Earthquakes

The Great Southern California ShakeOut
Exercise

READ: *The ShakeOut Earthquake Scenario—A Story That Southern Californians Are Writing*, U.S.Geological Survey, Circular 1324. You can view or download this report at **http://pubs.usgs.gov/circ/1324/c1324.pdf**

ANSWER the following questions:

1. What is the purpose of the ShakeOut earthquake scenario?

2. What is the size of the hypothetical earthquake that will be used in this scenario?

3. On what fault will it occur?

4. What degree of damage and casualties are expected in this scenario?

5. In this scenario, the earthquake begins at what time and on what date and day of the week?

6. Where do you expect to be at that moment? (In class? At school between classes? At home? On the road? At work?)

7. Look ahead to question #38, and as you read the rest of the narrative for this scenario, start jotting down your ideas for answers to question #38.

8. List the major lifelines (utilities and other infrastructure that support our society) that cross the San Andreas fault in Cajon Pass and will be offset and rendered temporarily dysfunctional by the scenario earthquake.

9. In this scenario, many newer buildings in areas with strong shaking suffer little or no structural damage, as a result of improved building codes over the years, but describe what happens inside these buildings.

10. Which two major freeways are offset by the San Andreas fault during the earthquake?

11. In addition to fault offset, what else contributes to freeway closures in Cajon Pass?

12. How long will strong shaking last in Los Angeles?

13. How does this compare to the duration of strong shaking in the Northridge earthquake?

14. What are the effects of the power outages that are expected to happen?

15. What are the effects of the broken water lines?

16. How many aftershocks are expected?

17. Of these, how many are expected to cause additional damage?

18. What is the status of the hospitals immediately after the quake?

19. Five minutes after the earthquake, what methods are available to residents to get information about what has just happened?

20. What is the status of the phone lines?

21. Most of the victims trapped in rubble after the earthquake are rescued by what agency?

22. What factors contribute to the **ignition** of fires after an earthquake?

23. What factors contribute to the **spread** of fires after an earthquake?

24. What issue is discovered 30 minutes after the earthquake that leads to the need for an evacuation, thus pulling emergency personnel away from other tasks?

25. At 10:33 am, an aftershock occurs in the Imperial Valley, south of the southern end of the main shock rupture. What effect does this aftershock have on the disaster response to the main shock?

26. Two hours after the earthquake, where do southern California firefighters turn for additional help?

27. What factors hinder the arrival of this additional help?

28. What is the status of communications 21 hours after the earthquake?

29. What is the status of utilities 24 hours after the earthquake?

30. What are the primary modes of transportation 24 hours after the earthquake?

31. What is the status of housing in heavily shaken areas 24 hours after the earthquake?

32. What are some of the rumors or myths that circulate after the earthquake?

33. What is the status of fires 3 days after the earthquake?

34. We have what is referred to as a "just in time" economy, in which goods are delivered just as they are needed and are not stock-piled locally in warehouses. What effect does this have on life after an earthquake?

35. After reading the section of the report for mid-December (one month after the earthquake), write a paragraph summarizing (hypothetically, but realistically) what your life is like at this point in time. Focus on the aspects of the earthquake damage described in the report that would most likely have the largest impact on your life.

36. Describe some of the effects of the earthquake on businesses 1-6 months after the earthquake.

37. What is the difference between a disaster and a catastrophe?

38. After an earthquake, there are many "domino" effects, in which the failure of one system puts added stress on other systems, potentially causing them to fail. As you think back on this scenario, list below as many of these linkages and inter-relationships as you can. Think first about the physical effects of earthquakes (both direct and indirect) on the natural environment, then about how these effects impact the built environment (buildings, roads, bridges, and other infrastructure), then about how disruptions to the built environment affect society.

    For example: earthquake shaking → power outages → ??? → ???
    fault rupture → offset roads → ??? → ???

    Try to think of as many of these chains as you can, and make the chains as long as you can. Use a separate sheet of paper if necessary. You may find it easier to show the relationships between some of these chains, using a two-dimensional diagram. Be prepared to share your ideas with the class.