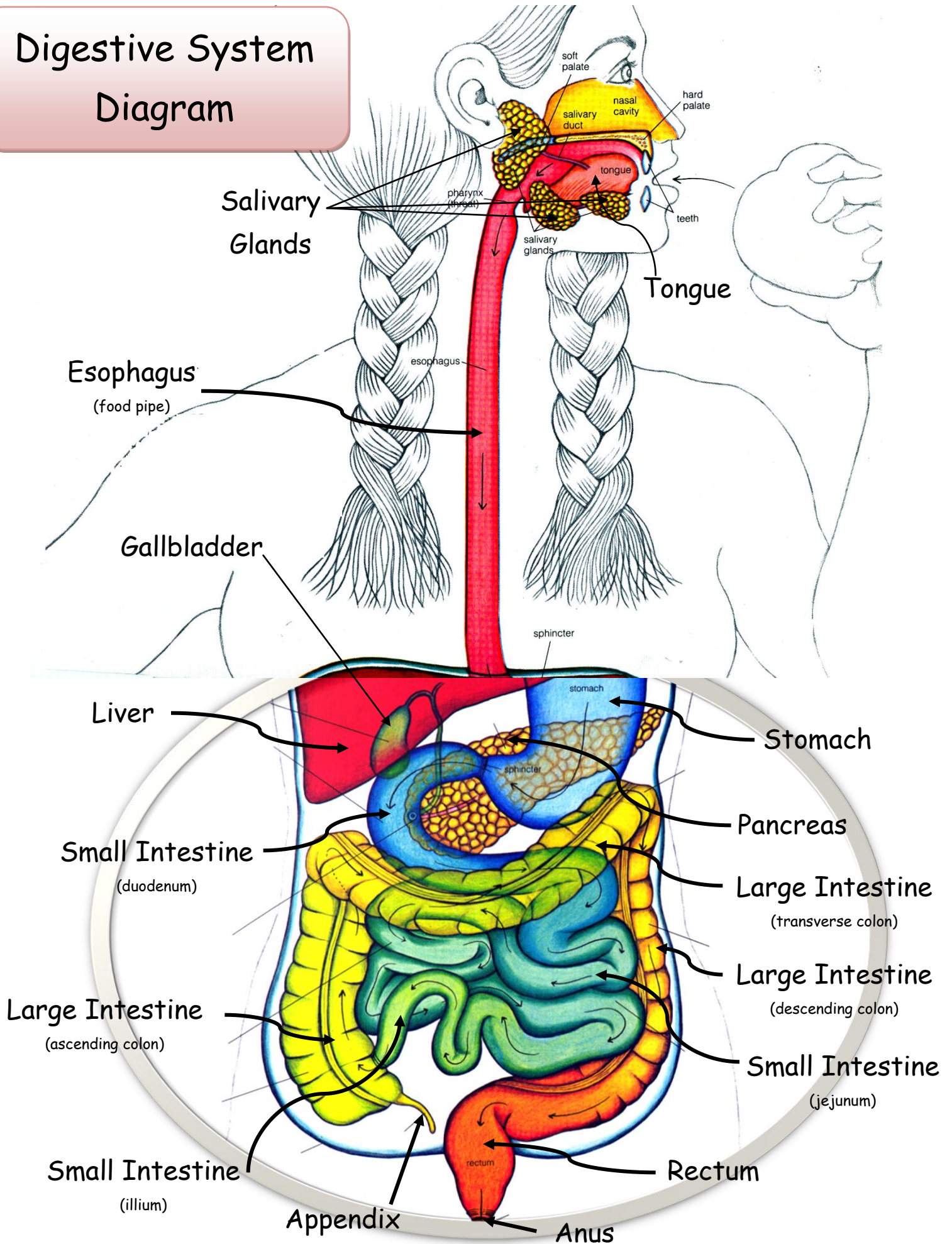


# Digestive System Diagram

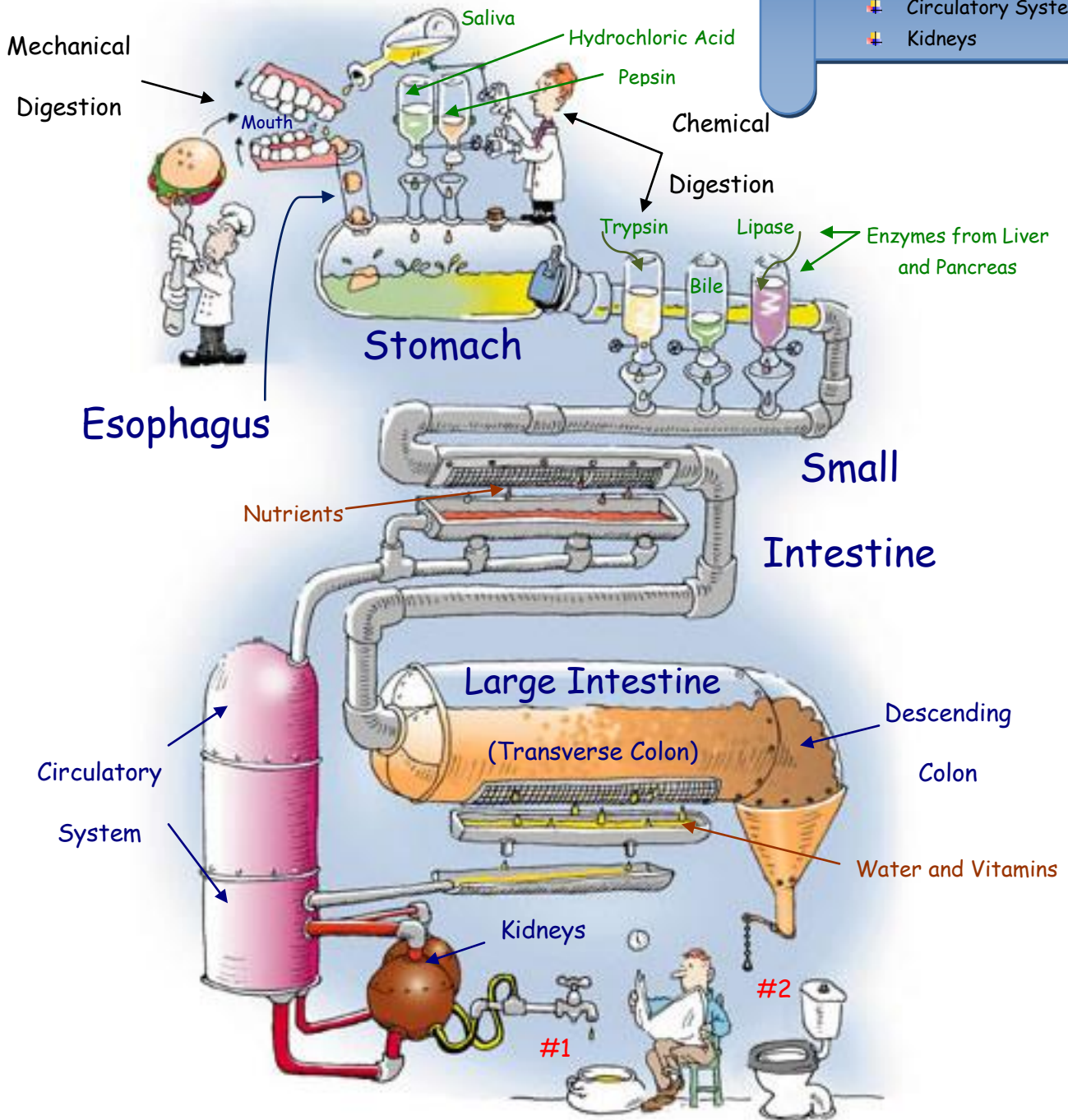


# The Digestive System

On your Digestive System  
Cartoon ...

Label these parts:

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



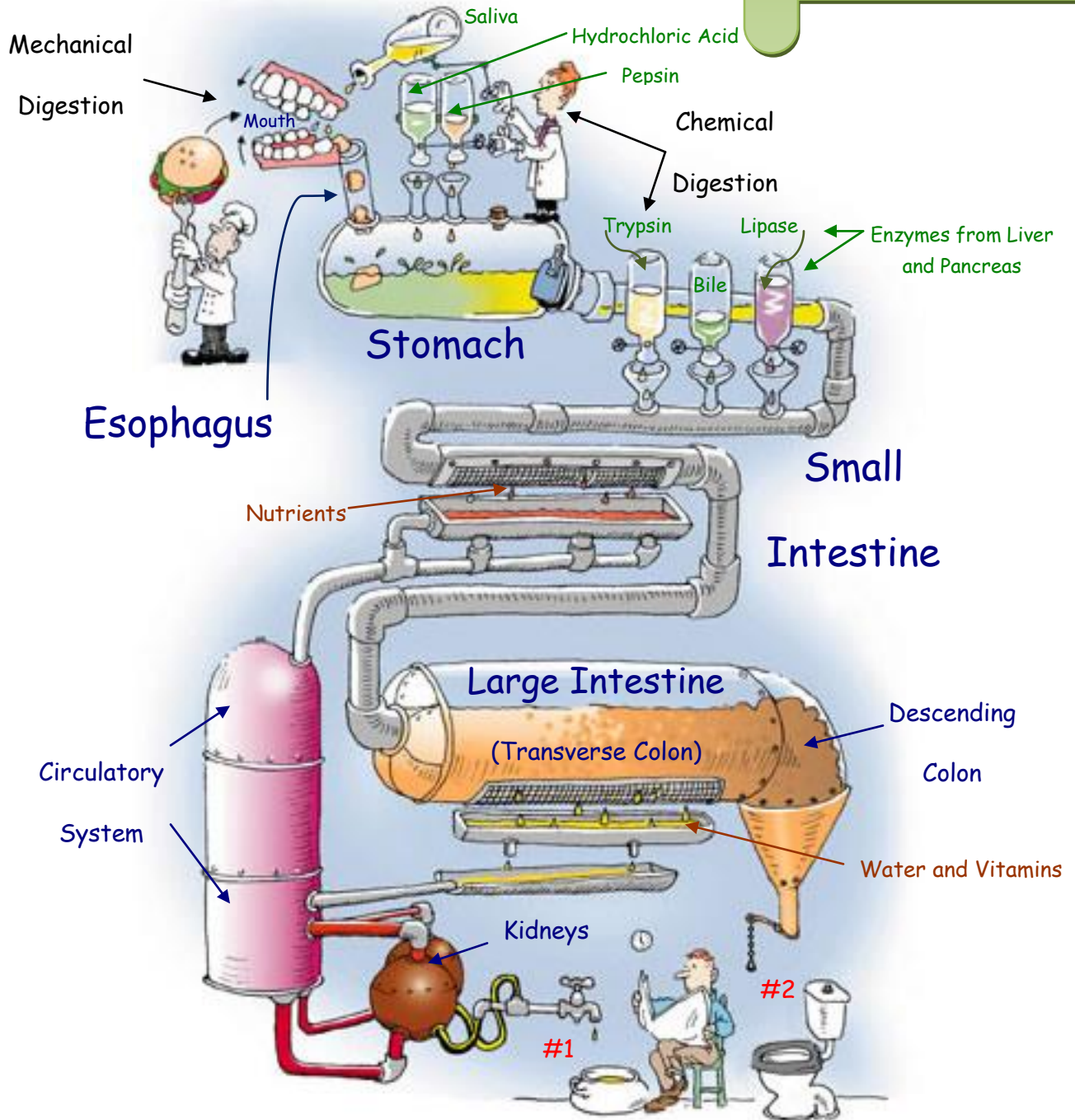


# The Digestive System

On your Digestive System Cartoon ...

Label these enzymes (chemicals):

- ✚ Saliva
- ✚ Hydrochloric Acid
- ✚ Pepsin
- ✚ Trypsin
- ✚ Lipase

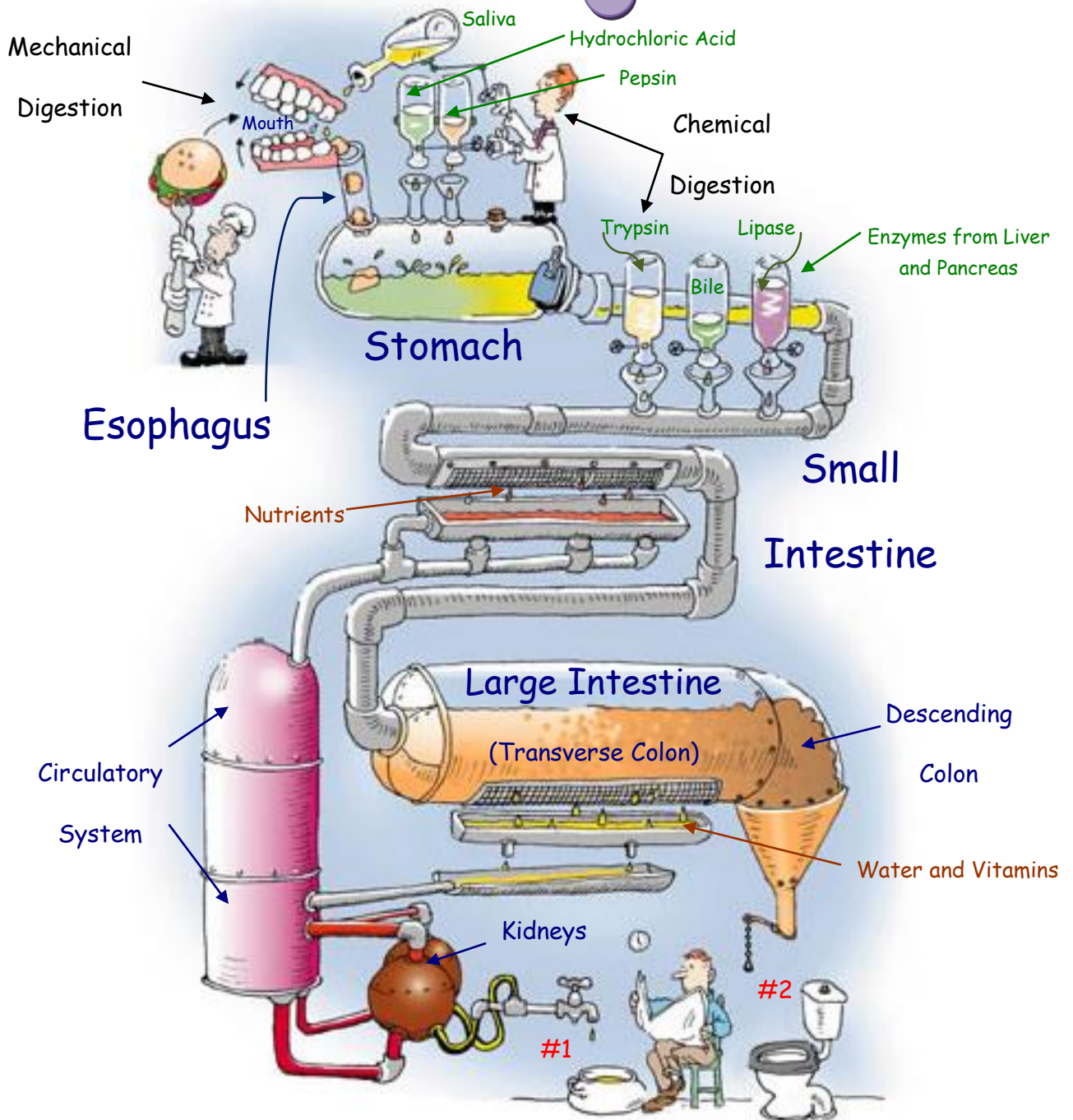


# The Digestive System

On your Digestive System Cartoon ...

Label these:

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



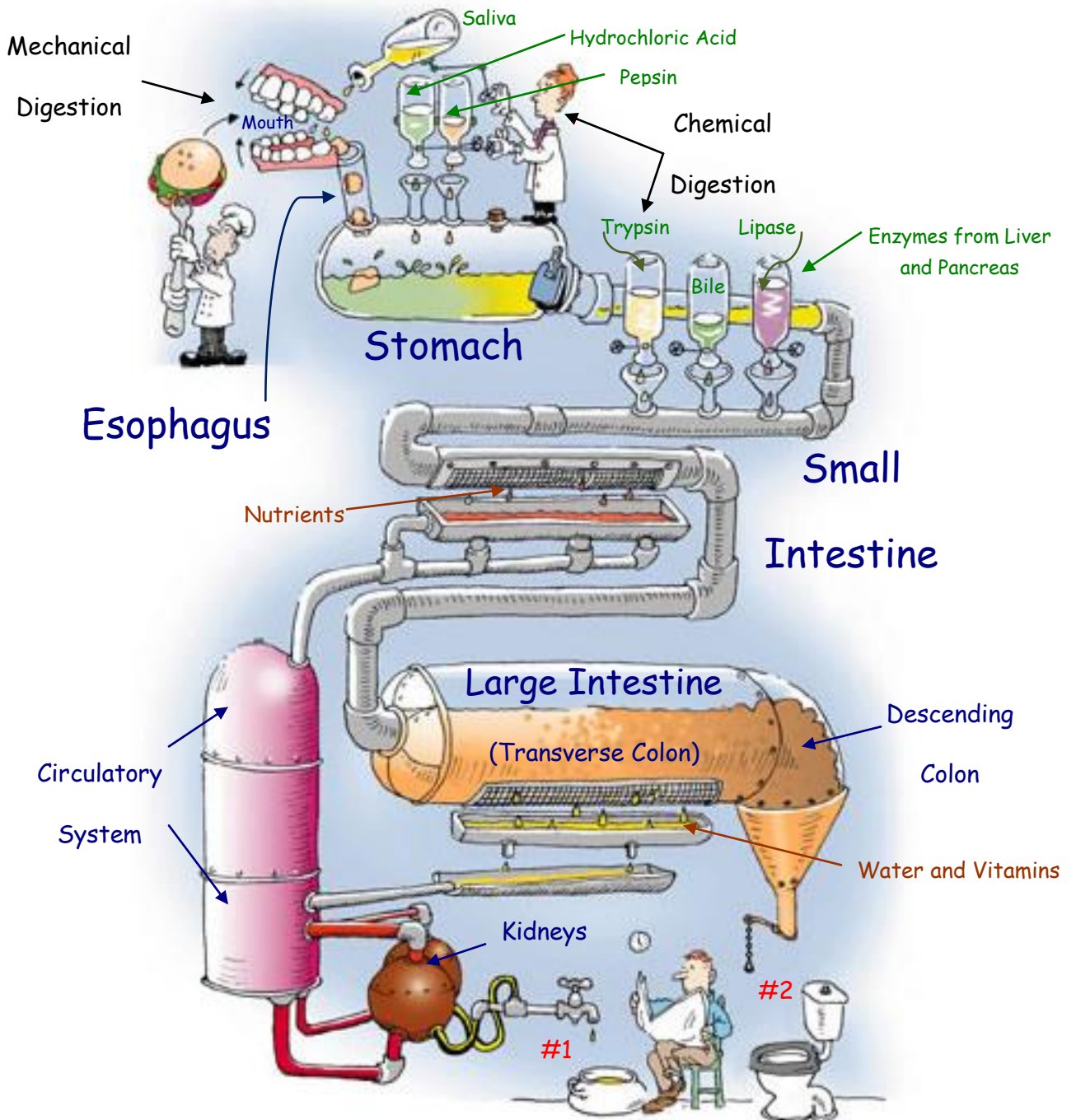


# The Digestive System

On your Digestive System Cartoon ...

Label these:

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

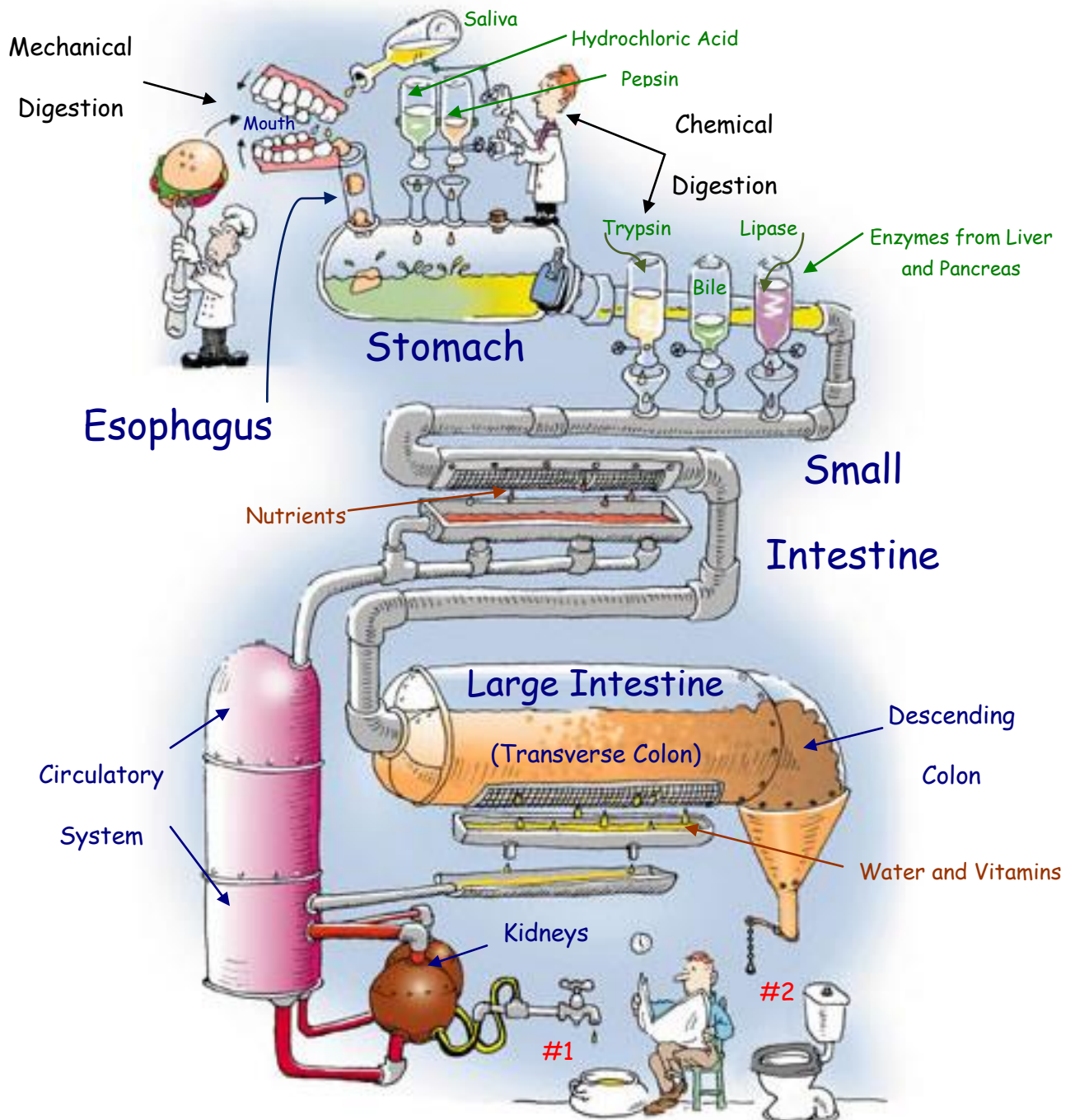


# The Digestive System

On your Digestive System Cartoon ...

- ✚ Color all parts
- ✚ Complete the SUMMARY of DIGESTION

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





View the Video clip from  
A.D.A.M.

found on the [Human Biology/Links](#) page of our  
website ([www.myscience8.com](http://www.myscience8.com))

# Digestion

Answer all questions on the answer sheet

Animation Player

Sort Animation list:  
Alphabetically  
Body System:  
Bones and Joints  
Brain and Nerves  
**Digestive System**  
Nails and Muscles

Animation List:  
**Digestion**  
Heartburn  
Peristalsis  
Stomach ulcer  
Swallowing  
Ulcers

ANIMATION  
PLAYER

This content is "bandwidth intensive". The latest versions of the following browser plug-ins must be installed:  
Shockwave Quicktime

**Digestion**  
This animation highlights the major parts of the digestive system and follows the breakdown of celery from consumption to excretion. **Launch animation!**

© 2002 A.D.A.M., Inc.

Click here





View the Video clip from  
A.D.A.M.

found on the [Human Biology/Links](#) page of our  
website ([www.myscience8.com](http://www.myscience8.com))

# Heartburn

Answer all questions on the answer sheet

Animation Player

Sort Animation list:

- Alphabetically
- Body System:
  - Bones and Joints
  - Brain and Nerves
  - Digestive System**
  - Hearts and vessels

Animation List:

- Digestion
- Heartburn**
- Peristalsis
- Stomach ulcer
- Swallowing
- Ulcers

This content is "bandwidth intensive". The latest versions of the following browser plug-ins must be installed:

Shockwave Quicktime

**Heartburn**  
This animation depicts how certain ingested foods can cause regurgitation of the stomach's contents back into the esophagus resulting in the sensation of heartburn. The relationship between the location of the esophagus and heart is shown in a front view of the body. **Launch animation!**

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website ([www.myscience8.com](http://www.myscience8.com))

# Peristalsis

Answer all questions on the answer sheet

Animation Player

Sort Animation list:  
Alphabetically  
Body System:  
Bones and Joints  
Brain and Nervous System  
**Digestive System**  
Hearts and vessels

Animation List:  
Digestion  
Heartburn  
**Peristalsis**  
Stomach Ulcer  
Swallowing  
Ulcers

ANIMATION PLAYER

This content is "bandwidth intensive". The latest versions of the following browser plug-ins must be installed:  
Shockwave Quicktime

**Peristalsis**  
This animation follows the processing of food through the digestive tract, focusing on the intestinal peristaltic movement (a series of wave-like muscle contractions that moves the food mixture down the digestive tract).  
**Launch animation!**

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View the Video clip from  
A.D.A.M.

found on the [Human Biology/Links](#) page of our  
website ([www.myscience8.com](http://www.myscience8.com))

# Swallowing

Answer all questions on the answer sheet

Animation Player

Sort Animation list:  
Alphabetically  
Body System:  
Bones and Joints  
Brain and Nerves  
**Digestive System**  
Hearts and Vessels

Animation List:  
Digestion  
Heartburn  
Peristalsis  
Stomach Ulcer  
**Swallowing**  
Ulcers

ANIMATION PLAYER

This content is "bandwidth intensive". The latest versions of the following browser plug-ins must be installed:  
Shockwave Quicktime

**Swallowing**  
From a side view of the head, this animation shows the step-by-step process and mechanism of chewing and swallowing a piece of celery.  
**Launch animation!**

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Click here





View the Video clip from  
A.D.A.M.

found on the **Human Biology/Links** page of our  
website ([www.myscience8.com](http://www.myscience8.com))

# Ulcers

Answer all questions on the answer sheet

Animation Player

Sort Animation list:

- Alphabetically
- Body System:
  - Bones and Joints
  - Brain and Nerves
  - Digestive System**
  - Heart and Blood Vessels

Animation List:

- Digestion
- Heartburn
- Peristalsis
- Stomach ulcer
- Swallowing
- Ulcers**

This content is "bandwidth intensive". The latest versions of the following browser plug-ins must be installed:

Shockwave Quicktime

**Ulcers**  
From an front view of the stomach, this animation shows the development of an ulcer in the stomach lining. **Launch animation!**

© 2002 A.D.A.M., Inc.

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*

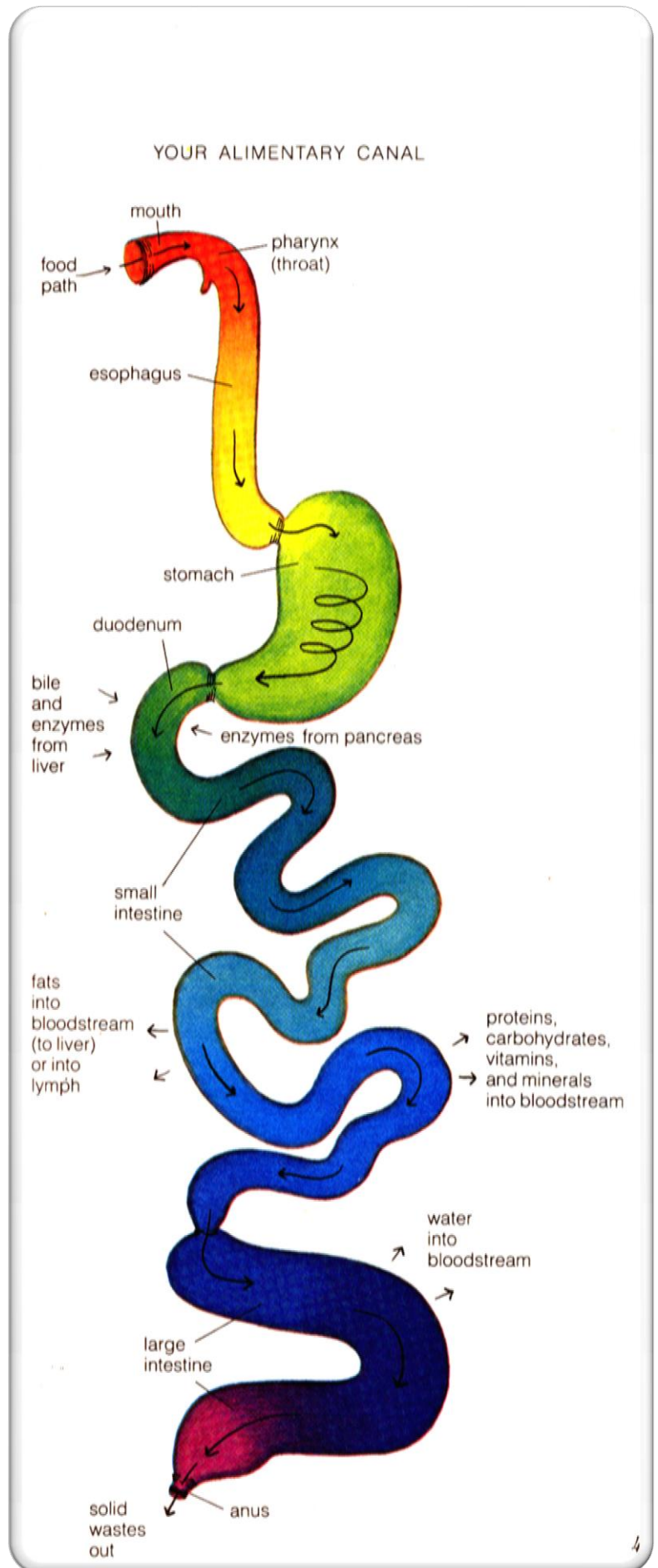
Food is broken down into simple nutrients by the chemical action of enzymes.

## *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).

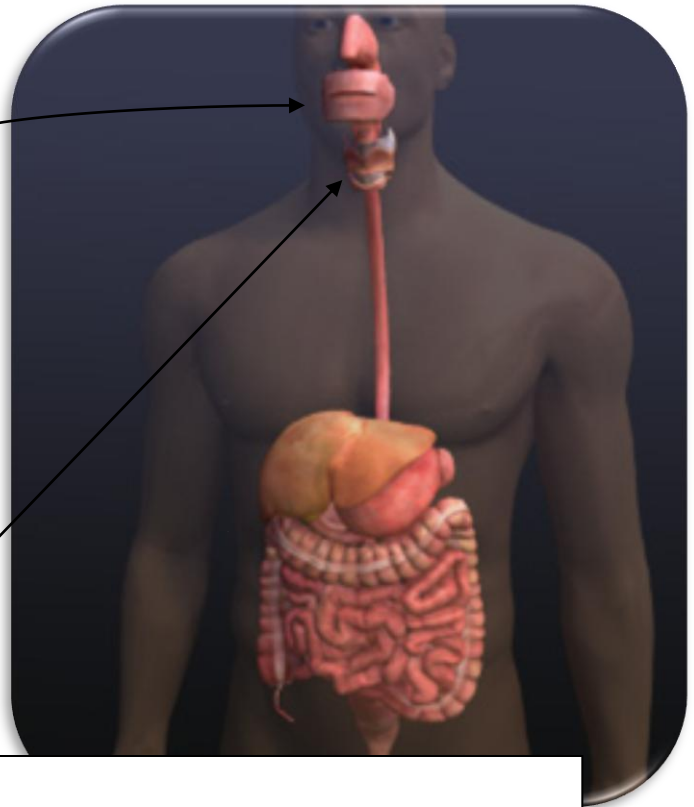
**Fats** are stored for future use. They contain vitamins.





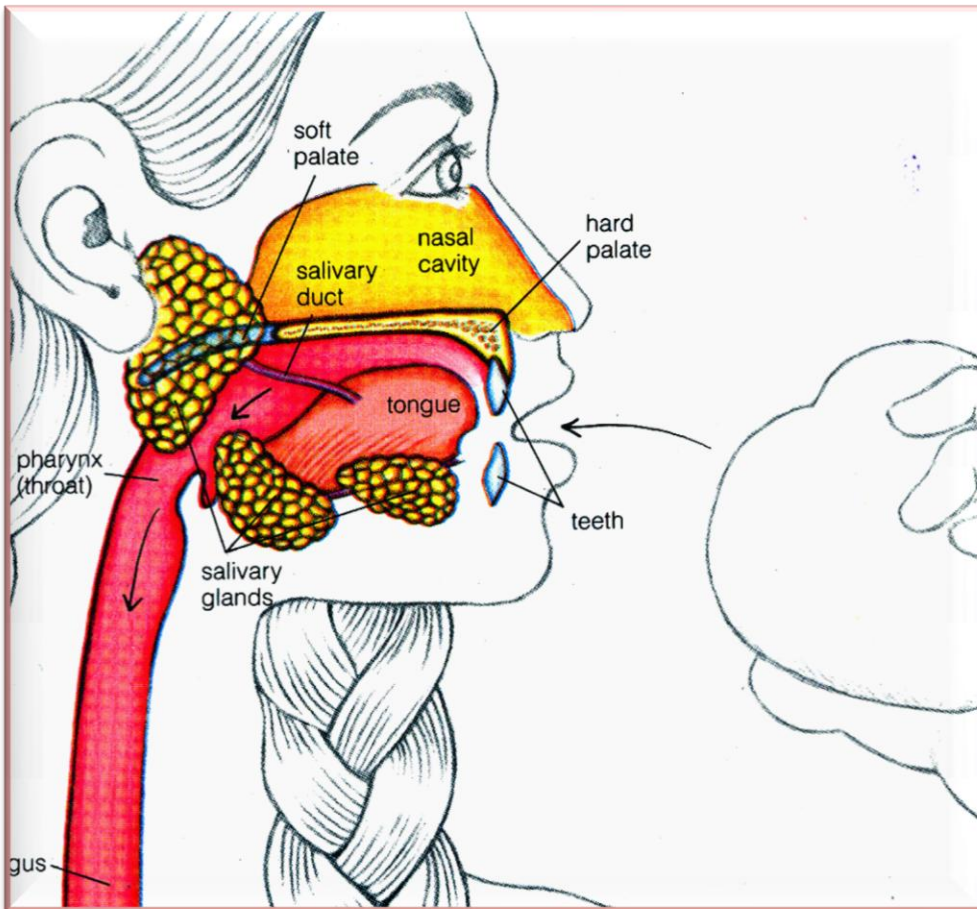
# The Mouth

- 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

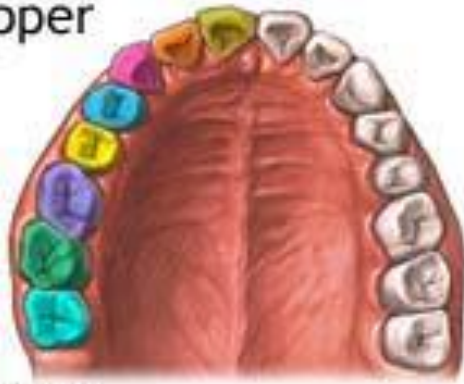
- The Epiglottis closes off the wind pipe (trachea).
- Muscles push food into the esophagus.



# 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**.

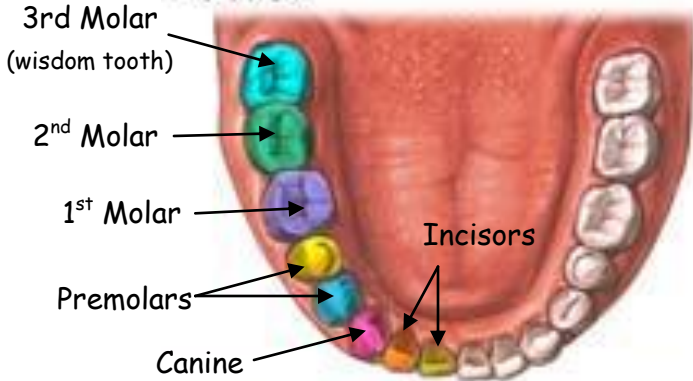
Upper



Adult 21-25 years old



Lower



 Central incisor	 Second premolar (bicuspid)
 Lateral incisor	 First molar
 Cuspid (canine)	 Second molar
 First premolar (bicuspid)	 Third molar (Wisdom teeth)

Permanent (adult) teeth



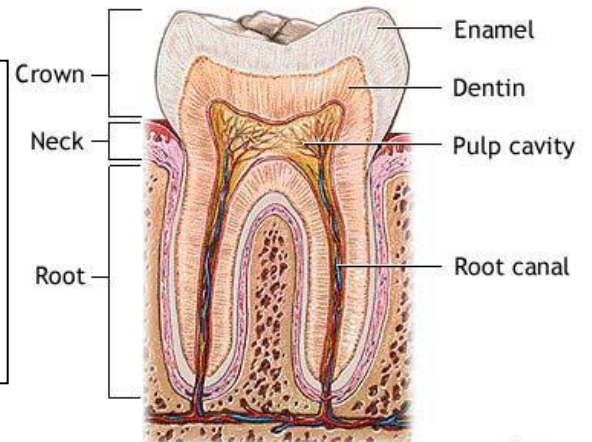
## Your Teeth are specialized



- 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

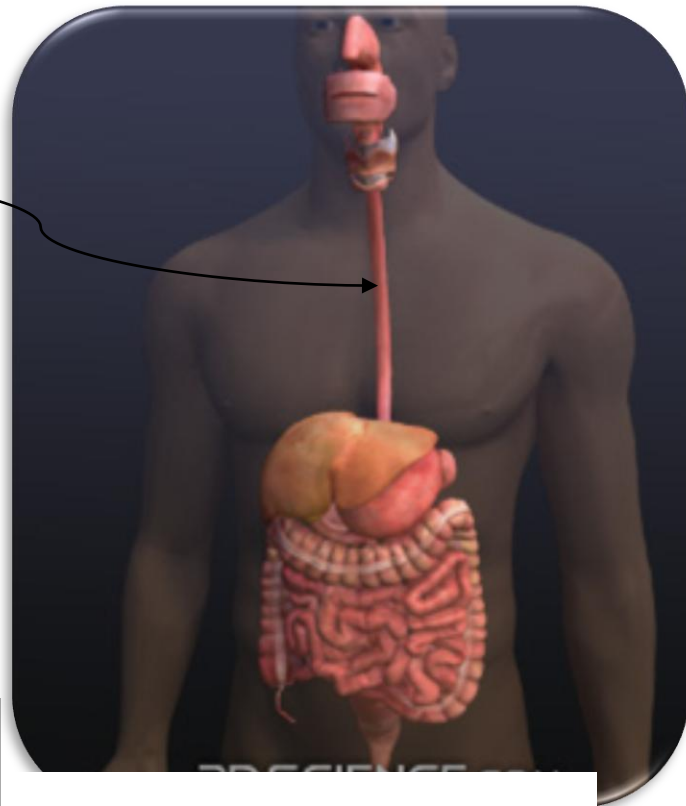
- Enamel is the hardest part of tooth. Made mostly of mineral.
- Dentin is softer than enamel. Contains some living cells.
- Pulp is also called the "nerve" of the cell. It is a soft tissue that contains living nerve cells.



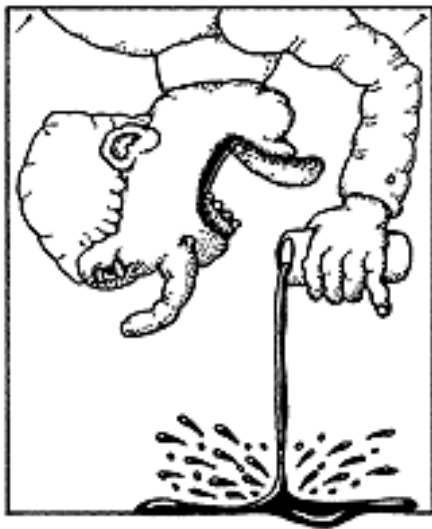
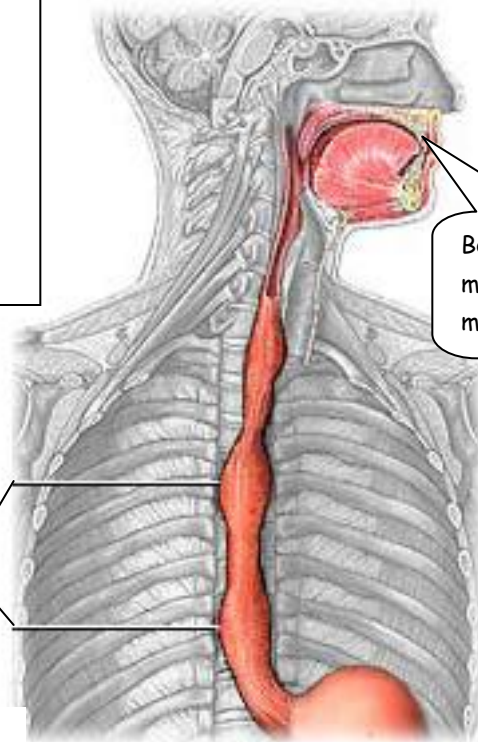


# The Esophagus

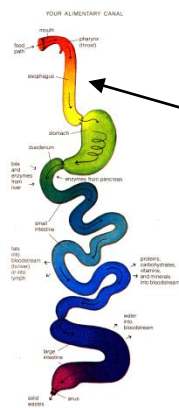
- Connects the pharynx (throat) to the stomach.
- About 10 inches long.
- Flat when empty but changes shape to allow food to travel to the stomach.
- Made of several layers of muscle that push food through to the stomach (peristalsis).



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.



Peristalsis



Esophagus

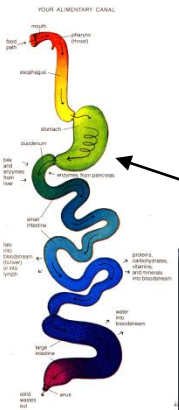
ADAM.

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

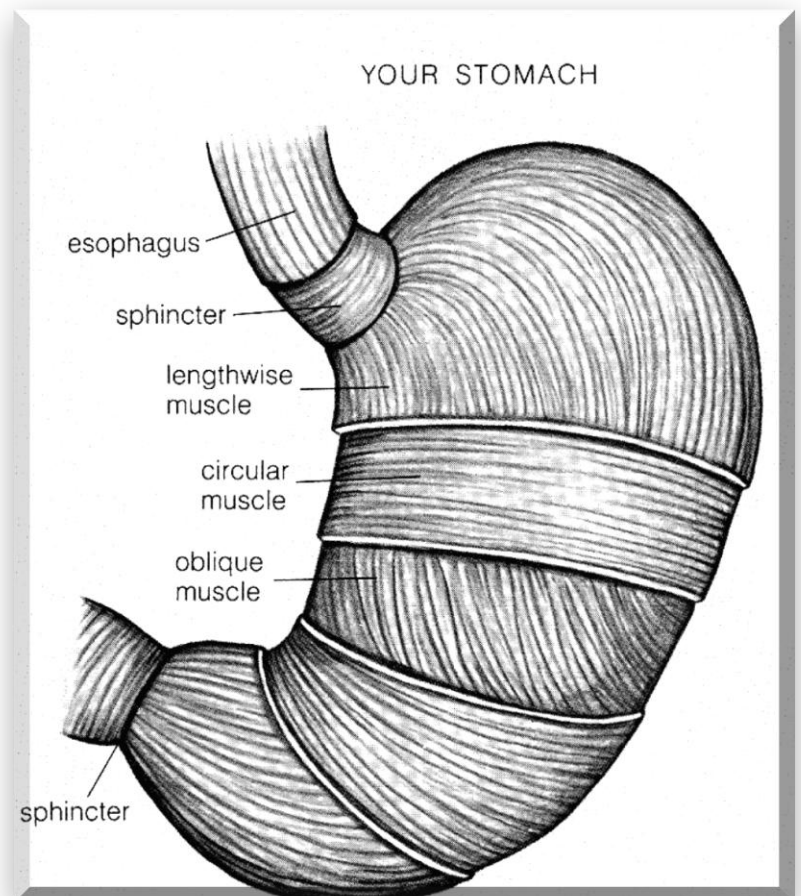
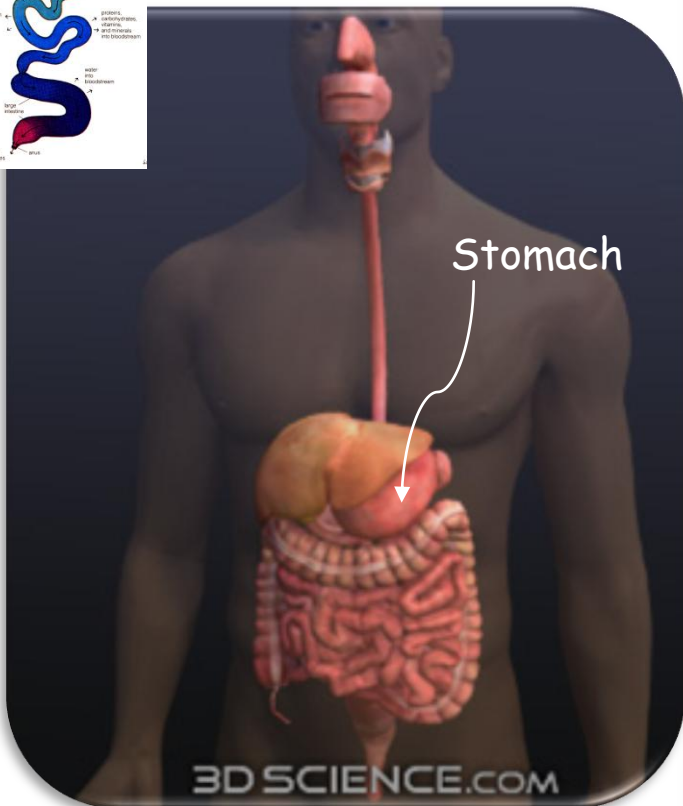
# The Stomach

- 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.

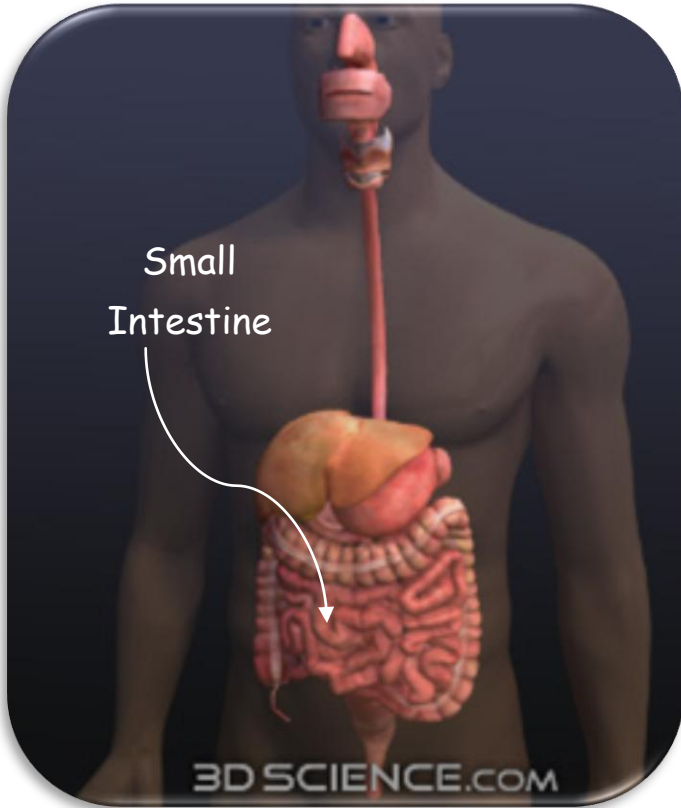
An *ulcer* forms when the stomach's protection breaks down its own acid begin to eat through the stomach.



Stomach

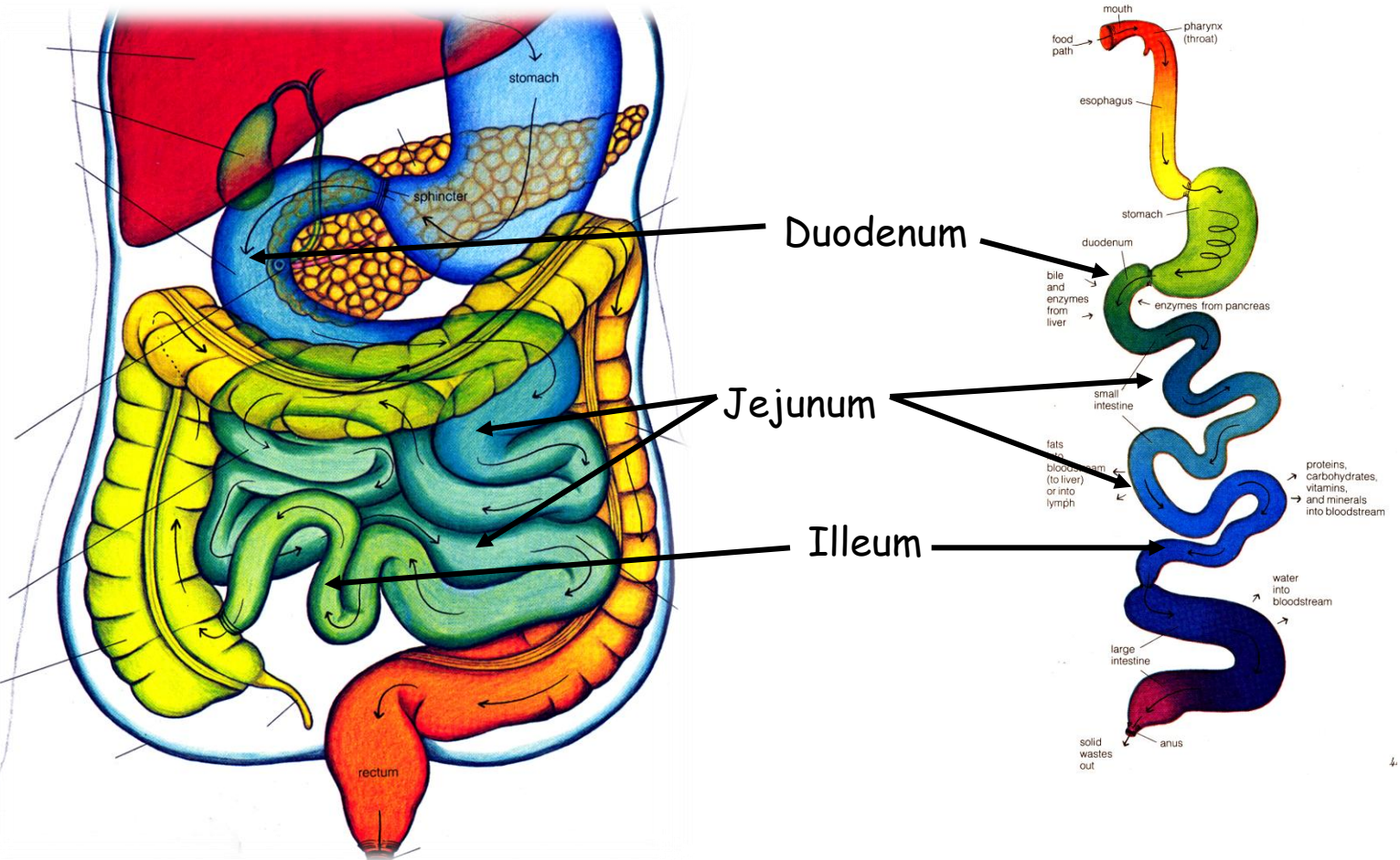






## Small Intestine

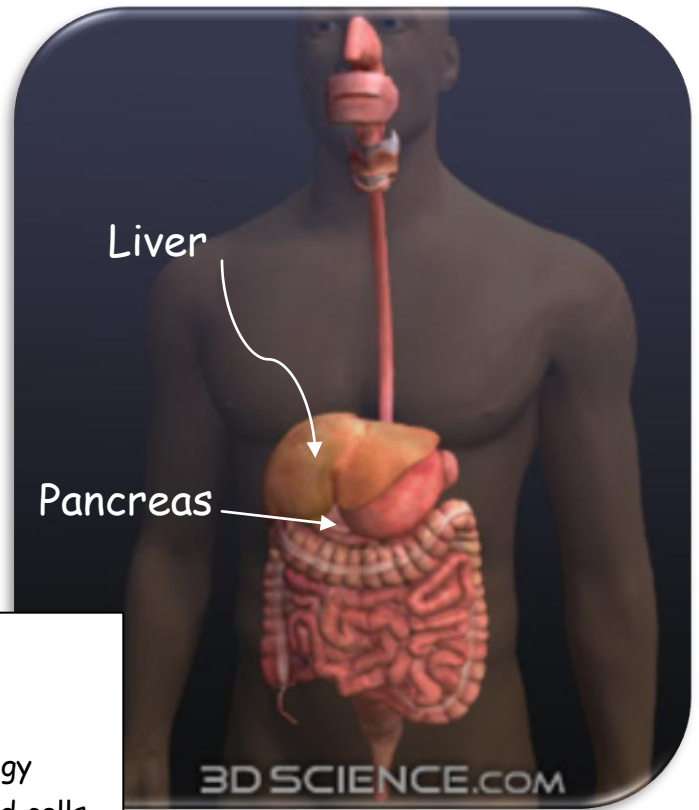
- The longest part of the alimentary canal (digestive tract).
- Divided into 3 parts:
  - Duodenum** - first segment
  - Jejunum** - middle segment
  - Ileum** - last segment
- Digestive enzymes from the liver and pancreas help to break down food further.
- Nutrients are absorbed into the body through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





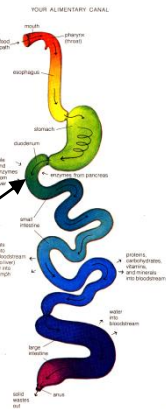
# The Liver, Gallbladder, and Pancreas

- The Liver produces the enzyme (chemical) *bile*. Bile breaks down fats.
- Bile is stored in the gallbladder and enters the duodenum (1<sup>st</sup> part of small intestine) when needed.
- The Pancreas produces  $\frac{1}{2}$  to 1 liter of enzymes (chemicals) daily. These enzymes are used to break down carbohydrates as well as fats and proteins.

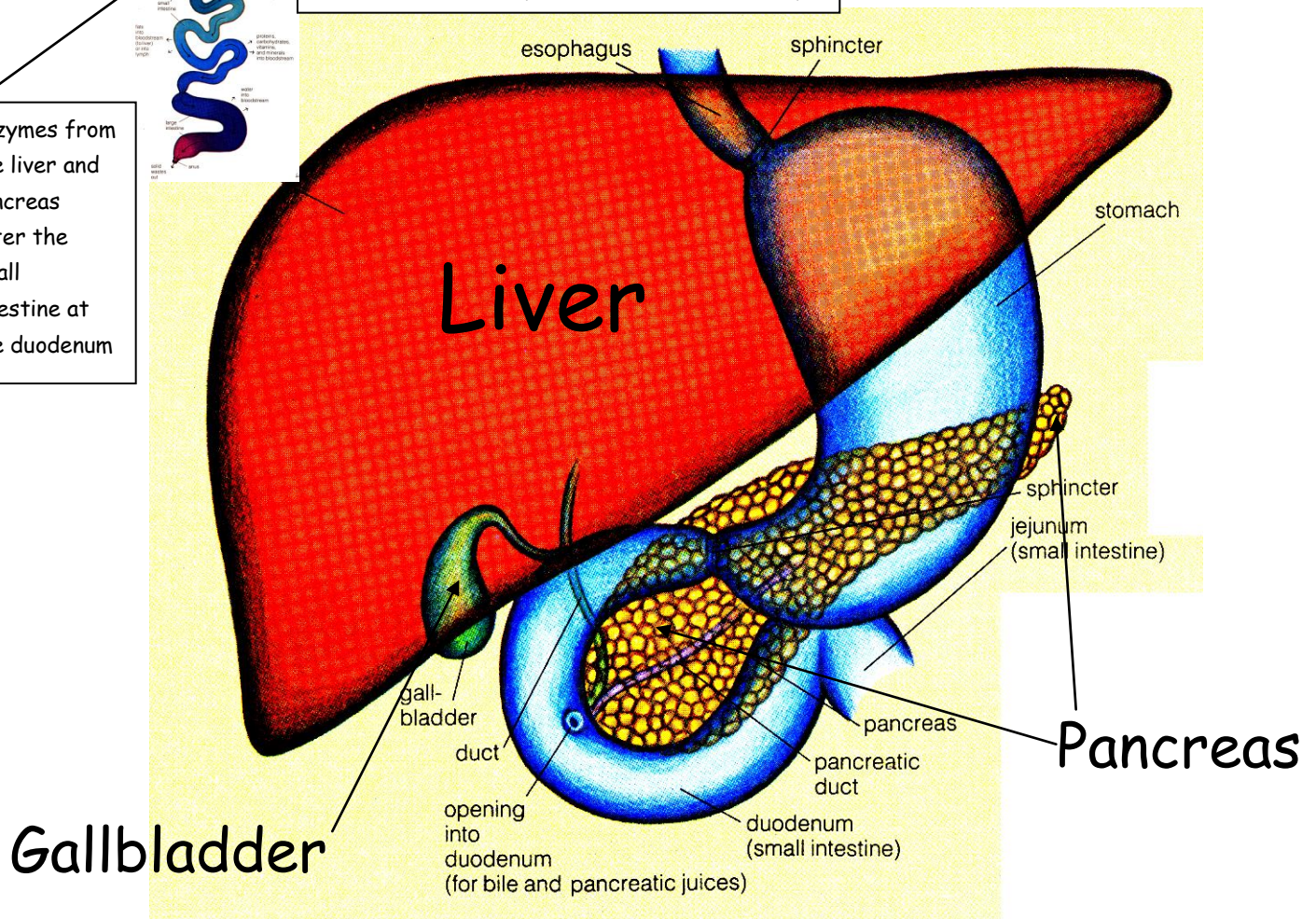


## The Liver:

- 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

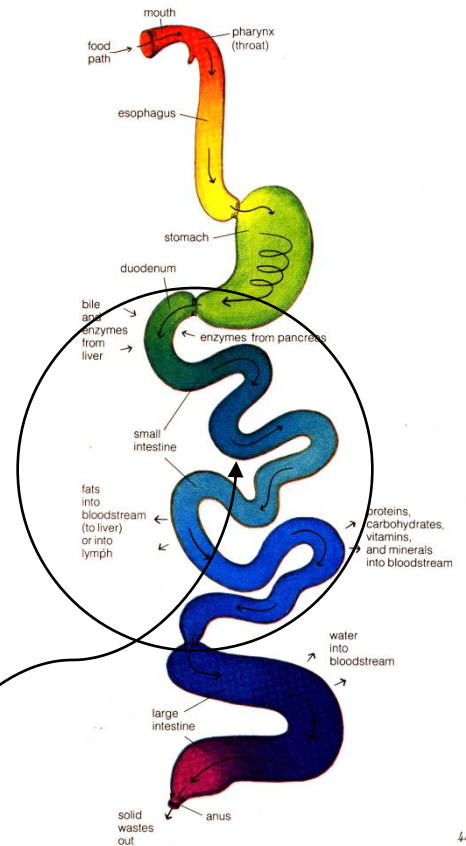




Nutrients are absorbed through the small intestine where the blood carries them to all the cells of the body.

The Basic Nutrients are:

- Amino Acids
- Simple Sugars
- Fatty Acids



Small Intestine

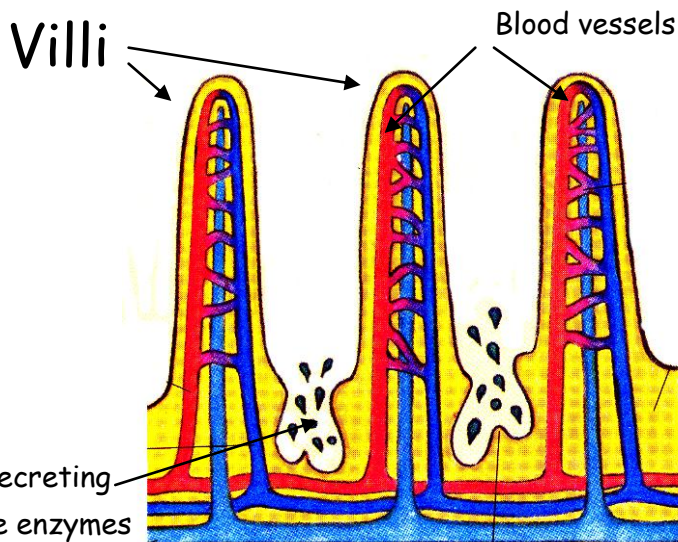
The inside lining of the small intestine contains *Villi*.

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)

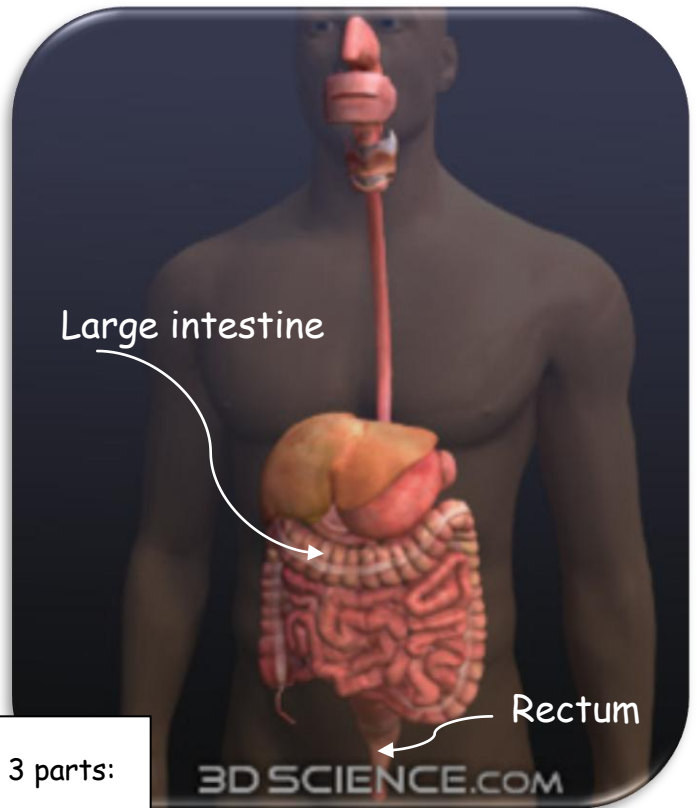
Note; your microscope will not show nearly the detail as in this picture.



Glands secreting digestive enzymes

## In the Large Intestine:

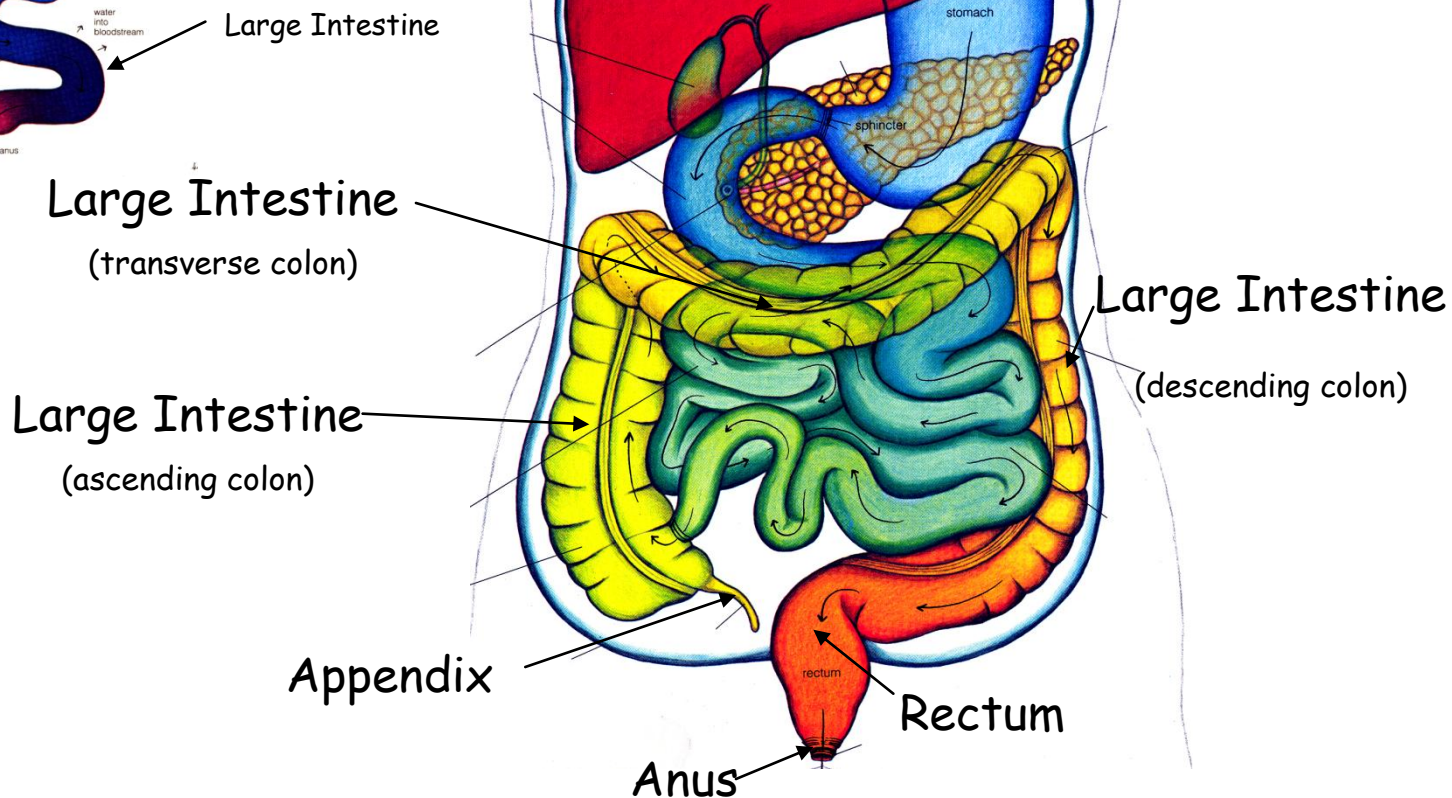
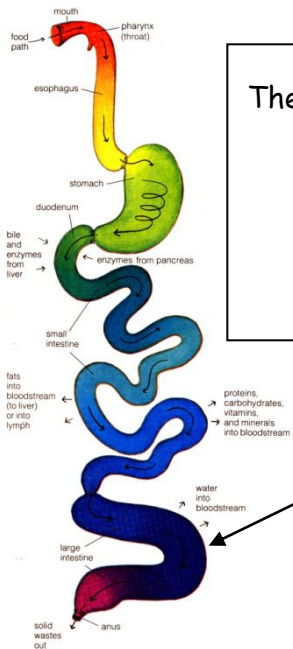
- Indigestible parts of food move from the small intestine to the large intestine.
- Water and vitamins are absorbed back in the blood to be reused.
- The remaining waste passes to the **RECTUM** where peristalsis forces it through the **ANUS** and out of the body.



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.

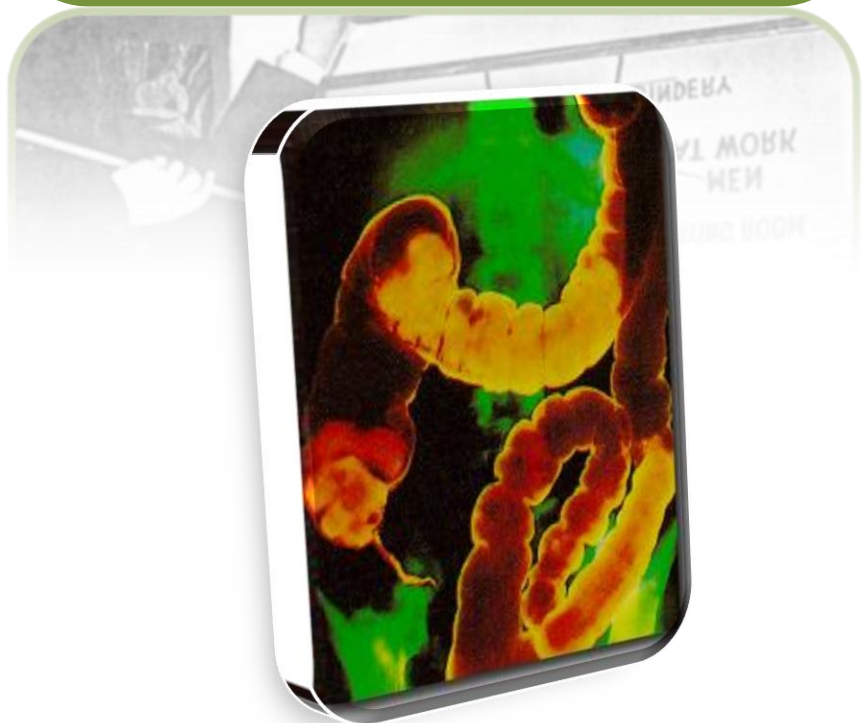
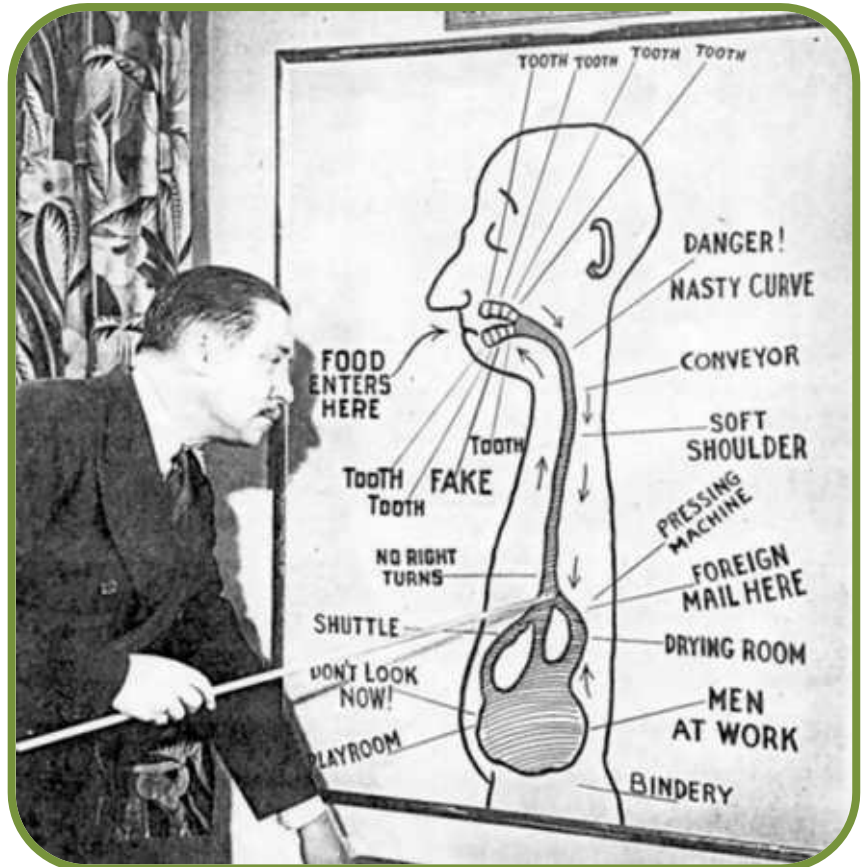




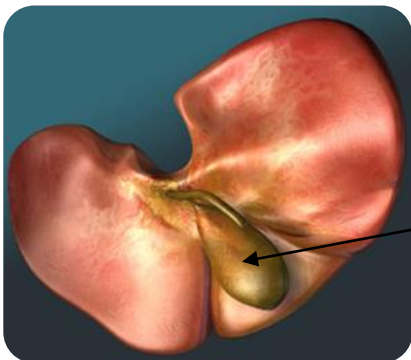
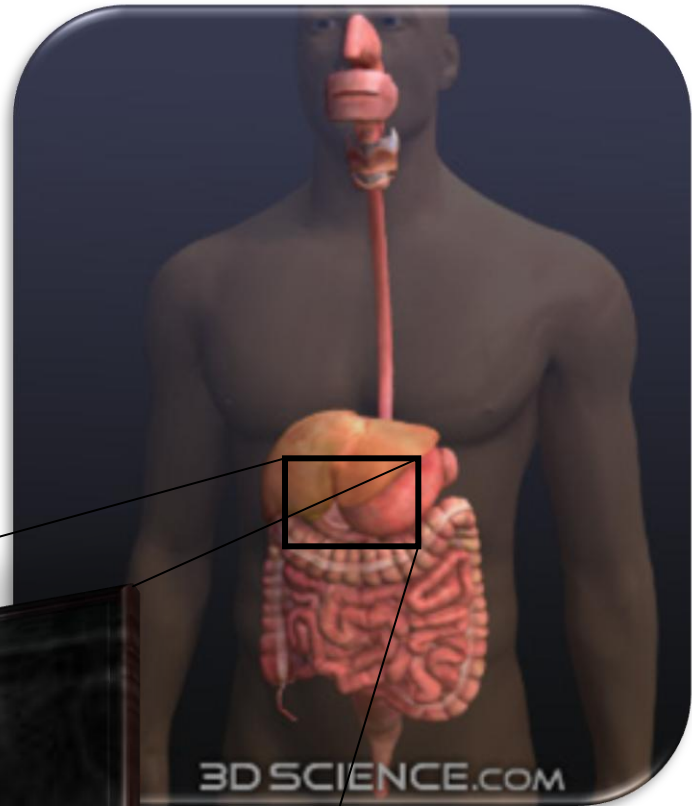
# Try to swallow this...

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

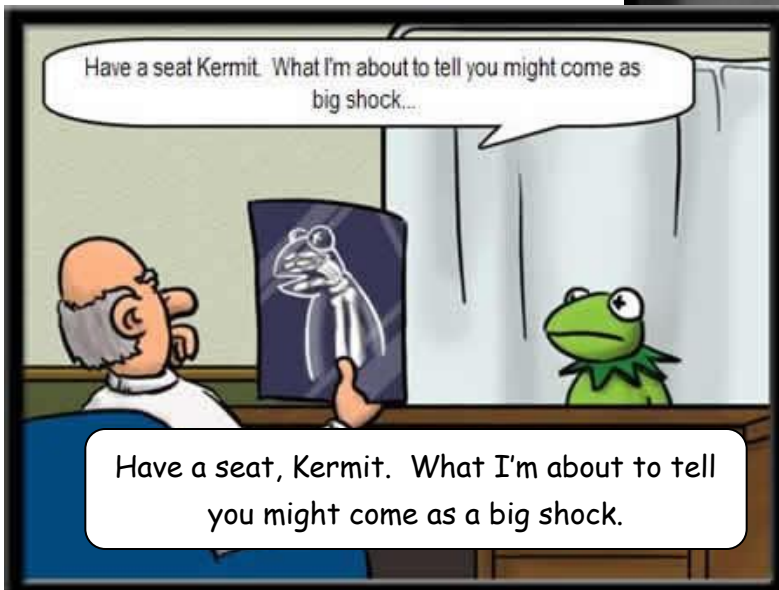
The digestive organ colored pink is probably the

- ❖ 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.

Hello there!



## 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:

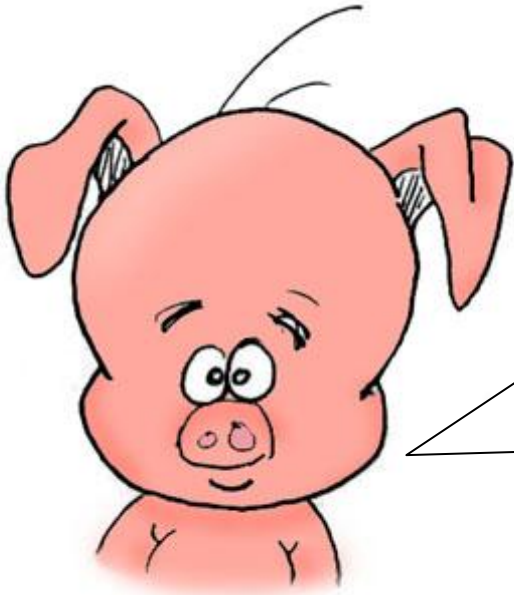
1. Take one unsalted cracker and chew but don't swallow.
2. Keep the **bolus** (chewed mush cracker) in your mouth for a minute.
3. After you notice the sweet taste you may swallow. Yum!!



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 (1<sup>st</sup> 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

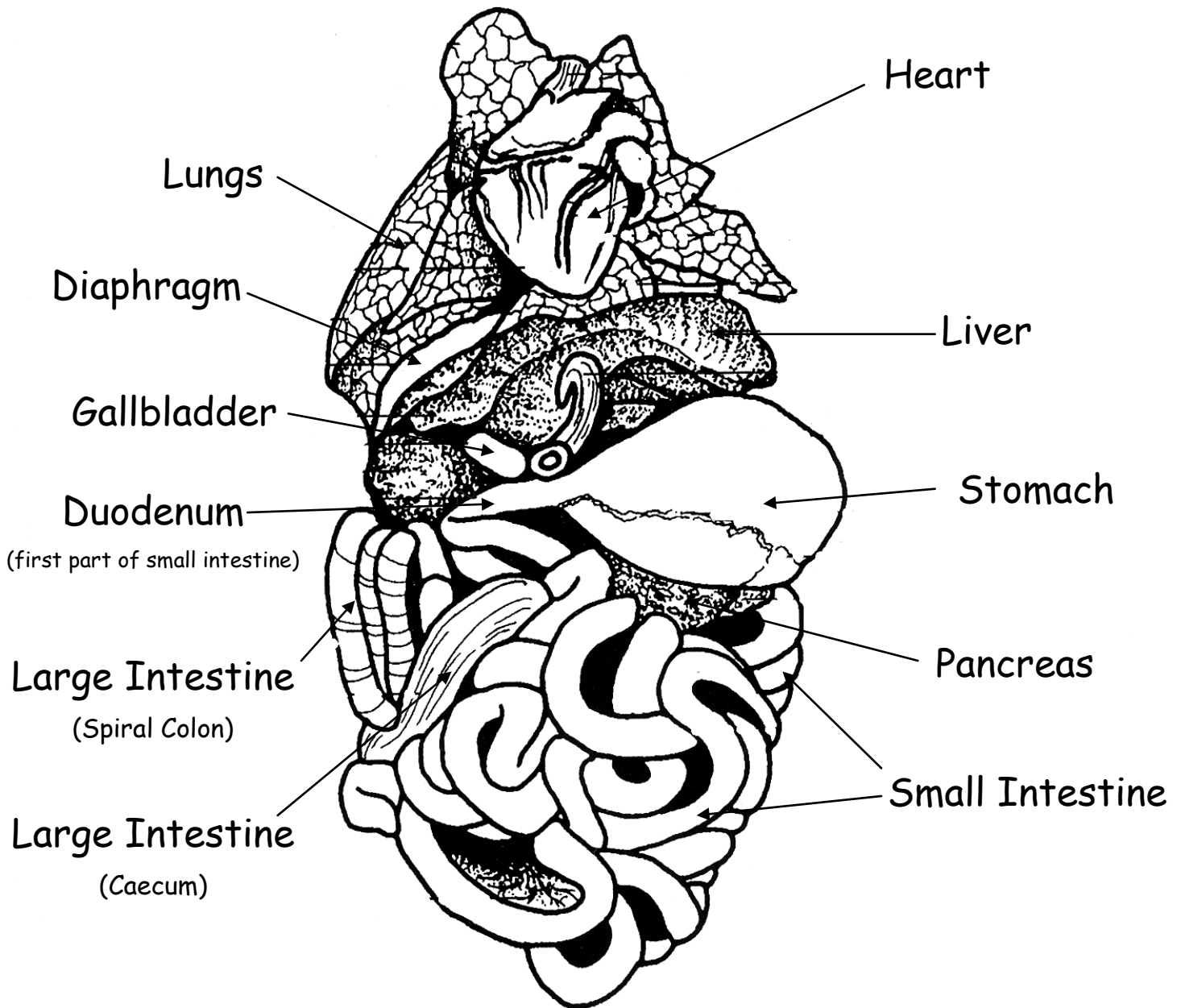
9

13



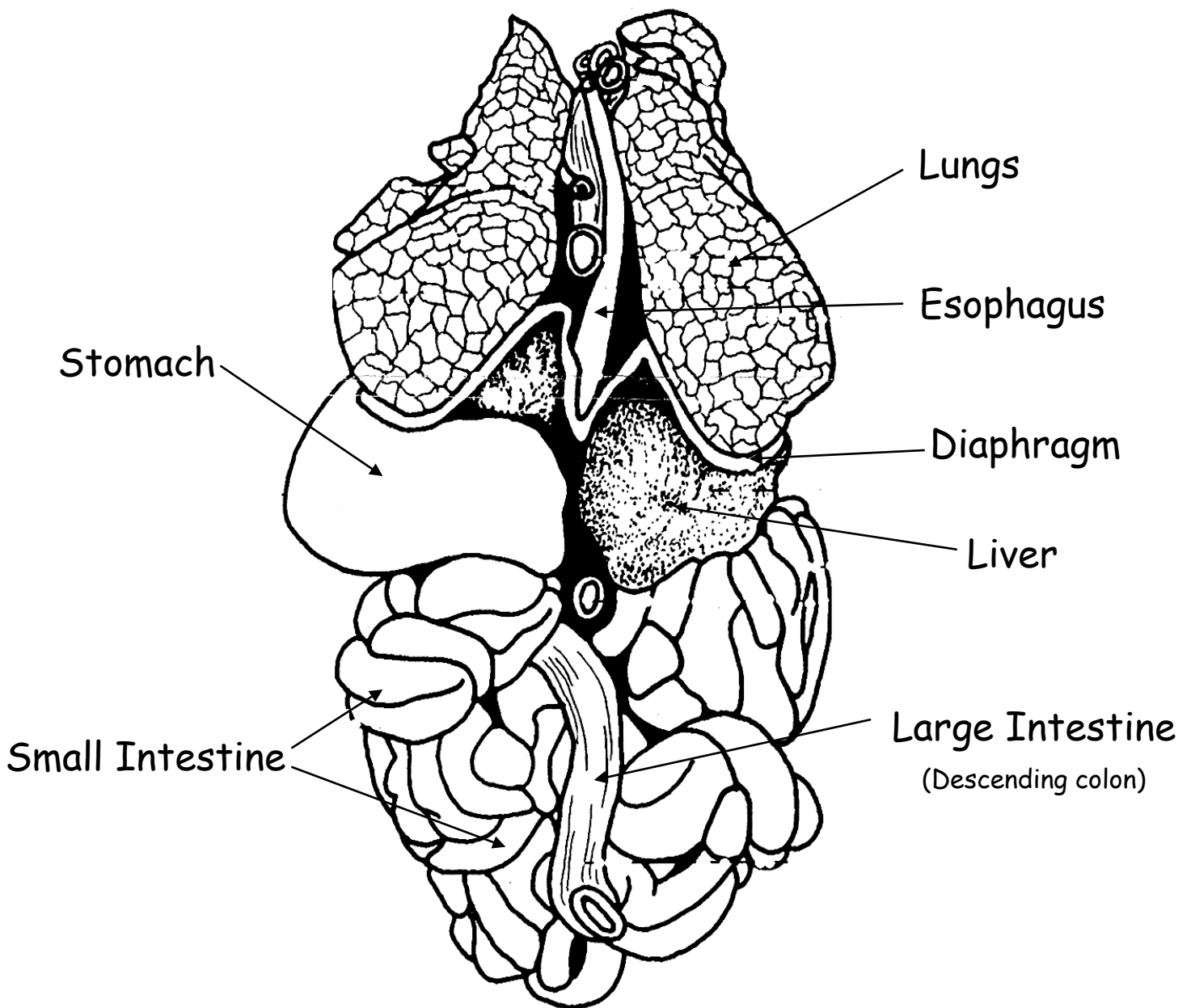
# Fetal Pig Internal Organs

Front view



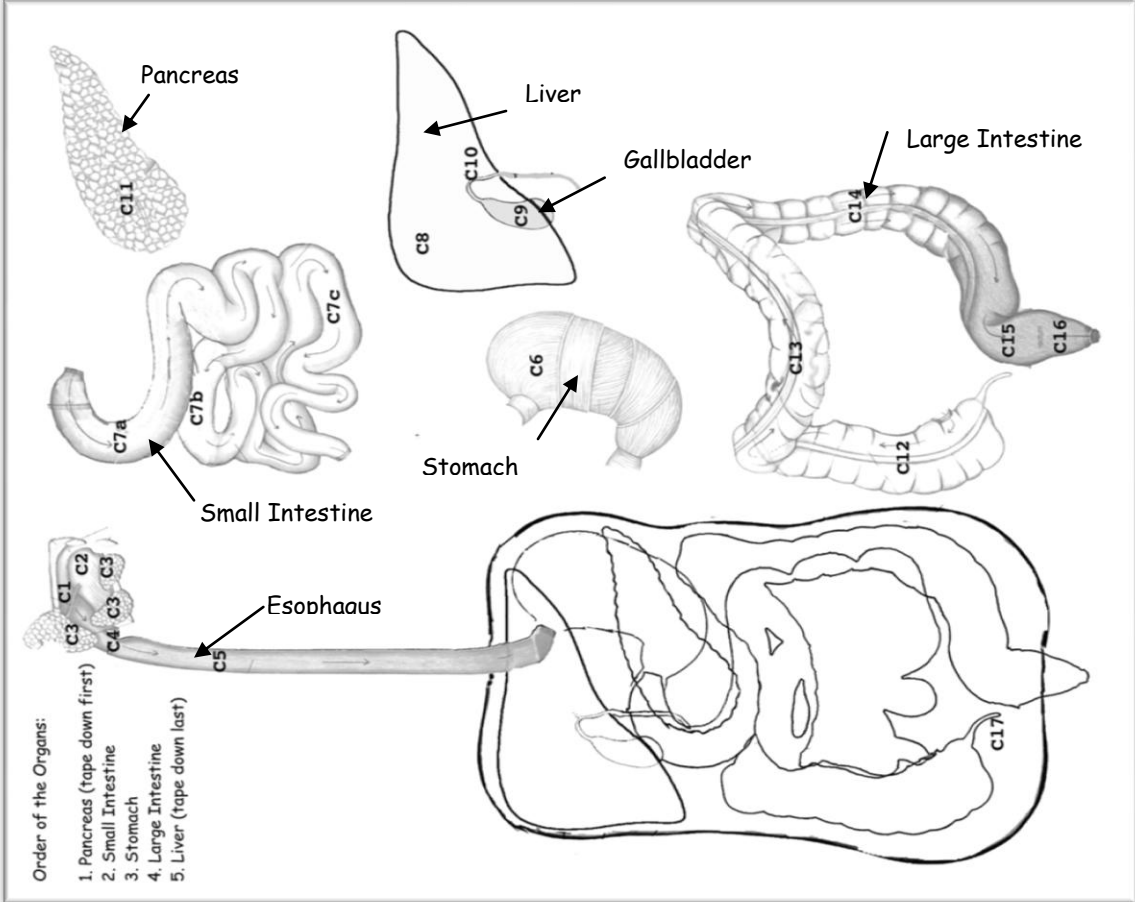
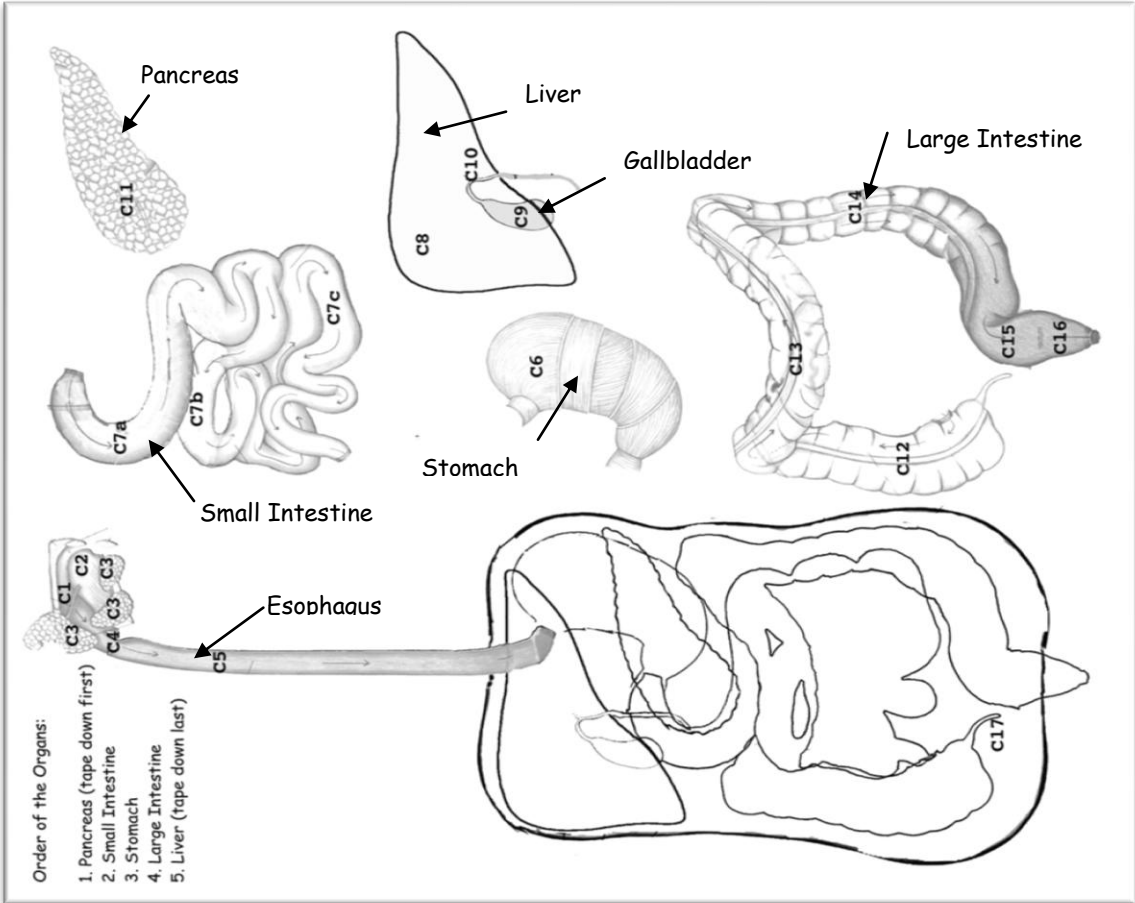
# Fetal Pig Internal Organs

Back view



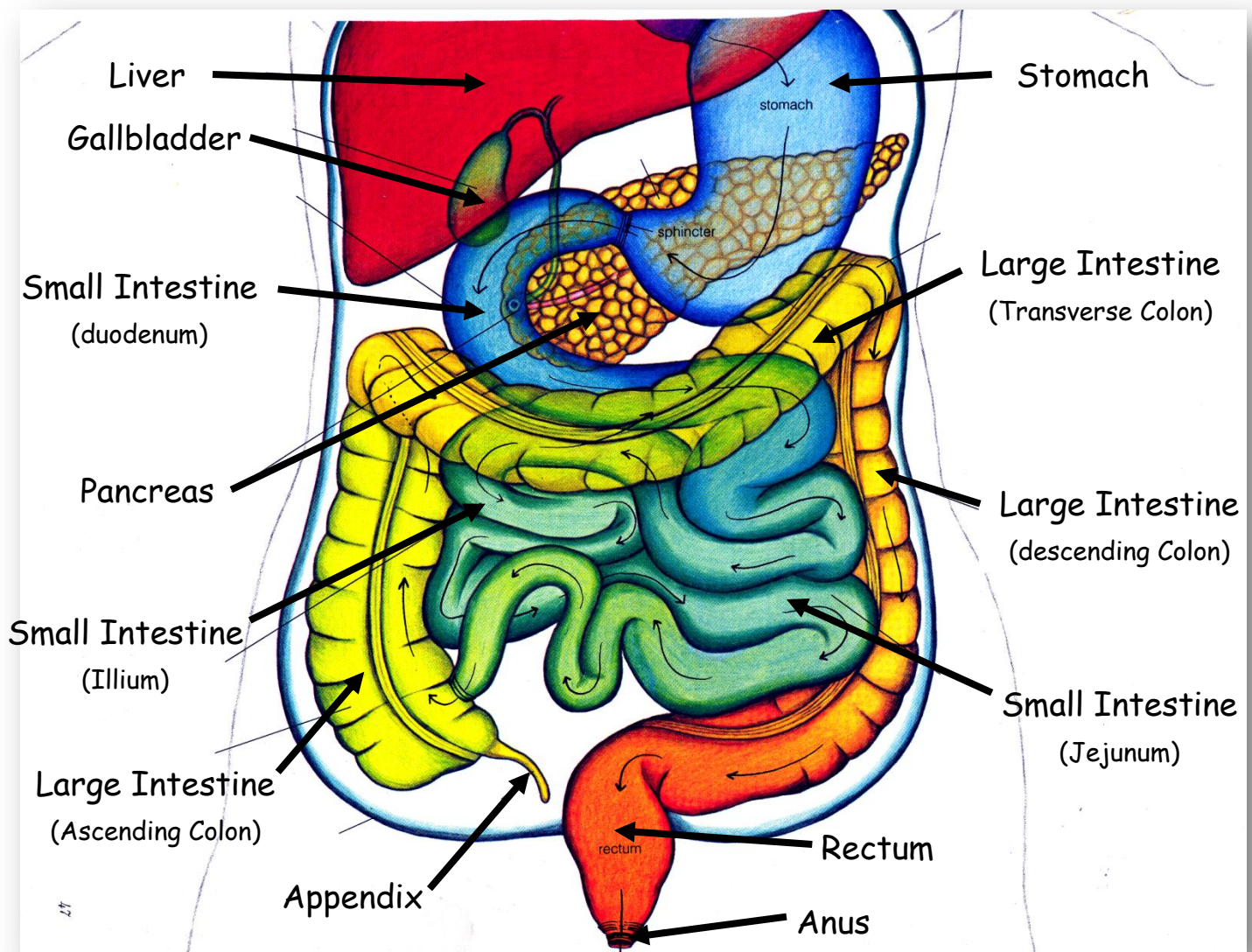


# Paper Model of Digestive System



# 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](http://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.skool.co.uk/content/keystage3/biology/pc/learningsteps/ABDLC/launch.html>

Also found at  
[www.myscience8.com](http://www.myscience8.com)  
Human Biology/Links page

2. **Malnutrition**

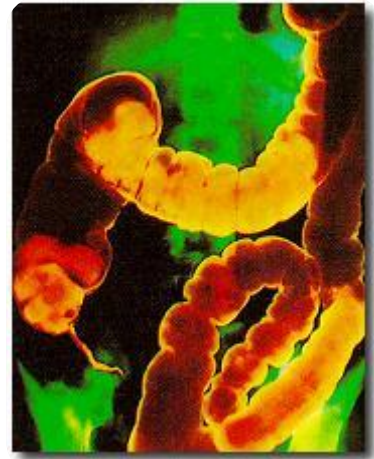
<http://lgfl.skool.co.uk/content/keystage3/biology/pc/learningsteps/MALLC/launch.html>

Also found at  
[www.myscience8.com](http://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.

