

What's My Purpose in This Life?

Intro to Cell Theory: Organelles

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Grade Level	6th – 10th Grade	**Time Frame**	3-4 class period(s)
Subject	Science	**Duration**	145 minutes
Course	Biology		

Essential Question

Why are organelles important to cells? Why are cells called “the building blocks of life”?

Summary

In this lesson, students explore cell organelles, their functions, and cell theory. Students begin by watching two videos and identifying analogies between them. They then research and identify the functions of cell organelles through a Concept Speed Dating activity. Next, students investigate the principles of cell theory and apply their understanding by creating a model that represents a cell through analogy. Finally, students review and reinforce their knowledge by participating in a Kick Me game about organelles and their functions.

Snapshot

Engage

Students watch two short videos and discuss analogies between them.

Explore

Students watch a video to synthesize the cell theory and then research a specific structure of a cell.

Explain

Students gather information about the other structures of the cell from their peers.

Extend

Students create a model analogy of an animal or plant cell. Students create a model analogy of an animal or plant cell, or students watch an ICAP video of Terese LaRose, a histotechnologist.

Evaluate

Students will play Kick Me about organelles and their functions.

Standards

ACT College and Career Readiness Standards - Science (6-12)

IOD302: Understand basic scientific terminology
EMI201: Find basic information in a model (conceptual)

Next Generation Science Standards (Grades 6, 7, 8)

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.

Oklahoma Academic Standards (6th Grade)

6.LS1.1.2: An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).

Oklahoma Academic Standards (6th Grade)

B.LS1.2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Attachments

- 3-2-1—What's My Purpose in This Life - Spanish.docx
- 3-2-1—What's My Purpose in This Life - Spanish.pdf
- 3-2-1—What's My Purpose in This Life.docx
- 3-2-1—What's My Purpose in This Life.pdf
- Cell Organelles Note Catcher—What's My Purpose in This Life - Spanish.docx
- Cell Organelles Note Catcher—What's My Purpose in This Life - Spanish.pdf
- Cell Organelles Note Catcher—What's My Purpose in This Life.docx
- Cell Organelles Note Catcher—What's My Purpose in This Life.pdf
- Cell Organelles Speed Dating Profile—What's My Purpose in This Life - Spanish.docx
- Cell Organelles Speed Dating Profile—What's My Purpose in This Life - Spanish.pdf
- Cell Organelles Speed Dating Profile—What's My Purpose in This Life.docx
- Cell Organelles Speed Dating Profile—What's My Purpose in This Life.pdf
- Cellular Systems—What's My Purpose in This Life - Spanish.docx
- Cellular Systems—What's My Purpose in This Life - Spanish.pdf
- Cellular Systems—What's My Purpose in This Life.docx
- Cellular Systems—What's My Purpose in This Life.pdf
- Kick Me Stickers—What's My Purpose in This Life.docx
- Kick Me Stickers—What's My Purpose in This Life.pdf
- Lesson Slides—What's My Purpose in This Life.pptx

Materials

- Lesson Slides (attached)
- Cell Organelles Note Catcher (attached; one per student)
- Cell Organelles Speed Dating Profile (attached; one per student)
- Cellular Systems (attached; one per student)
- Kick Me Stickers (attached; one per 30 students)
- Avery™ 5160/8160 address labels (or similar adhesive labels; one sheet per 30 students)
- 3-2-1 handout (optional; one per student)
- Notebook paper (one per student)
- Bell or buzzer
- Butcher paper or poster board (one per group of 3–4 students)
- Markers (one set per group of 3–4 students)

Optional Activity Materials

- Transparency paper or page protectors (10 per student)
- Index cards (10 per student)
- Multi-colored Sharpies or other permanent markers
- Stapler (two or three per class)
- Scissors
- Sticky notes (optional)
- Scratch paper (optional)
- Laptops (optional)

Preparation

Use the attached **Kick Me Stickers** to print sticky labels for the Kick Me activity. These labels are formatted for Avery 5160/8160 address labels. Alternatively, you can write terms and definitions on sticky notes. If neither option is available, paper and tape will work in a pinch.

15 minutes

Engage

Use the attached **Lesson Slides** to guide the lesson. Display **slide 2** to introduce the lesson. Display **slides 3 and 4** to share the essential questions and learning objectives with the class.

Display **slide 5** and show the video, *Introduction to Cells*. Move to **slide 6** and show the video *How It's Made Frozen, Pizzas*. Lead the class in a brief discussion on what was happening in the second video and the significance of each step in the pizza making process. Save the discussion of the intro to cells video until slide 7.

Display **slide 7** and ask the students the following questions:

- *What did you notice as the ingredients went from pizza dough to the finished pizza?*
- *Can you think of examples of everyday things that also have ordered steps?*
- *Challenge: Why do you think I showed both the video about cells and the video about making pizza?*

Possible Student Responses

- The pizza-making process followed a specific order—one step led to the next.
- Examples: Changing a tire, building a house, painting fingernails, following a recipe.
- The videos are analogous: Organelles perform specific jobs in a cell, just as each step in making a pizza has a purpose.

Teachers Note: Managing Time

This could be a fun time to let the students speculate and create some fun and wild situations. But keep an eye on time. Setting a timer is a great way to make sure this portion doesn't go any longer than 10 minutes for the videos and another 5 minutes of discussion.

30 minutes

Explore

Display **slide 8** and pass out the attached **Cell Organelles Note Catcher** and a piece of scratch paper. Have students watch the *Introduction to Cells* video again. This time, use the I Notice, I Wonder instructional strategy to have students write what they notice and what they wonder on their scratch paper or sticky notes as they watch.

Share with students that there are three parts to the cell theory that we are going to discover. Have students share their notices and wonders to see if they address the three parts of the cell theory based on the video for them to add to their Cell Organelles Note Catcher.

Display **slide 9** and review the parts of the cell theory to make sure they got all three.

Cell Theory:

- All living organisms are made up of cells.
- A cell is the basic unit of life.
- Every cell comes from a pre-existing cell.

Inform students they are going to explore the different types of cell organelles that exist in a cell.

Move to **slide 10** and organize students into groups of twelve. Within each group, have each student choose one of the following 12 cell organelles:

- Nucleus
- Mitochondria
- Cell membrane
- Endoplasmic Reticulum(Rough & Smooth)
- Ribosome
- Lysosome
- Golgi body
- Cytoplasm
- Vacuole
- Cell Wall
- Chloroplast
- Centrioles

Pass out the attached **Cell Organelles Speed Dating Profile** handout to each student. Have each student fill out their handout by researching information about their chosen cell organelle. Students can search online or use their textbooks. Be sure to tell them to identify if it is in a plant, animal, or both cells.

Teacher's Note: Review Handouts

Review students' Speed Dating Profiles before moving to the next step.

20 minutes

Explain

Teacher's Note: Activity Preparation

Before beginning the Concept Speed Dating activity, arrange tables in a U-shape around the classroom, or set up two lines of tables with chairs across from one another. Keep in mind you want the same set of 12 rotating together, to ensure all students learn about each cell organelle. Consider playing music to create a lively atmosphere and use a bell or buzzer to signal when students should rotate.

Display **slide 11** and ask students to refer to their Cell Organelles Note Catcher. Inform students they are going to learn about the other specialized cells through a Concept Speed Dating activity using the Cell Organelles Speed Dating Profiles they created.

Explain that each student will have one minute with each partner:

- 30 seconds to explain their assigned organelle.
- 30 seconds to listen and record information about their partner's organelle.

Have students record what they learn on their Cell Organelles Note Catcher.

Display **slide 12** and use the 30-second timer to help students know when to switch with their partner. Start the activity.

After each round, ring the bell or signal students to rotate to the next partner. Continue until all students have interacted with each member of their group.

Teacher's Note: Repeated Organelles

If a student encounters the same cell organelle more than once, encourage them to ask clarifying questions and gather additional information they may not have learned previously.

Possible Student Responses

Students may notice how efficiency, organization, or specialization helped the activity run smoothly. They may also observe the value of teamwork and how each part contributed to the whole.

Display **slide 13** and play the *Amoeba Sisters' Introduction to Cells: The Grand Cell Tour* video. Encourage students to fill in any remaining gaps in their Cell Organelles Note Catcher during the video.

40 minutes

Extend

Display **slide 14**. Organize students into groups of three or four. Provide each group with butcher paper or a poster board, markers, and the attached **Cellular Systems** handout.

Explain to students that they will create an analogous model of a cell by representing the structures and functions of a cell through a different system. Encourage students to think of familiar systems, such as a school, factory, or city—anything with parts that work together to complete a task.

Instruct each group to:

1. Choose a system that functions similarly to a cell.
2. Draw and label the components of their system on their butcher paper or poster board.
3. Complete the Cellular Systems handout by explaining how each part of their system corresponds to the function of each cell organelle.

Display **slide 15** to provide an example analogy:

- The principal represents the nucleus because they direct the school's activities.
- The walls represent the cell wall because they provide structure and protection.
- Lockers represent the Golgi apparatus because they serve as storage.
- The custodian represents the lysosomes because they clean and remove waste.

Encourage groups to be creative, but ensure their analogies accurately reflect cell organelle functions.

Optional Activity: ICAP Video

The following activity adds a career exploration element to this lesson as part of Oklahoma State Department of Education's ICAP (Individual Career Academic Plan) initiative. This way, students can discover a career that involves levels of organization. Unhide **slides 16** and **17**.

Go to **slide 16** and pass out the attached **3-2-1** handout. Inform students about the levels of organizations and emphasize how a group of cells make up tissue. Inform students that they are going to learn about a profession that involves working with the tissues that make up the human body. Let students know they are going to watch a video of Terese LaRose, who is a histotechnologist at Thomas Jefferson University Hospital in Philadelphia.

Invite students to watch the interview video, titled *Histotechnologist Terese LaRose ICAP*. As they watch, have students use the 3-2-1 strategy to complete their handouts:

- What are three things you learned?
- What are two questions you still have?
- What is one thing you found interesting?

After the video, encourage students to share out their responses.

Teacher's Note: Video Contains Sensitive Content

The following option contains sensitive content, and the URL might be restricted for certain school districts. Please advise any squeamish students to turn away before the 10-second mark.

Display **slide 17** and inform students there are several cells that perform unique functions called specialized cells. One of these cells is called the germ/sex cell. You may consider having students watch Medical Cortex's *Ovarian Teratoma* video to see a germ cell that became cancerous and resulted in a tumor in the ovary.

After the video, ask students to consider the levels of organization that were affected due to this disease of the ovaries (the levels of organization are as follows: oocytes (germ cell) < ovarian epithelial tissue < ovary (organ) < reproductive system < woman (organism). Ask students to consider what the importance of Ms. LaRose's career would be when it comes to this kind of phenomenon.

15 minutes

Evaluate

Display **slide 18** and introduce the Kick Me instructional strategy.

Pass out the attached **Kick Me Stickers** or use the prepared labels from the **Preparation** section. Each sticker or label should contain either the name of a cell organelle or a brief description of its function. Attach one sticker to each student's back, ensuring that students cannot see their own.

Explain the rules of the Kick Me activity:

- Students will move around the room and ask their classmates yes/no questions to gather clues about the term or definition on their back.
- Students may not ask directly if they are a specific organelle (e.g., "Am I the nucleus?" is not allowed).
- The goal is for students to infer their term based on the answers they receive.

Set a timer for 5 minutes and allow students to mingle and ask questions. You may choose to extend the time if necessary.

After the timer ends, bring students together as a class. Go around the room and have each student guess the term on their back based on the information they gathered.

Possible Student Responses

Sample interaction would look like this:

- Student A: "Student B, your term is the command center for the cell."
- Student B: "Student A, your term looked like a bean-shaped thing with folds in our flip book. It makes energy."
- During the class discussion, Student A should guess " mitochondria" and Student B should guess "nucleus."

Teacher's Note: Spoilers

Don't allow questions like, "Does mine say nucleus?" because that will give it away. Allow some creativity in the questions without being too blatant.

Resources

- Amoeba Sisters. (2016, November 2). *Introduction to Cells: The Grand Cell Tour* [Video]. YouTube. https://www.youtube.com/watch?v=8IlzKri08kk
- Frank Gregorio. (2012, January 31). *Introduction to cells* [Video]. YouTube. https://www.youtube.com/watch?v=gFuEo2ccTPA
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- Moe Sal. (2011, November 14). *How it's made frozen, pizzas.* [Video]. YouTube. https://www.youtube.com/watch?v=EW6UCWDQfj0
- Yglesias, D., Schoen, D., & Bonner, M. (n.d.). *The function of cell organelles* [Teaching idea]. Vernon Middle School, Washington County School District. CPALMS. https://www.cpalms.com/teaching-resources/resource/38327
- Tranquility. (2017, January 6). *Ovarian teratoma* [Video]. YouTube. https://www.youtube.com/watch?v=pMua1d5BE4g