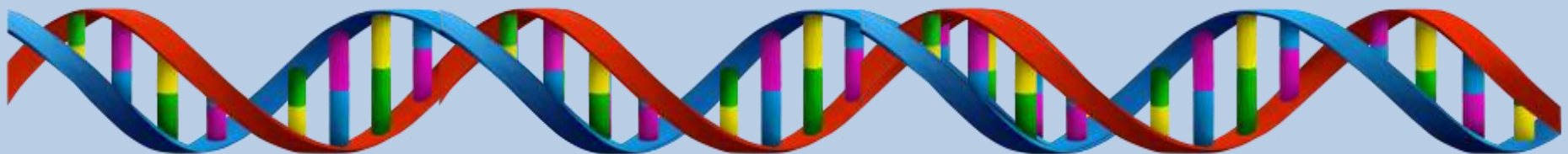
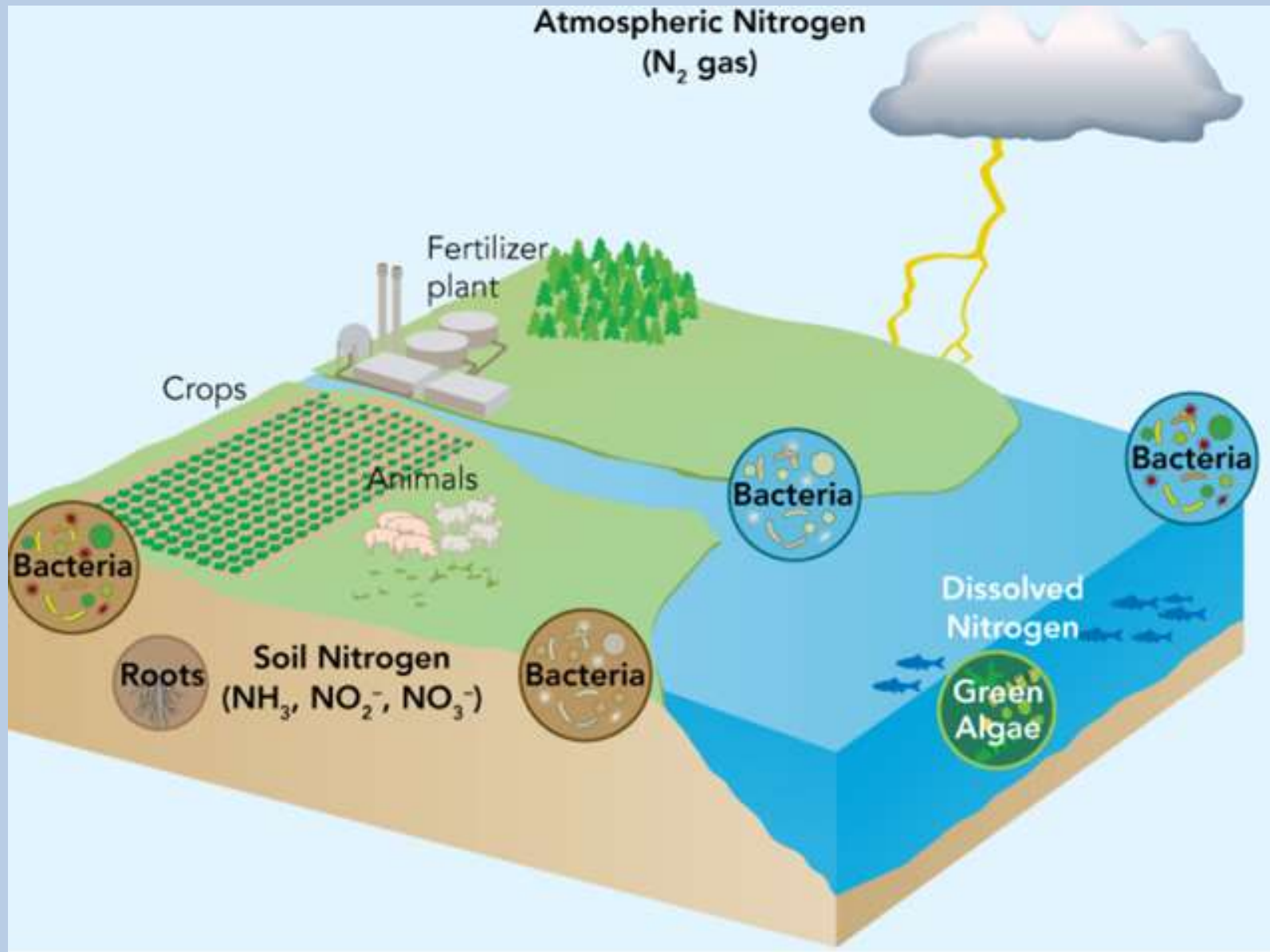


- 1. Why are bears “ecosystem engineers?”**
- 2. What would happen to the ecosystem if bears were removed in the 1940s like proposed?**
- 3. What is the difference between seepage and leaching?**



Nitrogen Cycle

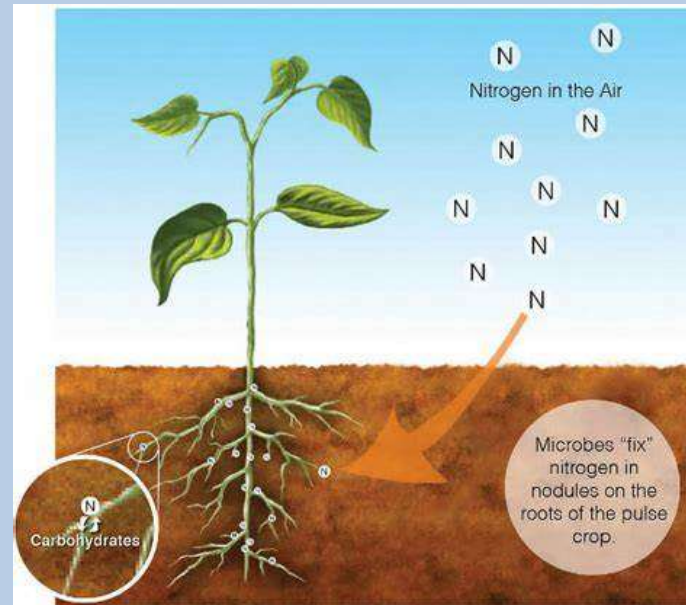


DO NOT WRITE THIS

1. **Nitrogen fixation: lightening or bacteria turn N_2 from the atmosphere into ammonia (NH_3) in soil or water. Bacteria in water and soil then turn ammonia into nitrates (NO_3)**

What you need to know:

1. Nitrogen fixation: bacteria takes nitrogen gas from the atmosphere and fixes it into a form of nitrogen that producers can absorb

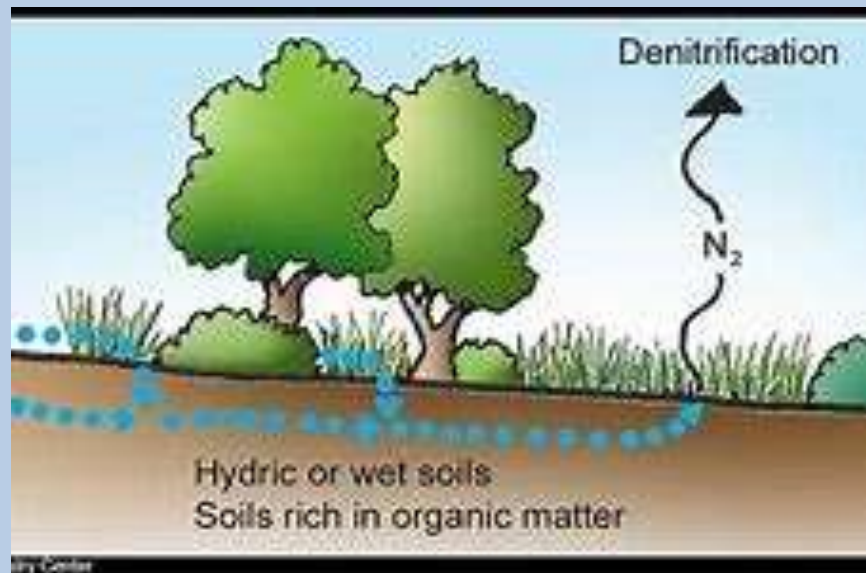


Nitrogen Cycle

2. Producers take up nitrate
3. Consumers eat producers
4. Decomposers break down dead organic matter and return nitrogen to soil and water

What you need to know:

5. Denitrification: bacteria turn nitrogen from plants back into nitrogen gas to be released into the atmosphere



Nitrogen Cycle

6. Humans capture N_2 to use in fertilizer
7. Fertilizer increases nitrogen concentration in soil (crops)
8. Leaching: excess nitrogen is washed into the waterways

Nitrogen Cycle

- **What happens when excess nitrogen is washed into waterways?**

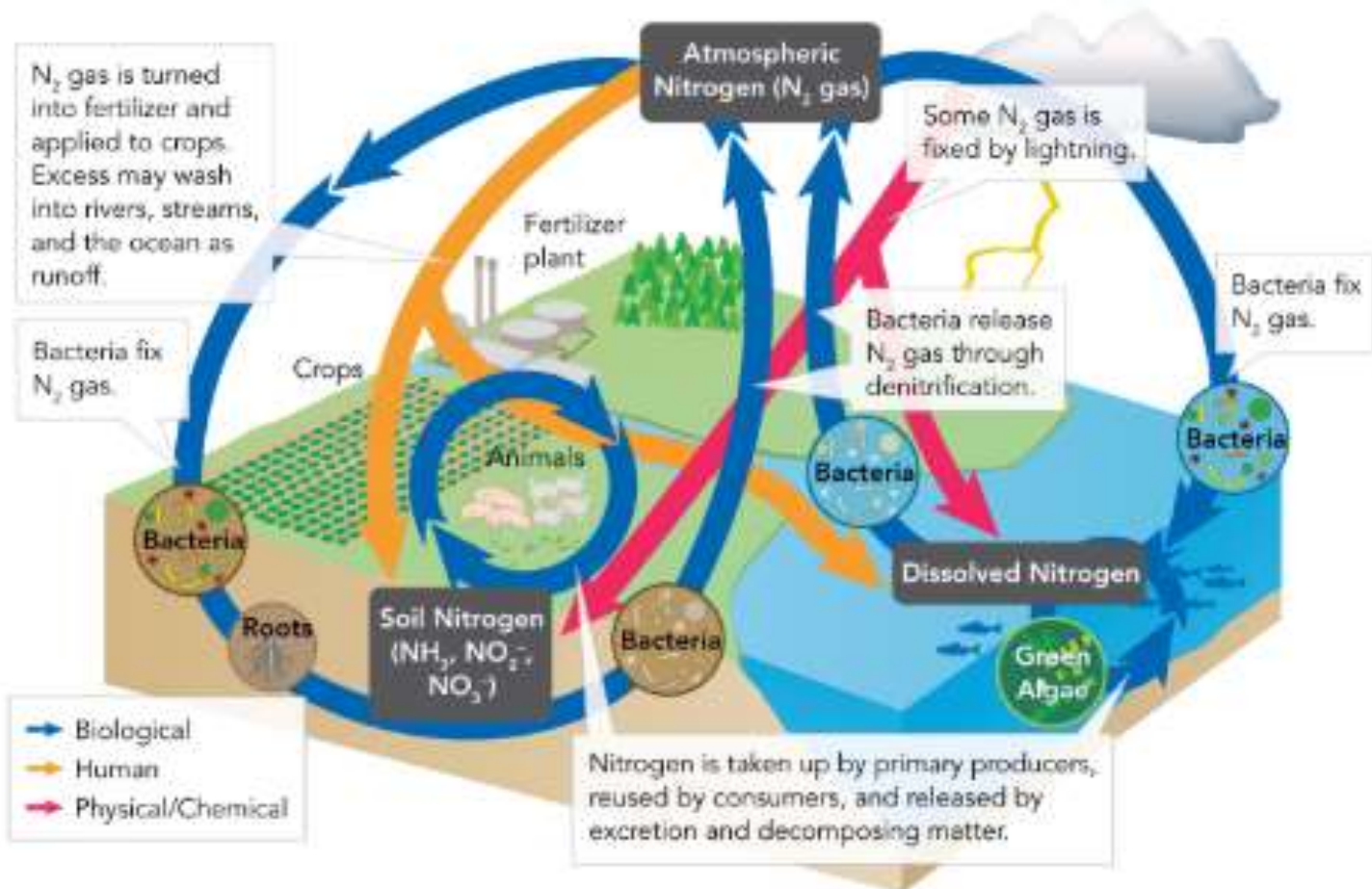
Nitrogen Cycle

- **What is the relationship between nitrogen fixation and denitrification?**

Nitrogen Cycle

Figure 4-13 The Nitrogen Cycle

The atmosphere is the largest reservoir of nitrogen. Nitrogen also cycles through the biosphere, geosphere, and hydrosphere.



Nitrogen Cycle

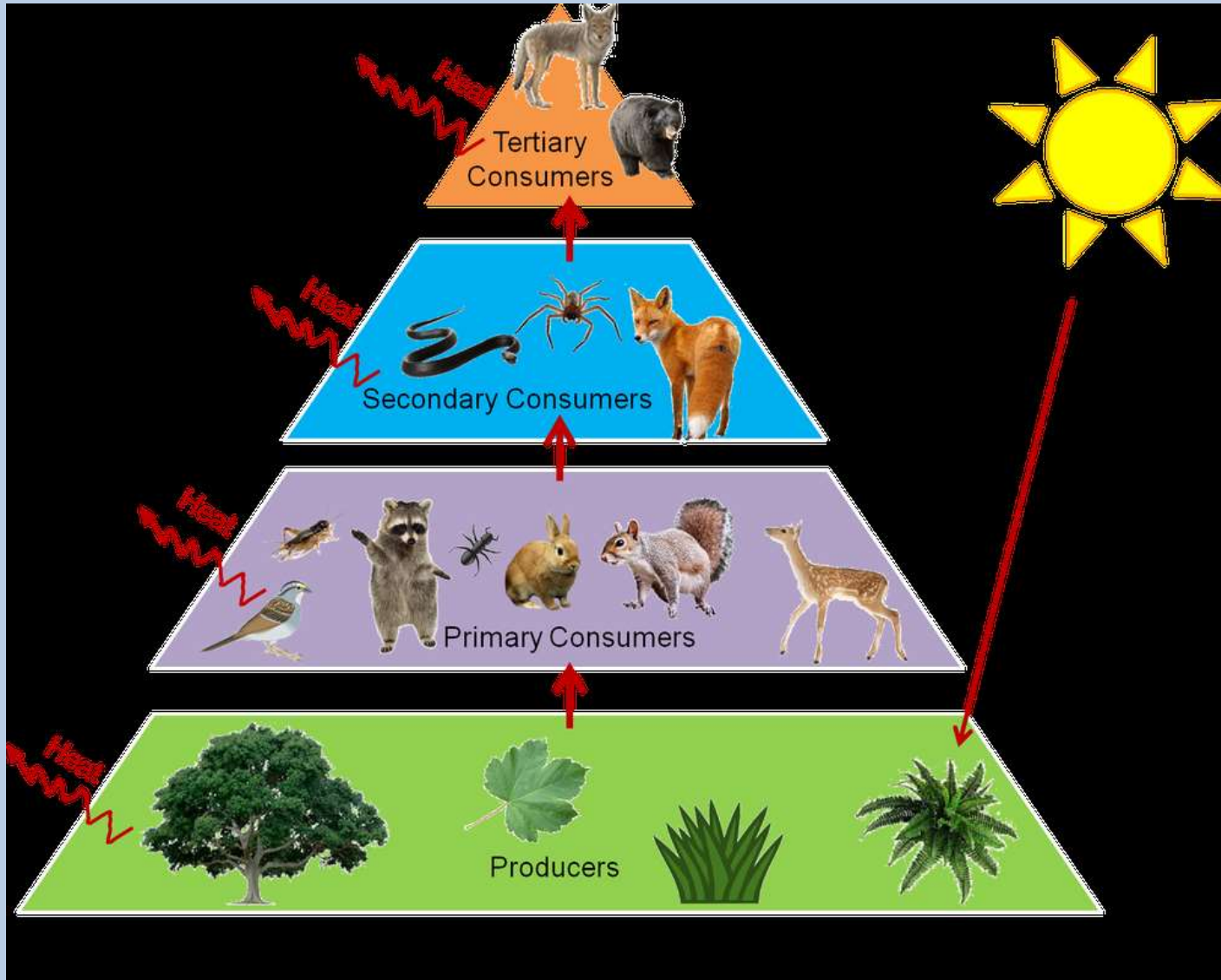
What you need to know:

- Nitrogen is converted into different chemical forms by bacteria
- Nitrogen in the environment cannot be used by biotic factors until it changes form

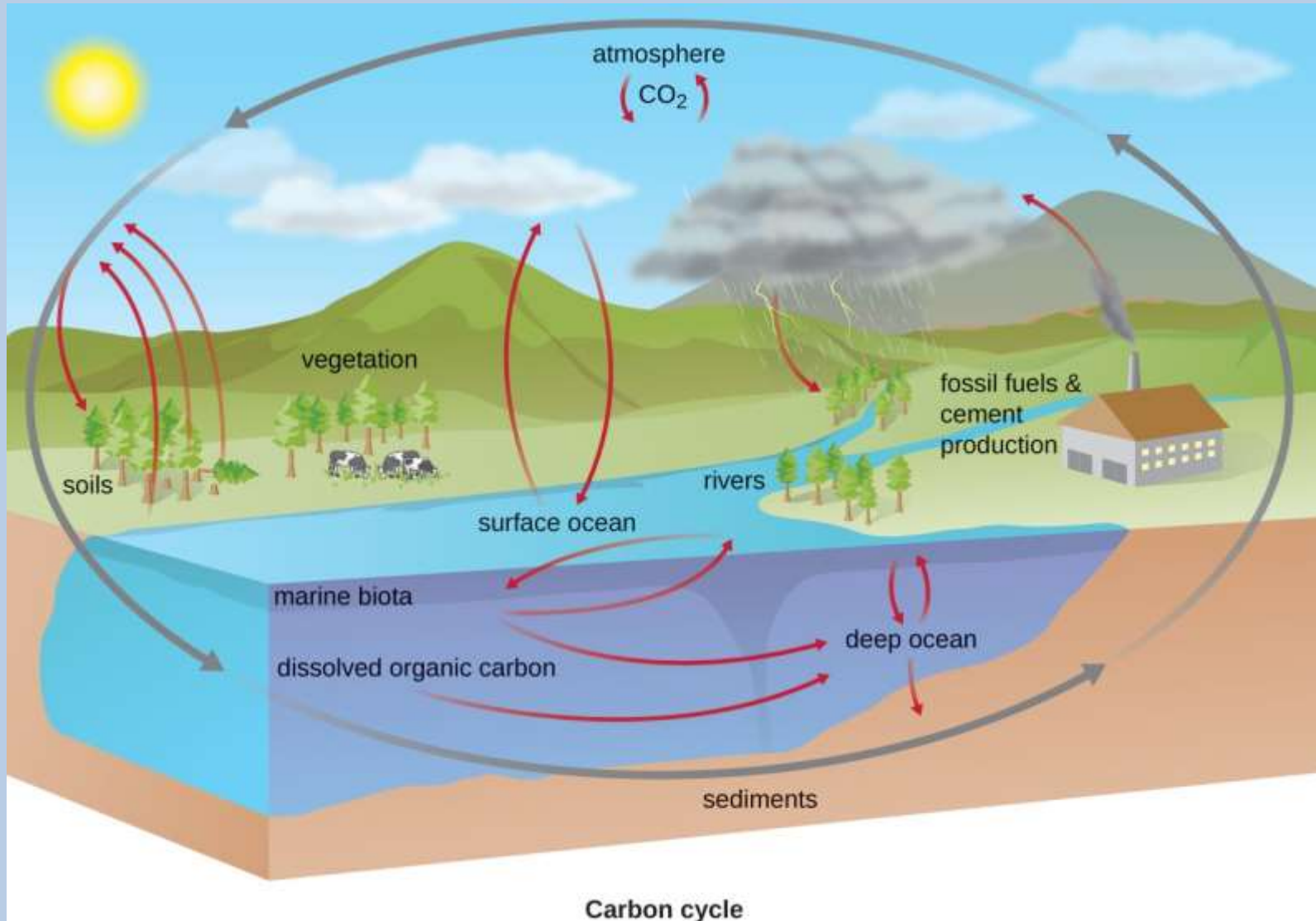
Logistics

- **Look at objective 9**
- **Energy flow vs. matter cycles**

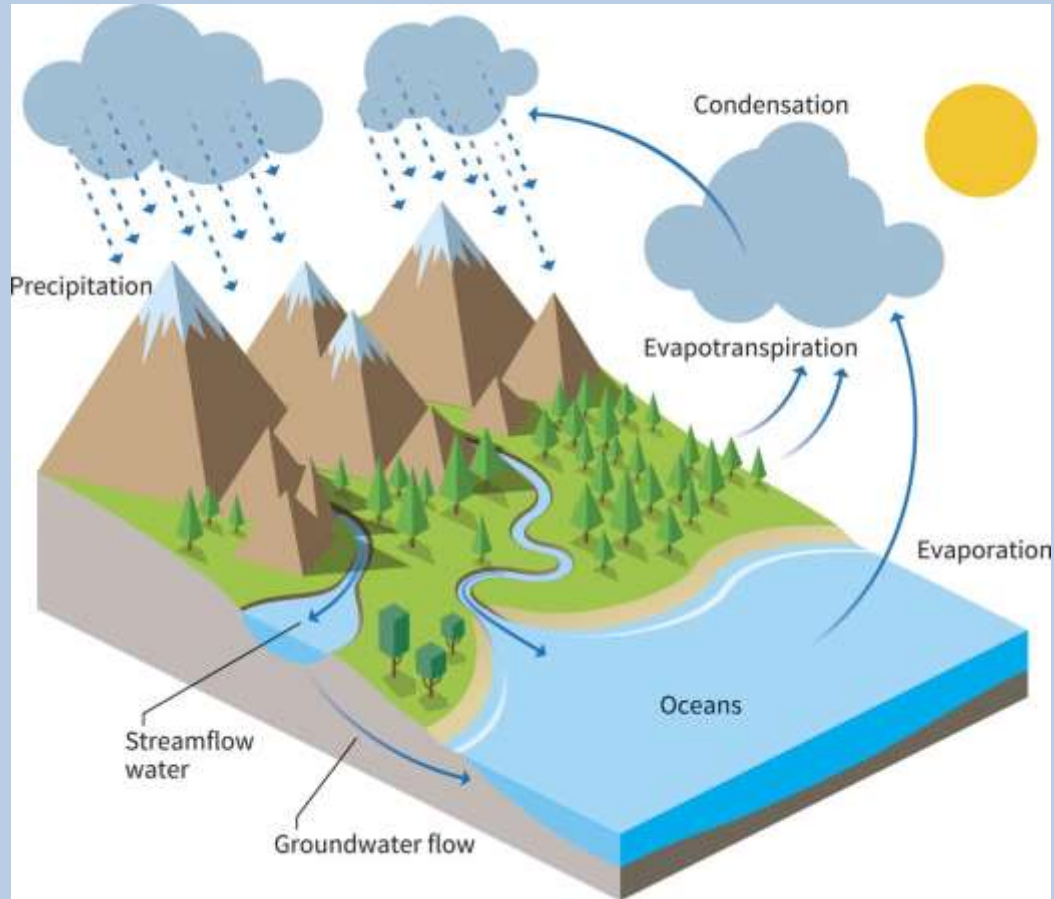
Energy Flow



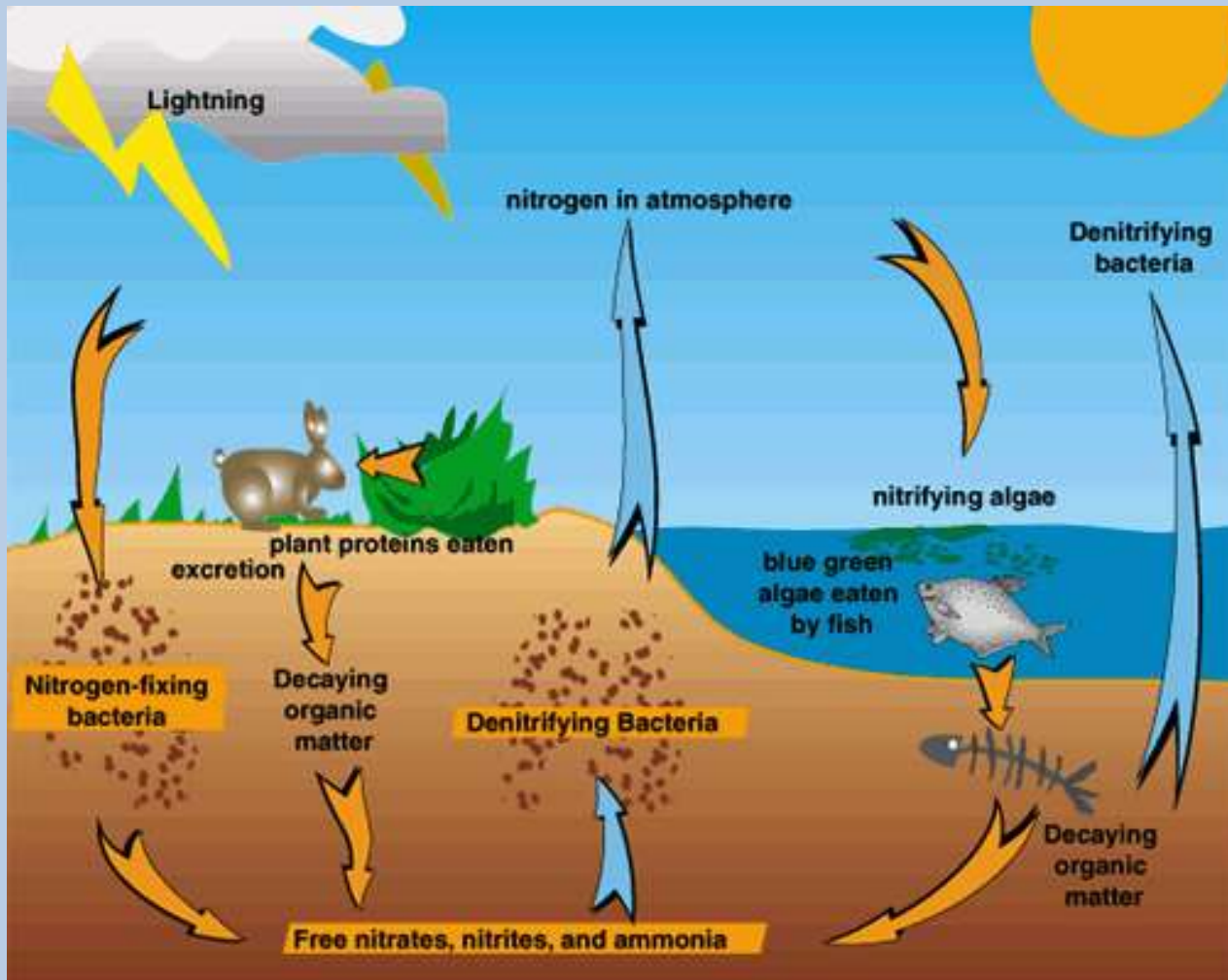
Matter Cycle



Matter Cycle



Matter Cycle



Logistics

- **You should know objectives 1-10 on your cover sheet**
- **Ask questions!**



INTERMISSION



Lab Introduction

- For the next few days we will be investigating algae growth rates



Pre-Lab

- What trophic level does *Chlorella* belong?
- How does *Chlorella* obtain energy?
- Why does *Chlorella* need additional nutrients?

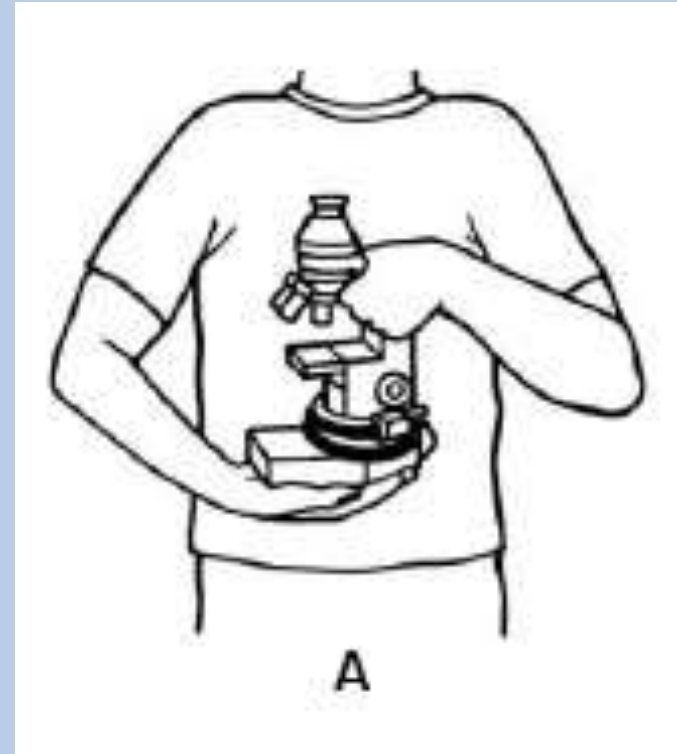
Lab Introduction

- **Are we studying a population or community?**



Microscope Activity

- Today you will be using microscopes
- **BE VERY CAREFUL:**
- Carry with two hands; one on base, one on arm



Microscope Activity

- **DO NOT USE THE COURSE ADJUSTMENT ON HIGH OBJECTIVES**
- **COURSE ADJUSTMENT IS THE BIG KNOB**



Microscope Activity

- **USE THE STAGE CLIPS**



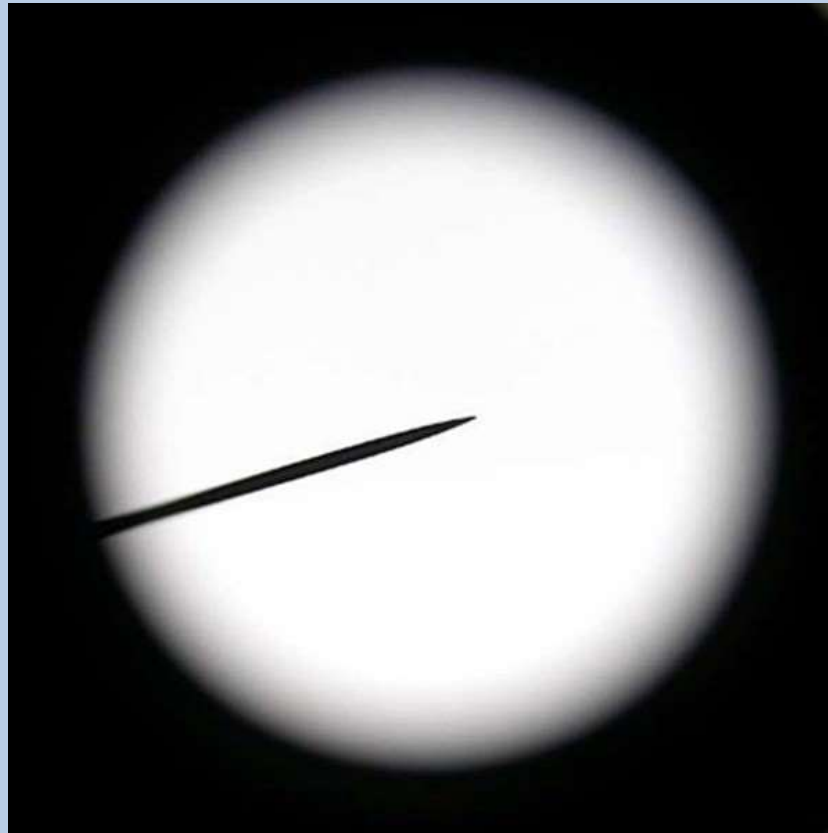
Microscope Activity

- **ADJUST THE LIGHT WITH THE IRIS**



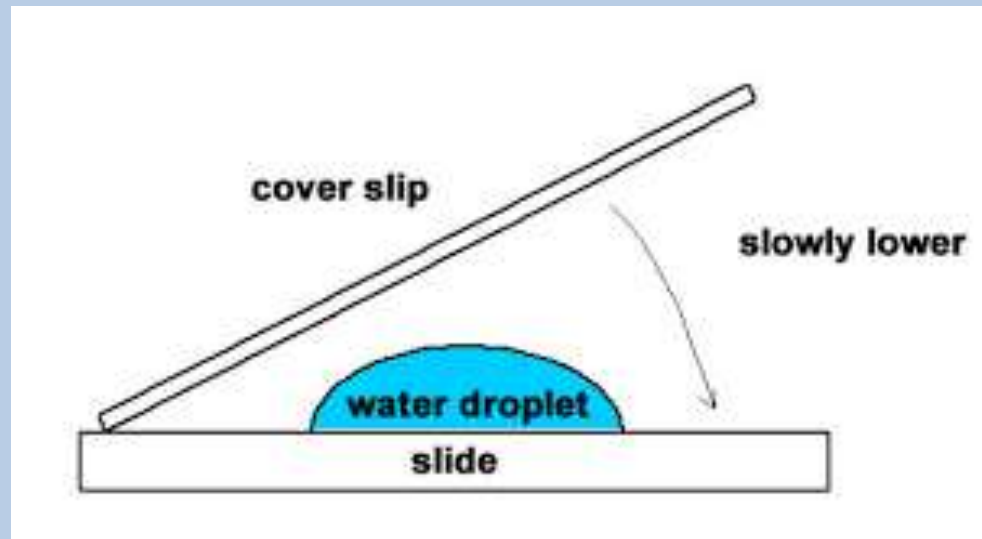
Microscope Activity

- **Whatever the needle is pointing at will be what is zoomed in on**



Microscope Activity

- **Wet mounts**
 - Place item on slide, drop water on slide, roll cover slip on to ensure there are NO air bubbles



Populations

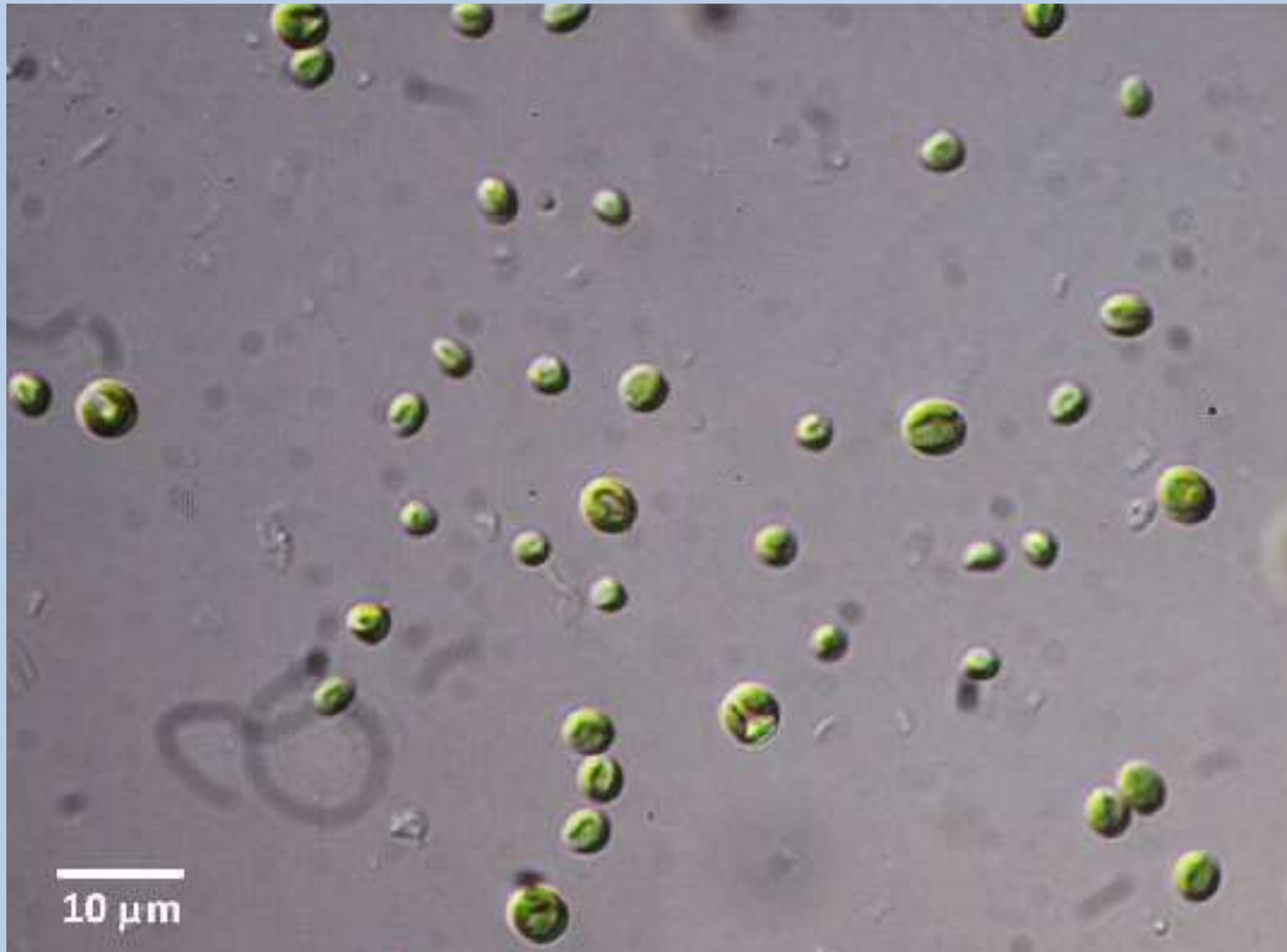
- You **must have your goggles on** your face when you are handling live culture.



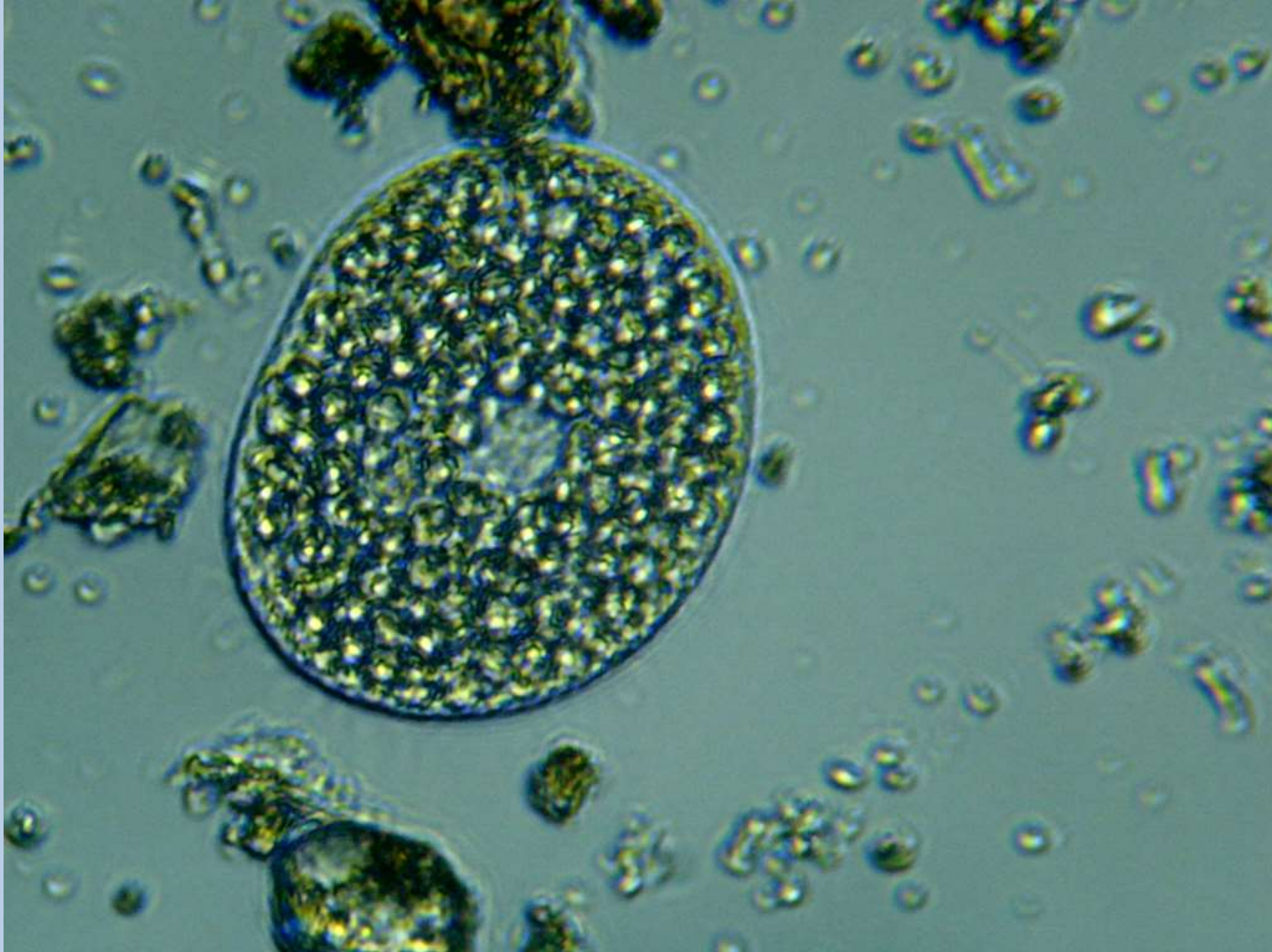
Populations

- **Today you will be setting up your experimental design:**
 - **Pre-Lab**
 - **Part A procedures**
 - **Complete your control counts**
 - **Clean up and wash your hands**

Populations



Populations



Populations

- **Submit your data before you leave today!**

