

## Organelles In Action: Integrating Artistic Elements Into Science Curriculum

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### Lesson Procedures

- Day 1:** Present organelle PowerPoint and have students record notes for all organelles.
- Day 2:** Present photography PowerPoint and have students record notes. Provide time for students to critique photographs for Elements of Art and Principles of Design.
- Day 3:** Students select their groups and randomly choose their organelle and plan on materials they will bring. Use research worksheets for deeper understanding of the function and structure of organelle. Skype with photography students on recommendations for photos.
- Day 4:** Students build models/start taking pictures. Assign individual reflection.
- Day 5:** Finish models/take pictures.
- Day 6:** Complete gallery walk fact sheet, artistic photo summary, share photos with teacher.
- Day 7-8:** Make stop motion films (PowerPoint, iMovie, Movie Shaker, etc.)
- Day 9-10:** Gallery Walk of organelles or sharing of stop animation films. Turn in personal reflection.

### Abstract

In this 10 day classroom activity, students will collectively construct a cell model to show the structure and function of eukaryotic cell organelles. Divided into groups of 3, students will be assigned one organelle and will create a model that demonstrates the structure and function of that organelle using various materials. After students have created models, they will take photographs that will later be compiled via computer software to make a stop motion film. Before photographing, science and art students will collaborate via Skype to discuss organelle functions and the basic principles of composition.



### Connections to Models & Materials

#### Connection to Models:

- Students will construct physical models of organelles that take into account scientific and artistic concepts
- Students will make a conceptual model of the function of organelles through the medium of film (stop action animation)
- Students will assess the use of models (their own and the models made by other groups) through a final written reflection

#### Connection Materials Science:

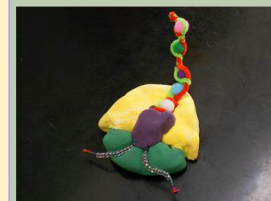
- Students will become familiar with specific vocabulary related to the characteristics of materials
- Students will make conscious decisions about the materials they will use to construct their models, keeping in mind the characteristics of the materials and the structure and/or function of the organelle they are trying to represent
- Students will justify their materials decisions using specific materials characteristics vocabulary

### CA State Science & Art Standards

7 <sup>th</sup> Grade Life Science	7 <sup>th</sup> Grade Visual Arts	9 <sup>th</sup> -12 <sup>th</sup> Biology	9 <sup>th</sup> -12 <sup>th</sup> Visual Arts
1b. Students know characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.	2.1 Develop increasing skill in the use of at least three different media. 2.6 Create an original work of art, using film, photography, computer graphics, or video.	1d. Students know the central dogma of molecular biology outlines the flow of information from transcription of RNA in the nucleus to translation of proteins on ribosomes in the cytoplasm.	1.6 Compare and contrast similar styles of works of art done in electronic media with those done with materials traditionally used in the visual arts.
1c. Students know the nucleus is the repository for genetic information in plant and animal cells.	4.3 Take an active part in a small-group discussion about the artistic value of specific works of art, with a wide range of the viewpoints of peers being considered. 4.5 Identify what was done when a personal work of art was reworked and explain how those changes improved the work.	1e. Students know the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.	2.3 Develop and refine skill in the manipulation of digital imagery (either still or video).
1d. Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis.	5.3 Examine art, photography, and other two-and -three-dimensional images, comparing how different visual representations of the same object lead to different interpretations of its meaning, and describe or illustrate the results.	1f. Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide	4.4 Articulate the process and rationale for refining and reworking one of their own works of art. 4.1 Describe the relationship involving the art maker (artist), the making (process), the artwork (product), and the viewer.

### Lesson Objectives

- Given a selection of materials provided by the teacher, students will collaborate and choose additional materials to best represent the structure and the function of their organelle.
- Given the completion of their model, students will know how to use different media to produce 3-dimensional works of art.
- Given the completion of the organelle model, students will know the structure and major functions of eukaryotic organelles.
- After completion of their model, students will take photographs based on the principles of artistic composition.
- Given an organelle to model, students will collaborate with their classmates to construct a whole class cell model.
- After completion of the project, students will reflect on their learning of the science, photography and materials science concepts.



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