

STEM Education in Early Years: How Can Students Use STEM to Learn About Natural Disasters?

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Engineering Design Process

Prototype Design

- More than one robot construction depending on type of natural disaster
- More than one task may be useful during a natural disaster, i.e. pushing/pulling, lifting/lowering, opening/closing

Imagining, Reflecting & Revising

- Student research of natural disasters and current rescue protocols
- Design of prototype
- Programming
- Testing of prototype
- Revision



Rationale

- Relatable to real-life natural disasters and emergency situations (such as the floods in 2013)
- Opportunity for students to imagine future tasks such as, what kinds of machines might be useful for the next flood?
- Offers multiple robot solutions to specific tasks, such as the Drop and Rescue Helicopter and Prevent Flooding Floodgate
- Use of robotics and technology challenges traditional Science, Math, and Social Studies teaching methods

Key Mathematics & Science Concepts

Science

- Kindergarten – Environment and Community
 - Awareness of the relationship between cause and effect in order to make sense of the environment around them
 - Exploration of the design and function of tools or robots in students' environment

Mathematics

- Grades 1 to 6 – Number Sense
 - Counting how many civilians need rescuing
 - Counting how many supplies packages are needed for rescue efforts
- Grades 2 to 6 – Shape and Space
 - Investigating the impact of weight and mass on rescue efforts i.e. how much civilians weigh, the weight of supplies to be delivered, how much weight can prototypes safely carry

Teaching Strategies & Assessment

Pedagogical Strategies

- Collaboration
- Class Discussion
- Establish Requirements & Expectations
- Resources for arena construction
- Resources for Robots
- Accommodation of different skill levels

Formative Assessment Strategies:

- Use of rubric based on Engineering Design Process
- Multiple opportunities for evaluation and adjustment
- Peer Feedback & Self Reflection



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