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| http://compsci.appstate.edu/sites/compsci.appstate.edu/files/imagecache/slideshow/slideshow/ASU_compsci_logo.png**The CS4ALL NSF Supported Program** | https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcQGzOU-XT8XZWIBUwiPs2jjgixLO3CvrEyNq90lu1dbXJ0BQume[**https://cs.appstate.edu/cs4all/**](https://cs.appstate.edu/cs4all/) |

**Activity Title:** “Cell Part Identification using SNAP”

Subject Area(s): Standard Biology 1

Computer Science Tools: SNAP

Grade Level: 9th-12th

Time Required: Part One - 30 minutes, Part Two - 90 minutes; time for homework

Recommended Group Size: Any depending on teacher preference

**Summary:** Using an existing SNAP simulation, students will identify different parts of a cell when prompted by a question. Students will answer the question by maneuvering their cursor to the correct cell part. Students will also go into the program, look at the code and create their own program.
\*The first part of this simulation can be done over a projector or something similar with a large group of students (to save time) or on individual students’ computers.

**Computer Science Connection:** Students will analyze the code in the SNAP simulation and be inspired to create their own.

**Keywords:** Biology, SNAP, plant cell, animal cell

**Educational Standards:**
Bio.1.1 - Understand the relationship between the structures and functions of cells and their organelles.

Bio.1.1.1 - Summarize the structure and function of organelles in eukaryotic cells (including the nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and ways that these organelles interact with each other to perform the function of the cell.

**Pre-Requisite Knowledge:**
**Part One:** Students should have basic knowledge of the function and structure of various cell organelles, both plant and animal. Students should be able to understand the interactions between basic cell organelles.
**Part Two:** Students should have a basic understanding of how to create a program using SNAP software.

**Learning Objectives:**

Students will be able to:
 - Correctly identify cell organelles when prompted by a question
 - Create their own review game or study tool using SNAP programming

**Materials List:**

* SNAP file “CellActivity.xml”
* projector or something similar for group game or individual student computers with the SNAP file loaded on them

**Assessment:**

Part One - This can be used for either formative or summative assessment after or during the cells unit. This works well as a large group activity or individual activity depending on time and teacher preference.

 Part Two - Students will be assessed based on quality and usability of their SNAP simulation.

**Results/Conclusions:** Students should be able to correctly answer all of the questions about parts of a cell for both animal and plant cells. Students should gain a basic understanding of how to create a SNAP program and use it as a review game or study tool.

**Teacher’s Note:** A table at the end of the student lab activity contains a color matching portion where the students are asked to fill in the reasoning behind each of the color-coded cell organelles. This is something that I use in my classes which greatly helps low-level students gain a better understanding of organelle function by associating it with a color. Feel free to delete it from your activity if you like!

**Key for table:**

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| --- | --- | --- |
| Cell Organelle | Color | Color Relates to Function |
| Nucleus | Dark green | Green is the color of nucleic acids and the nucleus contains DNA. When you think of living things, you think “green.” All living things contain DNA. |
| Vacuole | Light blue | Vacuoles contain water and water appears blue. |
| Mitochondrion | Red | Mitochondria make energy from glucose and glucose is a carb. Carbs give us energy. The color red reminds us of energy. |
| Chloroplast | Light green | Chloroplasts contain chlorophyll, which is a green pigment. It is light green because it absorbs light and does photosynthesis. |
| Ribosome | Dark blue | Ribosomes make protein. Protein helps build muscle, and when you have big muscles, you are strong. Paul Bunyan had a big blue ox named Babe, and he had huge muscles. (It’s a reach!) |
| Cell Membrane | Yellow | Cell membranes are mostly made up of lipids. Lipids are fats and oils. Butter and oil are both yellow.  |
| Cell Wall | Brown | Trees (and other plants) have trunks which help keep them sturdy. These trunks are made up of cell walls that contain cellulose. Tree trunks are brown. |