

Discovering the Story: A City and Its Culture

Solving a Problem to Tell the Story

A Mathematics Lesson for
Grades K-3

Based on *The Underground Railroad, 1893*
by Charles T. Webber



Charles T. Webber (1825-1911)
United States (Cincinnati)
The Underground Railroad, 1893
Subscription Fund Purchase, 1927.26

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CONCEPT STATEMENT

Fleeing enslaved persons from southern and other states throughout the United States in the 1800s traveled miles, faced hardships and risked dangers in hopes of reaching destinations for personal freedom. Recreated mini-scenarios provide a unit of study for students to examine mathematical problem-solving possibly faced by Underground Railroad participants – enslaved persons, abolitionists, “conductors” and slave owners. Observations and study of the C.T. Webber painting *The Underground Railroad* will aid teacher and students in their understanding of this historical undertaking. A picture of the painting can be found on the *Discovering the Story* website at http://www.discoveringthestory.org/ugrr/ugrr_full.jpg. (*The teacher will reinforce the fact that hearsay, oral traditions and transcribed stories are sources for many statistics and information about the Underground Railroad, as many slaves did not know how to write or read, and therefore did not keep specific logs or journals of all their experiences.*)

OBJECTIVES

- Students will understand the concept of the Underground Railroad and its impact on personal freedoms.
- Students will draw conclusions about the hardships of freedom seekers through observations of the C.T. Webber painting *The Underground Railroad*, an image of which can be found on the *Discovering the Story* website at http://www.discoveringthestory.org/ugrr/ugrr_full.jpg.
- Students will identify and use relevant information found in visual art forms to confirm their conceptual understanding of the Underground Railroad.
- Students will employ mathematical processing skills for calculation of various word problems and visual representations based on Underground Railroad scenarios.

TEACHER PREPARATION

CLASS PERIODS REQUIRED

- 1 to 2 class periods (20-30 mins.) for Pre-Videoconference Lesson Activities
- 1 (45-50 min.) class period for the Videoconference
- 1 to 2 class periods (30-50 mins.) for Post-Videoconference Lesson Activities
- 1 to 2 (30-50 min.) periods for Art Enrichment Activity (optional)

BACKGROUND INFORMATION

Refer to Background Information for more on the painting *The Underground Railroad* and the artist who created it. The background information is on the *Discovering the Story* website at <http://www.discoveringthestory.org/ugrr/background.asp>. This information also provides an historical background for the Underground Railroad and Cincinnati's involvement in this movement. This resource has been written for teachers to review before the lesson and then share with students.

VIDEO

Share the video that accompanies this lesson with your students prior to the videoconference. The video, which can be found on the *Discovering the Story* website at <http://www.discoveringthestory.org/ugrr/video.asp>, depicts the installation of an exhibit at the Cincinnati Art Museum that was inspired in part by C.T. Webber's *The Underground Railroad* and the overarching concepts of courage and freedom.

Video Duration: approx. 6 minutes.

PRE – VIDEOCONFERENCE LESSON ACTIVITIES

VOCABULARY

Definitions can be found in the Glossary on the *Discovering the Story* website at <http://www.discoveringthestory.org/ugrr/glossary.asp>.

Abolitionist
Conductor
Escape
Freedom
Freedom seekers
Safe-house
Slave owners
Underground Railroad

GUIDING QUESTIONS

- What is freedom?
- What is a slave?
- What can we learn from the Underground Railroad?

MATERIALS

- Print reproduction of *The Underground Railroad* – class set downloaded and printed from the *Discovering the Story* website at <http://www.discoveringthestory.org/ugrr/glossary.asp>

PROCEDURE

Teacher will:

- Facilitate class discussion to examine the questions, “What is freedom?” “What is slavery?”
- Introduce the concept of enslaved persons in the United States, and the Underground Railroad.
 - Emphasize:
 - That beginning in the 1600s or “a very long time ago,” people from the continent of Africa were brought to the Americas against their will and sold as slaves to be the property of and owned by others.
 - Enslaved persons yearned for freedom. They were willing to risk many dangers, even losing their lives, to live as free men and women.
 - Abolitionists were white people and free black people who believed that all enslaved persons should live as free human beings.
 - Many abolitionists and others helped enslaved persons to freedom through a secret system known as the Underground Railroad.
 - Underground Railroad participants and elements--conductors, safe houses, etc.
- Introduce a reproduction of the C.T. Webber painting *The Underground Railroad*.
 - Emphasize:
 - That the painting is one of many artist interpretations of the Underground Railroad.
 - (2nd and 3rd grades) Introduction of identifiable characters--Levi Coffin, Catharine Coffin, Hannah Haydock and Thomas Haydock, and discuss their roles in the Underground Railroad.
- Introduce facts about the painting and the artist.
- Instruct students to describe what they can observe in the painting.
 - Possible question prompts:
 - How many people are in this painting?
 - How many are adults?

- How many are children?
- What is the season of the year? What evidence helps one to know?
- What is the time of day? What evidence helps one to know?
- What are the people doing in this painting? Why?
- Facilitate classroom discussion to link observations from the painting to the previously discussed concepts of freedom, slavery and the Underground Railroad.
- Tell the students that they will learn more about this painting in a videoconference with the Cincinnati Art Museum.
 - Teacher will need to explain and describe the function and process of videoconferencing.
 - Teacher will collect student questions to ask museum staff during the videoconference.
 - Teacher will email questions to Museum staff prior to the videoconference.

VIDEOCONFERENCE

OBJECTIVES

- Students will interact with the Cincinnati Art Museum staff through a sixty-minute [videoconference](#).
- Students will learn about Cincinnati's contribution to the Underground Railroad.
- Students will use Museum objects to reinforce activities completed in preparation for this [videoconference](#).

CONCEPT

A [videoconference](#) conducted by the Cincinnati Art Museum staff extends student learning through emphasis on the viewing and discussion of art objects. During this [videoconference](#) with the Museum, students will explore Cincinnati's place in the story of the Underground Railroad movement and major tristate figures, such as Levi and Catharine Coffin, John Parker and John Rankin.

SCHEDULE

- **5 minutes** Introduction to CAM staff (*This is also buffer time in case of connection complications*)
- **10 minutes** Brief discussion of student pre-videoconferencing activities.
- **10 minutes** Museum staff will lead students in an in-depth investigation of C.T. Webber's painting *The Underground Railroad*

- **15 minutes** Museum staff will lead an interactive discussion with students on Cincinnati's place in the story of the Underground Railroad movement.
- **10 minutes** Questions and student sharing of art projects.
- **5 minutes** Closing (*This is also buffer time in case of connection complications*)

POST- VIDEOCONFERENCE LESSON ACTIVITIES

MATERIALS

- Reproduction of [*The Underground Railroad*](#) – class set downloaded and printed from the [*Discovering the Story*](#) website
- Counting manipulatives for younger students if necessary
- Word problem scenarios
- Pencil
- Paper

PROCEDURE

Students will:

- Problem-solve and calculate answers to word problem scenarios based on the concept of the Underground Railroad and the C.T. Webber painting.
- Understand how a visual art object, as either a primary or secondary source, contains useful and relevant information to help one's understanding of an event, person, place or topic.

Setting the stage:

We do not know who the enslaved persons are in this painting. We will imagine a story.

1. Add up the number of people appearing in this painting. How many people are in this painting?
2. Do you think all the persons in the painting that appear to have been enslaved hid under the wagon hay to get to this safe house? Why, or why not?

3. Look at the boy helping another carry packages toward the house. We will call him Thomas. Thomas is to get one egg for each child to eat. How many eggs in all will be needed for the children?
 - Each of the adults will need two eggs. How many eggs will be needed for the adults?
 - How many eggs in total will Thomas need to gather for the all of the enslaved persons?
4. After everyone has eaten their eggs, Thomas and his two new friends asked if they could visit the horses. There are two horses to pull the wagon. Thomas will need two apples for each horse. How many apples are needed?
5. All the enslaved persons were very tired, having traveled through the night. (They sleep during the day and travel at night. Why?) Five of those persons will sleep in the barn in the hayloft. The remainder will sleep in the cellar (or basement) of the house. How many will sleep in the cellar?
6. Mrs. Coffin, lady of the house, brought out eight blankets. How many enslaved persons will have to share a blanket?
7. Mrs. Coffin and Mrs. Haydock began baking to provide their new friends with food for the continued journey. Each of the two women will bake six loaves of bread. If they both bake six loaves of bread, what will be the total number of loaves of bread?
8. The enslaved women woke early and asked Mrs. Coffin if they could help her with the housework. All of them knew how to quilt very well. One woman sewed four quilt patches, another woman sewed six quilt patches, and another woman sewed five quilt patches. How many total quilt patches did they sew?
9. Levi Coffin, owner of the house and an abolitionist, asked if the African/African-American men would like to make benches for the new church. The church would pay each man two dollars. How many dollars would all the African/African-American men earn together?
10. Thomas asked his mother if he could give the enslaved persons the money that he had saved. He had two pennies, one nickel and one quarter. How much money had he have saved?
11. The African/African-American men received pay for their work from the Coffins. The men wanted to buy the little boy different shoes because his shoes were too small. Mrs. Haydock found a pair that cost \$. 85. She gave the clerk a \$1.00. How much change did she receive?
12. The man who owned the escaped enslaved persons was very angry. He said they cost more than \$300.00 each. The abolitionists said no person should be sold to another person. If the Coffins bought the enslaved persons from the slave owner and then set them free, how much money would the Coffins need to have?

13. If the escaped persons arrived at the Coffin's safe house at 5:00 a.m. and stayed there until 8:00 p.m. on the same day, how many total hours did they remain at the safe house?
14. If there were 2 inches of snow on the ground when the slaves arrived and it snowed 3 more inches before they left the next night, how many inches of snow would be on the ground for the next night's journey?
15. If Levi Coffin helped 15 slaves escape on this night and 8 slaves the night before, how many slaves did he help in those two days?

MATH EXTENSION

- Students will organize obtained data from above problem scenarios into visual charts, picture graphs and bar graphs.

ASSESSMENT OBJECTIVES

- Students will be able to verbalize a personal conceptual interpretation of the Underground Railroad.
- Students will be able to problem-solve mathematical scenarios based on hardships and undertakings of Underground Railroad participants.
- Students will identify the hardships and undertakings of the Underground Railroad participants embedded in the math scenarios and understand how these impacted personal freedoms.

SUGGESTED TEACHER RESOURCES

Books

Hudson, J. Blaine. *Fugitive Slaves and the Underground Railroad in the Kentucky Borderland*. Jefferson, NC: McFarland & Company, Inc., 2002.

Websites

[About.com](#) on African-American History

[The Fugitive Slave Act](#)

[Safe Passages](#)

[National Underground Railroad Freedom Center](#)

[National Geographic's Underground Railroad website](#)

[Library of Congress/American Memory Collection](#)

ACADEMIC CONTENT STANDARDS

NATIONAL STANDARDS: MATHEMATICS

Standard 3: Uses basic and advanced procedures while performing the processes of computation.

Grades: K-2

Benchmark 1: Adds and subtracts whole numbers.

Benchmark 2: Solves real-world problems involving addition and subtraction of whole numbers.

Grades: 3-5

Benchmark 1: Multiplies and divides whole numbers.

Benchmark 8: Solves real-world problems involving number operations (e.g., computations with dollars and cents).

Visual Art:

Standard 4: Understands the visual arts in relation to history and cultures.

Grades: K-4

Benchmark 1: Knows that the visual arts have both a history and a specific relationship to various cultures.

Benchmark 2: Identifies specific works of art as belonging to particular cultures, times and places.

Benchmark 3: Knows how history, culture and the visual arts can influence each other.

OHIO STANDARDS: MATHEMATICS

Number, Number Sense and Operations

Students demonstrate number sense, including an understanding of number systems and operations and how they relate to one another. Students compute fluently and make reasonable estimates using paper and pencil, technology-supported and mental methods.

Grades K-2

Benchmark K: Demonstrates fluency in addition facts with addends through 9 and corresponding subtractions.

Grade 3

Benchmark J : Estimates the results of whole number computations using a variety of strategies, and judges the reasonableness.

Benchmark K: Analyzes and solves multi-step problems involving addition, subtraction, multiplication and division of whole numbers.

Benchmark L: Uses a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.

Mathematical Processes

Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques, and communicate mathematical ideas.

Grades K-2

Benchmark A: Uses a variety of strategies to understand problem situations; e.g., discussing with peers, stating problems in own words, modeling problems with diagrams or physical materials, identifying a pattern.

Grade 3

Benchmark D: Uses mathematical strategies to solve problems that relate to other curriculum areas and the real world; e.g., uses a time line to sequence events; uses symmetry in artwork.

Benchmark K: Uses mathematical language to explain and justify mathematical ideas, strategies and solutions.

Visual Arts:

Historical, Cultural and Social Contexts

Students understand the impact of visual art on the history, culture and society from which it emanates. They understand the cultural, social and political forces that, in turn, shape visual art communication and expression. Students identify the significant contributions of visual arts to cultural heritage. They analyze the historical, cultural, social and political contexts that influence the function and role of visual art in the lives of people.

Grades: K-4

Benchmark B: Identifies art forms, visual ideas and images and describes how they are influenced by time and culture.

Benchmark C: Identifies and describes the different purposes people have for creating works of art.

Creative Expression and Communication

Students create artworks that demonstrate understanding of materials, processes, tools, media, techniques and available technology. They understand how to use art elements, principles and images to communicate their ideas in a variety of visual forms.

Grades: K-4

Benchmark A: Demonstrates knowledge of visual art materials, tools, techniques and processes by using them expressively and skillfully.

Connections, Relationships and Applications

Students connect and apply their learning of visual art to the study of other arts areas and disciplines outside the arts. They understand relationships between and among concepts and ideas that are common across subjects in the curriculum. Students recognize the importance of lifelong learning and experience in visual art.

Grades: K-4

Benchmark A: Demonstrates the relationship the visual arts share with other arts disciplines as meaningful forms of nonverbal communication.

Benchmark B: Uses the visual arts as a means to understand concepts and topics studied in disciplines outside the arts.