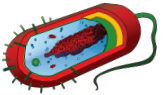
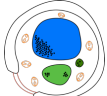
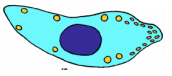
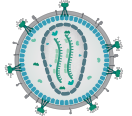


Immune System Exhibition Stations

Station 1- FUNCTIONS OF THE IMMUNE SYSTEM

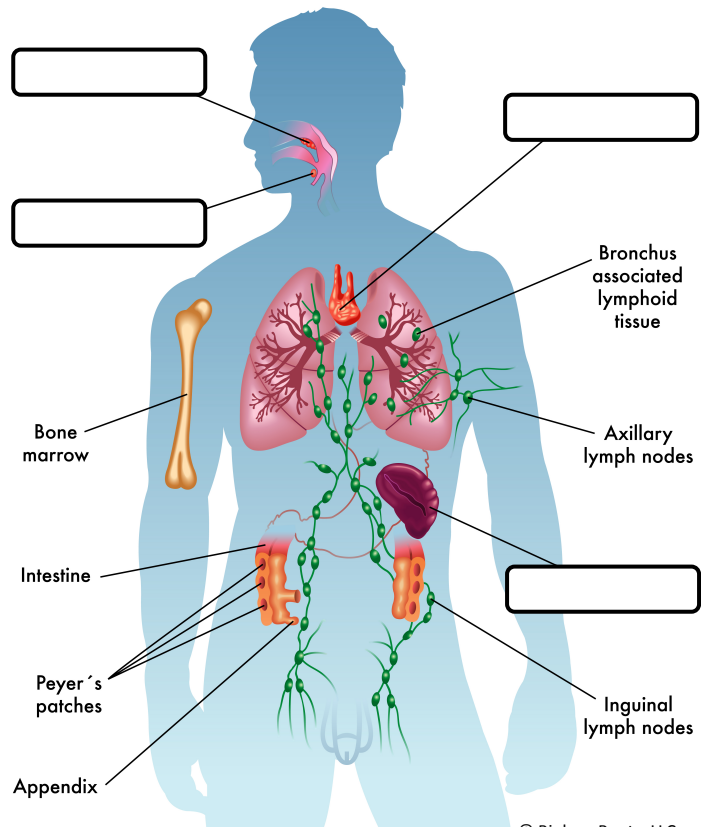
The immune system protects you from microorganisms that can cause disease, called _____.

| TYPE OF PATHOGEN | DESCRIPTION | Examples |
|---|---|----------|
| Bacteria  | _____ cells; most _____ pathogen. | |
| Fungi  | Forms _____ that can be transmitted through _____ or _____ contact. | |
| Protozoan Parasites  | _____ -celled eukaryotes. Typically need multiple _____. | |
| Viruses  | Made up of encapsulated _____ or DNA and _____; NOT cells. | |

Station 2- PARTS OF THE IMMUNE SYSTEM

| PART (organ, tissue, or cell) | Contribution to the IMMUNE SYSTEM |
|-----------------------------------|--|
| Tonsils and Adenoids | Create _____ and specialized cells. |
| Thymus | Produces specific immune cells called _____. |
| Bone Marrow | Creates _____ that help fight infection. |
| _____ nodes, tissues, and vessels | Help trap and destroy foreign substances and filter them from the blood. |
| Spleen | _____ pathogens from the bloodstream; produces _____. |
| White blood cells | |

Organs of the Immune System



Station 3- THE SKIN

Why is the skin the first line of defense?

Epithelial tissue of the nose and throat secretes _____. How does this help prevent infection? _____

Bacteria and other pathogens can enter the body if the skin is _____.

Station 4- INFLAMMATORY RESPONSE

During the first signs of an infection, the area may become red or swollen. Is this caused by the bacteria or your own body? Explain:



This is called an _____ response, and it is caused by a chemical called _____. It can also occur during allergic reactions. (Mosquito bites become itchy and swollen due to the allergic reaction we have to mosquito saliva).

Station 5- FEVER



How do fevers help fight infection?

People can die from high fevers. Why are high fevers concerning? _____

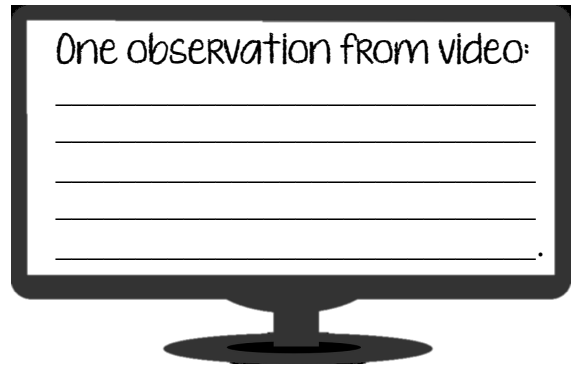
Station 7- PHAGOCYTES

What are phagocytes? _____



Examples: • Neutrophils • _____

• _____

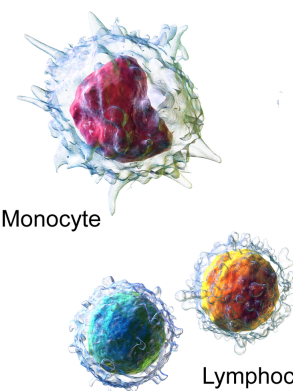
Greek prefix PHAGE means " _____ ".



Station 8- INNATE VS ADAPTIVE IMMUNE SYSTEMS

| | |
|--|--|
| INNATE IMMUNITY  | <ul style="list-style-type: none"> • Born with innate immunity • Non-specific • Cells of the innate immune system, such as macrophages and _____ attack all pathogens; you are _____ with these cells. |
| ADAPTIVE IMMUNITY  | <ul style="list-style-type: none"> • _____ to certain pathogens. • You are NOT born with adaptive immunity; it adapts to different _____ as they are introduced. • The adaptive immune system uses _____ to help fight infections more quickly. |

Station 6- WHITE BLOOD CELLS



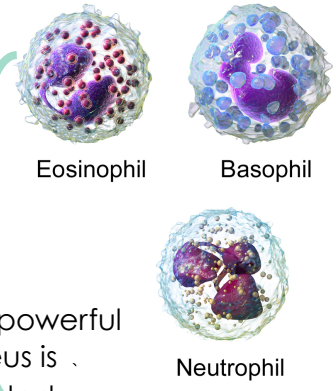
White blood cells are designed to _____ with other cells and _____.

Mononuclear white blood cells

Does not contain granules; nucleus is in _____.

Granular white blood cells

Contains granules with powerful _____; nucleus is _____ or twisted



Station 9- INNATE IMMUNE CELLS

MAST CELLS



- Where are mast cells found in the body?

- What is their function?

- What chemical do mast cells release when they detect injury?

- WHY do you think mast cells are located so closely to the skin?

MACROPHAGES



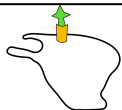
- What happens if a macrophage stumbles across a pathogen? (also name chemicals it releases):

NEUTROPHILS



- Make up _____ of your white blood cells.
- Activated by _____.
- What is pus?

Station 13- MHC



- MHC stands for major _____ and it is a protein that helps the immune system _____ substances.

What are antigen presenting cells?

Station 10- ADAPTIVE IMMUNE CELLS

- Adaptive immune cells are a bit more advanced. _____ make up most of the adaptive immune system, such as _____ cells and _____ cells. These cells rely on _____.

Station 11- ANTIGENS AND ANTIBODIES

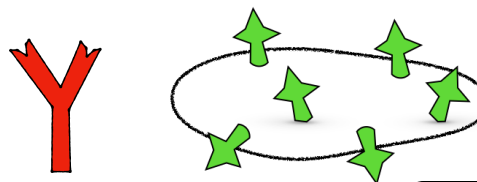
- Your adaptive immune system makes _____ called **ANTIBODIES**. Antibodies help _____ the pathogen.

Antibodies are _____ to _____.

Define antigen: _____

True or False: all antigens are the same. _____

True or False: antibodies specific to strep can also be used to tag E. Coli antigens. _____



Label the antigen and antibody.

Info at stations 11 and 12 may be required for station 20

Station 12- ANTIBODIES

- How are antibodies like a bridge?

Which type of immune cell attaches to antibodies?

How do antibodies help prevent or slow down future infections from the same pathogen?

Station 14- HELPER T CELLS

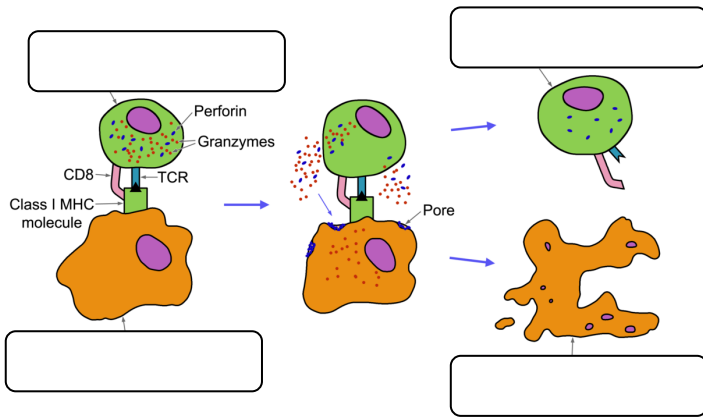


T cells are part of the _____ immune system.

Helper T cells communicate between the _____ and _____ immune systems by scanning _____ to determine which antibodies are required. They are activated by _____-presenting cells. Once they find an antigen, they release _____.

Cytokines can summon _____ T cells, _____ cells, which can make _____, other lymphocytes, or cells of the innate immune system such as _____ and macrophages.

Station 15 - KILLER T CELLS Label:



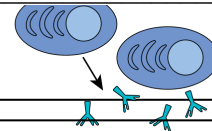
What do killer T cells do? _____

Station 16- B CELLS

B cells are antigen presenting cells that are capable of making _____.

Study the diagrams at the station. What happens when a B cell encounters a matching antigen? _____

The presented antigen attracts helper T cells, which release _____, this causes B cells to _____.

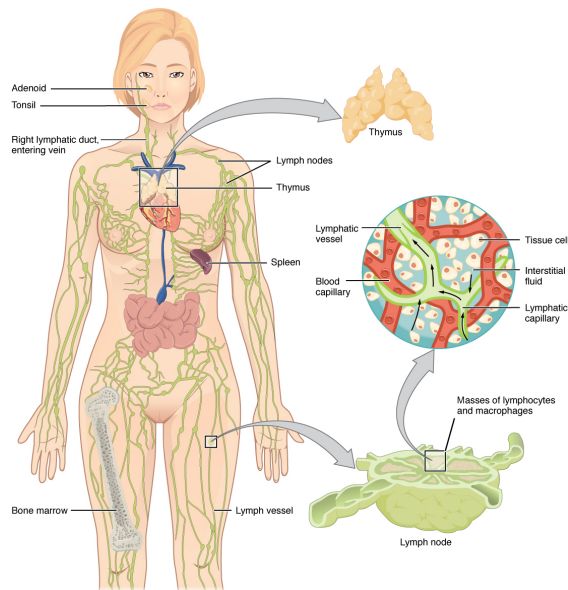


Station 17- LYMPHATIC SYSTEM

The lymphatic system is made up of tissues and organs that transport _____ - a fluid that contains _____.

What is produced at the lymph nodes? _____

When you visit the doctor, they may feel your neck during a routine visit. Though the common verbiage is "swollen glands"; they are actually checking for swollen lymph nodes. What might a swollen lymph node tell us? (No wrong answers here, it's your thoughts that count!) _____



The lymphatic system also rids the body of toxins and waste as a _____ system.

Lymph can also transport _____ to the _____ where they are destroyed by _____.

Station 18- PRIMARY ORGANS of the LYMPHATIC SYSTEM: THYMUS & RED BONE MARROW

| Organ or tissue | Contribution to the lymphatic system's function: |
|-----------------|--|
| Thymus | |
| Red Bone Marrow | |

LYMPHATIC SYSTEM

Station 19- HOW VACCINATIONS WORK

- What are you injected with when receiving a vaccination? _____
- What is the benefit of using a weakened version of the pathogen when vaccinating? _____
- What do vaccinations do for the health of the population? _____

Station 20- EDWARD JENNER + VACCINATIONS



Edward Jenner helped bring awareness to disease during the _____ pandemic. Smallpox is a strain caused by the Variola _____. Thanks to vaccines, smallpox has been completely eradicated since _____.

_____ is a virus that is similar to smallpox. However, cowpox is _____ and less _____ than smallpox. -Where does the word vaccine stem from? _____



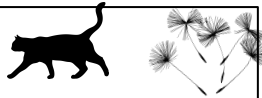
•Who is Sarah Nelmes? _____

•Describe what the first vaccination was like with James Phipps: _____

•What happened to James Phipps when he was exposed to smallpox? _____

*Based on this information, what would you conclude about the antigens of smallpox and cowpox? (If unsure, come back after you've visited stations 11 & 12). _____

Station 21- ALLERGIES



Allergies are _____ of the _____ system. The body reacts to things like _____ and _____ as if they were _____. These are called _____.

Why are antihistamines used for allergy relief?

Name 3 examples of allergens: _____

Station 22- AUTOIMMUNE DISEASE

Autoimmunity is when your immune system starts attacking _____ when they are mistaken for a foreign substance.

Examples of autoimmune disease:

- _____
- _____
- _____
- _____

Station 23- SIMULATION of DISEASE SPREADING

Choose a slip out of the box and follow the directions found at the station. Look at your slip of paper to determine how many different people to swap the contents of the cup with. **ONCE YOU HAVE THE NUMBER OF CUPS TO SWAP WITH, RETURN THE SLIP TO THE DESIGNATED AREA. DO NOT PUT IT BACK IN THE BOX.**

Once all classmates have gone through the simulation at the end of class, write down the numbers on you scrap paper to see which people/cups you shared germs with. Record them here: _____

How many classmates ended up "sick" after the simulation? _____

Even if you didn't swap liquids with anyone and practiced great hand washing, etc., how can you still get sick? _____

How does this simulate the spreading of germs? _____

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