

CLAYMATION: Making Mitosis Move

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GRADE LEVELS	7
TIME ALLOTMENT	Five one-hour sessions
OVERVIEW	<p>In this lesson, students will learn what mitosis, the process of cell division, is and how it happens. Mitosis results in the production of two daughter cells from a single parent cell. The daughter cells are identical to one another and to the original parent cell.</p> <p>Students will also make their own animated example of mitosis using a digital camera, a computer with video editing software and clay. Claymation involves sculpting clay and hand moving the figure so that they can be filmed and "animated."</p>
SUBJECT MATTER	Science and Visual Arts
LEARNING OBJECTIVES	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand and identify the steps in mitosis • Understand the persistence of vision, a theory on the mechanism by which we see motion pictures -the eye and brain hold on to a series of images to form a single complete picture • Create the illusion of movement with inanimate objects • Use digital cameras and computers to produce a claymation
STANDARDS	<ul style="list-style-type: none"> • Science Content Standards for California Public Schools (http://www.cde.ca.gov/standards/science) <p>Grade Seven -Focus on Life Science</p> <p>Cell Biology</p> <p>1. All living organisms are composed of cells, from just one to many trillions, whose details usually are</p>

visible only through a microscope. As a basis for understanding this concept:

- a. Students know cells function similarly in all living organisms.
- c. Students know the nucleus is the repository for genetic information in plant and animal cells.
- e. Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.
- f. Students know that as multicellular organisms develop, their cells differentiate.

- **Visual Arts Content Standards for California Public Schools**
(<http://www.cde.ca.gov/standards/vpa/visualart/>)

Grade 7 -Visual and Performing Arts

2.0 Creative Expression

Communication and Expression Through Original Works of Art

2.6 Create an original work of art, using film, photography, computer graphics, or video.

MEDIA COMPONENTS**Equipment**

- Television with remote control
- DVD player or VCR with remote control
- Digital Camera with tripod
- Computer with Internet connection
- Large-screen monitor or projector for viewing videos on the Web
- Video Editing Software such as iMovie or Adobe Premiere

Video

- Claymation videos: *The Incredible Adventures of*
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Wallace and Gromit (DVD or VHS), *Chicken Run* (DVD or VHS)

Wallace and Gromit DVD Bonus features of how to produce a Claymation

Available for purchase on www.amazon.com and www.ebay.com from \$5.00-25.00

Web Sites

- http://www.biology.arizona.edu/cell_bio/tutorials/cell_cycle/cells3.html

A tutorial on the cell cycle and mitosis by the University of Arizona's Biology Project. Includes illustrations, an animation on mitosis and a link to key vocabulary.

- <http://www.cellsalive.com/mitosis.htm>

This animation demonstrates the stages of mitosis in an animal cell. Can be paused on each phase of mitosis, forwarded or rewinded by steps.

- <http://www.cmi.k12.il.us/Urbana/projects/UMSart/gallery/claymationfall99/claytitles99.html>

A collection of claymation movies made by students in sculpture classes from Urbana Middle School, Urbana, Illinois.

- <http://www.klick.org/kids/techietalk/animation/claymation/>

This page provides quick and easy steps to start your own clay animated movie.

- http://www.pbs.org/safarchive/4_class/45_pguides/pguide_804/4484_alan.html

A PBS lesson plan on the Art of Science. "Information from the introduction up to the objective in Activity 1 will be useful in explaining the persistence of vision" concept.

MATERIALS

- Handout: Video Production Vocabulary (one for each student)
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- Storyboard Worksheets (One per team)
- Poster-board for oversized Storyboards
- Clay
- Sharp knife for teacher to cut clay
- Armatures: pipe cleaners or wire to serve as skeleton
- Clay shaping tools: dull knives, toothpicks
- Colored construction paper to be used for backgrounds

PREPARATION FOR TEACHERS

- Photocopy all student handouts
- **Cue** the digital video on mitosis to the correct starting point
- **Bookmark** Web sites
- Divide clay, pipe cleaners, and construction paper so that each group has enough to create project

**INTRODUCTORY ACTIVITY:
SETTING THE STAGE**

- Explain to students that they will create an animation of their own. In fact, they will create an animation of a cell in mitosis. But first, they will need to have an understanding of what mitosis is and how it works.
 - Assign students to read the textbook chapter or pages devoted to mitosis.
 - **(Check for student comprehension)** Use the following questions to guide the discussion:
 - What does mitosis mean?
 - When does mitosis occur?
 - What are the stages of mitosis?
 - How is plant mitosis different from animal mitosis?
 - How is it similar?
 - View the University of Arizona's Biology Project Web site tutorial on mitosis
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- Review the stages of mitosis with students
- **Play** the Quicktime animation found on that site to the end. The clips starts with interphase and illustrates, in ten seconds each of the phase.
- **Rewind** the animation clip after playing it once. **Play** the clip and **Pause** on each of the phases.
- **(Focus for media interaction)** After each phase, ask students to identify what has happened.
- Go to CellsAlive Web site to view their stages of mitosis in an animal cell.

Again, **Pause** at each phase of mitosis. Animation can be **forwarded** or **rewinded** by steps.

- **(Focus for media interaction)** Students have now seen three illustrations of mitosis (textbook and two Web sites).

Ask students to think about what medium helped them to best understand the concept of mitosis?

Would students be able to understand and explain mitosis if they had only seen the first Web site? What about if they had only read the book or seen the second Web site?

- Based on what they have discussed, ask students to think about and write down what types of projects they have used both text and video to understand a learning activity.

In addition, ask them to write in their own words (using illustrations if desired) the definition, process and stages of mitosis.

For this assignment, let students know they will be graded on effort, not accuracy. During the next activity, they will take the information they have read and viewed to reenact mitosis.

LEARNING ACTIVITIES

Activity 1

- Divide class into groups of three. Explain to students
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that each group will create a claymation.

- Ask students the following questions:

How many of you have seen a cartoon or claymation?

How do you think it is created?

- View bookmarked Urbana Middle School Web Site and select "Fanatic" and "The Surprise Party" to show students

If you were able to obtain professional claymation videos (*Chicken Run*, *Wallace and Gromit*), clips from these may also be shown at this time.

- **(Focus for Media Interaction)** Ask student to be to observe these claymations as if they were film critics. Discuss the following: materials, transitions, colors, camera angle and music.

What works in each of these claymation videos and what doesn't?

What would you do differently?

What technique did you like and want to learn?

- **Play** "Fanatic" in its entirety. Give students a chance to write down their thoughts before they share them with the class.
- **Rewind** "Fanatic" and **Pause** to check for questions or observations. **Resume play** and **stop** at the end.
- **Play** "Fanatic" in its entirety. Give students a chance to write down their thoughts before they share them with the class.
- **Rewind** "The Surprise Party" and **Pause** to check for questions or observations. **Resume play** and **stop** at the end.

Activity 2

- Students will now learn the steps involved in creating a claymation.
- Groups will need to determine how they will staff the

following roles: art director (moves the clay), storyboard artist, set designer (shapes the clay and creates background), writer (narration), music, camera operator, lighting, and animator.

- Distribute a copy of the storyboard handout, Video/Audio Story Board Worksheet, to each student so they can create a storyboard.
- Explain the function of a storyboard –a series of sketches that illustrate the shots and scene along with the accompanying dialogue.
- View the Klick.org Web Site on claymation.
- Ask a student to read the directions out loud on the Getting Started”page
- **(Focus for media interaction)** Clarify that students will begin by creating a storyboard of mitosis, using their handouts. Students should specify the audio, video and length for each frame. Students will use their storyboard as their blueprint for set design.

Using the steps outlined on the Getting Started”page, students should start creating their storyboard.

- Collect and mount storyboards on posterboard. Each group will briefly present their storyboard to the class.

Activity 3

- View the Klick.org Web Site on claymation. Click on forward, to Forming Clay”
- Ask a student to read the directions out loud
- Pass out art materials and instruct students to start working with the clay
- **(Focus for media interaction)** Using the steps outlined on the Forming Clay”page, students should start molding their clay

Activity 4

- Each team will create, from clay, a cell large enough to be photographed and manipulated.

- Set up camera on tripod
- Choose a background
- View the Klick.org Web Site on claymation. Click on forward, to the page called "Taking Photos"
- Assemble the set and place the mitosis "actors"
- Ask the class who has used a digital camera and see if these students are willing to step out of their groups to help provide technical assistance"
- If the digital cameras you're using have a manual, photocopy a few pages from the manual to illustrate what each button does. Camera companies also typically have useful tutorials on their Web site tailored for each product
- Have students start taking pictures and moving the clay between each shot. Remind them that the more pictures they take, the better their animation will be

CULMINATING ACTIVITY**Producing the Claymation**

- It may be useful to create a short animation in front of the class using iMovie or Premier
 - Assemble each claymation using a computer program such as iMovie (Mac) or Media Shaker (PC).
 - Again, ask the class who has used the computer program you have selected and see if these students are willing to step out of their groups to help provide technical assistance"
 - If the software you're using has a manual, photocopy a few pages to illustrate what the basic steps. Software companies also typically have useful tutorials on their Web site tailored for each product
 - Screen the completed animation. Have students explain their process in creating their claymation.
 - Have additional screenings with other classes. In both situations encourage critique and comments of the produced video.
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- Create a master copy of the tape. Keep one in the classroom and put the other in the school library to be checked out by other students.

**CROSS-CURRICULAR
EXTENSIONS****Video/Web Production**

- Put the video online for your school and other schools to view
- Submit claymations to video yearbook
- Create and broadcast commercials over your schools television network using the mitosis movies as publicity for biology, arts or technology classes

Language Arts

- Create an expository essay report detailing the purpose and process of the lesson.

Students may want to write from the perspective of a movie producer who has invested money in this project and is trying to explain and convince another movie producer to join the team.

Students will identify their strengths, weaknesses of their groups process; use their textbook to draw connections to their movie and the mitosis process; and provide recommendations for future classes.

- These essays can be used the following year as an introduction to the unit.

COMMUNITY CONNECTIONS




- Have students research possible science fairs or student competitions where they could enter
 - Take your class on a field trip to the Zeum Museum in San Francisco or Chabot Space and Science Center in Oakland
 - Visit a sculptor's studio
 - Visit a local television station to observe how animations are made for television
 - Call your local film commission to see if any movies are being filmed. Arrange for students to be allowed on the set during a shoot
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VIDEO/AUDIO STORYBOARD WORKSHEET

Project: _____

Reporting Team: _____

Comments: _____

VIDEO	DESCRIPTION
	Picture: Audio:
	Picture: Audio:
	Picture: Audio:



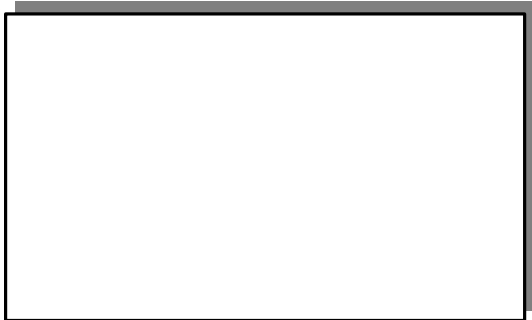
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