Mummies and Science

Art of Collaboration Project

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Egypt Lesson 1: The Science of Mummies

Introduction: Students will be introduced to mummies by examining photographs of Egyptian coffins and artifacts on display at the North Carolina Museum of Art. Students will then learn about the process of making a mummy and how the Egyptians preserved the human body. Students will learn how this process has allowed for scientists to use modern technology to make discoveries about diseases and other health factors that were prevalent in Ancient Egypt. They will learn how these discoveries have impacted the way that modern diseases are studied.

**Grade Level**: 7th

**Subject Areas:** Science and Visual Arts (Also has connections to Social Studies and Language Arts.)

**Learning Outcomes:**

After this lesson students will be able to:

Explain how humans in Ancient Egypt had their health impacted by various environmental factors and diseases.

Explain how the knowledge gained by scientists through the study of mummies has allowed for a greater understanding of the history and causes of heart disease and flu epidemics.

Explain how the Ancient Egyptians adapted to their environment through their preservation of the human body after death.

Explain how the Ancient Egyptian culture is better understood through the artifacts and art found in and on mummy coffins and tombs.

Explain the importance of the art found in and on mummy coffins and tombs.

Describe the common characteristics that are used in Ancient Egyptian art.

Describe how all of the art found in and on mummy coffins and tombs is related and relevant to Ancient Egyptian history and culture.

Describe some of the main gods of Ancient Egyptian beliefs and their importance to Egyptian culture.

**Curriculum Alignment:**

**North Carolina Standard Course of Study:**

7th Grade Science: 2004

4.07 Explain the effects of environmental influences on human embryo development and human health including: Smoking, Alcohol, Drugs, and Diet.

7th Grade Science: 2004

4.08 Explain how understanding human body systems can help make informed decisions regarding health.

7th Grade Social Studies: 2006

**3.01** Identify ways in which people of selected areas in Africa, Asia, and Australia have used, altered, and adapted to their environments in order to meet their needs and evaluate the impact of their actions on the development of cultures and regions.

7th Grade Visual Arts:

5.01 Identify the history, purpose and functions of visual arts in various cultures.

5.02 Describe characteristics of specific works of art that belong to a particular culture, time and place.

5.03 Describe relationships of works of art to one another in terms of history, aesthetics, and cultural/ethnic groups.

**North Carolina Essential Standards: Draft 4.0**

7th Grade Science:

7.L.2.3 Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival.

**National Science Education Standards:**

Content Standard A: Science as Inquiry

Content Standard C: Life Science

Content Standard E: Science and Technology

Content Standard G: History and Nature of Science

**Classroom Time Required:**

Four 90 minute class periods.

**Materials Needed:**

A digital or hard copy of the following works of art:

*Coffin of Djed Mut*

*Coffin of Amunred*

Copies of necessary worksheets.

Materials for Day 4 Lab if teacher chooses to do this activity.

**Technology Resources:**

Any means you have available to display the works of art. A smart board would be ideal but you can also use a computer with projector or even an overhead projector.

**Pre-Activities:**

**Teachers:**

Have copies of works of art and a way to display them.

**Students:**

Students should be familiar with different body systems.

Students should be familiar with heart disease.

Students should have basic knowledge of Ancient Egyptian culture.

**Activities:**

**Day 1:**

* Teacher should first show both works of art. (No more than 10 minutes total)
* Teacher should lead a discussion about the works of art using the following questions: (No more than 20 minutes total)
  + What is the form and function of the sarcophagus?\
    - Have students come up with their own questions about the sarcophagus to turn in as an exit pass at the end of class.
  + What is the form and function of a modern day casket?
  + What gods or deities do you see present on the sarcophagus?
    - Were the representations of the gods and deities on the works of art used as a means to appease the gods and guarantee protection of the body and organs in the afterlife ?
* Teacher should ask students to draw and color a picture of a sarcophagus complete with hieroglyphics that could be used to represent their life and their beliefs. (No more than 30 minutes) Some websites with links to hieroglyphics are:
  + Alphabet: <http://www.virtual-egypt.com/newhtml/hieroglyphics/sample/alphabet.htm>
  + Hieroglyphics Expressions: <http://www.uponreflection.co.uk/hieroglyphics/hieroglyphic_expressions.htm>
  + Hieroglyphics Gods and Goddesses:
  + <http://www.uponreflection.co.uk/hieroglyphics/hieroglyphic_gods.htm>
  + <http://www.bradshawfoundation.com/pyramids_of_egypt/hieroglyphs-deities.php>
* Students should each stand and explain their sarcophagus and its significance to the class. (No more than 30 minutes).

**Day 2:**

* Teacher should show both pictures of the works of art again and review what was discussed yesterday. (5-10 minutes)
* Teacher should lead a discussion about how the deities painted on the sarcophagus were believed to protect various organ systems and make a connection between the scientific knowledge used today and understanding organ systems and beliefs of the Ancient Egyptians. (15-20 minutes)
* Students should be given 25 minutes to complete the Atherosclerosis Worksheet by doing research on the computer. (25 minutes)
* Share with students article AHA: Mummies Show Evidence of Vascular Disease. You can find this article at this link: <http://www.medpagetoday.com/MeetingCoverage/AHA/1> You can read this article together as a class or have students read it individually. Discuss this article in reference to what students completed on their Atherosclerosis Worksheet. (10-15 minutes)
* For the last 20-30 minutes of class students should either draw a picture or write a poem about something that they have learned today.

**Day 3:**

* Teacher will once again show both works of art and review what has been discussed over the previous two days. (5-10 minutes)
* Teacher should visit the following link for worksheets on Mummy Science: <http://www.sciencenetlinks.com/lessons.php?DocID=244>
* Teacher should form three separate groups in the class and give each group one worksheet to complete. Students can either complete these by using the following website: [**http://www.pbs.org/wnet/pharaohs/secrets.html**](http://www.pbs.org/wnet/pharaohs/secrets.html)or teacher can print articles from this website and give to students in class. (30 minutes)
* Students should share their information with the class (15 minutes)
* Teacher should now have a discussion on how mummies are made. If the teacher has access to Discovery Education there several great videos on the process of mummification. (20-30 minutes)
* Students should rewrite the mummification process in their own words on a sheet of notebook paper. They will give this to the teacher as their Exit Pass. (5-10 minutes)

**Day 4: (Optional)**

* Teacher will once again show both works of art and review what has been discussed over the previous three days. (5-10 minutes)
* Teacher should review proper lab procedures if necessary.
* Students will create their own “mummy” using either an apple or a whole chicken. The teacher will choose which activity he or she is must comfortable doing. This will allow students to work with measurements: they weigh the apple or chicken before beginning this process and again over the following week or weeks when they add more preservatives to their “mummy.” This lesson will also allow students the chance to have hands-on experience with the mummification process.
* The following links contain lessons on mummification:
  + For Apple Mummies: <http://www.educationworld.com/a_lesson/dailylp/dailylp/dailylp102.shtml>
  + For Chicken Mummies: <http://www.mummytombs.com/mummymaking/mummychicken3.htm>
* The teacher should distribute the Make Your Own Mummy lab sheet. This sheet will work for either the Apple or Chicken mummies.
* Students should work in groups according to how many apples or chickens the teacher has available.
* The teacher should distribute the lab process depending upon which lesson he or she chooses.
* Students should complete this lab.
* Once finished students should clean up their lab area and go back to their seats. Their “mummies” will stay in the classroom until the project is complete. The time needed for this overall project depends upon which type of “mummy” the teacher has chosen.
* Students who finish early can create a sarcophagus for their mummy. They can cover a shoebox with brown paper and paint or draw hieroglyphics onto the box.

**Assessment:**

* Day 1: Rubric Grading for Picture.
* Day 2: Atherosclerosis Worksheet Grade and Rubric Grading for either poem or picture.
* Day 3: Completion of Worksheets and Exit Pass (Check for understanding).
* Day 4: (Optional) Completion of mummification process and turning in lab sheets.

**Modifications:**

* All students should be able to participate in the discussion in class. The teacher can direct simplified questions to lower level or English Language Learners if they have not responded to the other discussion questions. Examples of these types of questions are:
  + What is a mummy?
  + Where are places where mummies can be found?
  + What are some of the main organs in the human body?
  + What is a sarcophagus

**Supplemental Information:**

More mummy information: <http://www.mummiesoftheworld.com/mummy-sciences/>

**Critical Vocabulary:**

Sarcophagus, Mummy, Atherosclerosis, Heart Disease, and Hieroglyphics.

**Suggestions for Cross-Curricular Connections with Lesson Ideas:**

**North Carolina Standard Course of Study**

* **Social Studies: 2006**

12.01, 12.02, 12.03 (Influence of major religions, ethical beliefs, and values on cultures in Africa, Asia, and Australia).

Discussion questions for this social studies goal and these objectives:

1. The symbols painted on the sarcophagus represent the different gods and goddesses of the Egyptian belief system.
   1. Why do you think they used these symbols?
   2. What symbols do the major religions you are familiar with use?

Lesson suggestion: Students could research modern day religious groups that are active in Egypt. They could compare and contrast these religions to the religion of the Ancient Egyptians.

* **Language Arts: 2004**

**2.02** Use multiple sources of print and non-print information in designing and developing informational materials (such as brochures, newsletters, and infomercials) through:

* identifying and using appropriate primary and secondary sources.
* comparing, contrasting, and evaluating information from different sources about the same topic.
* Evaluating information for extraneous details, inconsistencies, relevant facts, and organization.

Discussion questions for this language arts goal and objective:

1. What aspects of each sarcophagus tells a story?
   1. Which sarcophagus do you believe tells the most complete story about the mummy it held?
   2. Why do you believe this?
2. What is a brochure?
   1. How are brochures helpful in gaining information?
   2. Do any modern religions use anything like a brochure? Give examples.

Lesson suggestion: Have students work in groups of 3-4 students. Assign each group a different god or goddesses from Ancient Egypt. Have each group research their assigned god or goddess and create an informational brochure about this figure. Have each group draw a picture of their god or goddess for their brochure. When they are finished they should share their brochure with the class.

**Works of Art to be Used Including the Wall Descriptions That Appear in Museum of Art:**



Egyptian, Late Period, Dynasty XXII-XXIII   
*Coffin of Djed Mut*, about 945-712 BC  
Wood, gesso, polychrome  
5ft 11in x 0in (1m 80.3cm x 0cm)  
Gift of the James G. Hanes Memorial Fund, 1973 (73.8.4)

This wooden coffin was the final resting place of the deceased, identified by [hieroglyphic](JavaScript:OpenGlossaryWindow(%22182%22)) text on the back as Djed Mut, the daughter of Narht-Hor-erou; both father and daughter are otherwise unknown. The cover is in the [form](JavaScript:OpenGlossaryWindow(%2245%22)) of a [stylized](JavaScript:OpenGlossaryWindow(%22131%22)) woman representing the deceased; she wears a wig, and her face is framed by [vulture](JavaScript:OpenGlossaryWindow(%22194%22))'s wings. The wings represent the protection of the goddess [Isis](JavaScript:OpenGlossaryWindow(%22106%22)), to whom the [vulture](JavaScript:OpenGlossaryWindow(%22194%22)) is sacred. Below the broad and colorful [pectoral](JavaScript:OpenGlossaryWindow(%22125%22)) [collar](JavaScript:OpenGlossaryWindow(%22323%22)) that ends in [falcon](JavaScript:OpenGlossaryWindow(%22181%22)) heads on the shoulders is the goddess [Nut](JavaScript:OpenGlossaryWindow(%22112%22)). Flanked by two rams, her wings outspread, [Nut](JavaScript:OpenGlossaryWindow(%22112%22)) kneels atop a small [shrine](JavaScript:OpenGlossaryWindow(%22127%22)). Djed Mut is led by the [ibis](JavaScript:OpenGlossaryWindow(%22104%22))-headed god [Thoth](JavaScript:OpenGlossaryWindow(%22132%22)) toward the [mummiform](JavaScript:OpenGlossaryWindow(%22110%22)) god [Osiris](JavaScript:OpenGlossaryWindow(%22114%22)), who is accompanied by other protective [deities](JavaScript:OpenGlossaryWindow(%2296%22)) in a frieze running across the front.   
  
At the top of the central column, Djed Mut appears again on a [bier](JavaScript:OpenGlossaryWindow(%2291%22)). Over her flies the [ba](JavaScript:OpenGlossaryWindow(%2290%22)), the deceased's spirit that preserves her identity for eternity. Beneath the [bier](JavaScript:OpenGlossaryWindow(%2291%22)) are four [Canopic](JavaScript:OpenGlossaryWindow(%2292%22)) jars with heads of the four sons of [Horus](JavaScript:OpenGlossaryWindow(%22103%22)), who protect her liver, lungs, stomach, and intestines inside the jars. Arranged in vertical [registers](JavaScript:OpenGlossaryWindow(%22191%22)), lines of text from [the Book of the Dead](JavaScript:OpenGlossaryWindow(%22180%22)) fill the central column beneath the scene of Djed Mut on her [bier](JavaScript:OpenGlossaryWindow(%2291%22)). This [ritual](JavaScript:OpenGlossaryWindow(%22286%22)) text provided guidance for the deceased on her journey into the [afterlife](JavaScript:OpenGlossaryWindow(%22179%22)).  
  
Djed Mut appears once more in the area of the feet, where she is shown between the gods [Horus](JavaScript:OpenGlossaryWindow(%22103%22)) and [Anubis](JavaScript:OpenGlossaryWindow(%2289%22)). A protective snake lies along the whole length of the cover on both sides. The theme of protection carries over to the interior of the coffin, where [Nut](JavaScript:OpenGlossaryWindow(%22112%22)) is depicted on both the lid and bottom, literally enveloping the [mummy](JavaScript:OpenGlossaryWindow(%22188%22)).



Egyptian, Late Period, Dynasty XXII-XXXIII (Egyptian, about 945 - 712 BC)  
*Coffin of Amunred*, about 945-715 BC  
Wood, gesso, polychrome  
5ft 11in x 0in (1m 80.3cm x 0cm)  
Gift of the James G. Hanes Memorial Fund, 1973 (73.8.5)

This wooden coffin was the final resting place of a man named Amunred, who is represented in the [form](JavaScript:OpenGlossaryWindow(%2245%22)) of a [stylized](JavaScript:OpenGlossaryWindow(%22131%22)) man on the cover and whose name is written in [hieroglyphs](JavaScript:OpenGlossaryWindow(%22185%22)) on the back of the case. He wears a blue striped wig and a colorful [pectoral](JavaScript:OpenGlossaryWindow(%22125%22)) [collar](JavaScript:OpenGlossaryWindow(%22323%22)) of alternating bands of lotus flowers and petal patterns. His braided beard identifies him with [Osiris](JavaScript:OpenGlossaryWindow(%22114%22)), the God of the Underworld. In the middle section of the case, the goddess [Nut](JavaScript:OpenGlossaryWindow(%22112%22)), crowned with a sun-disc, kneels with her wings outspread holding feathers in each of her raised hands. The Eye of [Horus](JavaScript:OpenGlossaryWindow(%22103%22)) hovers above her wings on either side. Below [Nut](JavaScript:OpenGlossaryWindow(%22112%22)), the central vertical column contains text from [the Book of the Dead](JavaScript:OpenGlossaryWindow(%22180%22)). Also below [Nut](JavaScript:OpenGlossaryWindow(%22112%22)), and flanking the central text column, are the four [mummiform](JavaScript:OpenGlossaryWindow(%22110%22)) sons of [Horus](JavaScript:OpenGlossaryWindow(%22103%22)) who served as the protectors of the entrails placed in [canopic](JavaScript:OpenGlossaryWindow(%2292%22)) jars. Below them stand the female figures of [Isis](JavaScript:OpenGlossaryWindow(%22106%22)) and Nepthys both with opened wings. Near the deceased feet, two black jackals sit atop biers or platforms. When the case lies horizontally, these jackals sit upright and gaze over the length of the case at Amunred.

The following are other photographs and close-ups of the *Coffin of Amunred* that I took at the North Carolina Museum of Art:







The following are other photographs and close-ups of the *Coffin of Djed Mut* that I took at the North Carolina Museum of Art:





The above 3 photographs are other views and close-ups of the *Coffin of Djed Mut.*

**Extensions to Lesson:**

**Author Info:**

My name is Kristen Hensley. I teach at Bunn Middle School in Franklin County. For the past 6 years I have taught 6th grade Science and Social Studies. I am a National Board Certified Teacher and a Kenan Fellow. I developed this lesson through my Kenan Fellowship project, The Art of Collaboration. I have designed lessons that help teachers integrate art into science lessons. Through this project I have found that integrating art into science is much easier than I first thought. The lessons are very engaging and the students love them.

Through the Kenan Fellowship program I work with a mentor from the North Carolina Museum of Art. My mentor is Jill Taylor. She works with the Art of Collaboration project at the museum. This program works with teachers from different school systems in the state and helps them to learn how to integrate art into their subject areas.