

**Curriculum Unit Title**

Encouraging Student Creativity and Leonardo da Vinci: Dreaming Up Inventions

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**KEY LEARNING, ENDURING UNDERSTANDING, ETC.**

In this unit students will learn about the impact of ancient inventions like the arch upon newer inventions and the role of tools and technology throughout history. They will also examine ideas for inventions created by Leonardo da Vinci within the context of the Renaissance. The students will use their creativity to plan and draw designs for their own inventions. Upon the completion of the unit, these plans will be displayed along with students' explanations of their designs in an art exhibit. This unit integrates science, technology, engineering, math and art, adding the A for the Arts into STEM, making it a STEAM-driven unit.

**ESSENTIAL QUESTION(S) for the UNIT**

Are we smarter than the ancients? Does technology include more than just computers and cell phones? What does the study of ancient inventions have to do with me? How does previous knowledge affect inventions? What need will my invention fulfill? Will my invention make the world a better place? Will color enhance my drawing? What are some of the most important inventions in the world? What are some of the most important inventions in the art world? The last question can be tailored for a particular class. For example, the words "art world" could be replaced with "ceramics," "painting," or "drawing," or whatever would pertain to your specific discipline.

**CONCEPT A**

Creativity concept: Students are encouraged to look beyond the intended purpose of an object (functional fixedness) to find alternative uses for that object.

**CONCEPT B**

Using the steps in the creative process that include problem solving, sketching ideas, constructing prototypes, testing, evaluating, refining, and implementing, students will make a chair out of a single piece of paper.

**CONCEPT C**

Anyone can invent something. Many inventions are created to fill a need. Some inventions are created "accidentally" (penicillin, Post-it Notes, the Slinky, Wheaties, ...)

**ESSENTIAL QUESTIONS A**

What are some strategies that I can use to find alternate uses for an object? If the Titanic passengers had visualized the iceberg as a giant flotation device and not just an object to sink ships, could more of them been saved?

**ESSENTIAL QUESTIONS B**

How many different types of chairs are there? How do I make a chair out of a single piece of paper? How can I attach the chair parts without using tape, staples, string or anything besides the paper?

**ESSENTIAL QUESTIONS C**

Why do people invent things? What need will my invention fulfill? Will my invention make the world a better place? Will color enhance my drawing? What are some of the most important inventions in the world?

**VOCABULARY A**

Functional fixedness, fixed mindset, open mindset, flexibility

**VOCABULARY A**

STEM, STEAM, prototype, bone folder, tab and slot, triangle, T-square

**VOCABULARY A**

Invention, innovation, imagination, patent, Antikythera

**ADDITIONAL INFORMATION/MATERIAL/TEXT/FILM/RESOURCES**

Included in this unit are some great sites for videos that range from ancient medical inventions, the use of jaws of live army ants to suture wounds, the search for longitude, ancient inventions, architectural wonders, the invention of a device to remove an arrow from the face of a future king, and others. The students will take a field trip to the rare book collection at the University of Delaware to view some selections that include the limited edition life-size reproductions of Leonardo da Vinci's notebooks.