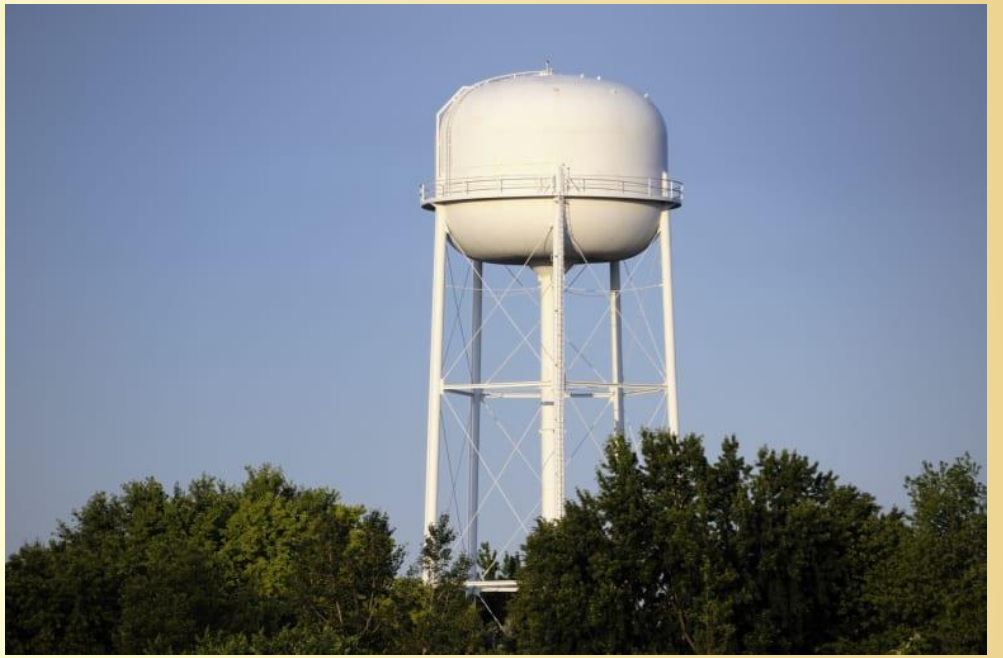
Water Tower Design

1. Question & Research Task

Water covers over 70% of the Earth's surface. It is the largest natural resource but only 3% of it is fresh water, which can be used with agriculture and cities. Water is essential to life for people, animals, and plants. Think about some of the ways you use water in your daily life.

The demand for water constantly increases. In the 1800's engineers created water towers to provide water for potable use or fire protection. Today, water towers are large container for storing water. They serve as a reservoir to supply water to places where the water pressure would be inadequate for distribution at a consistent pressure.

You will be asked to design a water tower for use at an amusement park. What are some designs that you could use? What are factors that might affect the structural integrity of your tower?



Your teacher will select the picture above to show a video about water towers.

Image Source: World Book Student © Thinkstock

In this Slam Dunk, you will conduct brief, focused research to respond to the inquiry question:

How do forces impact the design of water towers?

2. Information Sources

Choose several of the information sources linked here to complete the Student Activity on Slide 3.

The following resources will give you insight on the design water towers and their functions.

Building a Water Tower

How Water Towers Work

The Shape of Water Towers: An Engineering History

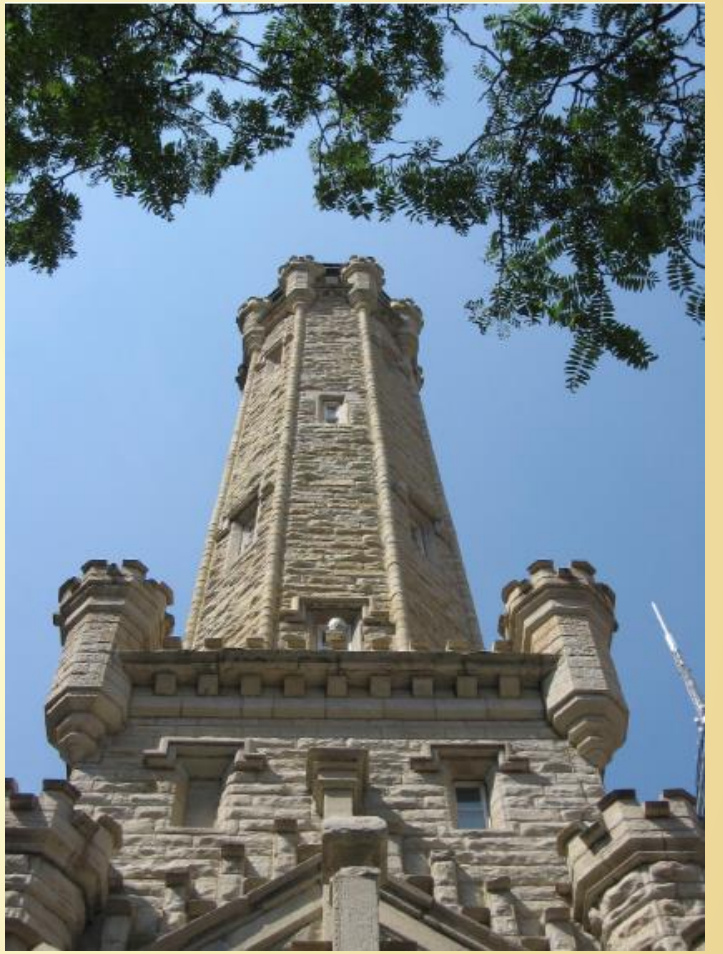
Wondering about Water Towers

Types of Water Tanks

Water Towers and Community Identity

Water Supply

Review the forces that work against construction of structures.



The historic water tower in Chicago, IL, built in 1869 and now a museum.

Image Source: Nancy Barber, USGS. Public domain

3. Student Activity

Use the information sources on Slide 2 to …

You will use the online resources on Slide 2 to gather information about the types of Water Towers, their functions and possible design problems and solutions.

Use this graphic organizer to record your findings.

Blue painted water tower.

Image Source: Discovery Education

4. Assessment Activity

How do forces impact the design of water towers?

- Using the information from your research to explain what considerations should be made when designing and engineering the construction of a water tower for an amusement park. What are some designs that you could use? What are factors that might affect the structural integrity of your tower? Be sure to consider the functionality and types of water towers, as well as problems and solutions associated with them.

- You may write your explanation under your notes on the graphic organizer you used in Slide 3.

Peach shaped water tower

Image Source: John Margolies, Library of Congress

5. Enrichment Activities

Sacramento water tower.

Image Source: Mark Wasneski, Flickr Public Domain

Using your completed graphic organizer from Slide 3, develop an alternate solution to the problems. Write an editorial for your local newspaper recommending renovations for your local water tower.

Complete this concept map or create your own using Google Docs or Google Slides to explain water towers to a student in another class.

Games

Desalination - There is a water shortage in many areas of the world. Desalination is the process of removing salt from seawater Can you design and build a new thermal difference desalination plant?

Water Sense - Test your knowledge of water efficiency. Move the water-efficiency hero Flo through water pipes and answer water-efficiency questions while avoiding water-wasting monsters.

Note: Scroll down to find the game.

6. Teacher Resources

SLIDE NAVIGATION

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Learning Standards Alignment

Maryland Technology Education Standards

Engineering Design and Development (S3):

iii. Researching and Generating Ideas – students will be able to conduct research to assess prior solutions to the problem.
V. Exploring Possibilities – students will conduct research and explore possibilities for potential solutions.
ix. Testing and Evaluating Design Using Specifications – students will be able to use establish specifications to assess their design product.

Common Core State Standards for English Language Arts & Literacy

Reading: 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

Writing: 7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

AASL Standards Framework for Learners

Inquire: Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.

Think: Learners display curiosity and initiative by:

I.A.2 Recalling prior and background knowledge as context for new meaning.

Create: Learners engage with new knowledge by following a process that includes:

I.B.1 Using evidence to investigate questions. I.B.3 Generating products that illustrate learning.

Share: Learners adapt, communicate, and exchange learning products with others in a cycle that includes:

I.C.1 Interacting with content presented by others.

Grow: Learners participate in an ongoing inquiry-based process by:

I.D.2 Engaging in sustained inquiry.

Grade 7: Technology Education

Objective: Students will analyze information from multiple sources and use the engineering design process to construct an operable replica of a water tower.

Time Frame: 3-5 (45 minute) class periods

Differentiation strategies for this lesson:

- Access digital content from the Apps Portal. Refer to Digital Content Snapshots & Support resources for guidance as needed.

Notes to the teacher:

- Collaborate with your school library media specialist to plan and implement this lesson.
- The Archive.org video on Slide 1 must be projected by the teacher.
- Concept Map on Slide 5 is an editable PDF. Once students type in their response, they will need to select File> Print> Save to PDF> Rename your file with your name. Then upload the assignment as directed by the teacher.
- Consider using the Schoology Assignment Apps feature to assign Microsoft/Google Docs for students to access, edit, and submit through Schoology.

Last updated: July 2022. Use this form to Report Broken Links.