

Case of the 15 Million Clay Lottery Ticket: Teacher Guide

Subject: Physical Science, English Language Arts, World Literature

Grade Level: Middle School (8th grade) or High School (9th World Literature, World History)

Case Summary

What would you do if you discovered a block of clay? Would you try to break it open or throw it away? A farmer claimed to have found Ancient coins in a block of clay. Skeptics from current 8th grade physical science and language arts classes are currently in the lab testing the hoard.

Credits

This case was written by Staci L. Weaver (teacher, Austin Middle School, Douglasville, GA). Author may be contacted at sweaver@paulding.k12.ga.us

This case was adapted from *The Copper Corrosion Lab* from The Science Behind Art Conservation Workshop

Learning Objectives

1. Students will compare/contrast the physical and chemical properties and chemical changes with coinage, both ancient and modern.
2. Students will examine the physical and chemical properties of the corroded coinage, both modern and ancient
3. Students will examine the way copper corrodes and its effect on materials
4. Students will write/create an informative/explanatory text that examines a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content

Georgia Performance Standards

SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.

S8CS2. Students will use standard safety practices for all classroom laboratory and field investigations.

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate techniques in all laboratory situations.
- c. Follow correct protocol for identifying and reporting safety problems and violations.

S8P1. Students will examine the scientific view of the nature of matter.

- a. Distinguish between physical and chemical properties of matter as physical (i.e. density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).
- b. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color)

ELACC8RI1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

ELACC8RI2. Determine a central idea of a text and analyze the development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.

ELACC8W2. Write informative/explanatory texts to examine and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

- a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; including formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic with relevant well-chosen facts, definitions, concrete details, quotations, or other information and examples.
- c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
- d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
- e. Establish and maintain a formal style.

SSWH3. The student will examine the political, philosophical, and cultural interaction of Classical Mediterranean societies from 700 BCE to 400 CE.

- a. Compare the origins and structure of the Greek polis, the Roman Republic, and the Roman Empire.
- b. Identify the ideas and impact of important individuals; include Socrates, Plato, and Aristotle and describe the diffusion of Greek culture by Aristotle's pupil Alexander the Great and the impact of Julius and Augustus Caesar.
- c. Analyze the contributions of Hellenistic and Roman culture; include law, gender, and science.
- d. Describe polytheism in the Greek and Roman world and the origins and diffusion of Christianity in the Roman world.
- e. Analyze the factors that led to the collapse of the Western Roman Empire.

ELACC9-10SL1. Initiate and participate in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 9-10 topics, texts, and issues*, building on others' ideas and expressing their own clearly and persuasively.

- a. Come to discussions prepared and having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

ELACC9-10W2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

Assessment

- Students will be assessed using a self-assessment rubric as well as a peer-review rubric for the lab procedures. These will be formative (quiz grades). After the lab procedures identifying physical and chemical properties of ancient and modern coins, they will conduct research on modern, and Ancient Roman and Greek coins using a rubric and research worksheet. Once the research is conducted, they will create a compare/contrast brochure comparing ancient and modern coins (including dates, materials, locations found).

Implementation Strategy

Day 1

- The students will read the case independently then the instructor will have students volunteer to read lines of the story one per student out loud.
- Students will then complete the box chart by writing down the Facts/Big Ideas, Questions, Hypothesis and Problems of the Case independently and allow students approximately 3-5 minutes to complete the chart.
- Teacher will create the same box chart on the board and after 5 minutes ask for volunteers to complete each box according to their thoughts about the case.
- After discussing the case and box charts the teacher will put on the projector the following resources for the case and the factual story which the case was based upon with the class and pull up on the projector

Fox News. Retrieved from:

<http://www.foxnews.com/scitech/2012/06/27/ancient-coins-worth-15-million-found-by-amateur-treasure-hunters-after-30-year/#ixzz2Yl2Q0700>

- The teacher will show the introductory PowerPoint presentation on copper corrosion from Science and Art resources.
- The teacher will link to the Carlos Museum site and link to the conservation tab, discussing “What is conservation” <http://carlos.emory.edu/conservation/what-conservation>) as well as Roman and Greek Collections (<http://carlos.emory.edu/collections/greek-roman>).

Day 2

- The lab will take place in three parts over a two week period (with approximately 45 minutes each class period)
- Part I of the lab (Day 2), students will refer to the Copper Corrosion lab from The Science Behind Art Conservation Workshop. Students will work in groups of 2 or 3 depending upon class size and will be put in groups by teacher preference.

Day 3/4/5

- Once the set –up of the labs are completed, students will visit the computer lab and visit at least 3 websites to cite information on modern and ancient coins. They will be given a research worksheet to complete. Once the research is complete, they use their worksheet to create a brochure comparing and contrasting modern and ancient coins (this should take approximately 3 days). This brochure should include a section on care of these coins.
- The students will research the types of copper corrosion – presented in the introductory presentation, what environment these corrosion products are typically formed, and the color of these copper corrosion products.

Week 2

Day 1:

- Students will complete week 2 of the *Copper Corrosion Lab*
- During the labs, students will complete the Copper Corrosion Answer Sheets. Based on the colors of the coins mentioned in the case (green and brown), the teacher will lead a discussion Once the labs are completed, they will complete self and peer evaluation forms.

Facilitator Guide

Scene 1 – Possible Questions:

- Where is Jersey?
- Are the pounds in this case a measure of weight or currency?
- What is magnetometer? Why are the two men using it?
- What are the possible dangers of treasure hunting? (See metal detecting below)

Scene 2 – Possible Questions:

- What metal could be green and brown?
- Why is it green and brown?
- What is the treasure?
- Why would it be buried?
- What authorities should the men contact? (See www.finds.org.uk)
- What is a conservator?
- What can a conservator do for these objects? (See the Carlos link in Care for Copper below)

Resources

Ancient Coins for Education (2013). Retrieved from

<http://ancientcoinsforeducation.org/content/view/132/95/>

Fox News. Retrieved from:

<http://www.foxnews.com/scitech/2012/06/27/ancient-coins-worth-15-million-found-by-amateur-treasure-hunters-after-30-year/#ixzz2YI2Q0700>

Metal Detecting

http://www.bbc.co.uk/history/ancient/archaeology/metal_detect_01.shtml

<http://usnews.nbcnews.com/news/2012/03/23/10827391-civil-war-relic-thief-engaged-in-heartbreaking-destruction>

<http://finds.org.uk/documents/advice.pdf>

Select British History

http://www.bbc.co.uk/history/ancient/romans/late_01.shtml

<http://faculty.history.wisc.edu/sommerville/123/123%204%20roman.htm>

<http://www.historyworld.net/wrldhis/plaintexthistories.asp?historyid=ac71>

<http://www.pasthorizonspr.com/index.php/archives/02/2013/crisis-or-continuity-roman-coin-hoards-may-hold-the-answer>

<http://www.archaeology.co.uk/articles/news/hoards-and-hoarding.htm>

British Coinage

<https://www.royal.gov.uk/MonarchUK/Symbols/Coinageandbanknotes.aspx>

<http://www.wnccoins.com/0024.htm>

<http://www.bsswebsite.me.uk/A%20Short%20History%20of/coins.html>

<http://collections.museumoflondon.org.uk/Online/group.aspx?g=group-19938>

<http://www.romancoins.info>

Care of Copper

<https://www.thehenryford.org/research/caring/brass.aspx>

<http://www.cci-icc.gc.ca/publications/notes/9-4-eng.aspx>

<http://carlos.emory.edu/conservation/case-studies/ancient-american/ceremonial-knife>

Mystery of The 15 Million Clay Lottery Ticket: Scene 1

It was a typical day on the farm in Jersey. Reg had been helping Richard till the crops and they decided to take a break. Reg and Richard put their rake and shovel down then decided to do what they had been doing for years during their break times. Reg already had a few pounds in his pocket but Richard had none.

Reg was just about to get back to work when he yelled at Richard, “What are you doing with that big block of clay?” Richard yelled back at Reg, “Give me a minute, I have not seen this big block of clay here before. Run and get my magnetometer from the shed!”

Reg figured Richard was wasting his time poking around the blocks of clay that they have rummaged through for years before. “What could be in there anyway? ” Reg thought to himself. As Reg brought it over the magnetometer to Richard, he realized that Richard wasn’t crazy after all. It is what they have been dreaming about for 30 years.

Box Chart for Scene 1

<p>Facts /Big Ideas of the Case</p> <p>(What we know from the scene?)</p>	<p>Questions</p> <p>(What we want to ask characters in the scene to gather more info?)</p>
<p>Hypothesis (What we think is going on, what will happen?)</p>	<p>Problems</p> <p>(What we need to know to address the problem?)</p>

Mystery of The 15 Million Lottery Ticket: Scene 2

Richard shouted in excitement, “Reg, would you believe, finally, after all the years!”

“I do not believe it, Can you get it open any further?” Reg exclaimed. “Could it be? Why haven’t we been able to find such treasures years ago? I cannot figure out if these are genuine or not, why are these green and brown?”

Richard explained to Reg, “You know I have been reading a lot lately about how when the Roman Army, under the command of Julius Caesar invaded the British Islands, the people of our lands had to hide their prized possessions in any way they could to prevent them from being seized!

Reg questioned if they were genuine or not. Richard was not sure of the next step. Should they contact the authorities? Should they contact the local conservator they know? Perhaps they should ship them to Reg’s daughter, who was attending graduate school at a university in Atlanta. “Richard explained, “Yes, maybe your daughter could give them to her professor, a conservator at The Carlos Museum!”

They were not sure of their next step, but felt positive that they had their find of a lifetime and needed a conservator to help them!

Box Chart for Scene 2

<p>Facts /Big Ideas of the Case</p> <p>(What we know from the scene?)</p>	<p>Questions</p> <p>(What we want to ask characters in the scene to gather more info?)</p>
<p>Hypothesis (What we think is going on, what will happen?)</p>	<p>Problems</p> <p>(What we need to know to address the problem?)</p>

Activity after the Case and Box charts

Resource for Case/Student will view and read aloud with teacher

Fox News. Retrieved from:

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Metal Detecting

http://www.bbc.co.uk/history/ancient/archaeology/metal_detect_01.shtml

<http://usnews.nbcnews.com/news/2012/03/23/10827391-civil-war-relic-thief-engaged-in-heartbreaking-destruction>

<http://finds.org.uk/documents/advice.pdf>

Select British History

http://www.bbc.co.uk/history/ancient/romans/late_01.shtml

<http://faculty.history.wisc.edu/sommerville/123/123%204%20roman.htm>

<http://www.historyworld.net/wrldhis/plaintexthistories.asp?historyid=ac71>

<http://www.pasthorizonspr.com/index.php/archives/02/2013/crisis-or-continuity-roman-coin-hoards-may-hold-the-answer>

<http://www.archaeology.co.uk/articles/news/hoards-and-hoarding.htm>

Self Evaluation Worksheet

Date: _____

Your Name: _____ Group #: _____

Instructions: Please circle the response with which you agree the most. This evaluation will only be read by your teacher and will not be shown to other students.

1. How would you rate *your* participation in group discussion and group work?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

2. How would you rate *your* effort in completing the lab?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

3. Did *you* complete all of the assigned lab work ? Yes No

If No, explain why:

4. How well did *you* work with everyone in your group?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

5. Overall, how would you rate *your* performance in this lab?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

6. What praise or criticism do you have for other group members? What are your thoughts about the case?

(Adapted from What Happened???)

Bethany L. Turner and Katherine Shamsid-Deen)

Peer Evaluation Worksheet

Date: _____

Your Name: _____ Group #: _____

Instructions: Please circle the response with which you agree the most. This evaluation will only be read by your teacher and will not be shown to other students.

1. How would you rate your partner's participation in group discussion and group work?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

2. How would you rate your partner's effort in completing the lab?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

3. Did your partner(s) complete all of the assigned lab work ? Yes No

If No, explain why:

4. How well did you partner(s) work with everyone in your group?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

5. Overall, how would you rate your partner's performance in this lab?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

6. Other Comments:

**(Adapted from What Happened???)
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Student Worksheet for Research on Modern and Ancient Coins

Directions: Research websites, articles, and/or books explaining the history of coins, both ancient and modern (include how U.S. /Ancient coins are made, place(s) where produced, materials from which they are made, interesting facts such as what are the rarest and why). Do the same for the types of copper corrosion products and how to care for copper alloy objects. You should have at least three sources for the history coins and at least two sources for corrosion products and care of copper.

1.Website Title:

URL:

Date Retrieved:

Information Retrieved:

2.Website Title:

URL:

Date Retrieved:

Information Retrieved

3.Website Title:

URL:

Date Retrieved:

Information Retrieved

4.Website Title:

URL:

Date Retrieved:

Information Retrieved

5. Author Name and date of article:

Article Title:

Journal Name and Volume:

Pages of article:

Information Retrieved

6. Author Name and date of article:

Article Title:

Journal Name and Volume:

Pages of article:

Information Retrieved

7. Author Name and Date of Book:

Book Title:

Publisher and Place of Publication:

Information Retrieved

Resources

The following are only an example of some resources you may use. You **MUST** find additional sources.

US Mint

<http://www.usmint.gov>

British Coinage

<https://www.royal.gov.uk/MonarchUK/Symbols/Coinageandbanknotes.aspx>

<http://www.wnccoins.com/0024.htm>

<http://www.bsswebsite.me.uk/A%20Short%20History%20of/coins.html>

<http://collections.museumoflondon.org.uk/Online/group.aspx?g=group-19938>

<http://www.romancoins.info>

Care of Copper

<https://www.thehenryford.org/research/caring/brass.aspx>

<http://www.cci-icc.gc.ca/publications/notes/9-4-eng.aspx>

Rubric for Modern and Ancient Coin Brochure/Summative(Final Assessment)

Category	Excelling (20 points)	Above Meeting(18 points)	Meeting (15 points)	Does Not Meet Standard (10 points)
Attractiveness/ Organization	The brochure has exceptionally attractive formatting and well-organized information.	The brochure has attractive formatting and well-organized information.	The brochure has well-organized information	The brochure's formatting and organization of material are confusing to the reader.
Content	The brochure has all of the required information from student worksheet on both types of coins and some additional information	The brochure has all of the required information on both types of coins from the student worksheet	The brochure has most of the required information from the worksheet but may be missing information from one type of coin	The brochure has little of the required information from the student worksheet
Writing - Mechanics (Conventions)	All of the writing is done in complete sentences. Capitalization and punctuation are correct throughout the brochure.	Most of the writing is done in complete sentences. Most of the capitalization and punctuation are correct throughout the brochure.	Some of the writing is done in complete sentences. Some of the capitalization and punctuation are correct throughout the brochure	Most of the writing is not done in complete sentences. Most of the capitalization and punctuation are not correct throughout the brochure.
Graphics/Pictures	There is a good mix of text and graphics.	The graphics go well with the text, but there are so many that they distract from the text.	The graphics go well with the text, but there are too few.	The graphics do not go with the accompanying text or appear to be randomly chosen.
Sources	At least 3 or more websites are used and cited correctly	2-3 websites are cited but some citing is inaccurate/not in correct format	1-2 websites are cited but some citing is inaccurate/not in correct format	Only 1 source is cited