

Holistic Education

A.1 Literature Project

Alice's Adventures in Wonderland

Getting Started

Levens Carroll was a mathematician who also wrote famous books for children.

Essential Question: How does mathematical problem solving influence a story plot?

Read: *Alice's Adventures in Wonderland* by Lewis Carroll. In each chapter, create one of the episodes so that it contains more of the math that you have studied this year.

Sample: You could rewrite Alice's shrinking adventure as follows:
Alice's normal height was 37" or 93 centimeters. After drinking the bottle marked "Drink Me," Alice could fit her hand through doors and more doors several meters. Alice was only two-thirds of her original height. Would Alice have to bend over to walk through a door that is only 1 foot high?

Things to Remember

- You can download each chapter of the book at www.digitalebooks.com.
- Add your own illustrations to your pages.
- Try to include as many different math concepts as possible. Your goal is to use at least one concept from each of the

A.4 Science Project

Why Does Ice Float?

Getting Started

During the winter in our solar system, Earth is clearly the "water planet." Water occurs on Earth's surface as a liquid, solid, and gas. Ocean waters cover about 70% of Earth's surface. Fresh water lakes and rivers cover less than 1%. Think about it: we permanently cover Earth's polar regions, and we have a higher percentage of water in the atmosphere than about half of Earth's surface as a liquid.

Essential Question: How does the density of water affect the water cycle?

There are three parts to the water cycle: evaporation, condensation, and precipitation. How does the density of water affect the water cycle? How does the difference between these two types of objects affect the water cycle?

Second, you have to discover what is special about water. Almost all other elements and compounds have the property that their solid forms sink in their liquid forms.

Think: you have to research how water is solid. How does the environment and living organisms. You may want to explore ocean currents, weather, and weather cycles including the water cycle.

Things to Include

- Draw a diagram showing all the parts of the water cycle in a natural glass window.
- Without changing the radius, draw a circle that is wider than the one you drew.
- Without changing the radius, draw a circle that is narrower than the one you drew.
- Without changing the radius, draw a circle that is the same width as the one you drew.
- Color the design to make a picture.

A.3 Art Project

Circle Art

Getting Started

Circles have been used in art for thousands of years.

Essential Question: How have circles influenced our art and students' art?

Find examples of art in which circles were used. Describe how the artist might have used properties of circles to make each piece of art.

Sample: Here is a technique for making a picture that uses circles in a natural glass window.

- Draw a circle to draw a circle.
- Without changing the radius, draw a second circle whose center lies on the first circle.
- Without changing the radius, draw a third circle whose center is one of the points of intersection.
- Without changing the radius, continue to draw more circles at the points of intersection.
- Color the design to make a picture.

Things to Include

- Describe how ancient artists drew circles.
- Describe the symbolism of circles in ancient art.
- Find examples of how circles are used to create modern art projects.
- Measure the angles that are formed by the patterns in the circle art you find. For instance, you might describe the angles formed by the setting in the Great Pyramids of Giza.

Things to Remember

- Add your own illustrations to your project.
- Try to include as many different math concepts as possible. Your goal is to include at least one concept from each of the chapters you studied this year.
- Organize your report in a binder, and think of a title for your report.

A.2 History Project

Mathematics in Ancient Egypt

Getting Started

The ancient Egyptian civilization in North Africa prospered 3300 B.C. with the union of Upper and Lower Egypt under the first pharaoh. The role of the pharaoh included to be a god, when the pharaoh was young and to be a priest.

The ancient Egyptians' achievements included a system of mathematics, a system of writing, a system of medicine, a system of astronomy, and a system of art. Their mastery of surveying, quarrying, and building led to the construction of the pyramids, temples, and other structures.

Essential Question: How is mathematical knowledge used in ancient Egypt?

Sample: In multiply your whole number, the ancient Egyptians multiplied by 10. The "multiplying" was done by doubling by 10. The last step when the last number in the list has to be greater than the last number in the second list.

1	10
2	20
4	40
8	80
16	160
32	320
64	640

Because $10 \times 1 = 10$, $10 \times 4 = 40$, $10 \times 32 = 320$, $10 \times 242 = 2420$, $10 \times 2002 = 20020$.

Things to Include

- Explain how the ancient Egyptians multiplied two whole numbers. Give an example.
- Explain how the ancient Egyptians divided two whole numbers. Give an example.
- How did the ancient Egyptians write whole numbers? Give some examples.
- Describe how ancient Egyptians used mathematics. How does this compare with the ways in which mathematics is used today?

Things to Remember

- Add your own illustrations to your project.
- Try to include as many different math concepts as possible. Your goal is to include at least one concept from each of the chapters you studied this year.
- Organize your report in a binder, and think of a title for your report.

Appendix A includes four "Big Idea" projects.

At many times in the history of our planet, being an "educated person" had a broader meaning than it has today. To help bring a more holistic approach to education at the middle school level, we have introduced three major features.

- Many of the activities, examples, and exercises describe real-life, exciting applications of the mathematics.
- The Teaching Editions frequently include additional information, fun facts, and data about the examples and exercises.
- Appendix A includes four major projects that relate mathematics to Literature, Art, History, and Science.

BigIdeasLearning.com