

Gr. 3 - Understanding Structures & Mechanisms

Strong and Stable Structures

A Strong Wall

Specific Expectations:

- 1.1 Assess effects of strong and stable structures on society and the environment.
- 2.1 Follow established safety procedures during science and technology investigations.
- 2.2 Investigate, through experimentation, how various materials and construction techniques can be used to add strength to structures.
- 2.3 Investigate, through experimentation, the effects of pushing, pulling, and other forces on the shape and stability of simple structures.
- 2.4 Use technological problem-solving skills, and knowledge acquired from previous investigations, to design and build a stable structure that serves a purpose.
- 3.3 Identify the strength of a structure as its ability to support a load.
- 3.4 Identify the stability of a structure as its ability to maintain balance and stay fixed in one spot.
- 3.7 Describe ways to improve a structure's strength and stability.
- 3.8 Explain how strength and stability enable a structure to perform a specific function.

Big Idea (for lesson):

Students investigate what makes a strong and sturdy wall, and test their wall in various conditions that are intended to replicate environmental and man-made forces.

Accommodations:

- Increase time
- Visual Aids
- Manipulatives
- Chunking
- Step-by-Step
- Scaffolding
- Copy of Notes
- Student Grouping

Differentiated Instruction:

- Content: Use demo to show the content as you offer verbal descriptions.
- Process: Have students work in pairs and support each other if physical impediments exist.
- Product: Students may show their final product in pairs, and communicate their findings either verbally, visually, or through written means.
- Other: _____

Bloom's Taxonomy:

- Knowledge
- Comprehension
- Application
- Analysis

Multiple Intelligence:

- Verbal/Linguistic
- Logical/Mathematical
- Visual/Spatial
- Bodily/Kinesthetic

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- Synthesis
- Evaluation

- Naturalist
- Musical/Rhythmic
- Interpersonal
- Intrapersonal

Delivering The Lesson:

Portion & Timing	Grouping:			Introduction:	Materials
Minds On: 5 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Teacher introduces the notion of strength and stability in structures:</p> <ul style="list-style-type: none"> -For stability, the teacher can have the class quickly compete against one another to see who can stand on one foot the longest. -For strength, the teacher can do a demo with sand and tissue paper, or show the analogous video using napkins and salt. <p>The steps of the in-class demo can be found here: http://www.stevespanglerscience.com/lab/experiments/strong-sand</p> <p>Ask students if they consider sand to be a stable or strong surface to build a structure on. Ask them if they could use what they saw in the demo to make a strong structure? (<i>Answer: compact the sand tightly to make "bricks", or whole walls</i>)</p>	<p>A Strong Wall – Magic Tube – Sick Science! #138</p> <p>Cardboard tube Sand Tissue Paper Rubber Bands Scissors Stick</p>
Action: 30 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	<p>Have students build and test their different walls according to the instructions on the handout.</p> <p>Have a water station (a big bin with small watering can) set up beforehand.</p> <p>Teacher can circulate and ask questions of the different groups:</p> <ul style="list-style-type: none"> -Do you think it matters that the bricks that touch lots of other bricks seem to make the strongest pattern? (<i>Answer: yes, the friction between these several different surfaces works against the wall moving.</i>) -What types of soil do you think your best wall would hold up well on? (<i>Answer: something compact, such as clay or loam, would hold up better than a looser soil, sand, or pebbles.</i>) 	<p>A Strong Wall Handout (Materials listed)</p> <p>Large tub of water Watering can</p>

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Consolidate: 5 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input type="checkbox"/>	<p>As they finish, have the students draw their wall pattern down on the record sheet and compare with one another. Discuss any discrepancies, and the strengths/weaknesses of the different designs.</p> <p>Discuss the environmental concerns that arise with the building of walls: what factors are important to consider when you're building? <i>(Answer: temperature, air flow, precipitation, foundation, soil types, etc.)</i></p>	Record Sheet
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