

Teacher Instructions

Title: Six Foot Walk-in Cell Project

Grade Focus: Grade 7

Subject: Science

Integration Activities: Imaging, PowerPoint, Video Production

Recommended Time to Completion: 10 50-minute classes

INTRODUCTION: This cell model building and related presentations, games and activities are to review the basic structures of a cell and answer and illustrate these learning questions:

- What are the parts inside the cell? (For example, the nucleus, endoplasmic reticulum, and mitochondrion.)
- What part of a cell keeps it intact? (The cell membrane on the outside and the cytosol on inside.)
- What do you think some of these cell parts do? (Answers will vary.)

Focus both on terms, structures, interrelationships and on the big idea that the cell has many parts and each has a job to do. Emphasize that this is a model of a cell and that it doesn't represent any cell in particular.

PREREQUISITE EXPERIENCE:

TEACHER PREP TIME:

Review these training videos from Nortel LearniT

- Imaging, <http://nortellearnit.org/technology/Imaging/>
- PowerPoint Presentations:
http://nortellearnit.org/technology/PowerPoint_Presentations/
- Video Production,
http://www.nortellearnit.org/technology/Video_Productions/

MATERIALS:

Digital Camera and/or Digital Video Camera

Computer(s) with Word Processing and/or PowerPoint software

Materials to make the 9'x9'x9' frame of the walk-in cell using PVC pipe and connectors, duct tape, and clear plastic.

Materials to construct modified walk in/or ceiling cell and/or cell parts, see:

- http://www.accessexcellence.org/AE/AEC/AEF/1994/hopkins_cells.php
- <http://www.win.co.nz/bioweb/jello.html>

Materials to make games:

- Crossword puzzle: <http://www.win.co.nz/bioweb/ccword.html>

For presentations and game creation, chart paper, large paper, crayons/markers

Writing about

<http://www.instructorweb.com/linkgo.asp?L=26&B=resources/biology.asp>

PROJECT:

Students will create a giant animal cell model, games, puzzles, and presentations that they will share with visitors.

ASSESSMENT/GRADING:

The students will be graded individually using the rubric in the Evaluate section.

During small group and whole group discussions, the teacher may wish to complete informal assessments.

TIME MANAGEMENT TIP:

This is a very labor-intensive project, so be sure to schedule lots of time and help to put the cell This lesson takes 8 – 50 minute class periods to introduce the project and prepare, 1 – 50 minute period to practice, 1 blocked class to present. together initially Some of this work could be completed during writing as well as social studies.

Engage

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Following an introductory unit on cell biology, including understanding of cell organelles; location, size, and function, explore together the interactive cell models and online explanations at the Internet sites:

http://www.cellsalive.com/cells/cell_model.htm

<http://www.cellsalive.com/cells/bactcell.htm>

http://www.biology4kids.com/files/cell_main.html

http://www.biology4kids.com/files/cell2_main.html

Provide a research time for students to do basic guided searches of example sites for model pictures to kick off the model building and the committee work:

<http://www.enchantedlearning.com/subjects/animals/cell/>

<http://www.the-aps.org/education/lot/cell/cell-ebration.html>

Explore

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1. Provide a research time for students to do basic guided searches of example sites for model pictures to kick off the model building and the committee work:

<http://www.enchantedlearning.com/subjects/animals/cell/>

<http://www.the-aps.org/education/lot/cell/cell-cebration.html>

<http://www.ibiblio.org/virtualcell/tour/cell/cell.htm>

Explain

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Ask students to volunteer to put together the 9'x9'x9' frame of the cell using PVC pipe and connectors, duct tape, and clear plastic.

2. In class, the teacher should explain the different committees:
 - cell parts committee: create the cell organelles with labels explaining the function of each part
 - hosting committee: create an introduction for the performance, a handout, and invitations
 - public relations committee: create a tour of the cell, press releases, flyers, and announcements
 - game committee: create cell related games
 - puzzle committee: create cell related puzzles
 - presentation committee: create a 5-minute presentation about cells
2. Allow students to choose which committee they want to be on, and then give them the appropriate rubrics. If you need extra committees, add another game committee or puzzle committee.

Students will meet with groups to brainstorm the actions and dialogue for the problem situation, and begin a list of props. During this time, the group will need to complete a storyboard for the problem situation and decide who will play each part.

Elaborate

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1. Students will prepare their committees for the day of the walk-in cell performance.
2. On the day of the performance, visitors will hear a brief introduction from the hosting committee, be separated into small groups, and be led through several 5-minute stations with the cell parts committee as their guides. The stations include:
 - walk-in cell tour: led by public relations committee
 - presentation: led by presentation committee
 - game: led by game committee
 - puzzle: led by puzzle committee
3. Allow students to choose which committee they want to be on, and then give them the appropriate rubrics. If you need extra committees, add another game committee or puzzle committee.

You will meet with your group to brainstorm the actions and dialogue for the problem situation, and begin a list of props. During this time, your group will need to complete a storyboard for the problem situation and decide who will play each part.

Evaluate

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Activity and Project Evaluation Rubric				
Criteria	Level 1 (D)	Level 2 (C)	Level 3 (B)	Level 4 (A)
Research	Limited research, from limited sources; provides no evidence of critical thinking to evaluate content	Somewhat efficient & uses some critical thinking to evaluate content from somewhat varied sources.	Well researched, from various sources and uses critical thinking to evaluate content	Thorough research from varied sources presenting different points of view & uses critical thinking to evaluate content
Storyboard / planning	Limited planning evident	Some planning evident	Planning evident	Thorough planning evident
Content	Lacks detail	Some detail	Good detail	Excellent detail
Technology Use to Demonstrate Under-standing	Technology use with little purpose	Technology use with some purpose	Technology use with purpose	Intuitive technology use with specific purpose
Applied Under-standing	Applied understanding is not evident	Applied understanding somewhat evident	Applied understanding evident	Applied understanding clearly evident
Overall Final Project	Inconsistent and inappropriate aesthetics & technical functionality	Somewhat consistent & appropriate aesthetics & technical functionality	Consistent & appropriate aesthetics & technical functionality	Consistent, creative & appropriate aesthetics & technical functionality

Extend

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For next level learning, look at:

- http://www.eurekascience.com/ICanDoThat/bacteria_cells.htm
- http://school.discoveryeducation.com/lessonplans/programs/eb_thecell/
- <http://biologyinmotion.com/> (some activities require a Flash plugin)

Related Resources

- Janice VanCleave's A+ Projects in Biology: Winning Experiments for Science Fairs and Extra Credit (VanCleave A+ Science Projects Series) (Paperback)
- Cell and Microbe Science Fair Projects: Using Microscopes, Mold, and More *by* Kenneth G. Rainis