

# Biology of Plants & Animals

You can fill out this worksheet as we go along to get the most out of time together, or you can use it as a review exercise at the end of the course to see where your strengths are.

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## What we're going to cover today:

- Different fields of Biology:
    - Zoology
    - Biochemistry
    - Molecular Biology
    - Botany
    - Entomology
    - Astrobiology
  - Compound Microscopes
  - Classification & Taxonomy
  - Insect structure and behaviors
  - Plant behavior and structure
  - Photosynthesis and Chemosynthesis
  - Properties of light
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Do this NOW: Write down two things you want to learn about biology:

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Do this NOW: Write down WHY you want to learn about the things you mentioned above. What will it give you, or provide you with, or make possible for you if you now understand these things that you wanted to learn?

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**IMPORTANT:** During this course, you can either fill out the worksheet, OR if that's too stressful or a hassle, just set it aside and fill it out after class is over so you can enjoy watching the class.

**Answer key** is on the last page, so put it in a place where you won't be tempted to peek at the answers until after you've given it your best shot.

## **Material List:**

### Materials for DNA Extraction experiment:

- Salt (1 tbl)
- Clear glass cup
- Coffee filter and a funnel
- Magnifying lenses (2 handheld)
- 91% isopropyl alcohol (1 Tbl)
- Blender or food processor
- Liquid dishwashing detergent (like Dawn or Palmolive)
- Apple OR squash OR bananas OR carrots OR anything else you might have in the fridge!  
(Must be a fruit or vegetable.)



### Materials to make Live-Cell Laser Microscope:

- Needle-nose pliers
- Paperclip
- Red laser pointer
- Rubber band

## **During the Lesson:**

You can look over the worksheet so you know what to listen for as you go through the class with me, or you can go through it along with me during class. OR... flip it over and forget about it and just enjoy the class. When class is over, flip it back over and fill it out and be amazed at how much you've picked up and learned!

1. Biology is the science that studies all \_\_\_\_\_ organisms.
  
2. \_\_\_\_\_ studies animals in the lab and also in their natural environment.
  
3. Molecular biologists study \_\_\_\_\_, do research and perform experiments to solve real world problems.
  
4. Astrobiologists study \_\_\_\_\_ on earth and in space.
  
5. Entomologists study \_\_\_\_\_, including appearances and behaviors, and also their environment.
  
6. Three questions scientists ask:
  - a. \_\_\_\_\_

b. How does it work, function, or behave?

c. \_\_\_\_\_

7. Botany (plant biology) studies the nature of \_\_\_\_\_ and their environment.

8. Sunlight has to go through more \_\_\_\_\_ at sunrise and sunset.

9. Phototropism describes the way plants grow in \_\_\_\_\_ to light.

10. Phytochrome is a light-activated \_\_\_\_\_ in the leaves of plants.

11. Plants respond to \_\_\_\_\_ by ripening their fruit.

12. Plants use chemicals to change \_\_\_\_\_.

13. Special cells in the root cap contain a starch that is \_\_\_\_\_ than the rest of the cell, and \_\_\_\_\_ in a gravitational field.

14. Plants, algae and certain bacteria convert sunlight into \_\_\_\_\_ by photosynthesis.

15. Photosynthesis is how plants use \_\_\_\_\_ of the sun to convert CO<sub>2</sub> into useable carbon.

16. A \_\_\_\_\_ is the smallest unit of life that can replicate independently.

17. Lenses \_\_\_\_\_ and distort images to \_\_\_\_\_ the image.

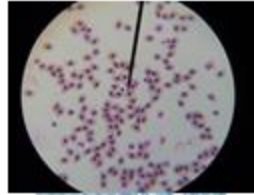
18. Hydrothermal \_\_\_\_\_ are surrounded by thriving communities of organisms that \_\_\_\_\_ from the vents for chemosynthesis.

19. Chromatography is how scientists separate a \_\_\_\_\_ in the lab.

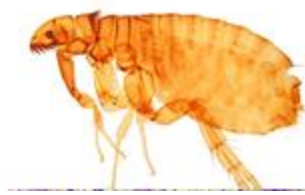
20. What is it?



a. \_\_\_\_\_



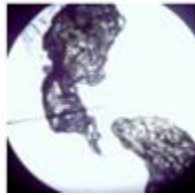
b. \_\_\_\_\_



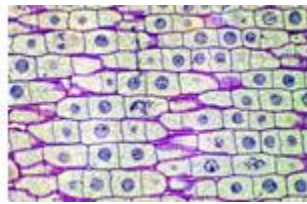
c. \_\_\_\_\_



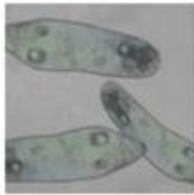
d. \_\_\_\_\_



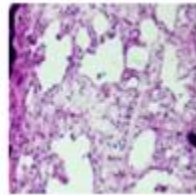
e. \_\_\_\_\_



f. \_\_\_\_\_



g. \_\_\_\_\_



h. \_\_\_\_\_



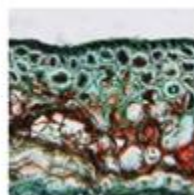
i. \_\_\_\_\_



j. \_\_\_\_\_



k. \_\_\_\_\_



l. \_\_\_\_\_

21. What I didn't know about biology until class today was:

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## Answer Key

1. Biology is the science that studies all living organisms.
2. Zoologist studies animals in the lab and also in their natural environment.
3. Molecular biologists study cells, do research and perform experiments to solve real world problems.
4. Astrobiologists study life on earth and in space.
5. Entomologists study insects, including appearances and behaviors, and also their environment.
6. Three questions scientists ask:
  - a. What is it?
  - b. How does it work, function, or behave?
  - c. How does it change?
7. Botany (plant biology) studies the nature of plants and their environment.
8. Sunlight has to go through more atmosphere at sunrise and sunset.
9. Phototropism describes the way plants grow in response to light.
10. Phytochrome is a light-activated switch in the leaves of plants.
11. Plants respond to ethylene gas by ripening their fruit.
12. Plants use chemicals to change color.
13. Special cells in the root cap contain a starch that is denser than the rest of the cell, and sinks in a gravitational field.
14. Plants, algae and certain bacteria convert sunlight into chemical energy by photosynthesis.
15. Photosynthesis is how plants use energy of the sun to convert CO<sub>2</sub> into useable carbon.
16. A cell is the smallest unit of life that can replicate independently.
17. Lenses bend and distort images to magnify the image.
18. Hydrothermal vents are surrounded by thriving communities of organisms that use energy from the vents for chemosynthesis.



19. Chromatography is how scientists separate a mixture in the lab.

20. What is it?

- a. Moth wing
- b. Frog blood
- c. Flea from a cat
- d. Ant
- e. Sneeze
- f. Onion cells
- g. Paramecium (single-cell protist)
- h. Respiratory tissue sample (like from your lungs)
- i. Hair growing on a scalp
- j. Green algae
- k. Water flea
- l. Pine wood