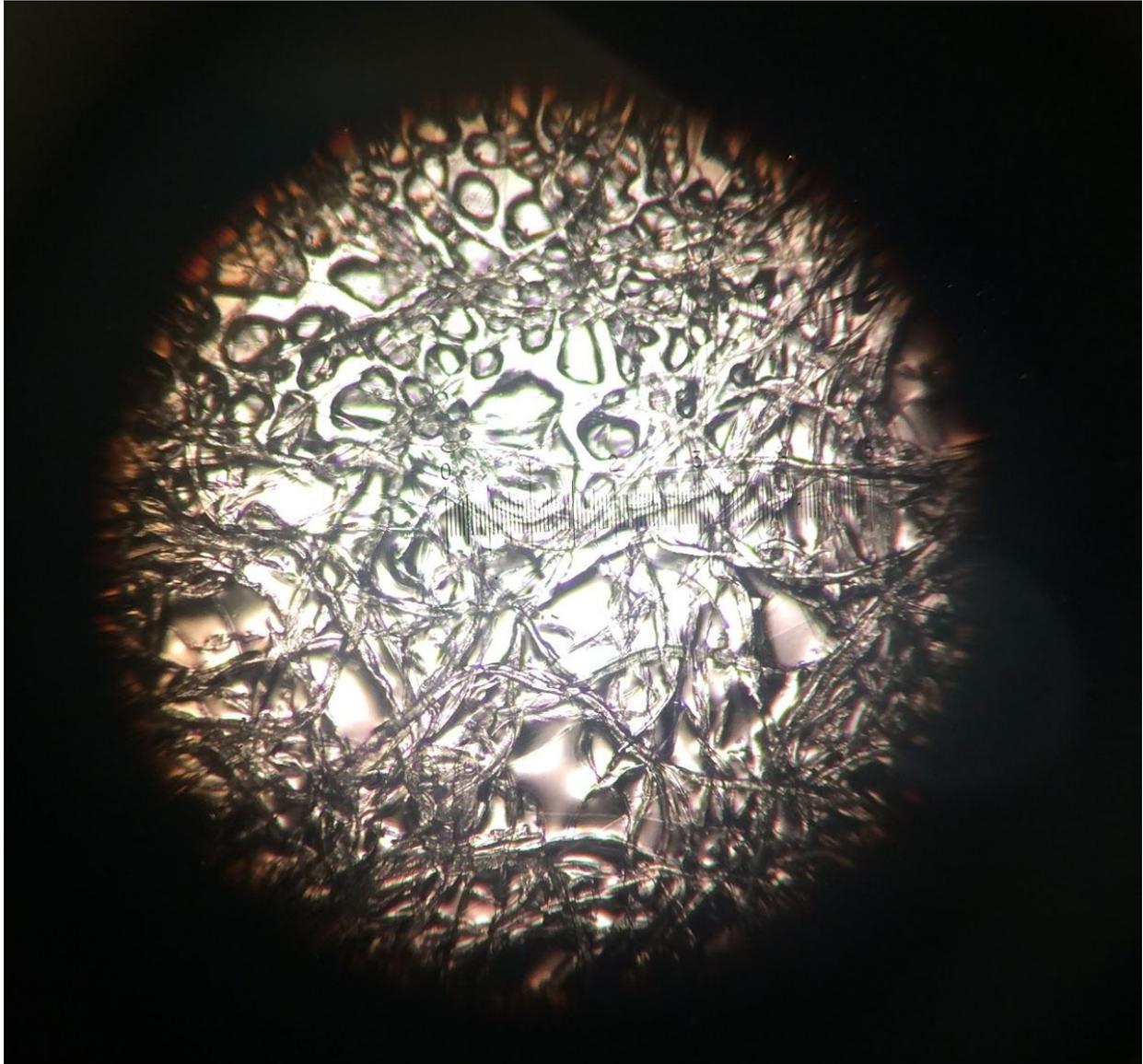


Cell Investigation

Are Biotic Things Made up of Cells?



Awesome Student

2.15.2017

6TH GRADE SCIENCE

INTRODUCTION

For this investigation, you will be using a microscope to look at slides, both biotic and abiotic. Using this data, you will prove that biotic things are made out of cells. You will also be showing that a body is a system of interacting subsystems composed of groups of cells.

PURPOSE

To prove that biotic things are made up of cells and that the body is a system of interacting subsystems composed of groups of cells.

MATERIALS

1. Microscope
2. Slides
 - a. Cat ovary, duck feather, carrot root, cotton, pine leaf, and coffee slides
3. Power outlet

PROCEDURE

1. Learn all the cell parts and how to use a microscope.
 - a. If you don't know how, you can use these websites to help you.
 - i. [Virtual Labs: Using the Microscope](#)
 - ii. [Microscope Labeling Game](#)
 - iii. [Virtual Microscope](#)
2. Gather materials.
3. Plug in the microscope into the closest power outlet.
4. Make sure the arm of the microscope is closest to you.
5. If the light source isn't on, turn the microscope on by flipping the switch on the base of the microscope or turning a switch towards you (this switch would be on the base too or next to the stage or diaphragm).

- a. The switch most likely says on and off or has an open circle and a line.
Make sure the on part or the open circle part is flipped on.
6. Turn the coarse knob towards you all the way so that the body tube moves up or the stage moves down.
7. Move the revolving nosepiece clockwise so that it is on the lowest objective.
8. Adjust the diaphragm so that you have good lighting. Usually at 4.
9. Move the stage clips so that the ends are pointing in opposite directions. The ends of the slide clips should be off the stage.
10. Place cat ovary on the top of the stage.
11. Make sure that the part of the slide you want to look at is in the center of the stage so that it is directly above the little hole shaped in a circle in the stage or you won't be able to see the slide.
12. Lift the stage clips up and place them back so that they are on top of the slide, keeping the slide in place. They should be facing away from you now.
13. Look through the ocular lens
 - a. If you don't see your slide, adjust the coarse knob until you can see the image as clear as possible. You move the knob away from you to move the stage up or the body tube down and you move it towards you to move the stage down or the body tube up.
 - i. If you can't even see a faint outline of the image, adjust the slide so that it is centered.
 - ii. Also, make sure the lenses are on the correct setting. You move them by turning the revolving nosepiece clockwise until you feel and hear the click. Your lens should be directly over the part of the slide you want to see. You can always change the lens so that you can see the slide closely. It can help you record your data later. When you want to change the lens, make sure the stage is as far away from the lenses as possible so that you don't break the lens.
 - iii. You should also check to make sure your diaphragm is at the correct setting so that the lighting is good.
 - b. If it still isn't very clear, adjust the fine knob so you can see the image clearly.
14. Write down the data in the data table.

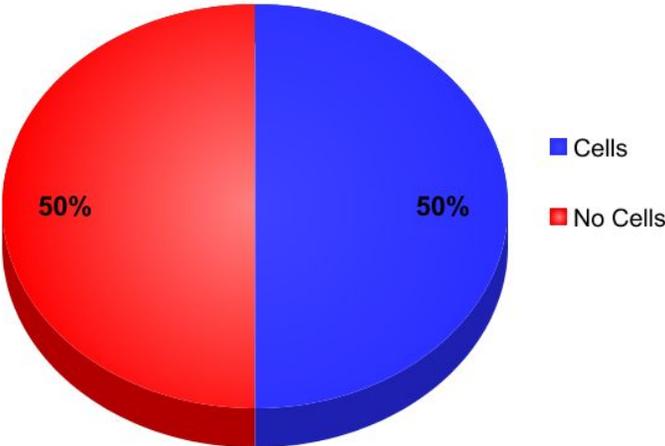
15. Turn the coarse adjustment knob towards you so that the stage goes down or the body tube moves up. Keep turning it until you can't anymore.
16. Lift up the stage clips and rotate them in opposite directions so that the ends are off the stage.
17. Take the Cat Ovary slide off the stage and move it next to the microscope.
18. Place the Duck Feather slide on top of the stage.
19. Now, repeat steps 9-14.
20. Take the Duck Feather slide off the stage and move it next to the microscope.
21. Place the Carrot Root slide on top of the stage.
22. Now, repeat steps 9-14.
23. Take the Carrot Root slide off the stage and move it next to the microscope.
24. Place the Cotton slide on top of the stage.
25. Now, repeat steps 9-14.
26. Take the Cotton slide off the stage and move it next to the microscope.
27. Place the Pine Leaf slide on top of the stage.
28. Now, repeat steps 9-14.
29. Take the Pine Leaf slide off the stage and move it next to the microscope.
30. Place the Coffee slide on top of the stage.
31. Now, repeat steps 9-14.
32. Take the Coffee slide off the stage and move it next to the microscope.
33. Turn the light source off by flipping the switch that says off or has a line on it. Make sure the off or the line is closest to the base.
 - a. If it isn't a switch, it might be a small circle on the side of the base that can turn towards you to turn it off.
34. Unplug your microscope.
35. Wrap the plug around the microscope and then put it away.

DATA

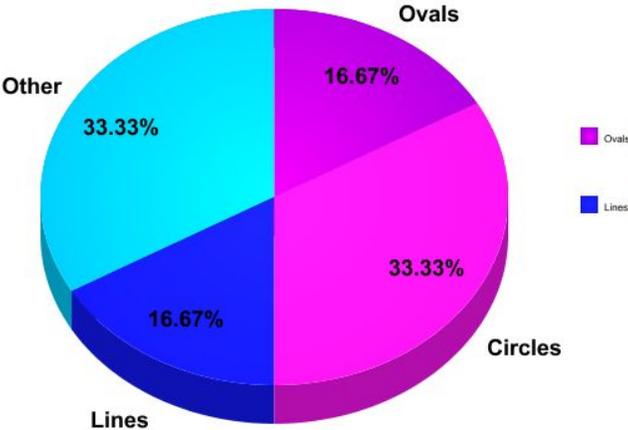
| | Cat Ovary | Duck Feather | Carrot Root | Cotton | Pine Leaf | Coffee |
|---------|--|--|---|---|---|---|
| Color | Pink in the middle; orange on the outside | Black | Pink | Black, White | Pink, purple, blue, black, white, green | Dark Brown |
| Pattern | Oval with many circles and shapes inside | One long line with little lines at a 45 degree angle coming off of it | Circle with many little circles forming lines into the center; kind of like a bicycle wheel | Lots of lines and circles all jumbled | Semi-oval with a circle with little circles around it; many different shapes, colors, and sizes | Blob with some small circles inside of it |
| Size | Medium; around $\frac{3}{4}$ cm horizontal; around $\frac{3}{8}$ cm vertical | Small; around $\frac{1}{2}$ cm horizontal; around $\frac{1}{16}$ cm vertical | Medium; around $\frac{1}{2}$ cm horizontal; around $\frac{1}{2}$ cm vertical | Large; around 1 cm horizontal; around 1 cm vertical | Tiny; around $\frac{1}{8}$ cm horizontal; around $\frac{1}{8}$ cm vertical | Small; around $\frac{3}{8}$ cm horizontal; around $\frac{3}{8}$ cm vertical |
| Cells? | Yes; vacuoles, ribosomes, mitochondria, cell membrane | No; no cell parts | Yes; many different cells | No; no cells | Yes; many cell parts; cell membrane, lysosomes, nucleus, ribosomes | No; no cell parts |

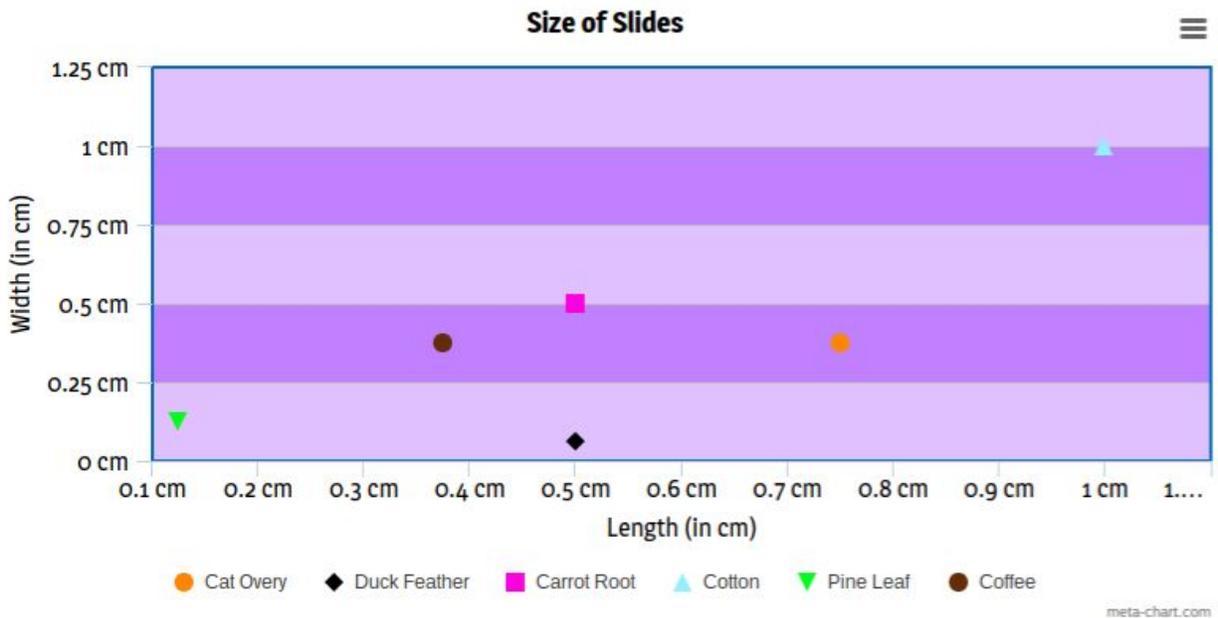
GRAPHS

Percentage of Slides that have Cells



Percentage of what Patterns are on Slides





CONCLUSION

In conclusion, all living things are made up of cells. As you can see in the graphs, 50% of the slides have cells in them and 50% don't. The cat ovary, carrot root, and pine leaf are all biotic things that all have cells in them. The abiotic slides, duck feather, cotton, and coffee, didn't have any cells in them. The graph shows that the patterns in the biotic slides were similar to each other because they all made shapes and circles. The patterns on the abiotic slides were all jumbled and had many lines and blobs so you couldn't tell what it was. 33.3% of the slides had circles and 50% of them had some sort of shape like a circle or oval or square. 50% had lines or other shapes in them with 33.3% of that made out of random/other shapes and things. Also, the scatter plot shows that the size of the slides have a line of best fit in it because the length and width slowly gets bigger like it's on an invisible line. The biotic slides had lots of bright colors and the abiotic slides had shades of colors that weren't very bright colors.

There are many cells in living things, which means that there are cells in people. Once many of the cells are doing the same job, they group together to form a tissue. Each tissue is made up of cells that work together to perform a special function. There are many different tissues like the connective tissue, epithelial tissue, and the nerve tissue. Multiple tissues come together to form an organ. Some organs are the stomach, heart, lungs, eyes, and brain. A group of organs working together to form an organ system.

There are many systems in the body, like the digestive system, respiratory system, and the muscular system. When all these organ systems work together, they form an organism, like a person. To make up a human, it all starts with cells.

ADDITIONAL REFERENCES

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