



STEM Virtual Learning- IMPACT

2nd & 3rd Grade

Structural Engineering

Lesson 4: Domes

April 27, 2020



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Learning Targets:

Students will...

- Understand force & constraints on building structures
- Understand challenges of engineers and the Engineering Design Process

Background: This is a review lesson from 2nd Grade Civil Engineering

- Students learn the impact of force on designs
- Students learn about domes
- Students learn to overcome challenges

Let's Get Started:

Watch & Read-

1. [The World's Largest Domes](#)
2. [Dome Basics](#)



Bonus- Where have you seen this dome?
What is it called?

Monday-

Practices:
Complete the 3 challenges.



Location One:
Baseball Stadium



Location Two:
Greenhouse



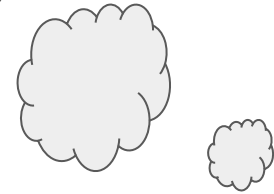
Location Three:
Capitol Building

Remember, a *tension ring* is a type of support that resists outward forces pushing against the lower part of a dome.

Monday-



Think
About It!

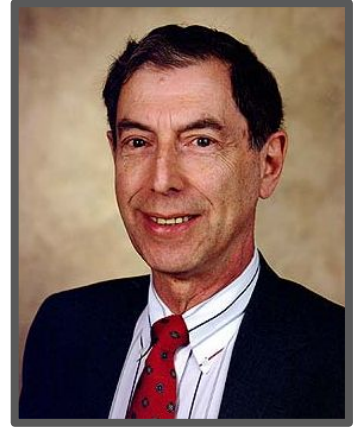


Can you list at least *three* things you learned from the practices?

Tuesday-

Practice on your own:
Let's meet structural engineer
[Matthys Levy](#)

Levy designed the Georgia Dome. Click this [link](#) to answer questions about the dome. Record answers on a sheet of paper.



1. What year was the dome completed?
2. What materials is it made of?
3. How large is the dome (square feet)?
4. A *tensegrity* roof is constructed of what shape?
5. How many stories tall is the dome?



Tuesday-

MORE Practice on your own:

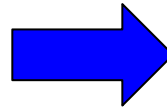


Watch the video-
[Missouri Capitol Dome Virtual Tour](#)

Use the internet to search for more domes in Missouri. Find 3 domes and answer the following questions for each. Record information on the same sheet of paper as your Georgia Dome answers.

1. In what city is the dome located?
2. What is the dome's purpose?
3. What is it made of?

Use this
format for
your answers



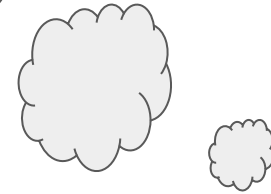
NAME OF DOME

- 1.
- 2.
- 3.

Tuesday-



Think
About It!

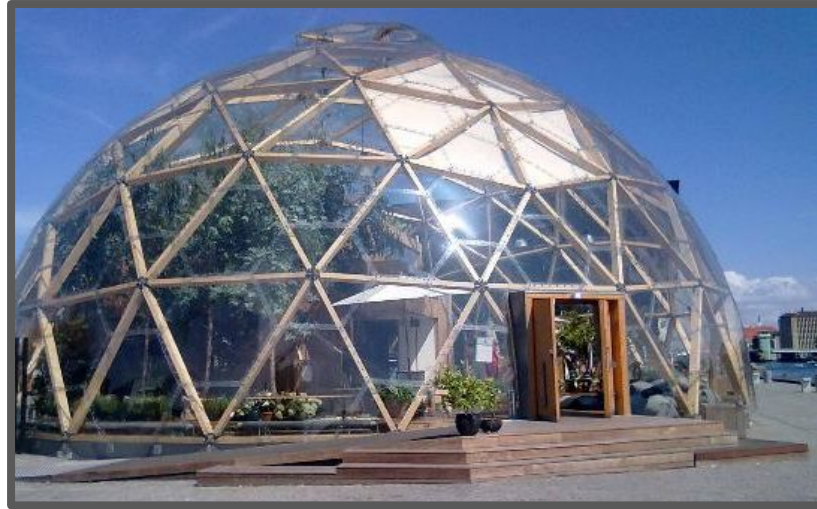


What are some of the uses for domes?

Wednesday-

Introduction to Geodesic Domes

Click the [link](#) to read about Geodesic Domes and then watch this [video](#).



Wednesday-



Think
About It!

Why do you think engineers use the *triangle* when building big structures?

Wednesday-

Prompt:

For your next assignment your contractor has sent you back home to Kansas City, MO. You have been asked to design a geodesic dome to cover the Arrowhead Stadium! Since the Chiefs won the Super Bowl, it has been decided that they will need better conditions to play football in the cold winter months. A geodesic dome would offer players protection from the cold and snow. You will need to do some research on the stadium and create a prototype before being considered for the job.



For inspiration watch this video-
[Chiefs Kingdom](#)

Wednesday-

Research:

Use this [report](#) to answer the following question about the Arrowhead Stadium. Record answers on a sheet of paper.

1. What is the stadium's address?
2. What is its architectural style?
3. What is its height?
 - a. Width?
 - b. Length?
4. What year was it constructed?
5. When was the last renovation?



Thursday-

Project:

Arrowhead Stadium Geodesic Dome

Create a prototype dome that could be used to cover the Arrowhead Stadium.

Materials:

- Straws, or other building material
- Tape
- Scissors
- Pencil
- Ruler or measuring tape
- Paper to record results (may use same paper used for research)



Thursday-

Procedure:

1. Use the straws or another building material that can be linked together to make a geodesic dome.
 - Remember, geodesic domes are made of triangles.
2. You may cut materials as needed.
3. When completed take measurements
 - What is your dome's *height* and *width*?
4. **Extension-** can you use some type of fabric or other material to cover the dome?



Thursday-

Self Check:



IMPACT students, make a report in Seesaw to share what you have learned.

In your report did you...

- Share the information about the three domes you found in Missouri.
- Explain why the triangle is the best shape for building big structures.
- Share your research on Arrowhead Stadium.
- Share your geodesic dome prototype and how you made it.



IGLOOS

There are different kinds of homes that are domes. An igloo is one. Let's learn a few [facts about igloos](#) and have some fun making a miniature one!



Task: *Ask permission* to use ice cubes to build a mini igloo. Can you get it to stay up?

IMPACT students, if you want to share, take a picture of your igloo to post on Seesaw.

Friday Funday-

MATH GAME OF THE WEEK!

The Dome Challenge

Rules:

- Two people play.
- Using blocks or Legos each person builds a dome.
- When finished take apart your dome keeping your blocks in one pile.
- Count the blocks you each used.
- The person who was able to build a dome with the *least* amount of blocks, wins!