Grade Level	4	**School(s)**		**District**	*Chino Valley Unified School District*
Timeline:		**Topic:** Earthquakes		**NGSS PE(s)**	Instructional Segment 4: Earthquake Engineering (Framework Chapter 4 pg. 90) 4-EES2-2: Analyze and interpret data from maps to describe patterns of Earth's features [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]
CA Science Framework: https://www.cde.ca.gov/ci/sc/cf/cascienceframework2016.asp **(Look to Chapter 11 for information on 5E Lessons)**					
DCI focus(es)	**ESS2.B:** Plate Tectonics and Large-Scale System Interactions **ESS.B:** Natural Hazards **PS4.A:** Wave Properties **ETS1.A:** Defining Engineering Problems **ETS1.B:** Developing Possible Solutions **ETS1.C:** Optimizing the Design Solutions			**CCC focus(es)**	**CCC-1:** Patterns **CCC-2:** Cause and Effect Mechanism and explanations **CCC-6:** Structure and Function
CCSS Math	4.NF.7			**SEP focus(es)**	**SEP-1:** Asking Questions and Defining Problems **SEP-2:** Developing and Using Models **SEP-3:** Planning and Carrying Out Investigations **SEP-4:** Analyzing and Interpreting Data **SEP-6:** Constructing Explanations (for science) and Designing Solutions (foe engineering)
Environmental Principles & Concepts	**Principle III:** Natural systems proceed through cycles that humans depend upon, benefit from and can alter **Principle IV:** The exchange of matter between natural systems and human societies affects the long-term functioning of both **Principle V:** Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes			**History/Social Sciences**	
CCSS ELA / CA ELD	4.SL2 4.W.8 ELD.PI.4.6			**Physical Education**	
VAPA: Visual & Performing Arts				**Social & Emotional Learning**	
LEARNING SEQUENCE PLAN					

ENGAGE
• Phenomena
• Questioning
• Prior knowledge
	Nepal plant movement during quake (video duration 1:10)
	• Have students watch the video with audio or without and document in their science notebook:
	  ○ What they notice (evidence-based observations)
	  ○ What they wonder (ask questions)
	  ○ What the video reminds them of (connect to past experiences)
	• Teacher facilitates a whole class discussion of the phenomena video				

EXPLORE
• Build own meaning
• Tinker
• Models
	Table Cloth Activity (click link to access the 3 pictures)
	• The activity is silent
	• Students investigate the pictures at each station (total of 3 pictures)
	• Students document their thinking at each station to process the information (observations, questions, drawings/models)
	• Students can comment on others' comments
	• Teacher notify students when to rotate to the next station
	• At the end of the activity students come together for a class discussion
	• Teacher calls on students to share pictures at each station:
	  ○ What have we learned?
	  ○ What questions do you have?
	  ○ What actions do we want to take?
	  ▪ At the end of the discussion, the class should generate the big idea or topic they will be learning = earthquakes
	• Students document the class discussion in their science notebook
	• Students reflect on the table cloth activity in their science notebook by answering these questions:
	  ○ What can you connect to our phenomenon?
	  ○ How does the land (Earth surface) appear after an earthquake?

EXPLAIN
• Communicate understanding
• Apply vocabulary
• Research
• Models
	Create a model
	• Have students think back to the phenomena video and the tablecloth activity
	• Students draw a model in their science notebook to explain what happens to their surroundings before an earthquake, during an earthquake, and the effects afterwards
	• Suggestion: use one color (like pencil or black ink)
	Readings (all links provided are from Gale Resources in Class Link)
	• Have students close read Earthquake Article
	• Have students close read Earthquake Disaster
	  ○ Close Reading Procedures:
	  ▪ Students read the article first
	  ▪ Students go back and circle important, new, and unknown words
	  ▪ Students underline one important sentence
	  ▪ Students can annotate (validations, questions, reminds me of...)
	• Have students read *Wonders Literature Anthology* pg. 48 **Earthquakes**
	• Share with the class the following earthquake picture models:
	  ○ How an earthquake occurs
	  ○ Illustration of an earthquake
	Revision of Model
	• Allow students to add/change their original model in their science notebook after reading
	• Students need to include vocabulary and new concepts that they learned
	• Suggestion: use a different color than before
	Build a Collaborative Model (in teams of 2-4 students)
	• Students share their model with their table groups
	  ○ What aspects of the individual models could apply?
	• Create a shared model on chart paper that shows what happens to their surroundings before an earthquake, during an earthquake, and the effects afterwards
	• Shared model will be displayed in a gallery walk

ELABORATE
• Apply to new contexts
• Make connections
• Models
• Engineer
• Build investigation
	Writing through Claim, Evidence, and Reasoning (CER)
	• Driving Question: What would happen if an earthquake occurred near an ocean?
	  ○ Students independently write a CER in their science notebook
	  ○ Optional: CER sentence frame
	
	In their collaborative groups, students create one CER and add it to their collaborative model

EVALUATE
• Notebooks
• Models
• Rubrics
• Performance Task
• Claim, Evidence, Reasoning
	Gallery Walk
	• Students provide feedback to other classmates' collaborative models
	  ○ Students write on Post-its what they notice and what they wonder about their classmates' model
	• Teacher notifies groups when to rotate or sets the amount of time for students to leave feedback for their classmates
	• After groups have visited all the collaborative models, students go back to their original poster
	  ○ Students review and reflect on the feedback provided by their classmates
	  ○ Ask students: What would they add or change in their model or CER?