A Strong Wall

Specific Expectations:
2.1 Follow established safety procedures during science and technology investigations.
2.2 Investigate, through experimentation, the characteristics of air and its uses.
2.3 Investigate, through experimentation, the characteristics of water and its uses.
3.4 Identify sources of water in the natural and built environment.

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
- Synthesis
- Evaluation

Multiple Intelligence:
- Verbal/Linguistic
- Logical/Mathematical
- Visual/Spatial
- Bodily/Kinesthetic
- Naturalist
- Musical/Rhythmic
- Interpersonal
- Intrapersonal

Delivering The Lesson:

<table>
<thead>
<tr>
<th>Portion &amp; Timing</th>
<th>Grouping:</th>
<th>Introduction:</th>
<th>Materials</th>
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<tbody>
<tr>
<td>Minds On: 5 mins</td>
<td>W ☑ S ☐ I ☐</td>
<td>Teacher introduces the notion of strength and stability in structures: -For stability, the teacher can have the class quickly compete against one another to see</td>
<td>A Strong Wall – Magic Tube – Sick Science! #138</td>
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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. The steps of the in-class demo can be found here: [http://www.stevespanglerscience.com/lab/experiments/strong-sand](http://www.stevespanglerscience.com/lab/experiments/strong-sand)

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? (*Answer: compact the sand tightly to make “bricks”, or whole walls*)

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Have students build and test their different walls according to the instructions on the handout.

Have a water station (a big bin with small watering can) set up beforehand.

Teacher can circulate and ask questions of the different groups:

-Do you think it matters that the bricks that touch lots of other bricks seem to make the strongest pattern? (*Answer: yes, the friction between these several different surfaces works against the wall moving.*)

-What types of soil do you think your best wall would hold up well on? (*Answer: something compact, such as clay or loam, would hold up better than a looser soil, sand, or pebbles.*)

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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.

Discuss the environmental concerns that arise with the building of walls: what factors are important to consider when you’re building? (*Answer: temperature, air flow, precipitation, foundation, soil types, etc.*)

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Cardboard tube
Sand
Tissue Paper
Rubber Bands
Scissors
Stick

A Strong Wall Handout
(Materials listed)
Large tub of water
Watering can

Record Sheet