

Scratch and Cells: Coding Lesson Grade 8: Understanding Life Systems: Cells

| <h2 style="margin: 0;">Offline Lesson Plan</h2>   | Coding Tool  | Scratch Blocks |
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|   | Cross-curricular   | Language       |
| <p><b>Big Ideas</b></p> <p>Cells are the basis of life.</p> <p>Cells organize into tissues, tissues into organs, organs into organ systems, and organ systems into organisms.</p> <p><b>Learning Goals</b></p> <p>Students will learn about Scratch Coding, and compare the idea of scratch blocks to living cells.</p> | <p><b>Specific Expectations</b></p> <p><b>Science:</b> Understanding Basic Concepts</p> <p><b>3.5</b> identify unicellular organisms (e.g., amoebae) and multicellular organisms (e.g., invertebrates [worms], vertebrates [frogs]), and compare the ways in which they meet their basic needs (e.g., nutrition, movement, gas exchange)</p> <p><b>3.6</b> describe the organization of cells into tissues, organs, and systems (e.g., groups of cells with similar functions combine to make up tissues; groups of tissues with similar functions combine to make organs; groups of organs work together as organ systems)</p> <p><b>Language:</b> Classifying Ideas</p> <p><b>1.4</b> sort and classify ideas and information for their writing in a variety of ways that allow them to manipulate information and see different combinations and relationships in their data (e.g., by using electronic graphic organizers, tables, charts)</p> |                |

**Description**

In this lesson, students will be introduced to Scratch Coding Blocks, and will discuss how they work in similar and different ways to that of multicellular organisms

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| <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Definitions Handout</li> <li>• Cue Cards</li> <li>• Venn Diagram Handout</li> <li>• Scratch Block Handouts</li> </ul> | <p><b>Computational Thinking Skills</b></p> <ul style="list-style-type: none"> <li>• Computational Thinking</li> </ul> |
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## Introduction

### Part 1: Definitions - Cells

Teacher will review/discuss unicellular and multicellular organisms. Students will be given the ‘*Definitions handout*’ document to support their learning.

- **Organism:** A single living plant, animal, virus, etc. A human, fern, and frog are all examples of multicellular organisms.
- **Unicellular Organism:** an organism that consists of a single cell. This means all life processes, such as reproduction, feeding, digestion, and excretion, occur in one cell. Amoebae and bacteria are single-celled organisms. They typically can not be seen with the naked eye (<https://biologydictionary.net/unicellular/>)
- **Multicellular Organism:** an organism composed of many cells, which are to varying degrees integrated and independent. The development of multicellular organisms is accompanied by cellular specialization and division of labour; cells become efficient in one process and are dependent upon other cells for the necessities of life. (<https://www.britannica.com/science/multicellular-organism>)
  - Discuss specifically how multicellular organisms work when the cells come together to make up an organism or organ. Connecting to the organs of a human body

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## Action

### Part 2: Introduction - Blocks

Introduce Scratch if class is unfamiliar:

- Watch *What Is Scratch*: <https://www.youtube.com/watch?v=jXUZaf5D12A>
- Discuss the concept of Scratch Blocks
  - Explain that in coding, algorithms are the clear steps that are used to define a problem. “Coding” is the process of writing these steps, something that we can call “writing code” or “coding”

As a class, review the coding blocks provided (see attached document with blocks for this lesson). Post blocks on board for students to refer to upon explanation. This lesson will discuss: move, turn, repeat, and if/then, and the “make a command” option.

- Move: Indicate where to move (specific distance, steps etc.)
- Turn: Indicate which direction to turn (left/right and degrees, i.e. 90 degree to the left)
- Repeat: Indicate a command to complete again
- If/Then: If something occurs, then something else will occur (i.e. If it is raining, then take an umbrella)
- Make a Command: Students create a command specific to the task (i.e. pick up toothbrush)

### Part 3: Task - Blocks

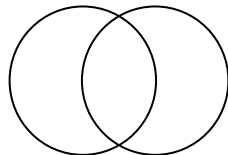
Allow students to “code each other”, by writing code for their partner to follow with their body. Using cue cards, students can write a list of blocks for their partner to follow in the classroom

- I.e. Move five steps forward. Turn 90 degrees to the left. Move 7 steps forward. If the bell goes, stop.

### Part 4: Introduce Concept of a Venn Diagram

If necessary, this video can be shared: [https://www.youtube.com/watch?v=CkV\\_uRErIqk](https://www.youtube.com/watch?v=CkV_uRErIqk)

A Venn Diagram: A Venn diagram is an illustration that uses circles to show the relationships among things. Overlapping circles demonstrate characteristics that are the same.



### Part 5: Task: Create a Venn Diagram

The teacher can choose to either assign this task, or co-create it as a class.

Create a Venn Diagram comparing Scratch Blocks and Cells

Learning Outcome:

- Scratch blocks do little individual things, which come together to do a thing.
  - Individual blocks build on each other to complete a task
- Cells are little individual things, which come together to create a larger thing (ie. organism)
  - Different components of a cell (ie. mitochondria) work together
  - Cells make up multicellular organisms or an organ
  - Organs come together to make up an organ system
  - Organ systems come together to make up a working body

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### Consolidation/Extension

Students can be given more time to explore the Scratch Blocks by working with their partner to complete a specific task, i.e. throw a used paper in the recycling bin, close the classroom door, feed the fish etc.

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### Assessment

Students can be assessed on their knowledge of the organisms definitions, the task of *Coding a Partner* and also their ability to compare/contrast the concepts of Scratch Blocks and Multicellular Organisms using the Venn Diagram.

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## Additional Resources

### What is a Venn Diagram? Teacher or Student refresher

[https://www.youtube.com/watch?v=CkV\\_uRErIqk](https://www.youtube.com/watch?v=CkV_uRErIqk)

### Organism Definitions:

<https://biologydictionary.net/unicellular/>

<https://www.britannica.com/science/multicellular-organism>

### MIT Scratch Coding:

YouTube Channel: <https://www.youtube.com/channel/UCjcQmKeifVUUH5s4E4OrMhg>

What Is Scratch: <https://www.youtube.com/watch?v=jXUZaf5D12A>

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