Lesson 1: What is happening in the Afar region?

Exploring a New Phenomenon	
In October 2005, people in northeast Africa took this photo of a huge crack in the ground that was not there before.	
With your class 	1. What might have caused this change in Earth's surface?
With your class 	2. What would you like to know more about in relation to this event and the area where it occurred?

Notice and Wonder

On your own 

3. On your own
   - Set up a Notice and Wonder chart.
   - Read about the region and what happened there in the StoryMap.
   - Record what you notice and wonder.

Share Noticings and Wonderings

With your class 

4. Discuss what you noticed and wondered.

Sharing Personal Experiences

With your class 

5. What experiences have you had with some of the phenomena we see in the Afar region?

With your class

6. What do we know about earthquakes that might cause them to happen in some places but not others?

7. Can earthquakes happen anywhere, even at non-plate boundaries?

Identify Potential Patterns

With your class

8. What patterns might we notice when looking at any potential earthquakes?

9. At what scale might we see those patterns?

Use Map Data to Identify Patterns

On your own

10. Let's explore an earthquake and plate boundary map.
    - Do earthquakes happen in our region?
    - What patterns do you notice?
    - At what scale are these patterns?
    - Why might we expect earthquakes to happen in some places but not others?

With your class

11. Do you think all earthquake lines or clusters are visible at the same scale?

12. Why might we expect earthquakes to happen in some places but not others?

13. How might these earthquakes that are not located at plate boundaries be similar to or different from what occurred in Afar?

Look for Similarities and Differences

On your own

14. Complete Step 1 on the handout:
    - Compare the earthquake you read about to the events at Afar: what is similar, and what is different?
    - Is there anything else that might help explain why these earthquakes are occurring?

With your group

15. Share each case with your group.
    - While others are sharing, complete Step 2 on the handout.

Collecting Earthquake Experiences

Home learning

16. Have you or someone you know experienced or heard about an earthquake in the past?
    - Collect these stories on a piece of paper, in a recording, or just listen and learn.
    - What did they notice before, during, and after the event?
    - If you feel comfortable sharing, be ready to share the story in the next class period.

Share Related Phenomena

With your class

17. Where did the event you learned about, or have experienced, occur?

18. What happened before, during, and after the event?

19. Were there any similarities or differences between this event and the events that occurred in the Afar region?

Look for Similarities and Differences

With your group

20. Look back at our Afar Noticings and Wonderings chart.

21. What similarities and differences do you see between your earthquake cases and the Afar case?

- Complete Step 3 on the handout.

Share Similarities and Differences

With your class

22. Share any interesting similarities or differences you noticed between your case sites and the Afar earthquake/crack.

Share Initial Ideas

With your class

23. What could be causing the patterns of earthquakes and cracks?

- What is cracking or shaking, and how?
- What is happening to the surface in an earthquake?
- What is causing the changes at the surface in our cases and Afar?
- Are the processes at Afar and all the cases the same? What evidence do we have?

Initial Model for Large-Scale Changes

On your own

24. Develop a model to help show and explain what happened below Earth's surface before and during the Afar case (the past) to cause these sudden phenomena we observed at the surface:

- a large crack in the ground at Afar
- short-term shaking of areas near Afar

25. Consider your earthquake case. What will happen to that region in the future (after)? What might be causing change? What interactions might be happening?

Compare Models

With a partner

26. Compare your 2 initial models.
    - What do you have in your models that are similar? Add a check mark (✔) to indicate where your models are similar.
    - What do you have in your models that are different? Add a question mark (?) to indicate where your models diverge, where you disagree, or where you have questions.

Revisit Our Community Agreements

On your own

27. What strategies were productive for supporting our Community Agreements when we worked together in a Scientists Circle in our prior unit?

With your class

28. Discuss this as a class, as well as any new ideas you have.

Coming to Consensus: East Africa

Scientists Circle

29. Come to consensus around what we know and do not know about:
    - What is happening below Earth's surface to cause cracking and movement in the Afar region?

Considering Scale of Changes

With your class

30. We have made observations about changes occurring at different spatial scales in Afar.
    - What observable events happened at Afar?
    - At what scale did they happen?

Coming to Consensus: Other Locations

Scientists Circle

31. Come to consensus around what might be happening at our earthquake cases.
    - What is similar?
    - What is different?
    - Why?

Developing Questions for the DQB

On your own

32. Record questions you have related to the things we have considered so far, including:
    - the Afar StoryMap

- the map of earthquakes and plate boundaries
- the earthquake cases
- the models we have made
- earthquake experiences shared with the class