

Woman Crush Wednesday: Terese LaRose

Hierarchical Organization of Multicellular Organisms

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Published by *K20 Center*

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Grade Level	9th – 10th Grade	**Time Frame**	210 minutes
Subject	Science	**Duration**	4-5 class periods
Course	Biology		

Essential Question

How have female scientists shaped science today? How do different cells affect specific systems within a multicellular organism?

Summary

This lesson is part of a series titled "Woman Crush Wednesday" in which we look at how female scientists have shaped our view of science. In this biology lesson, students will explore the contributions of Terese LaRose, a histotechnologist. Students will learn about the different levels of organization and how they interact within and between systems.

Snapshot

Engage

Students watch an ICAP video of Terese LaRose, a histotechnologist.

Explore

Students watch a video on how cells become specialized and then research a specific type of specialized cell.

Explain

Students gather information about the other types of specialized cells from their peers.

Extend

Students research the effects of a disease from the cellular level to the organism level. Students then design a model of the hierarchical levels of organization within an organism and compare the disease's effects at each level with normal functions at each level.

Evaluate

Students present their findings and explain how specialized cells affect interactions between systems.

Standards

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

IOD403: Translate information into a table, graph, or diagram
IOD505: Analyze presented information when given new, simple information
EMI401: Determine which simple hypothesis, prediction, or conclusion is, or is not, consistent with a data presentation, model, or piece of information in text

Oklahoma Academic Standards (Biology)

B.LS1.1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.
B.LS1.2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
B.LS1.3 : Plan and conduct an investigation to provide evidence of the importance of maintaining homeostasis in living organisms.

Attachments

- 3-2-1—WCW Terese LaRose - Spanish.docx
- 3-2-1—WCW Terese LaRose - Spanish.pdf
- 3-2-1—WCW Terese LaRose.docx
- 3-2-1—WCW Terese LaRose.pdf
- Lesson Slides—WCW Terese LaRose.pptx
- Levels of Organization Project Instructions—WCW Terese LaRose - Spanish.docx
- Levels of Organization Project Instructions—WCW Terese LaRose - Spanish.pdf
- Levels of Organization Project Instructions—WCW Terese LaRose.docx
- Levels of Organization Project Instructions—WCW Terese LaRose.pdf
- Levels of Organization Rubric—WCW Terese LaRose - Spanish.docx
- Levels of Organization Rubric—WCW Terese LaRose - Spanish.pdf
- Levels of Organization Rubric—WCW Terese LaRose.docx
- Levels of Organization Rubric—WCW Terese LaRose.pdf
- Specialized Cells Note Catcher—WCW Terese LaRose - Spanish.docx
- Specialized Cells Note Catcher—WCW Terese LaRose - Spanish.pdf
- Specialized Cells Note Catcher—WCW Terese LaRose.docx
- Specialized Cells Note Catcher—WCW Terese LaRose.pdf
- Specialized Cells Speed Dating Profile—WCW Terese LaRose - Spanish.docx
- Specialized Cells Speed Dating Profile—WCW Terese LaRose - Spanish.pdf
- Specialized Cells Speed Dating Profile—WCW Terese LaRose.docx
- Specialized Cells Speed Dating Profile—WCW Terese LaRose.pdf

Materials

- Lesson Slides (attached)
- 3-2-1 handout (attached; one per student)
- Specialized Cells Speed Dating Profile (attached; one per student)
- Specialized Cells Note Catcher (attached; one per student)
- Levels of Organization Project Instructions (attached; one per student)
- Levels of Organization Rubric (attached; one per student)
- A setup that allows videos and slideshows to be played for everyone to view

30 minutes

Engage

Teacher's Note: 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.

Use the attached **Lesson Slides** to guide the lesson. Begin with **slide 3** and briefly read aloud the essential questions. Display **slide 4** to go over the lesson's learning objectives. Review these slides with students to the extent you feel necessary.

Go to **slide 5** and pass out the attached **3-2-1** handout. Inform students 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.

Embedded video

https://youtube.com/watch?v=pbP3qazvJy0

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

Teacher's Note: Levels of Organization

If students already know the levels of organization, then you may review them here. If not, you can go into more detail about the levels in the Explain section.

30 minutes

Explore

Display **slide 6** and pass out the attached **Specialized Cells Note Catcher**. Have students watch the "How Cells Become Specialized" video until the 2:15 mark. As the video plays, have students take notes in the "Stem Cell" box at the bottom of the Note Catcher.

Embedded video

https://youtube.com/watch?v=t3g26p9Mh_k

After the video, inform students they are going to explore the different types of specialized cells that stem cells can become.

Go to **slide 7** and organize students into groups of seven. Within each group, have each student choose one of the following specialized cells:

- Blood
- Bone
- Epithelial
- Fat
- Immune
- Muscle
- Nerve

Pass out the attached **Specialized Cells Speed Dating Profile** handout to each student. Have each student fill out their handout by researching information about their chosen cell.

Teacher's Note: Review Handouts

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

30 minutes

Explain

Teacher's Note: Activity Preparation

Before beginning this activity, line tables in a U-shape around the classroom. Alternatively, create two lines of tables with chairs set up across from each other on both sides. You may choose to play music to add fun and help drown out others' conversations. Use a bell to indicate when it's time for students to rotate.

Display **slide 8** and have students refer back to the Specialized Cells Note Catcher. Inform students they are going to learn about the other specialized cells through a speed-dating game using the Speed Dating Profiles they created.

Inform students they will have 1 minute with each person across from them: 30 seconds to share information about their own cell and 30 seconds to gather as much information as they can about their partner's cell. Have students record the information they learn from each partner on the Specialized Cells Note Catcher.

After ringing the bell, have students on one side rotate to the next partner to share and gather information about a different cell. Repeat.

Teacher's Note: Repeated Cells

If students encounter a cell more than once, ask them to seek out and record any information they have not yet learned about that cell.

60 minutes

Extend

Optional Video

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 9** and inform students there is an eighth cell 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.

Embedded video
https://youtube.com/watch?v=pMua1d5BE4g

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)*). Inform students about the characteristics of the two types of germ cells, sperm and egg cells, and have students add this information to their note catchers. Then, let students know they are going to learn more about their specialized cells from the speed-dating game by researching the effects of related diseases across the levels of organization.

Go to **slide 10** and pass out the attached **Levels of Organization Project Instructions** and **Levels of Organization Rubric**. Pair up each student with someone else who has the same cell.

Have student pairs choose one of the diseases that they discovered is related to their cell. Ask students to research and develop a model, poster, or slideshow presentation that shows the effects of the disease from the cellular level to the organism level. In addition, have student pairs write a 1-page report about the disease's effects at each level and how these compare with normal functions at each level.

Teacher's Note: Presentation Date

Remember to set a presentation date and provide this information to students.

60 minutes

Evaluate

Display **slide 11**. Have students pairs present their findings to the class.

Alternative Strategy

If you need to save time, consider having students do a Gallery Walk of other students' models to see all the different types of specialized cells and how they function within systems.

To conclude the lesson, go to **slide 12**. Ask students to answer the Exit Ticket question on a sheet of notebook paper: *How do different cells affect specific systems within a multicellular organism?*

Teacher's Note: Saving Examples

You may consider asking students if you can save some of their exemplary models to use as examples for future students.

Resources

Amoeba Sisters. (2017). How cells become specialized [Video]. YouTube. https://www.youtube.com/watch?v=t3g26p9Mh_k

K20 Center. (n.d.). 3-2-1. Strategies. https://learn.k20center.ou.edu/strategy/117

K20 Center. (n.d.). Exit ticket. Strategies. https://learn.k20center.ou.edu/strategy/125

K20 Center. (n.d.). Gallery walk. Strategies. https://learn.k20center.ou.edu/strategy/118

K20 Center. (2022). Histotechnologist Terese LaRose ICAP [Video]. YouTube. https://www.youtube.com/watch?v=pbP3qazvJy0

Medical Cortex. (2017). Ovarian teratoma [Video]. YouTube. https://www.youtube.com/watch?v=pMua1d5BE4g