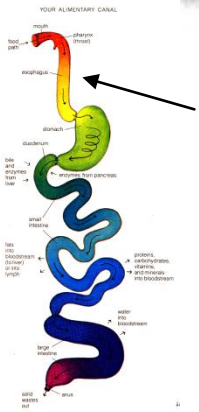
- Connects the pharynx (throat) to the stomach.
- About 10 inches long.
- Flat when empty but changes shape to allow food to travel to the stomach.
- Made of several layers of muscle that push food through to the stomach (peristalsis).



Peristalsis is the name given for the wavelike muscle contractions found in the esophagus, small intestines and large intestines. It is sort of like squeezing toothpaste through a tube.



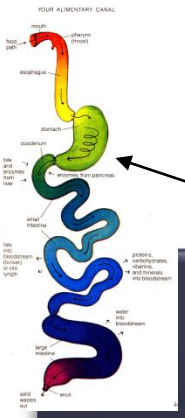




Yes, it is even possible to drink while upside down!!

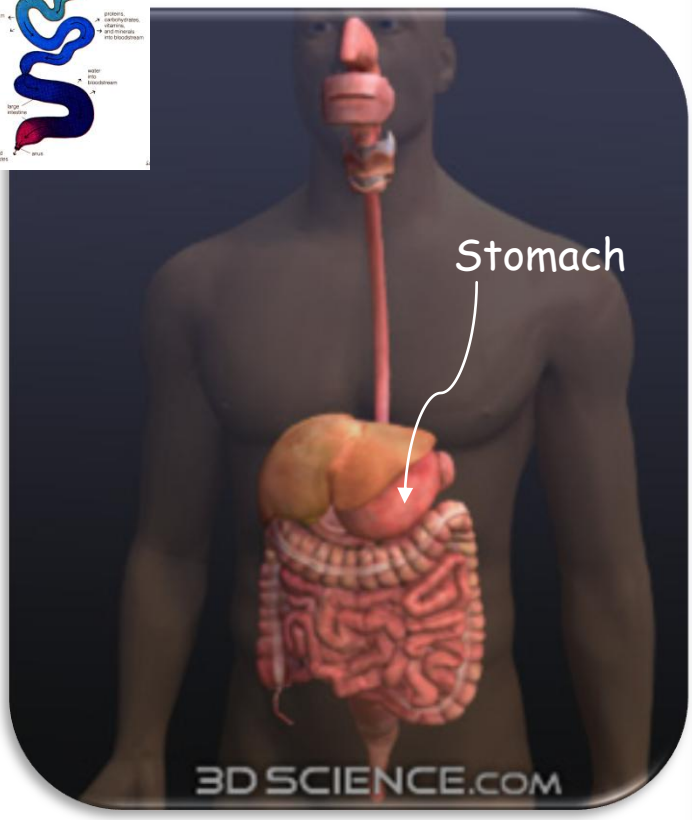
The Stomach

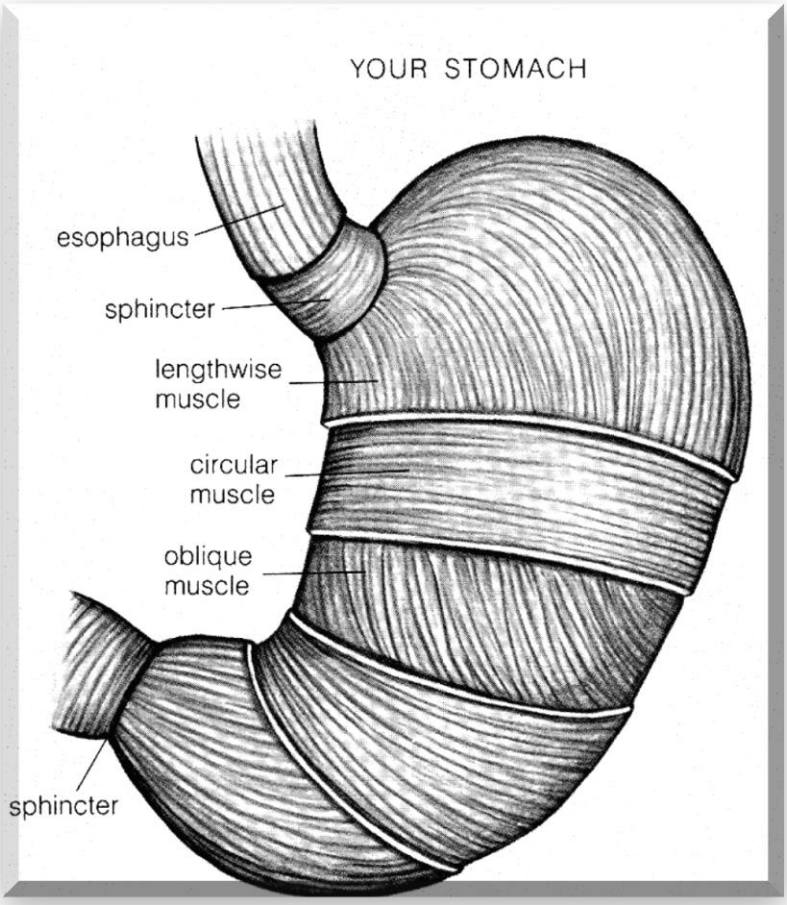
- Food enters the stomach from the esophagus.
- Hydrochloric Acid is produced in the stomach to digest proteins and kill off bacteria.
- Pepsin (a digestive enzyme) is produced to help digest proteins.
- Mucus is produced by glands of the stomach to protect the stomach from its own acid.
- Sphincter muscles control both ends of the stomach to allow food to enter and exit.
- The stomach is made of 3 strong layers of muscle which mixes and mashes the food with digestive enzymes.

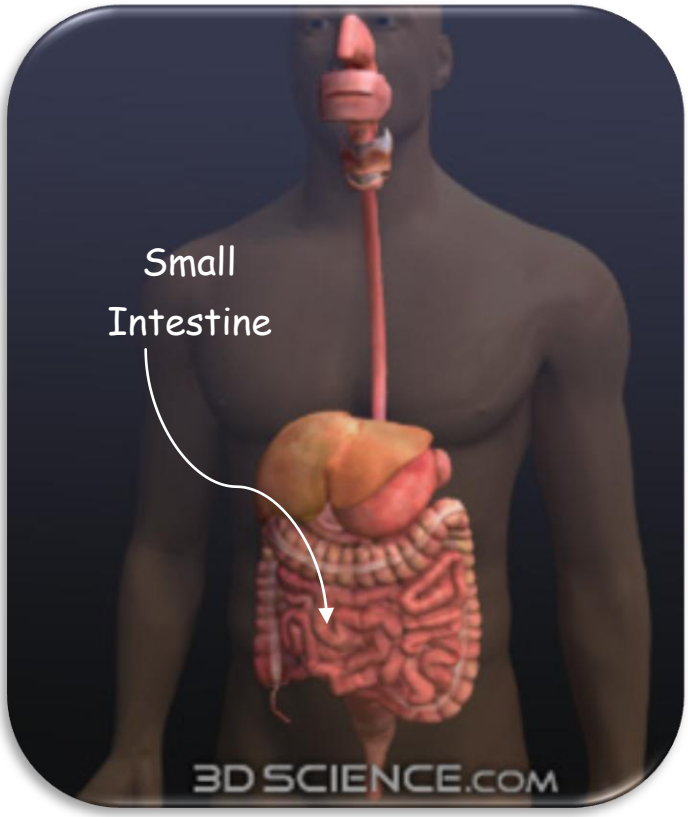


Stomach

An ***ulcer*** forms when the stomach's protection breaks down its own acid begin to eat through the stomach.

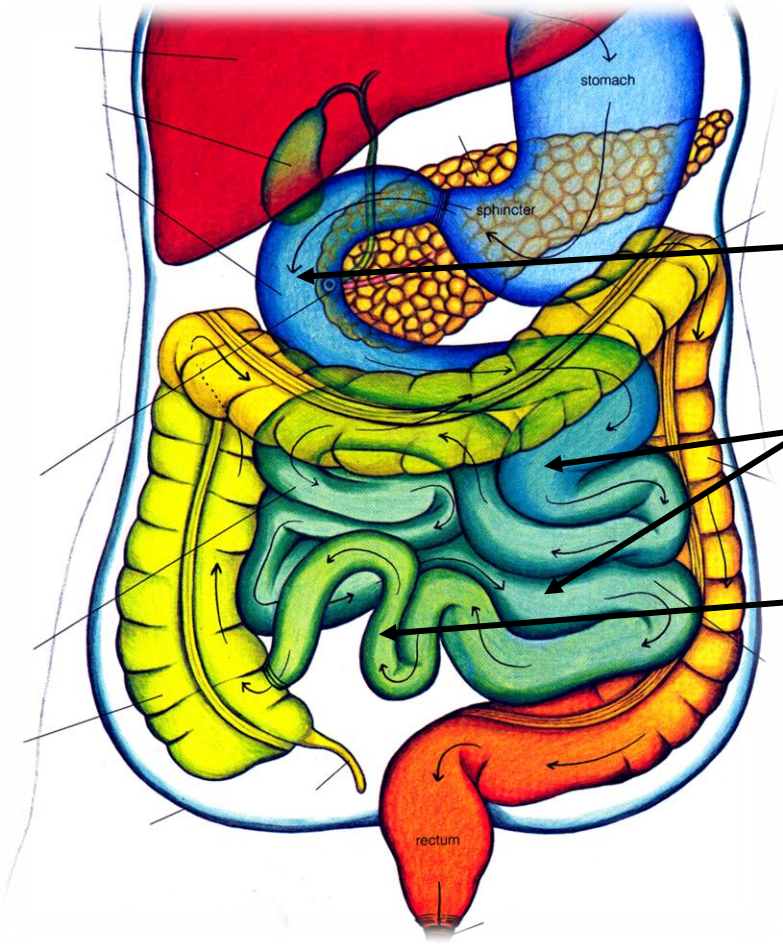






Small Intestine

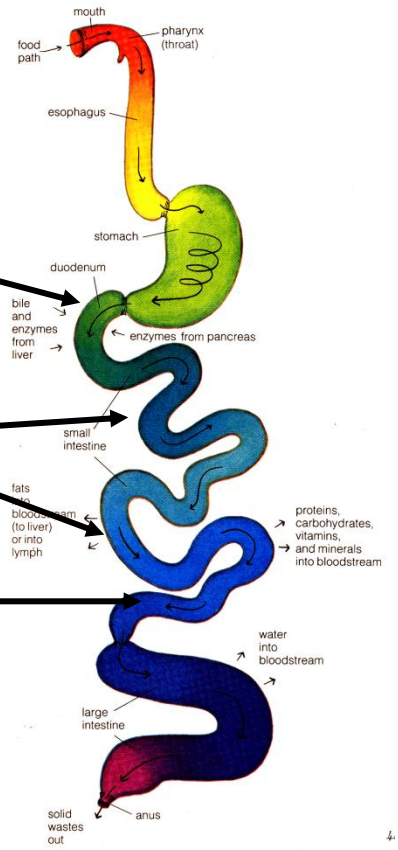
- The longest part of the alimentary canal (digestive tract).
- Divided into 3 parts:
  Duodenum – first segment
  Jejunum – middle segment
  Illeum – last segment
- Digestive enzymes from the liver and pancreas help to break down food further.
- Nutrients are absorbed into the body through the *villi.*



Duodenum

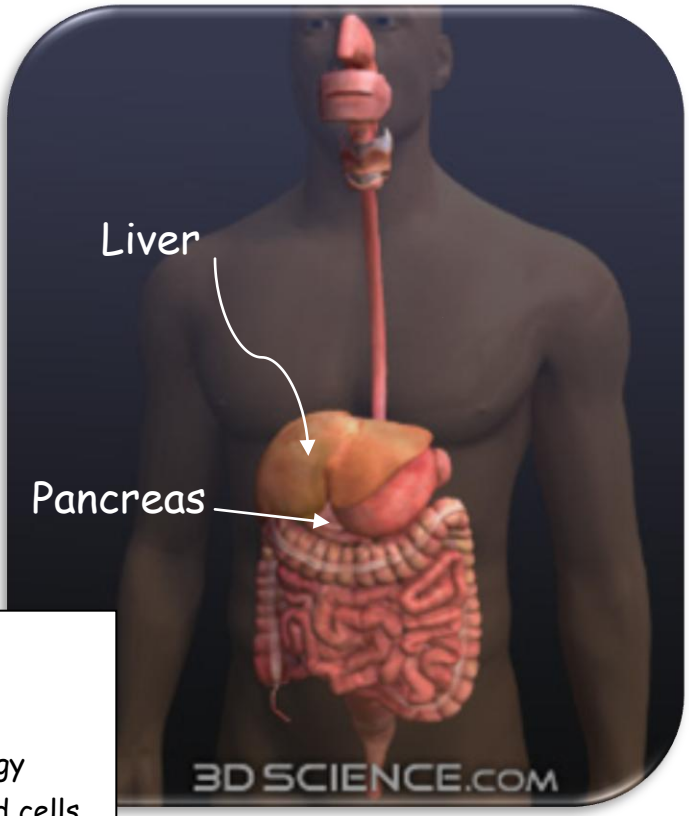
Jejunum

Illeum



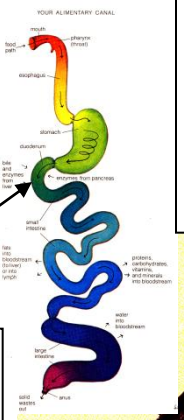
The Liver, Gallbladder, and Pancreas

- The Liver produces the enzyme (chemical) *bile* Bile breaks down fats.
- Bile is stored in the gallbladder and enters the duodenum (1st part of small intestine) when needed.
- The Pancreas produces ½ to 1 liter of enzymes (chemicals) daily. These enzymes are used to break down carbohydrates as well as fats and proteins.

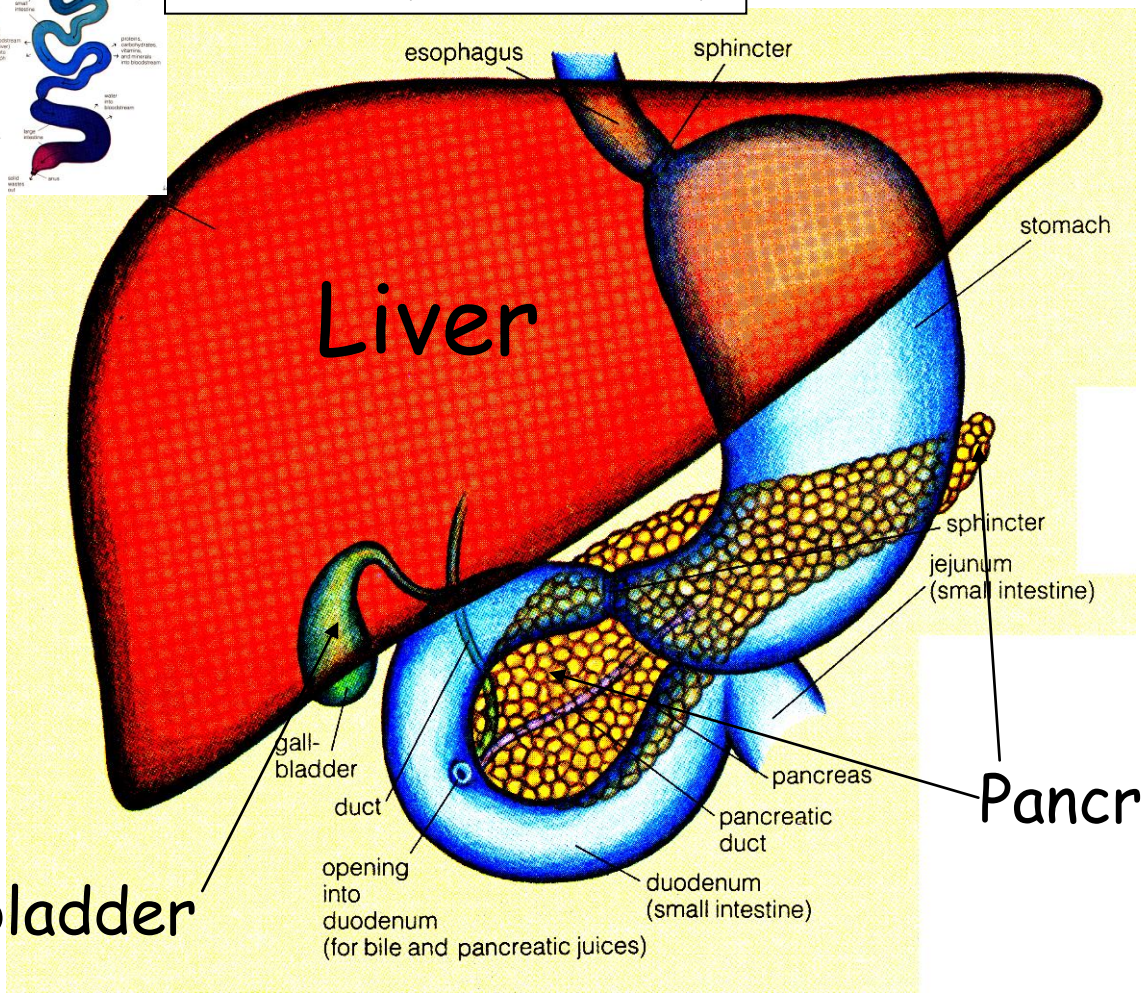


The Liver:

- Stores vitamins
- Stores glycogen for energy
- Breaks down old red blood cells
- Removes poisons from the body



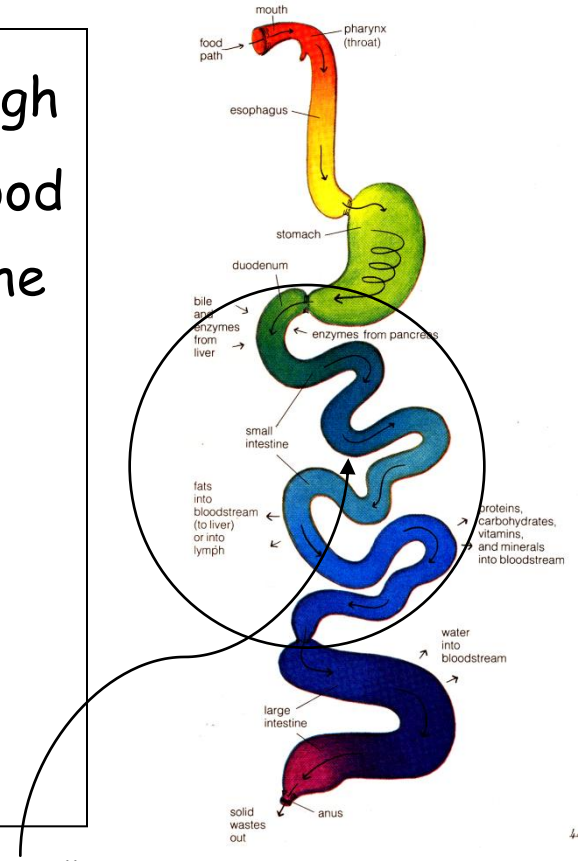
Enzymes from the liver and pancreas enter the small intestine at the duodenum



Nutrients are absorbed through the small intestine where the blood carries them to all the cells of the body.

The Basic Nutrients are:

- Amino Acids
- Simple Sugars
- Fatty Acids



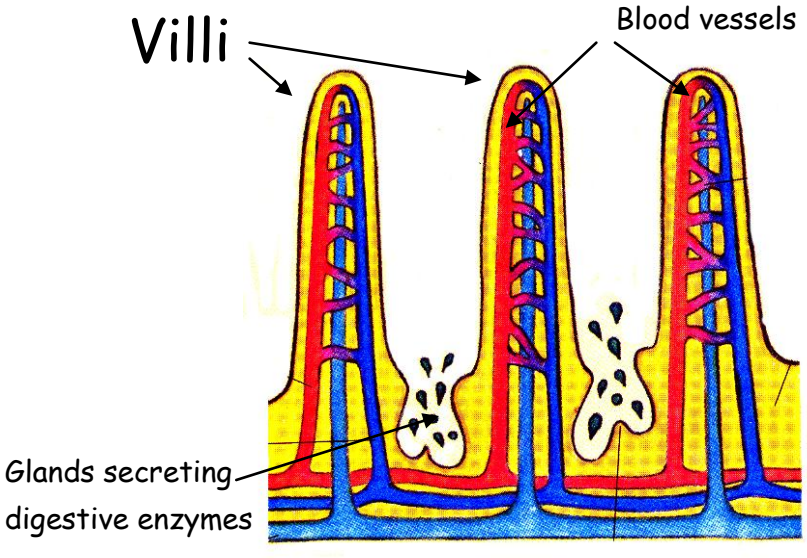
Small Intestine

The inside lining of the small intestine contains *Villi*.

These Villi tiny are fingerlike projections through which the nutrients are absorbed into the bloodstream. The Villi capture nutrients as they move through the small intestine.

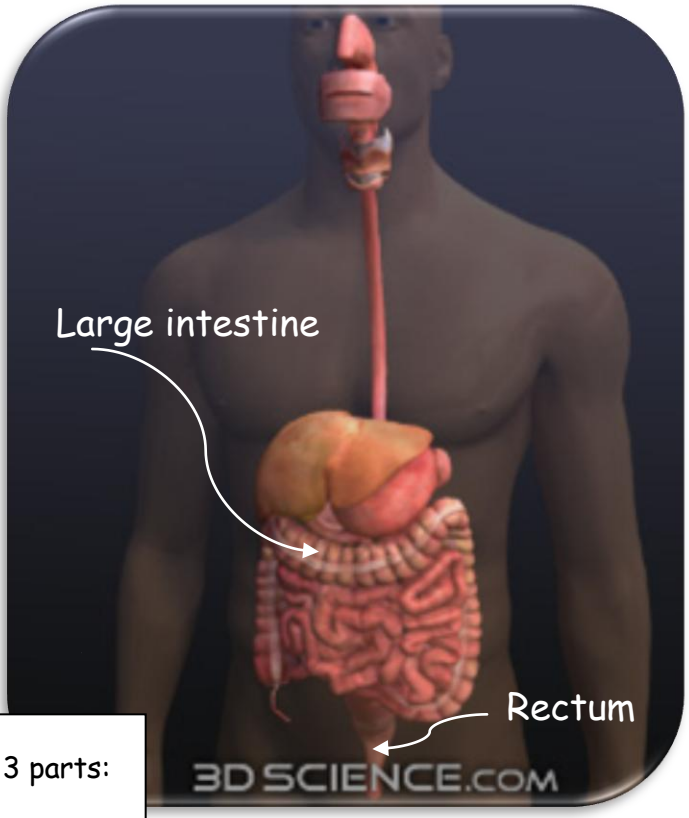
Photograph of Villi magnified (very high power)

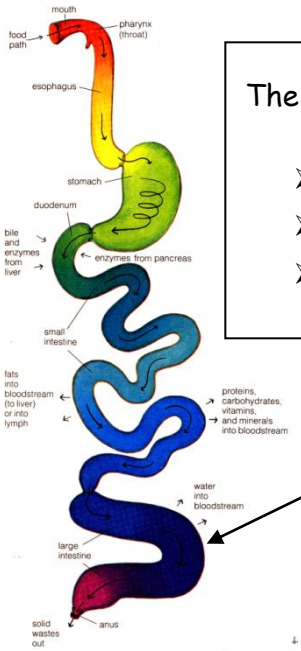
Note; your microscope will not show nearly the detail as in this picture.



In the Large Intestine:

- Indigestible parts of food move from the small intestine to the large intestine.
- Water and vitamins are absorbed back in the blood to be reused.
- The remaining waste passes to the RECTUM where peristalsis forces it through the ANUS and out of the body.



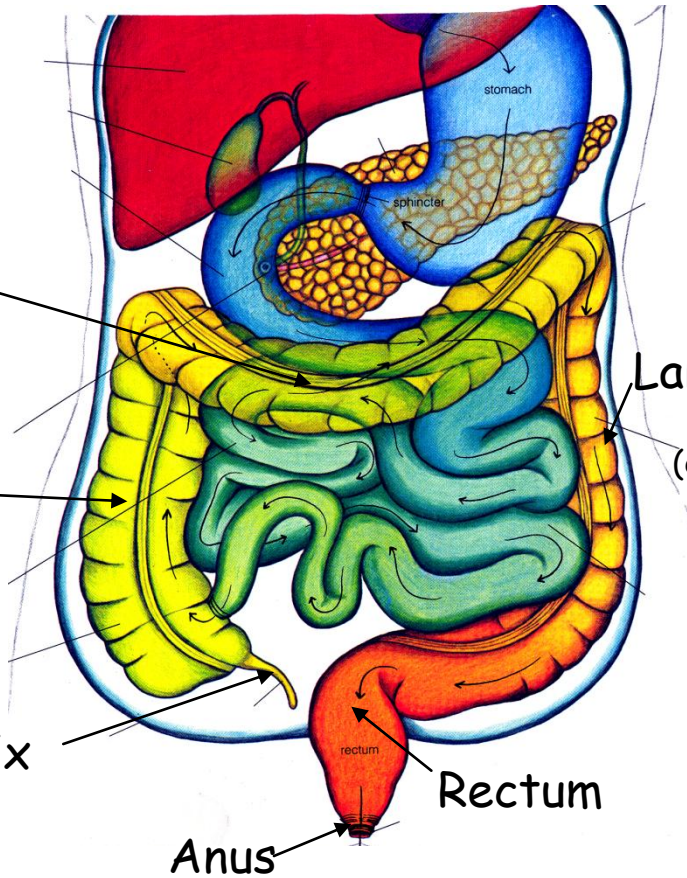


The **Large Intestine** is made of 3 parts:

- Ascending colon
- Transverse colon
- Descending colon

Note: The Appendix serves no useful purpose. Perhaps it had a role in digesting rough foods many, many years ago.

Large Intestine



Large Intestine
(transverse colon)

Large Intestine
(descending colon)

Large Intestine
(ascending colon)

Appendix

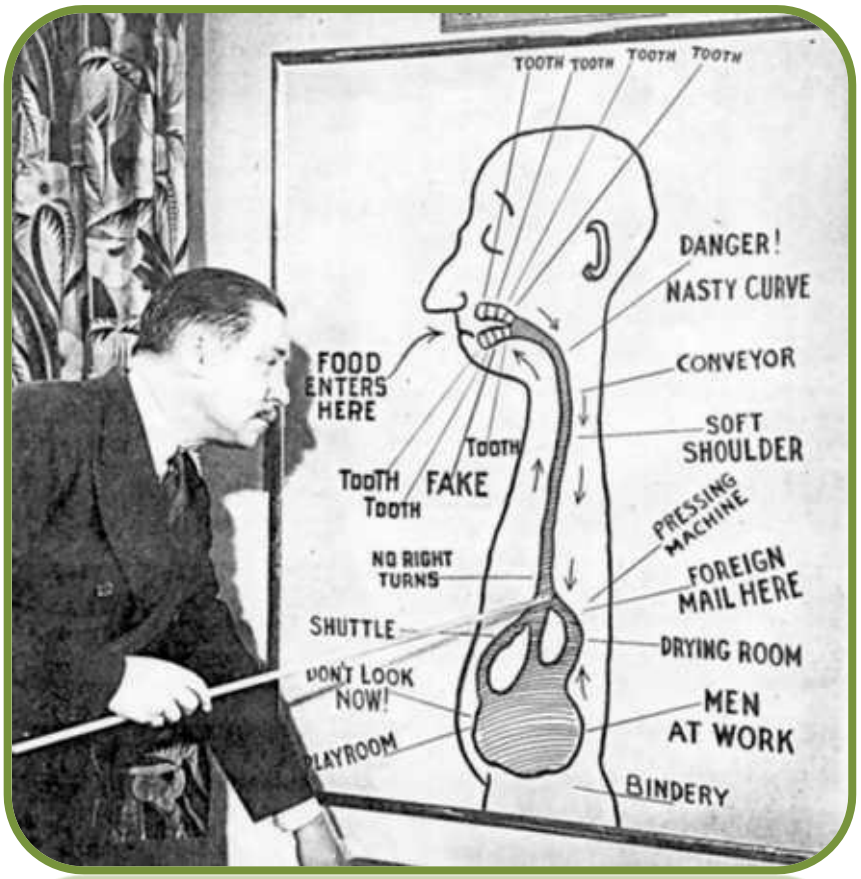
Rectum

Anus

Try to swallow this…

some interesting facts about your digestive system.

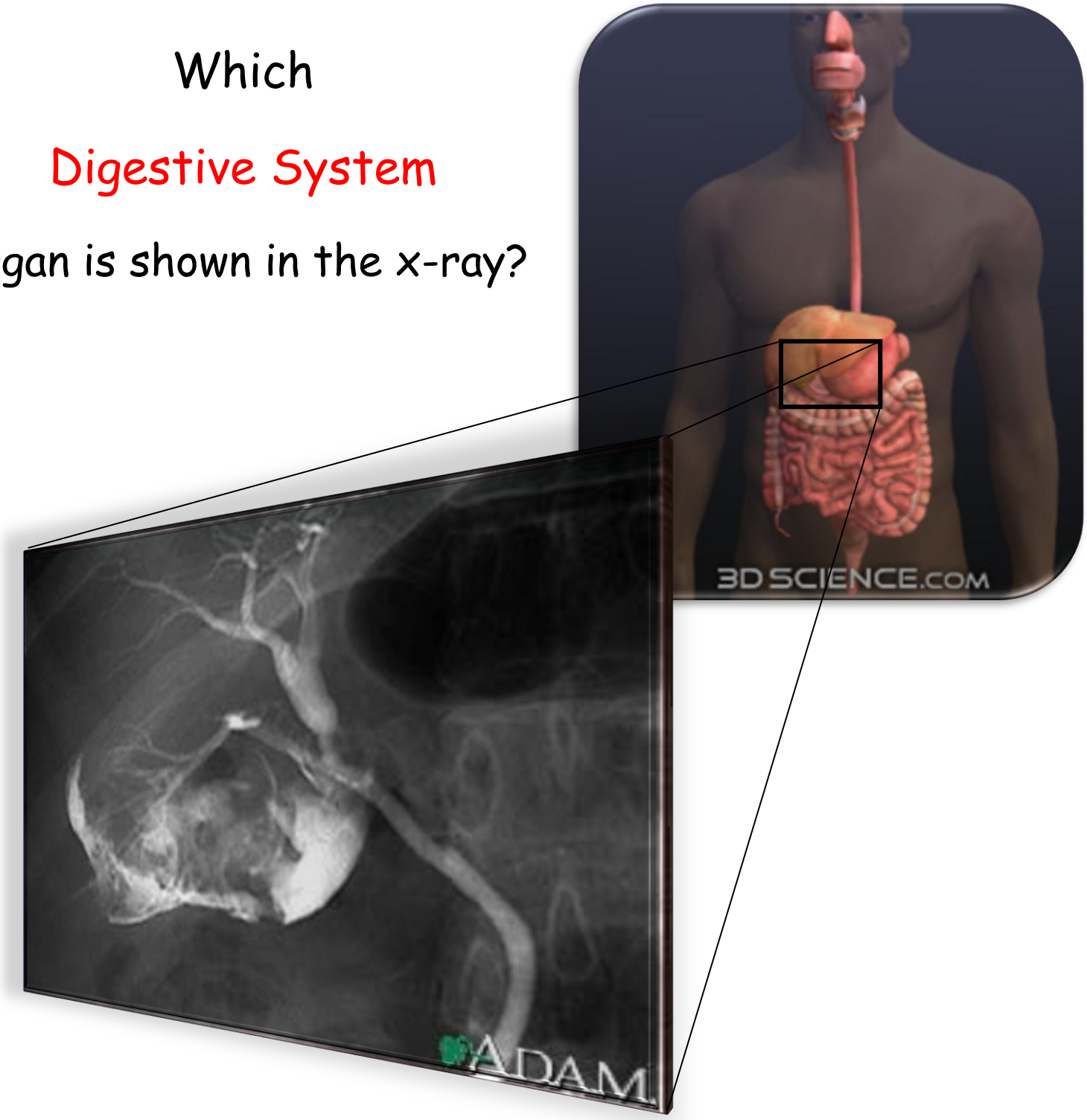
- The average digestive tract (alimentary canal) is 27 feet long!
- During a lifetime, a person will process between 60,000 to 100,000 pounds of food!
- Just the sight and smell of food begins the digestive process (saliva in your mouth, esophagus begins to ripple, stomach produces digestive enzymes)
- Your stomach can expand to hold 2 ½ pints of food.
- The liver is the body's second largest organ weighing 3-4 pounds. (the skin is the largest organ)
- A meal takes between 15 to 48 hours to completely digest and move through the alimentary canal.



Which

Digestive System

organ is shown in the x-ray?



Hint:

It stores Bile that was produced in the liver.

(If this doesn't help, do some other stations first)

Check out this x-ray:

The digestive organ colored yellow is probably the

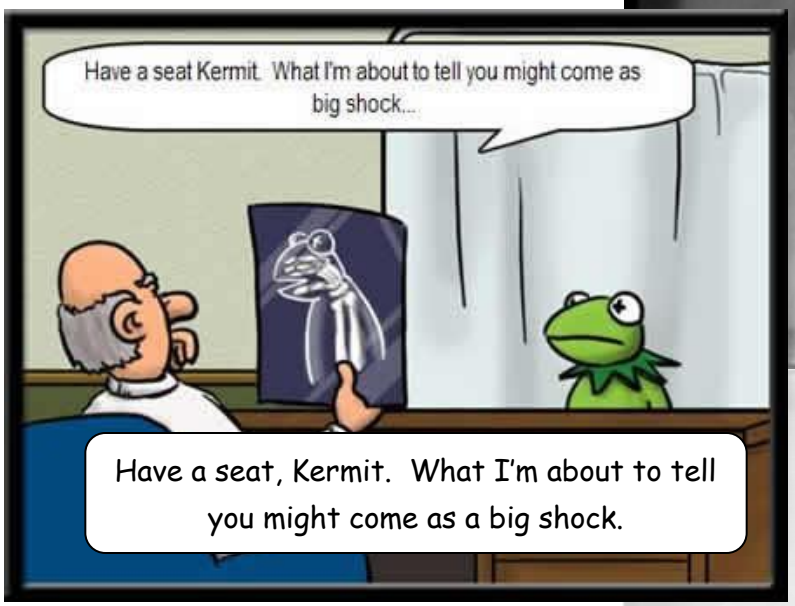
- Small intestine
- Large intestine
- Heart
- Pancreas

The digestive organ colored pink is probable the

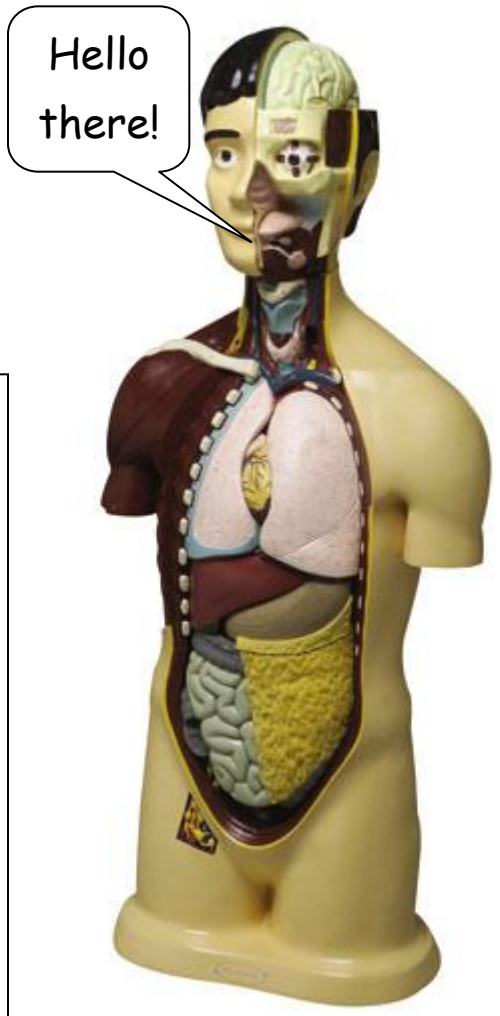
- Small intestine
- Large intestine
- Heart
- Pancreas

(answer on your lab answer sheet)

Hint: if you are not sure, do some other stations first.



This is **Tommy the Torso** (but he prefers Elvis). Tommy is an expensive, hand painted model of the human torso. His organs are removable but must be handled with care.



Do This:

1. Carefully remove the Liver, Stomach, and Intestines.
2. Locate and identify the following parts and match them with the numbers on the model:

Tongue
Salivary Gland
Esophagus
Stomach
Liver
Gallbladder
Pancreas
Duodenum
Small Intestine
Large Intestine
Appendix
Rectum

Choose from these numbers:

111/112	115	120	121/124
126	128	130	132
134	136	140	137/138/139

Return all parts before leaving this station. Ask if you need help.

Place all answers on you lab answer sheet

Your **Saliva** contains the enzyme **amylase** which breaks down huge starch molecules into smaller simple sugars.

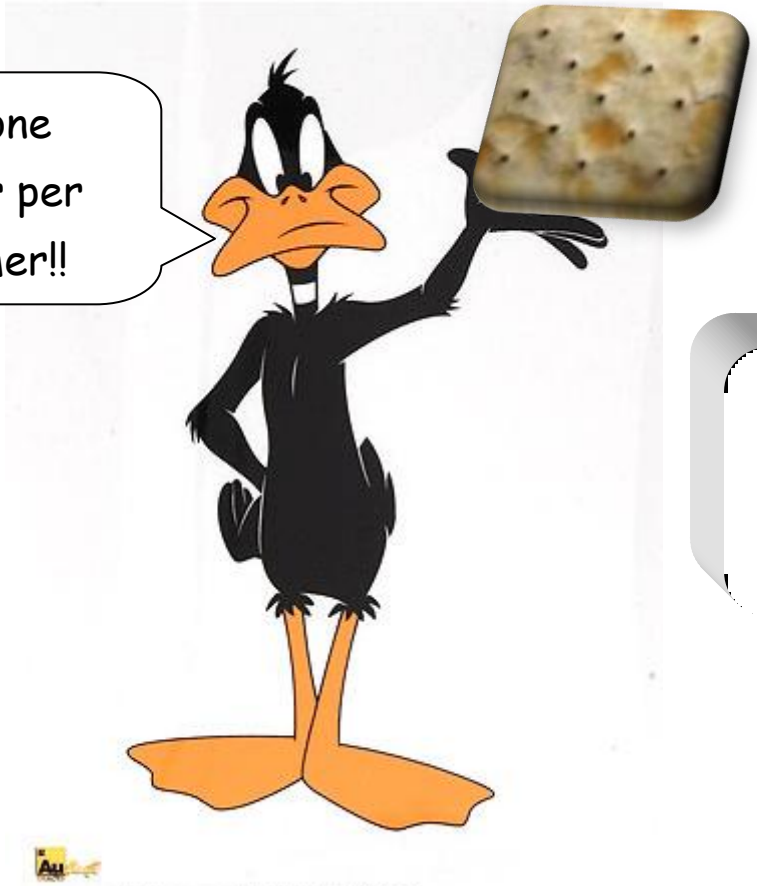
A cracker is mostly carbohydrate (starch) but if you leave it in your mouth long enough, it will become sugar and you will notice a sweet taste!!

Try it!!!

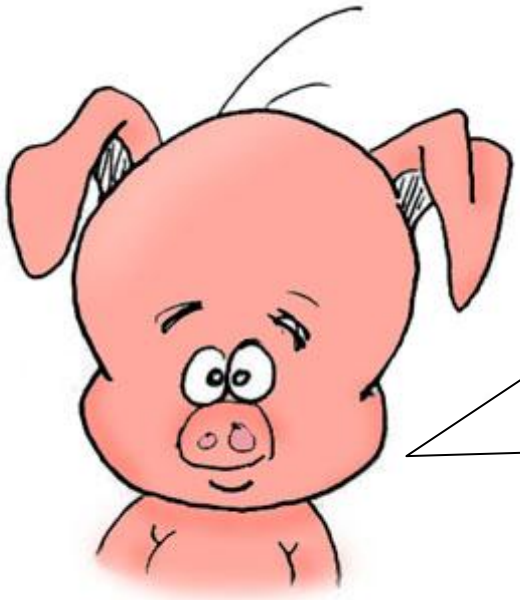
Do this:

1. Take one unsalted cracker and chew but don't swallow.
2. Keep the **bolus** (chewed mush cracker) in your mouth for a minute.
3. After you notice the sweet taste you may swallow. Yum!!

Only one quacker per customer!!



Crackers are located on the front lab table.



How many Digestive System pig parts can you find in this **Fetal Pig Model**?

Locate and identify the following parts and match them with the numbers on the model:

Pancreas

Small Intestine

Gallbladder

Duodenum (1st part of small intestine)

Large Intestine (caecum)

Large Intestine (spiral colon)

Large Intestine (Descending colon)

Liver

Stomach

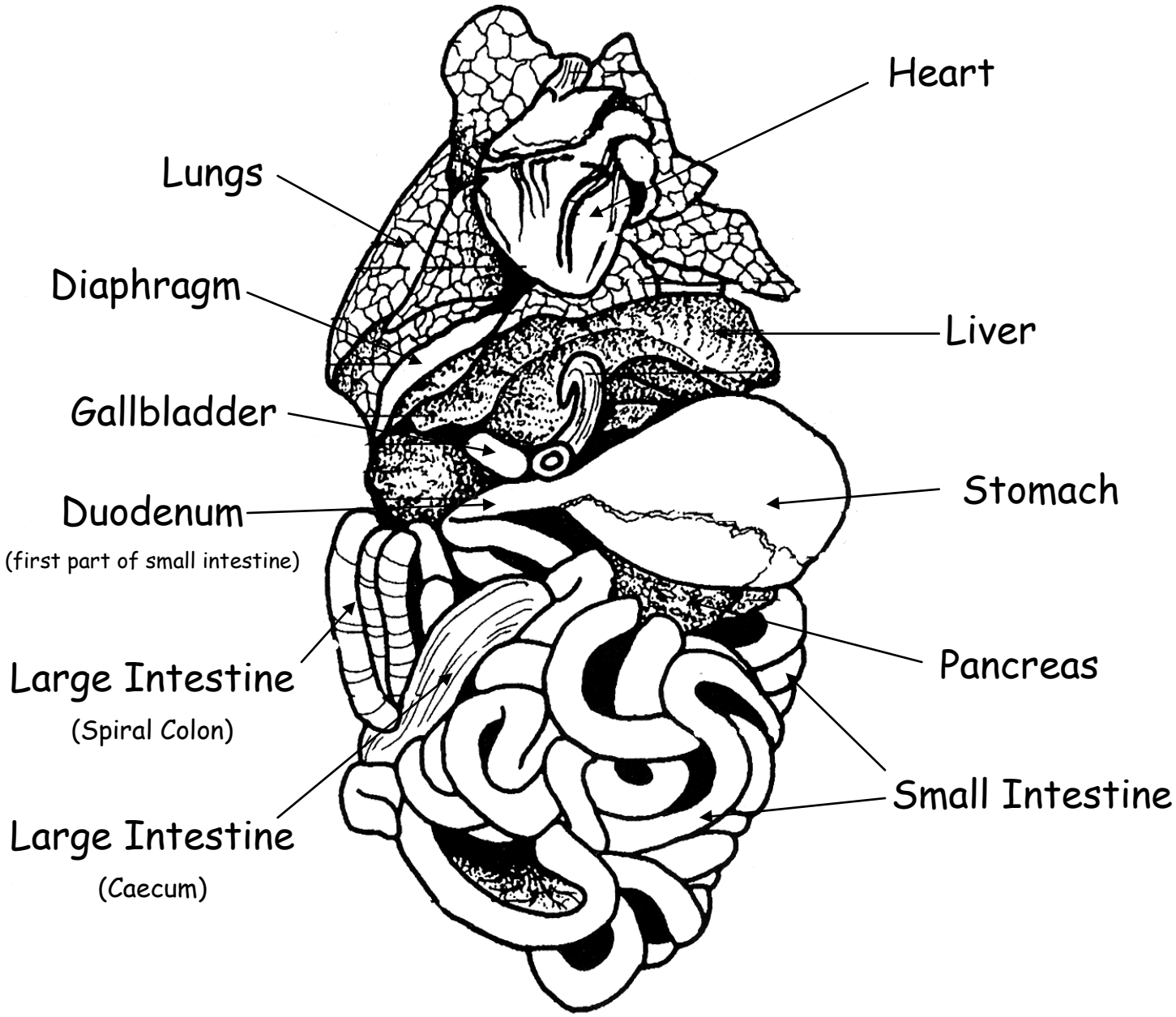
Esophagus

Choose from these numbers:

3	6	11	14
4	7	12	
5	9	13	

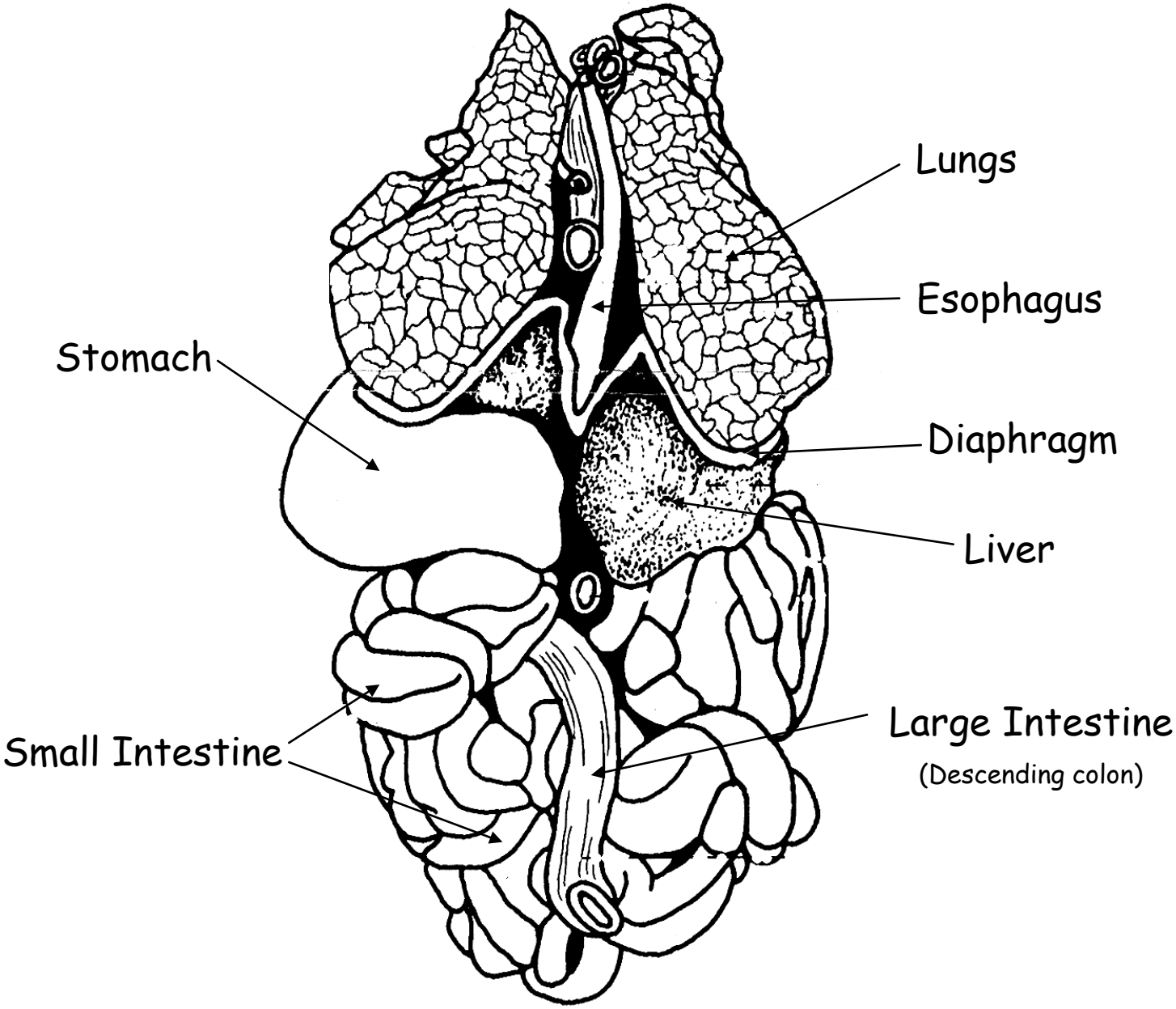
Fetal Pig Internal Organs

Front view

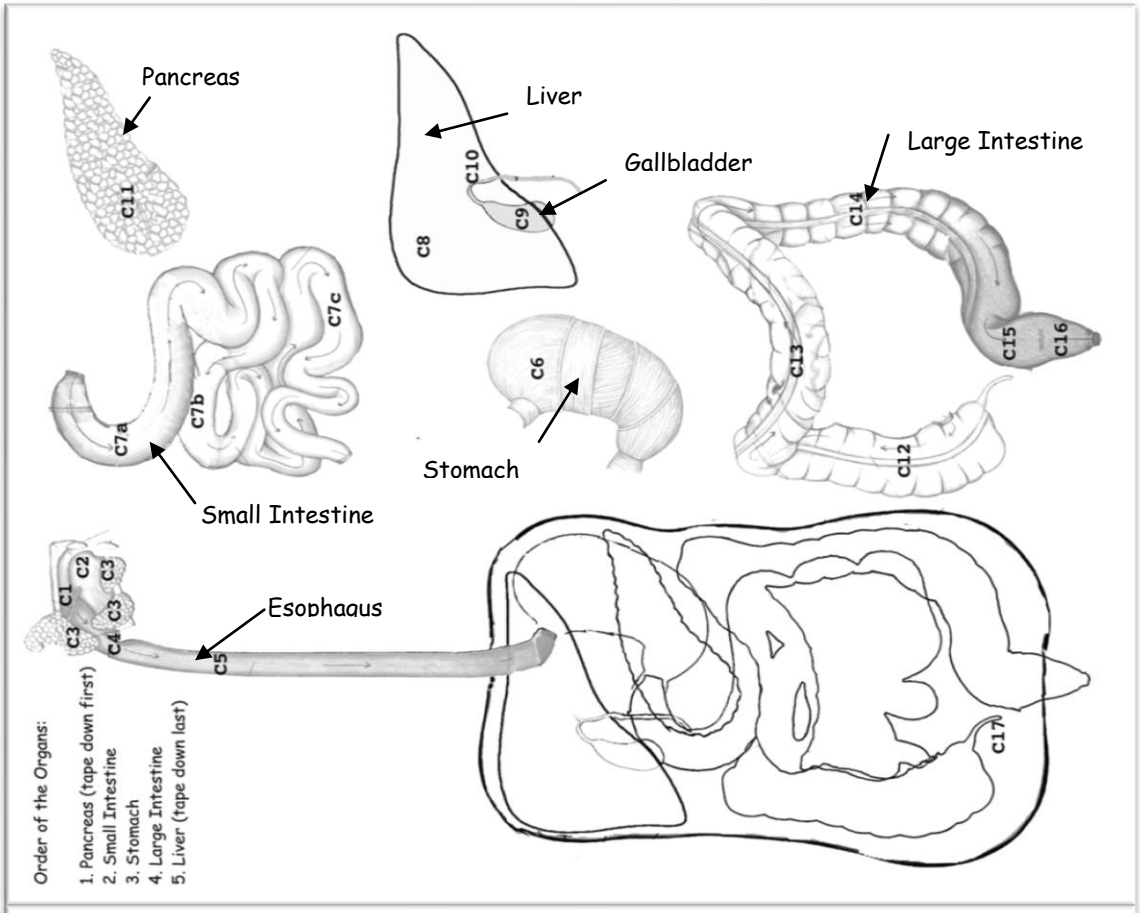


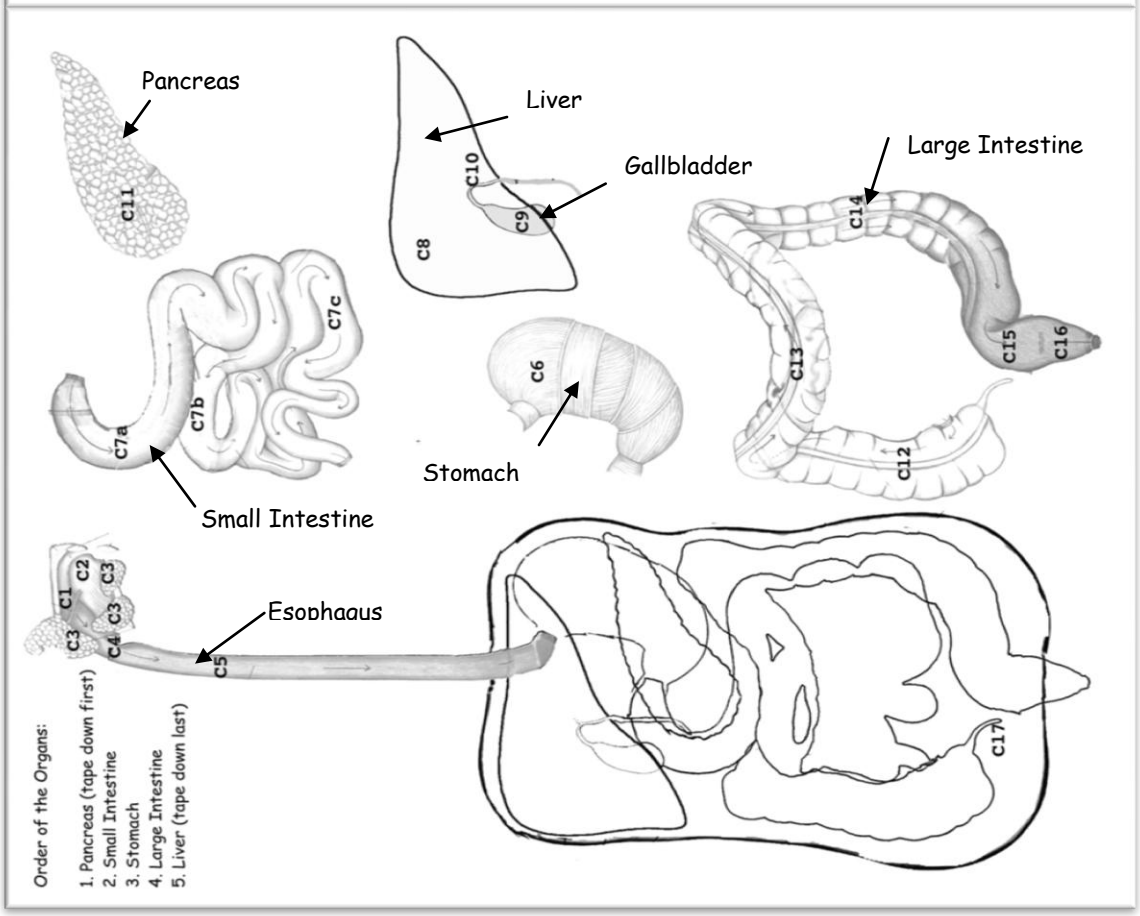
Fetal Pig Internal Organs

Back view



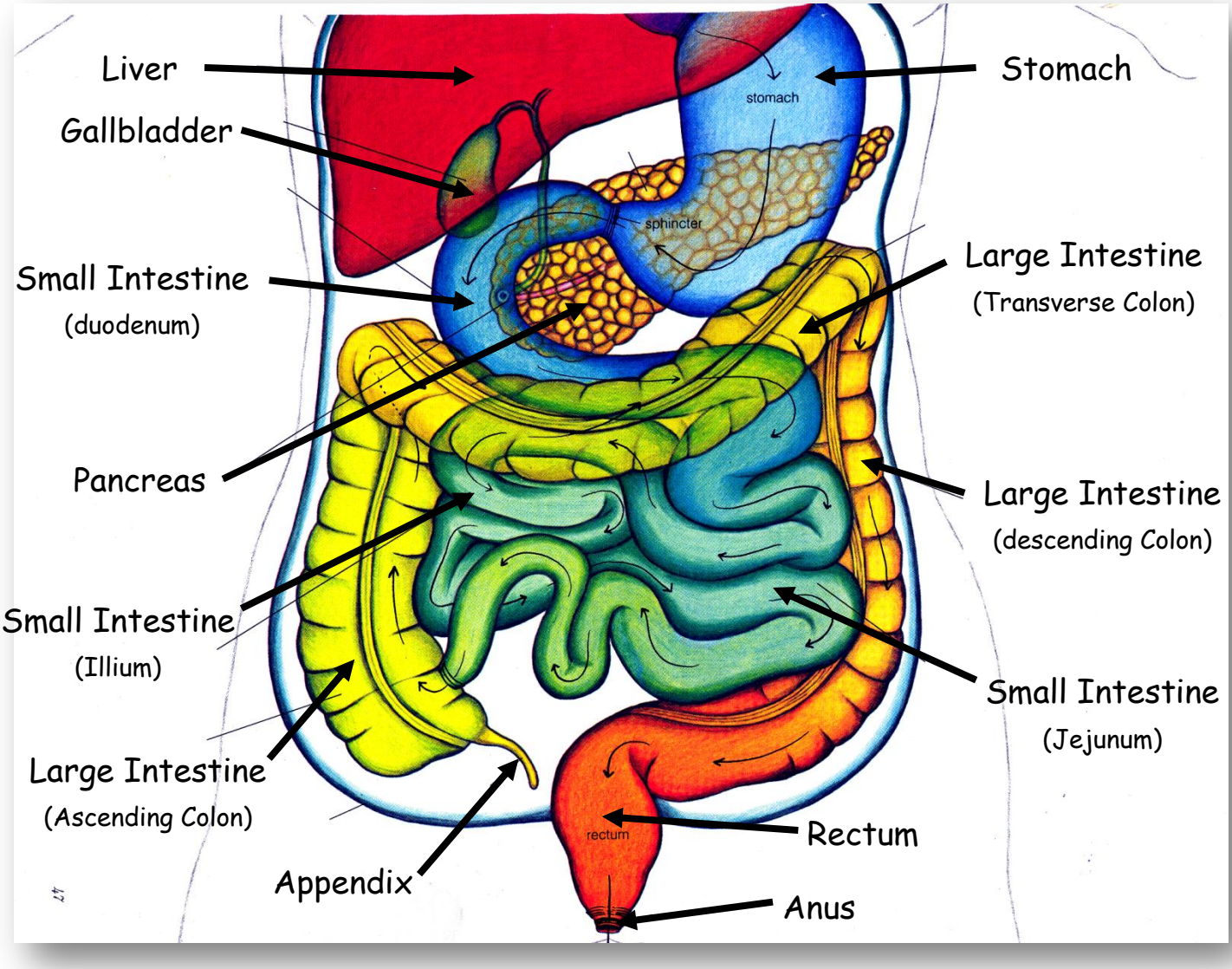
Paper Model of Digestive System

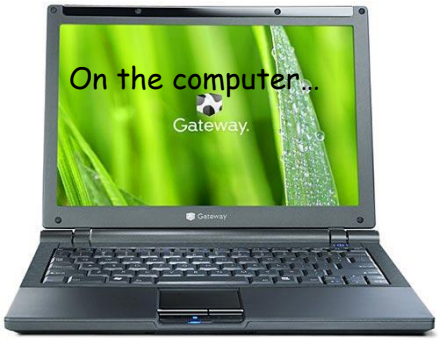




Build a paper model of the digestive system that looks like the picture below!!

1. Color each part so that it looks very similar to the picture.
2. Cut out each part carefully and tape it to the outline. Parts must be taped down in the proper order beginning with the pancreas.
3. Cut out the outline with all of the parts. Find the place on your lab answer sheet labeled "Tape Paper Digestive System Here" and tape your completed paper digestive system in that place.





Go to the Human Biology/Links page of our science website (www.myscience8.com)

Click on *Digestive System Tour Lab*

Find this page in the lab and click on the links. Answer all questions on your lab answer sheet:

1. ## A Balanced Diet

http://lgfl.skoool.co.uk/content/keystage3/biology/pc/learningsteps/ABDLC/launch.html

Also found at www.myscience8.com

Human Biology/Links page

2. ## Malnutrition

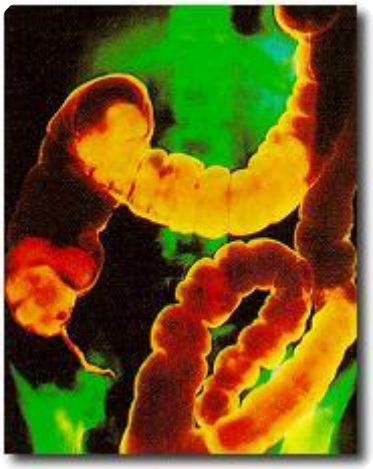
http://lgfl.skoool.co.uk/content/keystage3/biology/pc/learningsteps/MALLC/launch.html

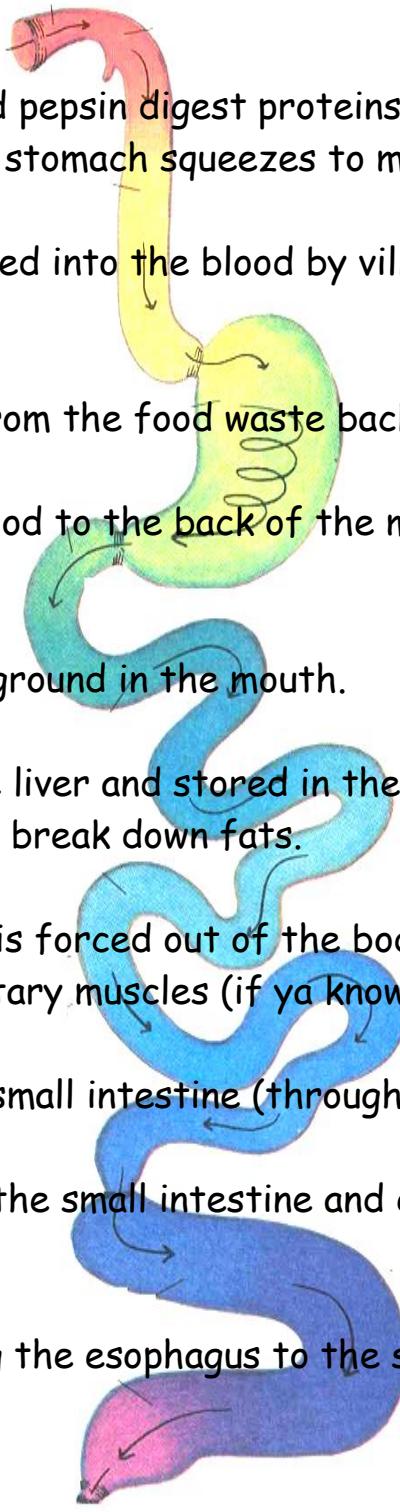
Also found at www.myscience8.com

Human Biology/Links page

Write these steps of digestion in their proper order. They are all messed up here.

Summary of Digestion





- Hydrochloric acid and pepsin digest proteins in the stomach. The stomach squeezes to mix food.
- Nutrients are absorbed into the blood by villi in the small intestine.
- Water is absorbed from the food waste back into the body.
- The tongue pushes food to the back of the mouth where it is swallowed.
- Food is chopped and ground in the mouth.
- Bile (produced by the liver and stored in the gallbladder) enters the small intestine to break down fats.
- Solid waste material is forced out of the body by action of both voluntary and involuntary muscles (if ya know what I mean).
- "Food" moves to the small intestine (through the duodenum).
- Waste (food) leaves the small intestine and enters the large intestine.
- The food moves along the esophagus to the stomach.