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| **Lesson 2:** Practice with map grids & Brainstorming problems |

**Problem Statement:**

The city of **Bothell** needs help! In the event of a natural disaster (e.g., earthquake, fire, flood, land/mudslides, and storms), power goes out, methods of communication and transportation are often lost or damaged, medical care is needed, and basic survival resources need to be maintained and distributed to those in the disaster area. Often, resources are low or have been damaged/contaminated. Your goal is to aid the community in the event of a disaster, with each group in charge of an area within the city affected by the disaster. Groups will identify two problems that can occur within a city grid, then develop a physical solution (build/repair) or a conceptual solution to a problem in future lessons.

**Learning Objectives: Students will…**

* **Practice** finding locations on a local map & **Identify** features on a map
* **Brainstorm** & **Identify** potential problems that could affect areas in Bothell when a catastrophic weather event occurs.
* **Utilize** *21st century skills* in a group setting
  + ***Think Creatively***
    - Use a wide range of idea creation techniques (such as brainstorming)
  + ***Work Creatively with Others***
    - Develop, implement and communicate new ideas to others effectively
    - Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
* **Determine** which physical solution and conceptual solution the class will be addressing in their engineering design process.

**Lesson Standards (NGSS, CCSS, CTE):**

* **MS-ESS3-2.** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
* 21st Century Skills

**Materials:**

* Weather Events Sound bite files or videos (example: <http://goo.gl/Qi1dbS>)
* Gridlined map of city
* Butcher paper with four quadrants drawn out at each group
* One die and 1-4 markers for each group
  + NOTE: different markers can be used to ensure student accountability
* Post-it notes to record potential problems
* Two different colored post-it notes to record physical and conceptual problems

**Lesson Preparation:**

* Have a visual aid for each step as you work with the class (example: presentation, flip chart).
* Create a gridlined city map showing the total area that could be affected by the catastrophic weather event.
* Cut large pieces of butcher paper (one for each group for each class) and draw a four-square grid onto the paper. You can prepare this butcher paper by adding a heading to each square for a student’s name.
* Tape down the butcher paper onto desks or lab stations.
* Tape down the map in the center of the butcher paper.
* Have a cup or supplies tray set up with one die and markers for each group.

**Time Required:**

**25-35 minutes**

**Grouping of students for instruction:**

Students will be in their “anchor groups”, which is their assigned seating. These groups are based on prior performance in order to scaffold each group to have a strong leader, strong academic performer, and a social individual.

(TEACHER SPECIFIC) Brainstorm What Students Know/Need to Know from prior lessons

* Catastrophic events can create hazardous situations for humans and the environment. After class discussion in Lesson 1, students should have brainstormed some of the following ideas:
  + Landslide or mudslide → HazMat incidents, infrastructure failure, power outage
  + Flooding → landslide, HazMat incidents
  + Snow, Ice, & Extreme Cold → fires, flooding, power outages, hypothermia
  + Windstorms → infrastructure failure, power outages, flooding

LESSON PROCEDURE:

* After Lesson 1, review the different types of catastrophic weather events that may occur in Bothell. Have students vote on which event they would like to (or think would) happen to Bothell.
* Before using the maps in groups, demonstrate how to identify a grid on the map and discuss as a class the features in that grid and potential problems that could occur during the catastrophic weather event students voted on.
  + Map Procedure: In real life, problems caused by catastrophic events are up to chance. Students will be using dice to determine which grids are affected by the event.
    - Roll the dice to see which block of your city is affected by a catastrophic weather event. First die roll is the row affected in your city grid while the second roll is the column affected.
    - Discuss & record at least 3 problems that may occur within this block in your section of the butcher paper.
* Group protocols for map activity:
  + After each person rolls, discuss as a whole group what problems might occur within that grid. The person who rolled will record these problems in their portion of the butcher paper using a specific color marker.
    - NOTE: Group discussion protocols vary by instructor (example: taking turns sharing out “in the round” one person at a time).
* As a class, have students discuss what problems occurred in multiple grids. Each group will then decide on a problem to share out
  + NOTE: Group discussion protocols vary by instructor (example: choosing a specific pen color to share out).

**Accommodations:**

All presented materials will be given in an easily readable font. All presentation materials will be font 24 or higher. Students with vision issues will be seated near to the board or have printed materials. All materials have sentence starters/instructions.

**Extensions:**

To extend the lesson, the class can discuss PHYSICAL problems and CONCEPTUAL problems that occur as a result of catastrophic weather events. The class can then identify ONE physical and ONE conceptual problem to focus on during Lessons 3-8 using a voting system, or leave the choice of potential problems open (e.g., each student/group would choose their own problem).