

### Curriculum Standards

Scientific Inquiry - Through scientific inquiry students will learn about possible careers in the field of seismology and the effects of earthquakes on the surrounding environment.

Physical Science - P.1.2 Measure or determine the physical quantities including mass, charge, pressure, volume, temperature, and density of an object or unknown sample.

P.1.3 Describe and apply the kinetic molecular theory to the states of matter.

Earth Science - ES.1.23 Explain motions, transformations, and locations of materials in Earth's lithosphere and interior.

ES.1.27 Illustrate the various processes that are involved in the rock cycle, and discuss how the total amount of material stays the same through formation, weathering, sedimentation, and reformation.

Mathematics - C.1.1 Understand the concept of limit and estimate limits from graphs and tables of values.

PS.1.1 Create, compare, and evaluate different graphic displays of the same data, using histograms, frequency polygons, cumulative distribution functions, pie charts, scatter plots, stem-and-leaf plots, and box-and-whisker plots. Draw these by hand or use a computer spreadsheet program.

### Carriage Inc.: The Search For a Safe Haven

**Objectives:** Students will be able to work in cooperative groups to decide where the most suitable location would be for their new trailer factory. Students will be able to navigate the WWW to search for information pertaining to the frequency in which earthquakes occur in a given area. Students will be able to use graphs, pie charts, and Venn diagrams to show similarities between building sites. Students will be able to work in a cooperative group setting to develop the best plan for locating a new building site.

Students will be able to develop an emergency plan for the safety of their new building.

Students will be able to navigate through the PEPP and IRIS Consortium networks to gather information about the site that choose to develop an understanding of the seismic activity of the area.

What's the story?

Upon graduating from college majoring in engineering, you accept a position as chief structural engineer for conglomerate in Indianapolis, SERCA (Structural Engineering Relocation Conglomerate Association). Your company just won a bid to design and locate a proper building site in California for the largest RV firm in the country. The company is named Carriage Inc. They are located in northern Indiana and ready to move west to tap into the market of increasing RV usage in the western United States.

You and three of your associates are sent to the Los Angeles area to find and scout for a potential building site for the factory. Two of your associates have degrees in structural engineering and also hold degrees in seismology. The associate with whom you will be working closely with has a degree in geology. The two of you will be in charge of selecting the best site in which to manipulate materials for ease of readiness and preparation for building on the site.

*Materials Needed:*

Each group will have access to the WWW via a high speed internet connection to download real-time information.

Each group will have access to Microsoft PowerPoint to create a presentation to board of chairman's (classmates).

An LCD projector to show their presentations and present their gathered information in a formal style of presentation.

Map of California seismic activity to help understand the frequency of earthquakes.

*Responsibilities:* The class will be split into groups of

- A. One group will gather seismic information about different areas that you are looking at for possible building sites.
  1. To accompany your search for the proper site you will also search for the best structure to use for your building. Due to the high concentration of oceanic salt found in the air you must find a connector that will be non-corrosive to the agents of the ocean. The following site will help in the decision making process. <http://www.strongtie.com/> . You must decide which connector will be used for your building purposes.
  2. Upon successful completion of your structure's design you need to research the optimal materials to use for the roof of your building. When the design of your building is complete a unionized contractor must be used to ensure that the job is done properly. California has a

completely separate set of building codes to compensate for the frequent tremors that occur and you must meet these codes. With your building ready to be constructed a call must be placed to the CBOA (California Building Officials Association). If you choose not to call you must make contact and arrange a date in which the association will come to the building site to help ensure that the building meets the correct structural integrity that is required to pass the standards of a California inspection.

- B. The other group of two will gather information about the seismic hazards of the specific areas that you are contemplating for the building site. Using the following website will enable you to work with committee in California to find the best suitable real estate property to survey.  
<http://www.creia.org/>. CREIA is a non-profit organization that promotes the industrial growth of central California and the opportunity to help decrease the percentage of unemployed.

*Group Responsibilities:*

Prepare a handout for your evaluators to help them understand and become aware of the current situation in the earthquake capital of the United States.

As a group you will design and present a PowerPoint presentation to your classmates. The requirements are as follow:

1. A minimum of 15 slides
2. Show in detail the processes that you used to research and find information for your chosen building site.
3. Include visually attractive images and seismograms that show your understanding of seismic data.
4. Include information from the PEPP Seismic network showing the speed and relative damage that may be caused to the site as the result of an earthquake.
5. Explain how you plan to build the safest environment for the employees and also to extend the longevity of the building.
6. Why did you choose this specific location for a building site?
7. Bibliography slide(s) detailing where you found the information for your location.
8. Casual dress required to provide a professional environment for the presentations.

Data Sheet #1