

Chinese Silkworms: Sericulture
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Eastern Asia Studies

Lesson Summary:

- Students will be learning about the field of helminthology and Lepidopterology.
- The students will be learning about the great variety of body plans.
- The students will be learning about worms.
- The students will be dissecting worms.
- The students will compare a frog dissection body plan with a worm.
- Students will be able to explain Sericulture: silk production from the moth.
- Students will hatch silkworm eggs and chart their growth and life cycle through scientific journals.
Students will understand the economic importance of the silkworm to the Chinese Culture.
- Students will heat, soak and unwind silk thread from cocoon.
- Students will complete a WebQuest titled: Silk, Sand & Pomegranates, When Cultures Collide on the Silk Road
- (<http://starr.pausd.org/~msano/WebQuest-SilkRoad/WebQuest-EastMeetsWest.html>)

Estimated Duration:

3-5 weeks of 45 minute sessions

Pre-Assessment :

- This Unit will run simultaneously with the social studies unit on the Silk Road
- This activity will be follow-up to the “Impact of World Population on the Earth’s Resources” Unit
- This unit will emphasize the academic content standard involving variety of Body Plans: Spider Unit, Earthworm/Frog Dissection, Owl Pellets

Post-Assessment :

- Formative Assessment in the form of discussion questions and quizzes
- Rubric on final presentation and lab report

Instructional Procedures:

- Order silkworm cocoons.
- Order silkworm eggs to hatch
- Order the silkworm larva
- Worm Notes
- Biomedicine: Leeches and maggots

- Dissect earthworms
- Students will have a brief research activity using internet to learn about the history of Chinese silk and the silkworm.
- Students will discuss the economic importance of the silkworm to China.
- Complete WebQuest

Life Cycle of the Silkworm:

- Eggs hatch in about 6-20 days. □
- Caterpillars eat for about 26 days before spinning silk. □
- It takes about 3 days to fully spin a cocoon and turn into a pupa. □
- The moth emerges from the cocoon after about 21 days. □
- The moth lays eggs about two days after emerging from the cocoon.

- Captions clockwise from top: □
- The female moth lays many small eggs. □
- A tiny black caterpillar hatches from its egg. □
- The caterpillar eats mulberry leaves and grows bigger and bigger. □
- The caterpillar spins a cocoon of silk thread around itself. □
- Inside the cocoon, the caterpillar changes into a pupa. □
- People unwind the silk thread from the cocoons to weave into silk cloth. □
- The pupa turns into a moth.
- The moth comes out of the cocoon. □
- The moth mates with another moth.

Differentiated Instructional Support:

- Hard copy of Notes
- Underline important concepts
- Enlarged copies for visually impaired
- Notes on Podcast for auditory review and absent students

Extension:

- Dissection of earthworm
- Hatching of silkworm eggs and recording data of silkworm life cycle.
- Unreeling of the cocoon to obtain the silk thread.

Homework Options and Home Connection:

- PowerPoint and Podcast available on the science website:
<http://web.mac.com/mmsscience/iWeb/Site/Science%20Podcasts/Science%20Podcasts.html>

- Enrichment Handouts as needed

Interdisciplinary Connections:

- I will strive to connect this to the Social Studies Unit and timeline of when my Social Studies Colleague will be teaching about ancient China and the Silk Road.

Materials/Resources Needed:

- Handouts
- Powerpoints
- Podcasts
- Earthworms
- Silkworm eggs, cocoons, silk moths
- Silkworm food
- Lab reports
- Rubric
- Dissection equipment: kit, zip lock bags, paper towels, dissection microscopes
- Computers with internet
- PupilCams

Key Vocabulary:

- Sericulture
- Helminthologist/Lepidopterology
- Silk
- Holometabolous
- polyphagy
- Detritivorous
- Silk road
- Cultivation
- Domesticated
- Weaving looms

Technology Connections:

Computers

Internet

WebQuest

PupilCams and Dissection Microscopes

Digital Cameras

PowerPoints
Projector/SmartBoard

Research Connections:

Correct and teacher guided internet research

General Tips:

Attachments:

Resources:

<http://www.suekayton.com/silk.htm>

<http://www.wormspit.com/bombyxsilkworms.htm>

<http://www.enchantedlearning.com/Home.html>

<http://animaldiversity.ummz.umich.edu/site/index.html>

"Animal Diversity Web". University of Michigan. March 19, 2008

<<http://animaldiversity.ummz.umich.edu/site/accounts/information>>.

Cherry, Ron. "Bugbios: Sericulture". Cultural Entomology Digest 1. March 19, 2008

<<http://www.insects.org/ced1/seric.html>>.

"History of Silk". Silkroad Foundation Home Page. March 16, 2008 <<http://www.silk-road.com/artl/silkhistory.shtml>>.

Kayton, Sue. "History of Silkworms". March 19, 2008

<<http://www.suekayton.com/Silkwoms/history.htm>>

Kayton, Sue. "Science Questions". March 19, 2008

<http://www.suekayton.com/Silkworms/science.htm>

Zhuo, Hao. "Chinese Silk and the Silk Road". About.com: Chinese Culture. March 19, 2008 <<http://chineseculture.about.com/library/weekly/aa021201a.htm?p=1>>.

Ordering Information:

<http://www.silkwormshop.com/guarantee.html>

Carolina Biological Supplies: <http://www.carolina.com/>

Standards:

PreK-12 Science
S02. Life Sciences

A. Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures. (06-08)

01. Investigate the great variety of body plans and internal structures found in multicellular organisms. (07)

B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species. (06-08)

08. Investigate the great diversity among organisms. (07)

C. Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment. (06-08)

02. Investigate how organisms or populations may interact with one another through symbiotic relationships and how some species have become so adapted to each other that neither could survive without the other (e.g., predator-prey, parasitism, mutualism and commensalism). (07)

06. Summarize the ways that natural occurrences and human activity affect the transfer of energy in Earth's ecosystems (e.g., fire, hurricanes, roads and oil spills). (07)

D. Explain how extinction of a species occurs when the environment changes and its adaptive characteristics are insufficient to allow survival (as seen in evidence of the fossil record). (06-08)

S04. Science and Technology

A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life. (06-08)

01. Explain how needs, attitudes and values influence the direction of technological development in various cultures. (07)

02. Describe how decisions to develop and use technologies often put environmental and economic concerns in direct competition with each other. (07)

S05. Scientific Inquiry

A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools. (06-08)

01. Explain that variables and controls can affect the results of an investigation and that ideally one variable should be tested at a time; however it is not always possible to control all variables. (07)

02. Identify simple independent and dependent variables. (07)

03. Formulate and identify questions to guide scientific investigations that connect to science concepts and can be answered through scientific investigations. (07)

04. Choose the appropriate tools and instruments and use relevant safety procedures to complete scientific investigations. (07)

B. Analyze and interpret data from scientific investigations using appropriate mathematical skills in order to draw valid conclusions. (06-08)

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Lesson Plan View <https://progressbook.treca.org/progressbook/Curriculum/LessonPlan...>
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05. Analyze alternative scientific explanations and predictions and recognize that there may be more than one good way to interpret a given set of data. (07)

06. Identify faulty reasoning and statements that go beyond the evidence or misinterpret the evidence. (07)

07. Use graphs, tables and charts to study physical phenomena and infer mathematical relationships between variables (e.g., speed and density). (07)

S06. Scientific Ways of Knowing

A. Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation). (06-08)

C. Give examples of how thinking scientifically is helpful in daily life. (06-08)

03. Describe how the work of science requires a variety of human abilities and qualities that are helpful in daily life (e.g., reasoning, creativity, skepticism and openness). (07)

