

Unit 6.5 CS: Where do natural hazards happen and how can we detect, warn, or protect people from them?

(Natural Hazards + Computer Science)

Changes between Public Release and Computer Science field test unit

Modifications to individual lessons are summarized in the table below:

Revision Lesson	Field Test Lesson and changes made
Lesson 1	Additional day of instruction embedded within the existing lesson to consider ways we use technology to detect, warn, and reduce damage from natural hazards. More emphasis on local hazards and possible solutions. Specific prompts have been added to the handout to have students add sensors to their initial engineering design solutions.
Lesson 2	After looking at historical tsunami data, students look back at their Local Hazards and Possible Solutions poster to consider what pieces of historical data and how sensors could have been used to collect the data. Students discuss how transforming data using a computational tool makes it easier to identify patterns. At the end of the lesson, students begin the unit's Progress Tracker using the <i>Science, Technology and Engineering</i> handout.
Lesson 3	One day of instruction is removed. The foil pan model analysis portion of the lesson has been removed and a physical model of wave generation shifted to Lesson 4. Students add to the Tsunami Chain of Events chart, and a new "layer" is incorporated from the Public Release version - What we know as computer scientists.
Lesson 4	This is a new 2 day lesson where students investigate changes in tsunami wave behavior as the wave moves towards the shore using micro:bits to detect changes in wave speed and height. Students investigate the two codes used to transmit and receive data from the wave tank investigation to their computers for analysis. Students update their Progress Trackers and add to the Tsunami Chain of Events chart.
Lesson 5	Computer science connections are embedded within the second and third day of instruction to the Public Release version of the lesson. Students hear from an architectural engineer who designs buildings to withstand natural hazards as part of an engineering career exploration video.
Lesson 6	A new day of instruction has been added to give students practice coding micro:bits using two tutorials. The first is aimed at coding two micro:bits to "talk" to each other which gives students practice into the radio code function they examined in Lesson 4. The second is aimed at calibrating the accelerometer to give an alert once a certain threshold of movement is detected. Students work to connect the two codes together to develop a remote warning system.
Lesson 7	This is Lesson 4 of the Public Release version which serves as the mid-point assessment of the unit. The decision to move this after students have experienced the lessons around reducing tsunami damage (Lesson 5) and detecting and sending warning signals (Lesson 6) was made using teacher feedback to improve student's ability to engage with portions of the assessment. Additional prompts to assess student's understanding of CS ideas have been added to the existing assessment. An additional day of instruction was added to revise

	Tsunami Chain of Events poster and complete a Progress Tracker entry using the <i>Science, Technology and Engineering</i> handout, as well as to provide ample time for students to complete a larger assessment.
Lesson 8	This is Lesson 7 of the Public Release version. Computer science thinking about accessibility and bias in the design of existing technology has been added to better support student's identification of criteria and constraints in developing communication systems. An Amazon Future Careers video highlights how engineers think about and design for accessibility. Students update the Tsunami Chain of Events poster and add information about accessibility and bias of technology under the "What we know as computer scientists" layer.
Lesson 9	This is Lesson 8 of the Public Release version. CSTA callouts have been added to highlight portions of the Public Release version where CS ideas were already present.
Lesson 10	This is Lesson 9 of the Public Release version. CSTA callouts have been added to highlight portions of the Public Release version where CS ideas were already present.
Lesson 11	This is days 1 and 2 of instruction of Lesson 10 of the Public Release version. This change was done so that there is a better split between determining which natural hazards affect a student's local area and the design challenge.
Lesson 12	This is the remaining portion of Lesson 10 of the Public Release version. An additional day of exploration with various micro:bit sensors has been added to provide students an opportunity to incorporate sensors they have not previously experienced into their design solutions.