

**Grade 3 Science and Technology, Strong and Stable Structures:
A Digital Choice Board**

Adam Malloy
Primary/Junior Teacher Candidate
Wilfrid Laurier University
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Digital choice boards offer students differentiated learning opportunities on a given topic. They are dynamic pedagogical tools which have become increasingly popular in the evolving context of remote learning. The virtual classroom choice board provided here offers Grade 3 Science students a variety of learning activities, online and offline, which examine Strong and Stable Structures. I have curated, modified and/or created each activity to appeal to Gardner's varying multiple intelligences (for a description of this epistemic diversity and its relevance in the classroom, see Edutopia, 2013). The template I use is available from VideoZeus, at: <https://mediazeus.lpages.co/virtual-classroom/>.

Activity 1: Help Nanabush Build A Bridge (Adapted from Aboriginal Access to Engineering, 2021) Students will read a short story about Nanabush, as told by Anishinaabe storyteller Eileen Conroy, in which Nanabush has to figure out a way to cross a river by constructing a bridge using only a piece of birch bark. Students will be challenged to design and construct their own bridge, strong enough to carry the weight of some coins, using only a piece of paper.

Curriculum Connections: 2.3, 3.3, 3.6

Corresponding Multiple Intelligences: Logical-Mathematical (Students will experiment with building techniques, analyzing and solving the problems they encounter); Bodily-Kinesthetic (Students will work with specific materials to build structures).

Activity 2: Science Max: Experiments at Large (Inspired by TVO Kids, 2015).

In the episode "How You Build It," Phil tries to build a bridge out of dry pasta. Not just a table-top replica, but a bridge big enough and strong enough that he can actually cross it! Students will watch the episode (22 minutes, available at <https://youtu.be/DDP1X-JcSVI>), and reflect on a series of questions in their Science field notebook.

Curriculum Connections: 2.5, 3.7, 3.8.

Corresponding Multiple Intelligences: Visual-Spatial (Students will watch a video which explains how to make structures stronger); Linguistic-Verbal (Students will reflect on what they have learned, and articulate their understanding of key terms).

Activity 3: Observation Walk

There are structures all around us! Students will walk around their neighbourhood and/or in nature and observe different kinds of structures: those made by humans (houses, fences, playground equipment, bridges, etc.), by animals (bird's nest, ant hill, beaver dam, bee's nest, spider web, etc.), and those that occur naturally (trees, flowers, caves, etc.). They will record their observations in their Science field notebooks by responding to a series of questions about each structure.

Curriculum Connections: 3.2

Corresponding Multiple Intelligences: Naturalistic (Students will explore the outdoor environment, identifying and examining structures built by humans, by animals, and structures that occur or grow naturally).

Activity 4: Strong and Stable Dance Moves

Working individually, in pairs, or in small groups, students will create a dance using body positions and movements which demonstrate principles of strong and stable structures. They will reflect on their learning by responding to a series of questions in their Science field notebook.

Curriculum Connections: 3.3, 3.4, 3.7, 3.8

Corresponding Multiple Intelligences: Bodily-Kinesthetic (Students will express their understanding of scientific concepts through embodied dance); Musical (Students will think in patterns, rhythms, sounds and movements to create an artistic representation of scientific concepts); Interpersonal (Students may work collaboratively and creatively with others).

Activity 5: Marshmallow Structures (Adapted from Let's Talk Science, 2021)

Students will be challenged to build the tallest structure they can – which will hold weight! – using only 20 toothpicks and 10 marshmallows. Upon completion of this inquiry challenge, students will reflect on their learning by responding to a series of questions in their Science field notebook.

Curriculum Connections: 2.2, 2.3

Corresponding Multiple Intelligences: Logical-Mathematical (Students will experiment with building techniques, analyzing and solving the problems they encounter); Bodily-Kinesthetic (Students will work with specific materials to build structures).

Activity 6: Science Max Online Challenge (Adapted from TVO Kids, 2021)

Students will try the Bridge Works online challenge, provided by Science Max. Starting at Level 1, they will use the virtual pasta pieces provided to construct a bridge strong enough for various vehicles to cross. They will reflect on their learning experience by responding to a series of questions in their Science field notebooks.

Curriculum Connections: 1.1, 2.3, 3.5

Corresponding Multiple Intelligences: Visual-Spatial (Students will use their visual and spatial judgement to design and test bridges in an online simulation game); Logical-Mathematical (Students will use various shapes, angles and patterns to solve the problem of how to build a bridge strong enough to withstand various forces).

Activity 7: Meet a Famous Indigenous Architect (Inspired by Reconciliation Education, 2019)

Students will watch the documentary, Douglas Cardinal: Architect of the Future, and reflect on the ways in which Cardinal's personal identity and cultural values influence his craft as an architect. Students will then reflect on their own cultural identity and personal values, and imagine how they could incorporate such values into their own architectural design.

Curriculum Connection: 2.6

Corresponding Multiple Intelligences: Intrapersonal (Students will reflect on their own identity and values, and consider how these unique qualities can be integrated into architectural design, just like Douglas Cardinal does); Visual-Spatial (Students will envision architectural design that is unique to them, and that expresses their personal interests).

Activity 8: The Three Little Pigs, Alternate Ending (Inspired by Walt Disney, 1933)

Students will read the folktale, and reflect on what the pigs' experiences taught them about strong and stable structures. They will then imagine and re-write an alternative ending to the story which demonstrates what they have learned about a structure's strength and stability.

Curriculum Connections: 2.5, 3.3, 3.4, 3.5

Corresponding Multiple Intelligences: Linguistic-Verbal (Students will use their creative imaginations and their storytelling skills to alter the end of this folktale, integrating their knowledge of strong and stable structures).

Safety Considerations

Students are advised to engage in each of these activities with appropriate care to identify and avoid the harm which could be caused by potential hazards. These include:

- Handle all materials with care. The sharp edges of a piece of paper in Activity 1, and the sharp points of a wooden toothpick in Activity 5, could cause injury.
- Minimize the risk of injury while dancing by working in a safe environment, and limiting dance moves according to each student's physical ability.
- Follow general safety precautions while exploring natural and built environments outside. For example, Grade 3 students should be supervised at all times, should dress appropriately for the weather, and should follow behavioural norms while crossing the street, exploring structures, plants, habitats, etc.
- For activities which require learning in an online environment such as YouTube, general Internet safety precautions apply. For example, teachers/guardians may wish to activate YouTube's Safety Mode in order to prevent young students from accessing inappropriate content.

References

- Aboriginal Access to Engineering. (2021). Nanabush Builds a Bridge. In Grade 3 Strong and Stable Structures: Black Line Masters, pp. 1-2. Queen's University Faculty of Engineering and Applied Science. Available at:
<https://www.aboriginalaccess.ca/sites/aboriginalaccess.ca/files/SS.3.BLMFINAL.pdf>.
- Disney, W. (1933). The Three Little Pigs. Read aloud of this traditional folktale is available at:
<https://youtu.be/leAh00n3hno>.
- Edutopia. (2013, March 8). Multiple intelligences: What does the research say? Available at:
<https://www.edutopia.org/multiple-intelligences-research>.
- Let's Talk Science. (2021). How tall can you build a marshmallow structure that will support weight? Available at: <https://letstalkscience.ca/educational-resources/hands-on-activities/how-tall-can-you-build-a-marshmallow-structure-will>.
- Ontario Ministry of Education. (2007). The Ontario Curriculum Grades 1-8: Science and Technology. Available at: <http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec18currb.pdf>.
- Reconciliation Education. (2019). Douglas Cardinal: Architect of the Future. Produced by the National Centre for Collaboration in Indigenous Education as part of the 4 Seasons of Reconciliation Film Series. Available at: <https://www.nccie.ca/knowledge-space/films/douglas-cardinal/>.
- Science Teachers' Association of Ontario. (2021). Safety Mindedness for Science and Technology (Grades K-8). Online Training Module, accessed May 2021. Available at:
https://stao.ca/safetymindedness/elem2/story_html5.html.
- TVO Kids. (Accessed 2021). Bridge Works, by Science Max. TVO Education Resources. Available at:
<https://www.tvokids.com/school-age/games/bridge-works-science-max>.
- TVO Kids. (2015, September 29). How you build it. Science Max: Experiments at Large, Season 1. Available at: <https://youtu.be/DDP1X-JcSVI>.