# Cells & Microorganisms Video Hook Standards

- **S5P1. Students will verify that an object is the sum of its parts.**
- b. Investigate how common items have parts that are too small to be seen without magnification
- .
- **S5L3. Students will diagram and label parts of various cells (plant, animal, single-celled, multi-celled).**
- a. Use magnifiers such as microscopes or hand lenses to observe cells and their structure.
- b. Identify parts of a plant cell (membrane, wall, cytoplasm, nucleus, chloroplasts) and of an animal cell (membrane, cytoplasm, and nucleus) and determine the function of the parts.
- c. Explain how cells in multi-celled organisms are similar and different in structure and function to single-celled organisms.

- **S5L4. Students will relate how microorganisms benefit or harm larger organisms.**
- a. Identify beneficial microorganisms and explain why they are beneficial.
- b. Identify harmful microorganisms and explain why they are harmful.

# Main Ideas

- All living things are made of cells.
- The structures inside of cells have unique functions.
- Single-celled organisms can be both beneficial and harmful to humans.
- HSP Science page 234
- A cell is the basic unit of structure and function in living things.
- Most cells are microscopic—they can be seen only with a microscope.
- HSP Science page 239

# Single and Multi-celled organisms

**Single-Cell Organism**
Made up of only one cell. Bacteria are single-celled organisms.

**Multi-cell organism**
Composed of several or many cells

- www.dictionary.com

# Vocabulary

- **Cell** cell membrane, cell wall, cytoplasm, nucleus, chloroplasts
  structure function
  magnifying microscope
  single-celled multi-celled

- **Microorganism** harmful beneficial
  disease bacteria
  protists protozoa
  germs virus
  microbe

# EQ. What is a Cell?

http://www.scsc.k12.in.us/SMS/Teachers/Martin/replacementlink.htm

- All living things are made up of cells.
- Each of us has about 100 trillion- an enormous number which is difficult to imagine.
- Each cell is a sort of bag made from a sort of skin called a membrane.
- The inside of a cell is watery and jelly-like.
- Cells are very small - you can't see them just using your eyes.
- You need to use a microscope, which makes them look many times bigger that they actually are.

# Cells

- Many cells cannot be seen with the naked eye.
- Animal and plant cells are structured differently.
- Organisms can be single-celled or multi-celled.
- Some objects are too small to be seen without magnification.
- Microscopes make it possible to see that living things are made up mostly of cells.
- Some organisms' cells vary greatly in appearance and perform very different roles in the organism.
- Some organisms are made of a collection of similar cells that benefit from cooperating.

# Video Connections

- Bill Nye-Cells
- Intro to Cells
- Cell Video (Parents, cut this video at 6:20.)
- Cell Rap
- http://www.jonathanfeicht.com/cells.html

# Prokaryotic and Eukaryotic Cells

- **Prokaryotic cell – No true nucleus**
- Pro means "before ," and
  Karyose means "kernel, "as in a kernel of grain.

Early scientists referred to a cell nucleus as a karyose since it looked like a kernel in the cell.

Prokaryotic therefore means "before a nucleus."

- **Eukaryotic cell –Has a true Nucleus**
- Eu means "true" and karyose means "kernel"; eukaryotic therefore means "possessing a true nucleus.

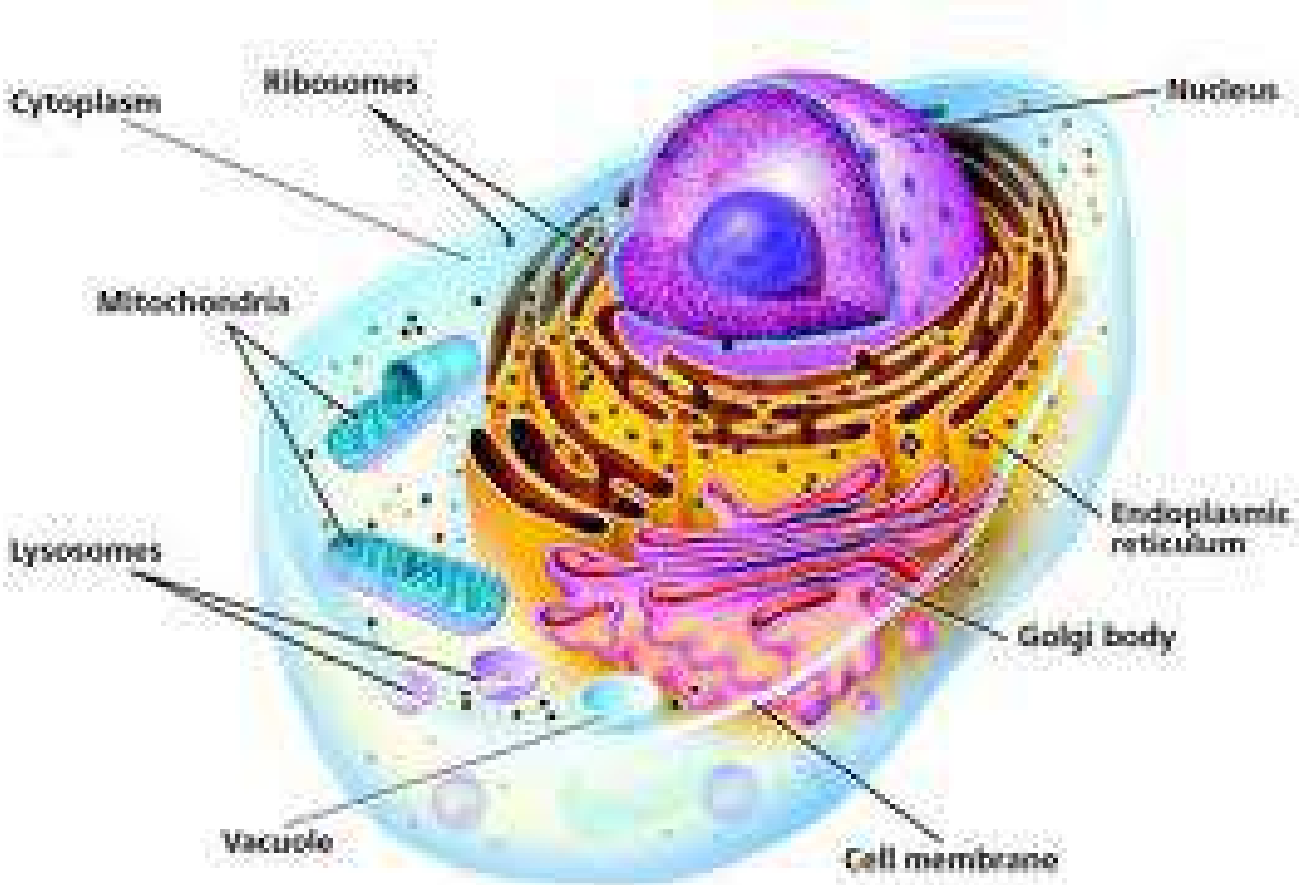
- http://www.nisdtx.org/cms/lib/TX21000351/Centricity/Domain/249/prokaryotic-eukaryotic-student-pages-11nov8.pdf

# Animal Cell http://www.cellsalive.com/cells/cell_model_js.htm

- Nucleus –
  - directs the cell's activities
  - (control center)
- Cytoplasm –
  - a jelly-like substance
  - that contains chemicals that help the cell stay healthy
- Cell membrane-
  - outer coating
  - Holds the cell together
  - Separates the cell from it's surroundings

http://studyjams.scholastic.com/studyjams/jams/science/animals/animal-cells.htm

# Animal Cell


Cytoplasm
Ribosomes
Nucleus
Mitochondria
Endoplasmic reticulum
Lysosomes
Golgi body
Vacuole
Cell membrane

# Plant Cell http://www.cellsalive.com/cells/cell_model_js.htm

## LIKE THE ANIMAL CELL

- Nucleus –
  - directs the cell's activities
  - (control center)
- Cytoplasm –
  - a jelly-like substance
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- Cell membrane-
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## ONLY IN THE PLANT CELL

- Cell Wall-
  - thick outer layer
  - Protects the cell
  - Supports and gives structure
- **Chloroplast**-
  - Makes food for the cell
  - Gives plants the greenish color

http://studyjams.scholastic.com/studyjams/jams/science/plants/plant-cells.htm

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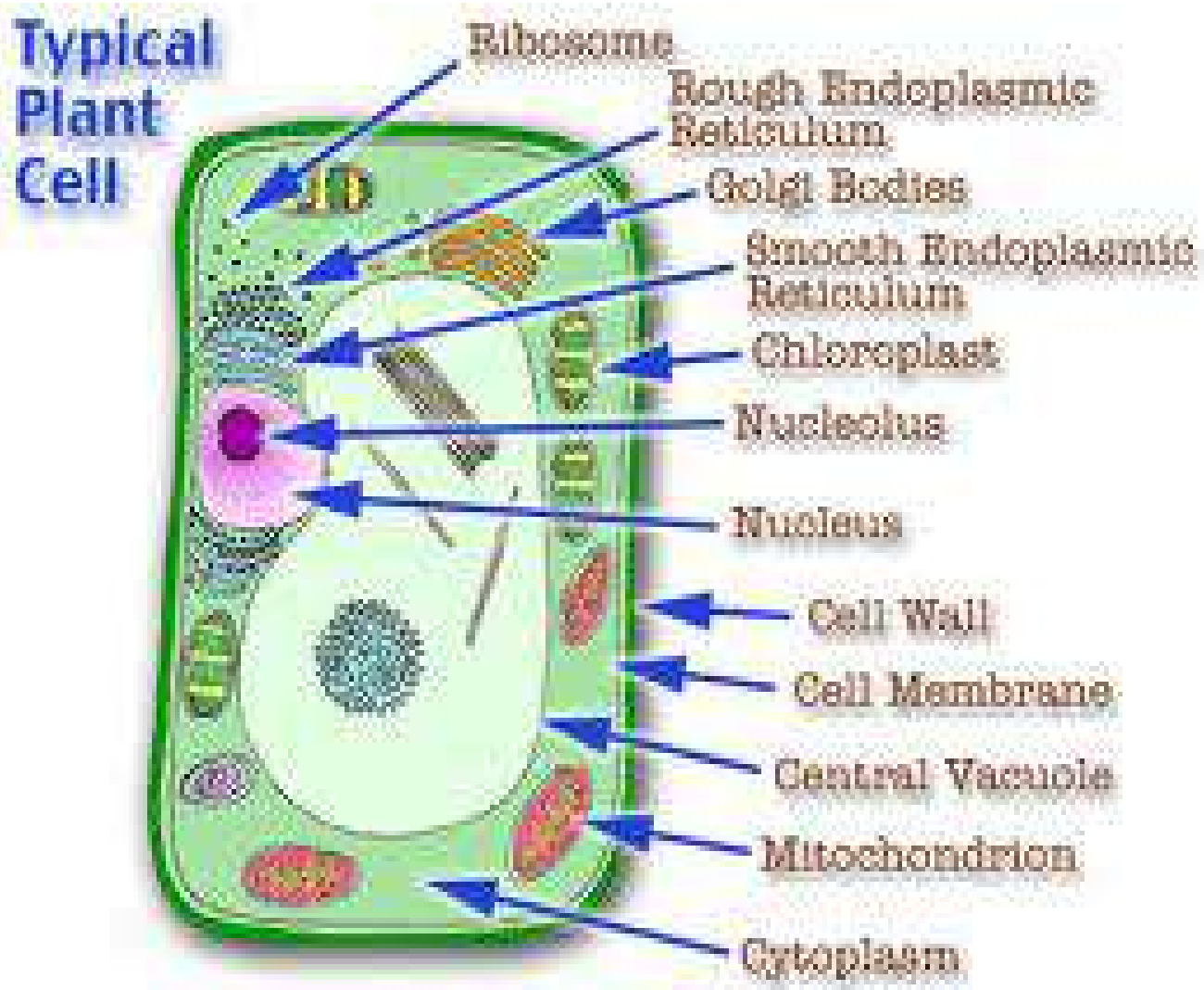
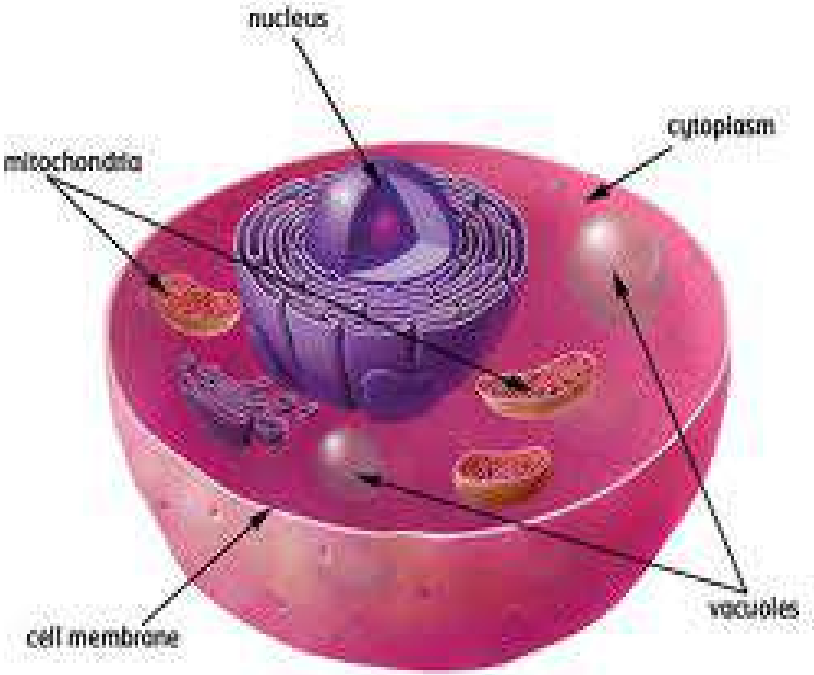
# Plant Cell

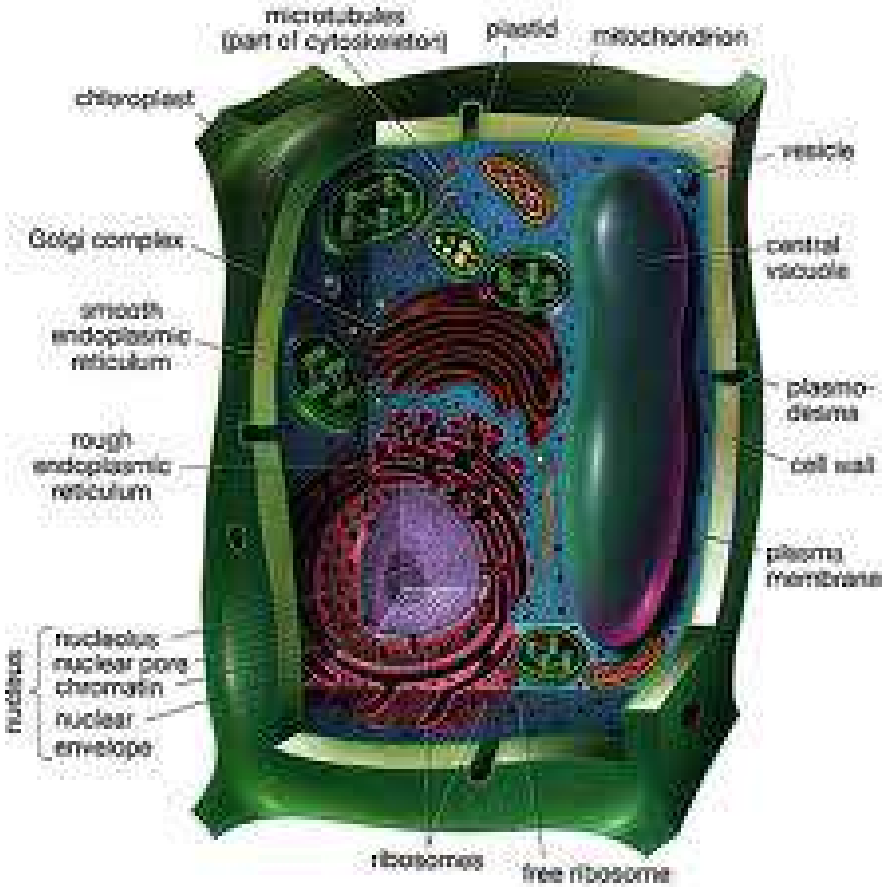

Typical Plant Cell
Ribosome
Rough Endoplasmic Reticulum
Golgi Bodies
Smooth Endoplasmic Reticulum
Chloroplast
Nucleolus
Nucleus
Cell Wall
Cell Membrane
Central Vacuole
Mitochondrion
Cytoplasm

# Animal Cell and Plant Cell

## LIKE THE ANIMAL CELL




## ONLY IN THE PLANT CELL



# Microorganisms

- Microorganisms can be beneficial.
- Microorganisms can be harmful.
- Microorganisms are too small to be seen with the naked eye.
- Microorganisms are living things.
- Microorganisms are not plants or animals.

# Misconceptions

- Organisms only contain cells, such as blood cells.
- Cells are too small and numerous to observe.
- Microorganisms are non-living.
- All microorganisms are harmful.
- Bacteria and viruses are the same.
- Different diseases are caused by the same germs.

# Proper Conceptions

- Organisms are mostly made up of cells that work together.
- Many cells such as onion skin cells and cheek cells can be viewed with magnification.
- A microorganism is a living single-celled organism of microscopic size.
- Some microorganisms are harmful, but some are beneficial.
- Decomposers are microorganisms. Many microorganisms are
- used in the food-making processes and aid in human digestion.
- Bacteria are the simplest living group of organisms and inhabit practically all environments.
- Viruses are generally regarded as non living and therefore are not microbes.
- Different diseases are caused by different microorganisms.
- There are four major types of germs: bacteria, viruses, fungi, and protozoa

# Important to know:

- Bacteria grow best in a warm and moist environment.
- How to prevent getting sick?
- Wash hand with soap and warm water.
- Chlorophyll is found in Chloroplasts.
- The genetic material in a cell is found in the nucleus. Scientist change the nucleus to change organisms.
- Viruses cause sickness like HIV, AIDS, eboli

# Review:

- Flatworm
- Paramecium
- Amoeba

# Good and Bad Microorganisms

By Ms. Muffitt

# Review

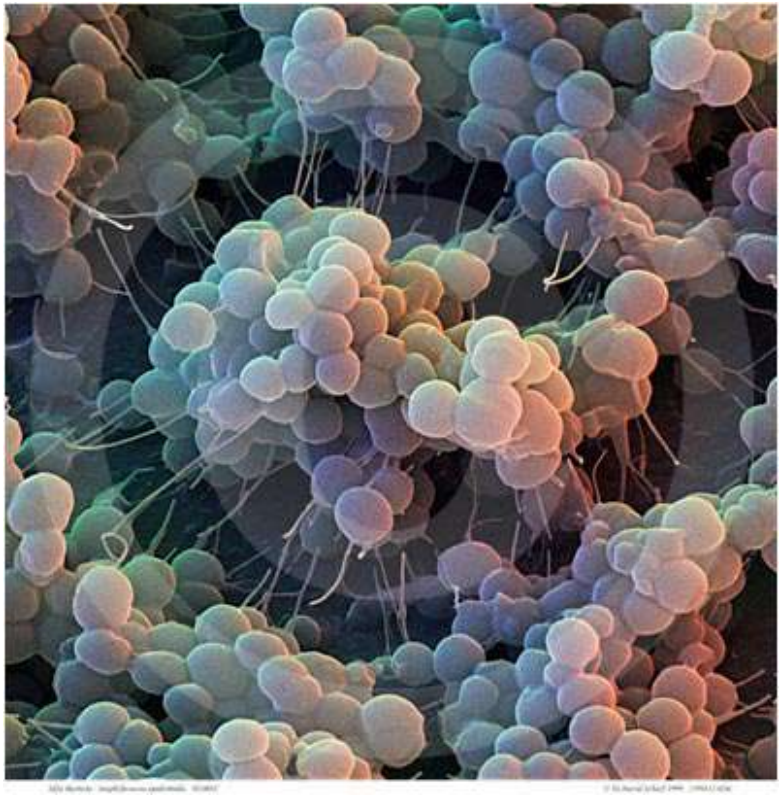
- What is the role of decomposers in the food chain?

VIDEO


VIDEO

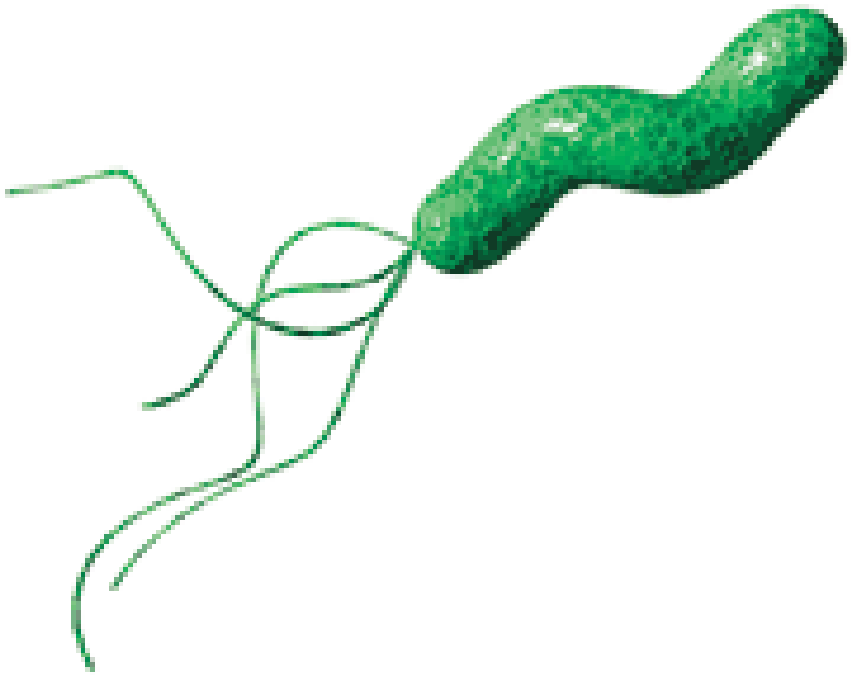
# Microorganisms

- Microorganisms are living things you cannot see without a microscope.
- Some are helpful while others are harmful.



# Helpful Microorganisms

- Bacteria live on and in our bodies and keep us alive!



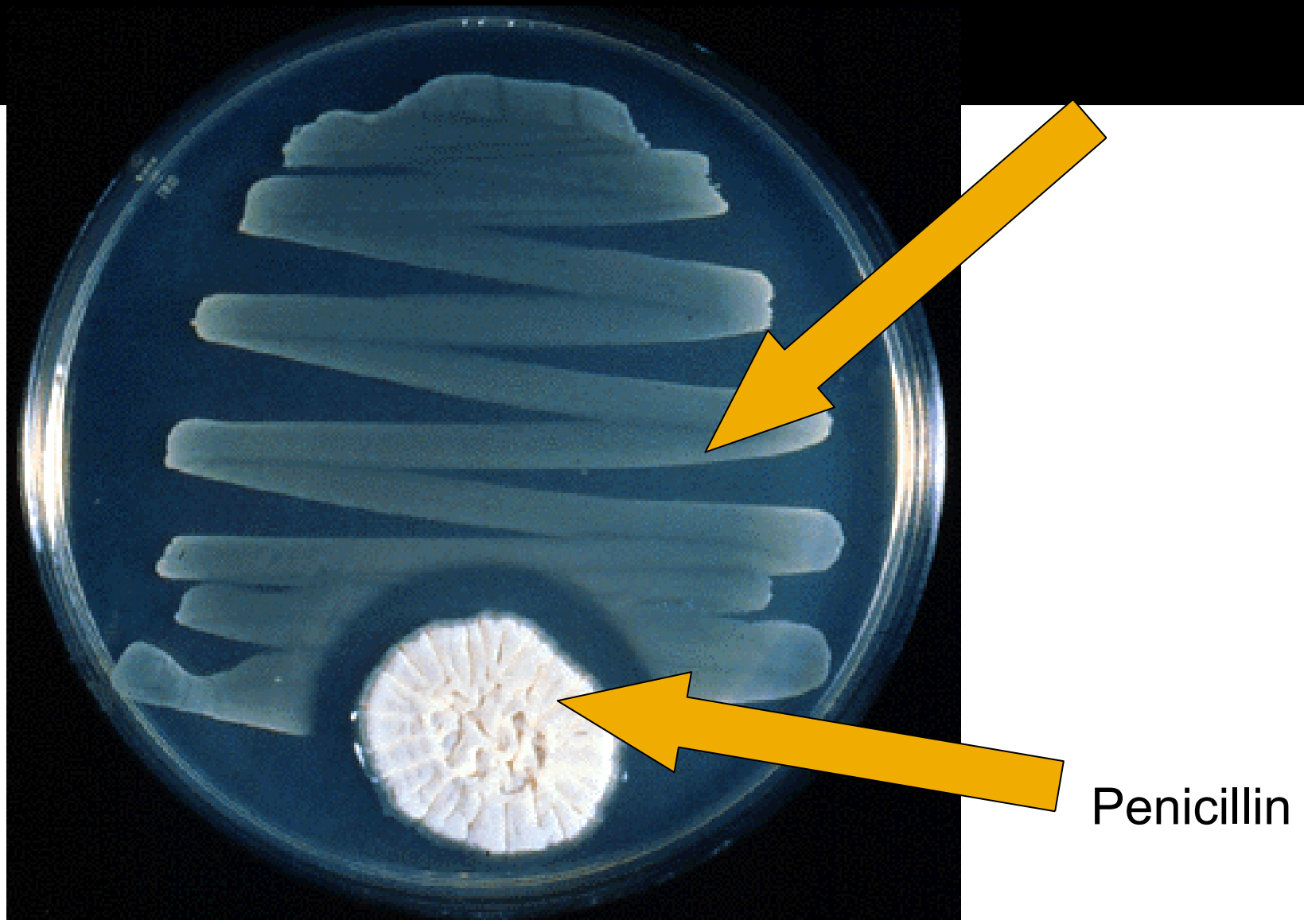
# Helpful Bacteria

- Bacteria are used to make cheese and yogurt!
- Different types of bacteria cause different tastes!

# Helpful Fungus

- Mold is a type of fungus.

- A mold called penicillin is an antibiotic (medicine) we take to kill bad bacteria.


Penicillin

# Helpful Fungus

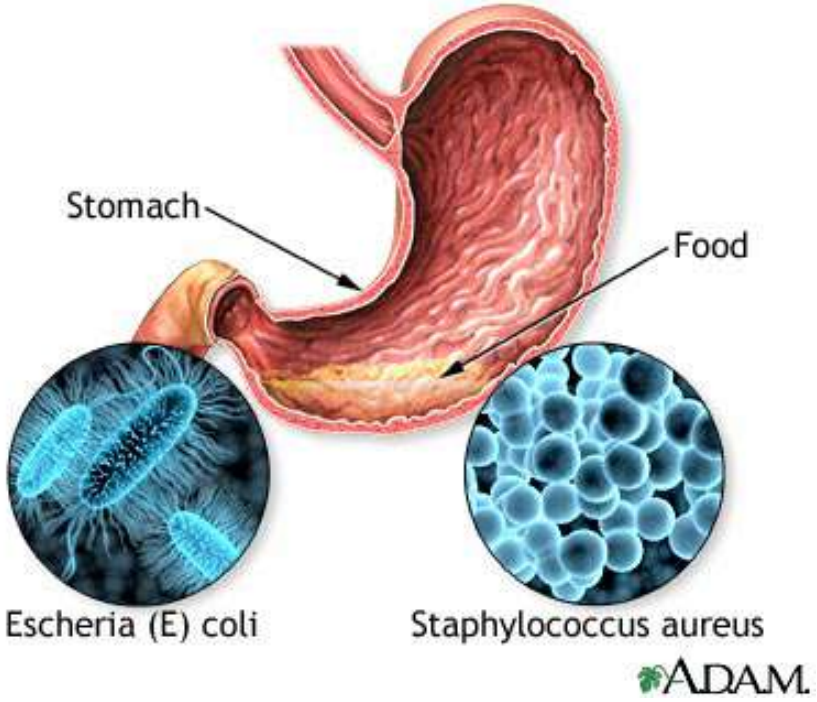
- Yeast is another type of fungus.
- We use yeast when baking bread (releases $CO_2$) and to make wine (creates ethanol).

# Harmful Microorganisms

- Some microorganisms make us very sick and destroy our food.

# Harmful Bacteria

- Some types of bacteria are responsible for sicknesses such as pneumonia and food poisoning.



# Harmful Fungus

- Fungus can cause things such as:
  - Mold on food
  - Athlete's Foot
  - Dandruff


# What's growing on you!?

Choose an area on your body where you think a lot of microorganisms would grow.

- Take a swab of that area and rub it on the clear mixture in the bottle.  Put your name on the bottle and place it on the window sill.

- Square out an area in your notes and explain why you think the body part you chose will have the most microorganisms.

# Resources:

- Centers for Disease Control: http://www.cdc.gov
- Food and Drug Administration: http://www.fda.gov
- Stalking the Mysterious Microbe: http://www.microbe.org
- Yogurt: http://www.foodsci.uoguelph.ca/dairyedu/yogurt.html
- Microbe Zoo: http://commtechlab.msu.edu/sites/dlc-me/zoo
- American Dairy Association—I Love Cheese:
- http://www.ilovecheese.com/chees_health.asp
- American Museum of Natural History—Infection Detection Protection:
- http://www.amnh.org/nationalcenter/infection/infectionindex.html
- Microbe World: http://www.microbeworld.org/home.htm