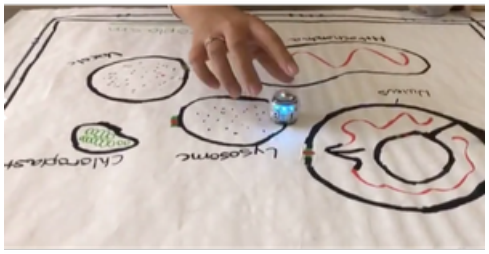
# Ozobot Cell Model

Author: Shannon Ventresca



**Grades:** 6—9

**Subject(s):** Science, Computer Science

**Pre-Reader/ESL-Friendly?** No

**Compatible Bot(s):** Evo

**Coding Method:** Color Codes

**Quick Summary:**

Students will create a model of the cell using markers. They will code the robot to move from cell part to cell part, and record a narration.

**Duration:** 120 min

## Objectives & Outcomes

1. Student will develop and use a model to describe the function of the cell as a whole and the ways the parts contribute to the function.

## Preparation

### Teacher Materials & Digital Resources

- ozobot cell.pdf
- samples_ozobot.pdf
- ozobot_cell_rubrics.pdf

### Student Materials

- 1 Evo or Bit per group
- 4 Markers per group
- 1 Large paper/Post-it per group
- 1 computer or graph paper for planning per group
- 1 Ipad with FlipGrid per group
- 5 plain white stickers/labels per group

### Teacher Tips

Groups of 2-3 students work best.

DO NOT let students start over with a new piece of paper. It is important for them to realize that coding can be a messy, iterative process.

Circulate among groups to check in with them as they are working.

### Direct Instruction

1. Model how to use the Ozobot color codes to make the bot perform different tasks, if students are unfamiliar with the color coding process.
2. Explain that students will be creating a cell model. The model will include (at minimum) a cell wall, cell membrane, nucleus, chloroplast and mitochondrion.
3. The robot must be able to seamlessly transition from one cell part to the next, using codes such as "line jump right." Demonstrate to students how to do this. Also, the ozobot must perform other tricks as it goes through the cell.
4. After completing a successful cell model, students will write a script describing the bot's journey through the cell. They are to include the function of each cell part (and as an extension: an analogy).
5. Students will videotape using FlipGrid or another platform. The "star" of the show will be the ozobot, with student voices narrating in the background. Students should be taking turns reading the script.

## Supplements

### Lesson Closure

Share the videos with the students! Whether you use FlipGrid or another platform, it is important to have the students "present" their models to the class.

### Lesson Extension(s)

1. Include an analogy for the cell part while narrating. For example "the nucleus is like the brain of  the cell."

### Academic Standards

- NGSS.MS-LS1-2

  Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.

Name:_____ Date:_____

# Ozobot Cell Model

Learning Target: I can develop and use a model to describe the functon of the cell as a whole and the ways the parts contribute to the function.

Parts of Cell Required: cell wall, cell membrane, nucleus, chloroplast and mitochondrion

You can add additional parts for extra credit.

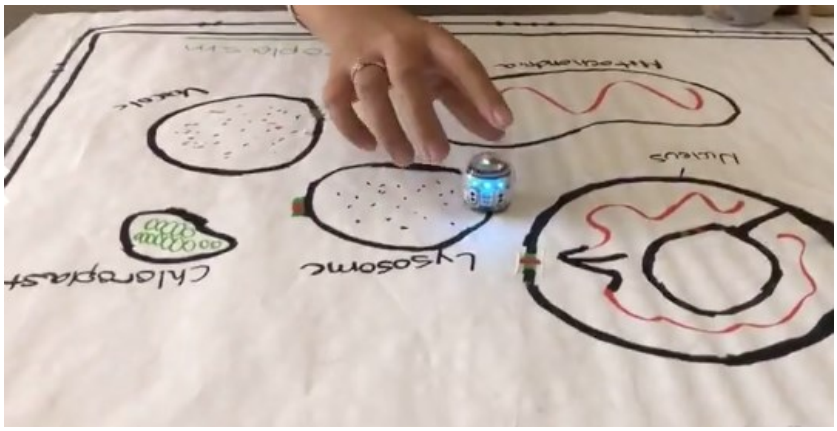
Planning Sheet:

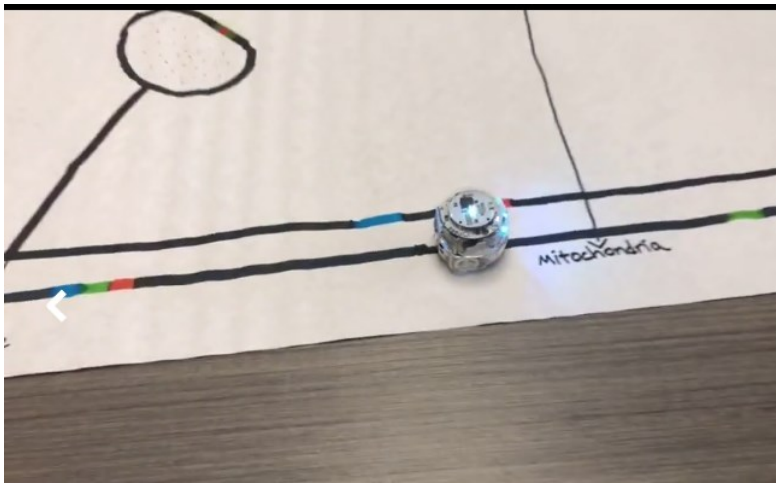
1. You will be drawing a working model of the cell that your ozobot can travel through autonomously using color codes.
2. You MUST include at minimum the 5 cell parts listed above.
3. Fill in chart below to have functions of cell handy.
4. Use the back of this sheet to plan your layout of the cell and how your bot will move through the cell.
5. When you have finished planning, see your instructor for a large blank piece of paper. This will be for your FINAL copy.
6. You will only get ONE final paper. If you make mistakes, as within coding sometimes things don't work, you will use stickers to fix the code.
7. After each part of the cell is programmed, be sure to test it to make sure your bot moves through the cell.
8. Once finished, you will be recording your ozobot's journey through the cell. You must narrate the journey, explaining each cell part that the ozobot travels to and what the function of that part is within the cell.

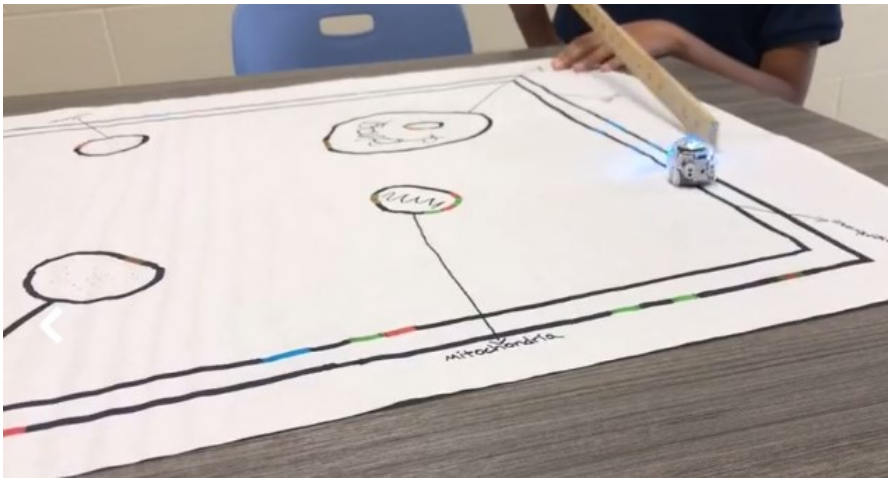
| Cell Part | Function within Cell |
|---|---|
| Cell wall | |
| Cell membrane | |
| Nucleus | |
| Mitochondrion | |
| Chloroplast | |

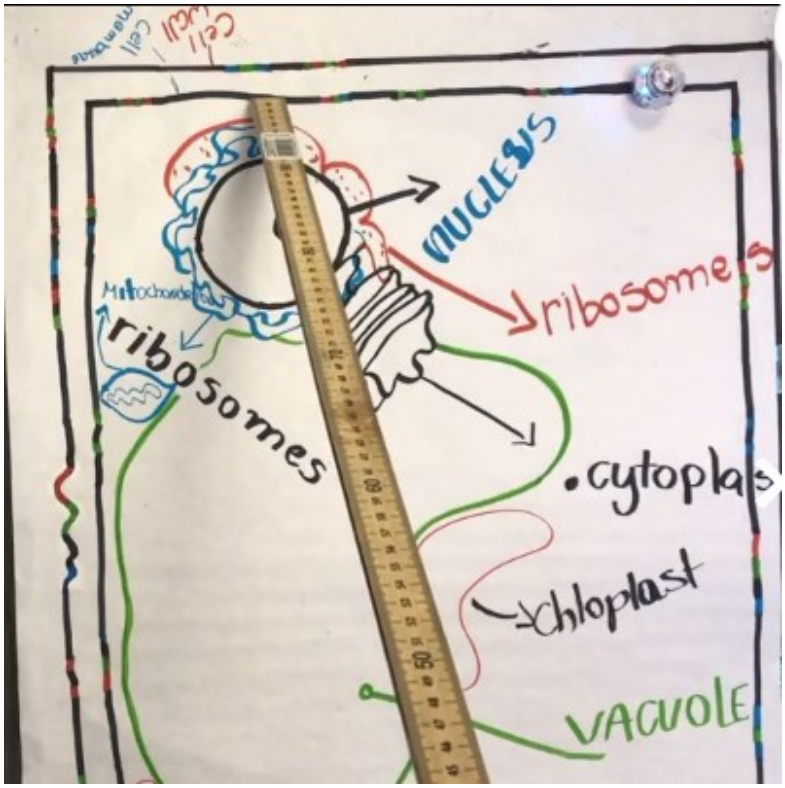
Extension: Create an analogy of an everyday object to the function of each cell part.

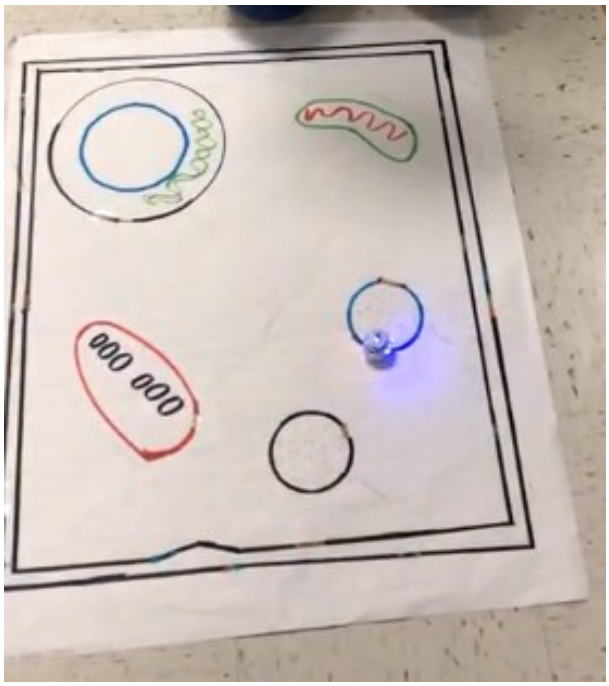
Samples of completed cell models:

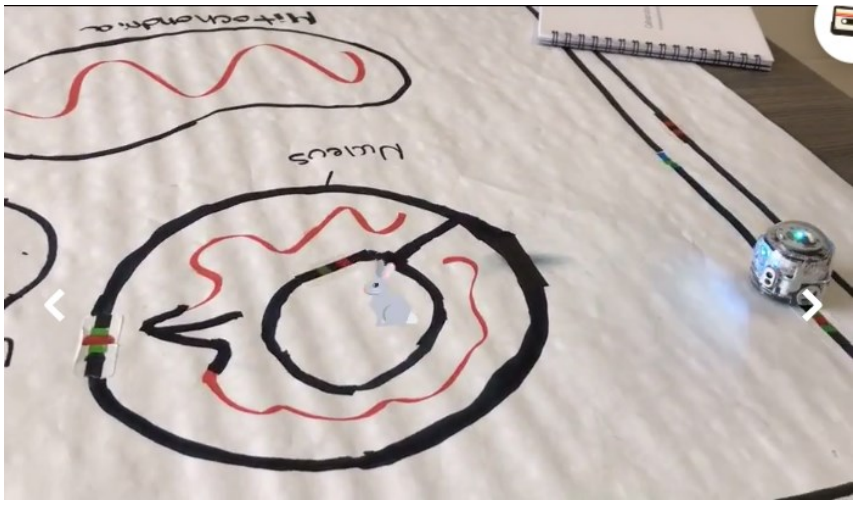



NUCLEUS
ribosomes
ribosomes
cytoplas
chloplast
VACUOLE




Nucleus

Name(s):_____ Date:_____

Self-Check for Student to Complete:

| **Item: In physical model** | **Completed** ✓ |
|---|---|
| Cell wall | |
| Cell membrane | |
| Mitochondrion | |
| Chloroplast | |
| Nucleus | |
| Any additional parts: | |
| Ozobot transitions/jumps from one cell part to the other autonomously | |
| Ozobot makes a minimum of 2 coded "tricks" in each cell location | |

| **Item: In Video Recording** | **Completed** ✓ |
|---|---|
| Cell wall function described fully. | |
| Cell membrane function described fully. | |
| Mitochondrion function described fully. | |
| Chloroplast function described fully. | |
| Nucleus function described fully. | |
| Any additional parts' function(s) described fully. | |
| Ozobot transitions/jumps from one cell part to the other autonomously during | |
| Ozobot makes a minimum of 2 coded "tricks" in each cell location during | |

Name(s):_____ Date:_____

Rubric for Teacher to Complete

| Item | Points Earned | Points Possible |
|---|---|---|
| Cell wall present | | 5 |
| Minimum of 2 "tricks" embedded in cell wall | | 5 |
| Function of cell wall described correctly | | 5 |
| Cell membrane present | | 5 |
| Minimum of 2 "tricks" embedded in cell membrane | | 5 |
| Function of cell membrane described correctly | | 5 |
| Mitochondrion present | | 5 |
| Minimum of 2 "tricks" embedded in Mitochondrion | | 5 |
| Function of mitochondrion described correctly | | 5 |
| Chloroplast | | 5 |
| Minimum of 2 "tricks" embedded in Chloroplast | | 5 |
| Function of chloroplast described correctly | | 5 |
| Nucleus | | 5 |
| Minimum of 2 "tricks" embedded in Nucleus | | 5 |
| Function of nucleus described correclty | | 5 |
| All codes function seamlessly | | 15 |
| Video is clear and easy to understand | | 10 |
| Points Earned | | 100 |

# Ozobot Cell Model

## What We'll Cover:

1. We'll develop and use a model to describe the function of the cell as a whole and the ways the parts contribute to the function.

## Materials:

- 1 Evo or Bit per group
- 4 Markers per group
- 1 Large paper/Post-it per group
- 1 computer or graph paper for planning per group
- 1 Ipad with FlipGrid per group
- 5 plain white stickers/labels per group

## Activity Instructions:

1. First, you will draw a draft of your cell. In your draft you should indicate the placement of each cell part. You should also plan the codes that will be embedded within the drawing. You can do this using letters OR actual colors.

2. Show draft to teacher and explain your plan. At this time, your teacher will give you a large piece of white paper. YOU ONLY GET ONE. If you make mistakes, you should edit the code using white label stickers (plain address labels).

3. Now you have the big paper and the markers. Make sure to draw your cell carefully, as you will not get another paper. Add in all codes, including codes that allow the bot to jump to the next cell part. Make sure to continually test the codes using your robot.

4. After you have tested and built a successful model, you will be writing a script that narrates the Ozobot's journey through the cell. You must take turns narrating. In your script include the function/job of each cell part.