

**CODE/MOE/UOIT Makerspaces Project**

**Lesson Plan: Grade 5 & 6 Science: Structures**

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| **Big Ideas :*** Structures and mechanisms throughout our environment have forces that act on and within them. (Overall expectations 1 and 3)
* Forces that result from natural phenomena have an effect on society and the environment. (Overall expectations 1 and 3)

**Overall Curriculum Expectations :*** Investigate forces that act on structures and mechanisms;
* Identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.
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| **Learning Goals :** * Make a structure that is able to resist external forces
* Learn the techniques for improving the strength and stability of a structure
 | **Success Criteria :*** Identify forces that act on a structure
* Describe the forces resulting from natural phenomena which can have serious consequences on the structure
* Choose appropriate materials
* Make a stable and solid structure
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| **Lesson Overview :**During this unit of study, students will :* Choose materials that are flexible, strong, and durable
* Come up with a logical way to attach the materials together
* Improve the stability of the object by ensuring there is a large base
* Use an appropriate scientific vocabulary
* Discuss climate change in relation to how natural disasters are increasing in severity and in frequency
* Follow the technological problem-solving skills continuum
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| **Materials and technology to be used :** * Wood
* Plastic
* Glass
* Cardboard
* Glue sticks
* Glue guns
* Scissors
* Tape

Technology: iPads, Green screen, laptops |
| **Adaptations /Modifications :** * Form heterogeneous (mixed ability) groups keeping in mind different learning difficulties
* Over the course of the project, constantly remind students to use specialized vocabulary
* Students will conduct research before deciding what kind of structure to make
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| **MINDS ON: Getting Started** |
| During this phase, the teacher will : * Conduct a mini-lesson to explore different structures that exist while simultaneously teaching specialized vocabulary
* Ask questions to understanding their pre-existing knowledge relating to structures, stability, and strength
 | During this phase, the students will : * Fill in a KWL chart
* Answer teacher questions

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| **Describe how you will introduce the learning activity to your students. What key questions will you ask? How will you gather diagnostic or formative data about the students’ current levels of understanding? How will students be grouped? How will materials be distributed?** * Ask students to research extreme external forces resulting from natural hazards/phenomenon obtaining their information from videos, online, and from textbooks
* Introduce the Maker challenge to students as well as the need to make a “roadmap” (plan)
* Review the technological problem-solving skills continuum
* Students will work in partners that are pre-selected keeping in mind learning difficulties, etc.
* Diagnostic information can be gleaned from the KWL chart that the students complete
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| **ACTION: Working on it** |
| During this phase, the teacher will :* Provide any materials that the students need
* Remind students of security protocols and ways to work collaboratively
* Help students as required
* Invite students to make their prototypes (which ultimately showcases what they have learned regarding structures and stability) while they follow the “roadmap” (their plan)
 | During this phase, the students will * Follow safety considerations laid out by the teacher with respect to tools, materials, electricity, etc.
* Explain their thinking in terms of what they are making, and choose their partner wisely
* Follow the “roadmap” they’ve created
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| **Describe the task(s) in which your students will be engaged. What misconceptions or difficulties do you think they might experience? How will they demonstrate their understanding of the concept? How will you gather your assessment data (e.g., checklist, anecdotal records)? What extension activities will you provide?** * Conduct in-class experiments to help students understand different forces that exist
* Help them conduct research by reading textbooks (or online materials) to gain an understanding of internal and external forces
* “Evaluation by triangulation”, conversations with students, using an observation checklist, peer evaluation, and marking what they make (the product, the roadmap, and the presentation at the Maker Faire)
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| **Consolidation : Reflecting and Connecting** |
| During this phase, the teacher will :* Ask students to fill-in their science journals constantly, using the following prompts:

\*What I learned\* What was difficult\* What was easy\*How can I improve my structure? | During this phase, the students will :* Fill out their science journal
* Present their project
* Do a self and a peer-evaluation
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| **How will you select the individual students or groups of students who are to share their work with the class (i.e., to demonstrate a variety of strategies, to show different types of representations, to illustrate a key concept)? What key questions will you ask during the debriefing?** * All students will have to present their discoveries and what they learned
* They will get a presentation checklist to help them understand how they will be assessed
* During the Maker Faire, students will present the challenge they sought to accomplish, explain the steps taken during the “making” phase, as well as important safety considerations they took into account, in addition to how their device works
* They will present the difficulties they encountered while making, along with the ways they succeeded in following their roadmap
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