6.1 Understand the Question

Think About What Geologic Activity Happens at Plate Boundaries

The earthquake data patterns you analyzed gave you enough information to determine the locations of plate boundaries. The types of volcanoes in your region provided more information about the directions your plates are moving and the geologic activity occurring in your region. To fully explain the processes within Earth that are causing this geologic activity, you need to know more about what is actually happening at the plate boundaries. This section will focus on the different ways plates interact at their boundaries and the resulting geologic activity. This will help you understand how volcanoes and earthquakes are related to each other and allow you to more fully explain what is causing the geologic activity in your region.

Get Started

You will watch four animations showing the different ways plates interact with one another. One animation will show what can happen when two plates move away from each other. Two animations will show what can happen when two plates collide. The last animation will show what can happen when two plates slide past each other.
You will see that the plates can interact several different ways depending on the type of crust involved. Remember that crust making up the ocean floor is thinner, but denser than continental crust. Although continental crust can be very thick, it is made up of rock that is less dense than that found in oceanic crust. As you watch the animations, pay attention to the different types of crust involved and how those differences affect geologic activity.

Conference

Work with your partner to complete the Plate Interactions: Animations page. For each animation, answer the following questions. If you cannot answer a question, make a note about what information you need to answer it. You may ask your teacher to replay the animations if you need to see them again.

- If more than one plate was involved, were the plates moving away from one another, toward one another, or sliding past one another? Record your observations in the row labeled How the Plates Move.
Was the action at the edges of both plates the same? Or, did one plate move differently from the other? For example, did the edges of both plates move upward or did one move upward and the other downward? Record these observations in the row labeled *Action at the Edges.*

What types of crust were the plates made of—oceanic-oceanic, oceanic-continental, or continental-continental? How do you think this affected the action of the plate edges? Record this information in the row labeled *Type of Crust.*

Did magma reach Earth’s surface at the plate boundary or at some other point on the plate? If so, describe how it reached the surface. Record your observations in the row labeled *How Magma Reaches the Surface.*

**Simulate Plate Interactions**

The animations showed several different types of plate interactions. To understand them better, you will work with your partner to simulate one of them and then present your simulation to others. Each pair will receive a different *Plate Interaction Flip Book.* Work with your partner to cut it out, color, label, and assemble it in the correct sequence. As you work together, note any disagreements or questions you have while working on labeling and assembling the flip book.

Try to imagine the kinds of geologic activity that might result when plates interact as they do in your simulation. Discuss why you think those kinds of geologic activity might happen.
Be prepared to share how you colored in and assembled the book, the types of geologic activity you think might result from these interactions and the reasons why and any disagreements or questions you had while working together.

**Conference**

Now get together with the other pairs that assembled the same flip book, and prepare to make a presentation to the class.

Share your flip books. Try to come to an agreement about the sequence. Identify any disagreements you have as you work together. Prepare to show the sequence of events you agree on. Come to an agreement about the type of geologic activity that is likely to result from your type of plate interaction. If you cannot come to an agreement, prepare to share any disagreements with the class, along with evidence that supports the different opinions.

**Communicate**

**Share Your Simulations and Ideas**

You will take turns presenting your flip books to the class. When your group presents, first describe the kind of interaction you are showing. One person should turn the pages of the flip book, while others describe the sequence of events. Be sure to include in your description the actions at the edges of the plates, the types of crust interacting, and any presence and movement of magma. Finally, present your ideas about the kinds of earthquake and volcanic activity that might result from this kind of interaction.

As other groups prepare to present, examine your *Plate Interactions: Animations* page to identify what you expect to see in their simulation. Think about the kinds of geologic activity that might result from the type of interaction they are presenting. If a group presents information about a plate interaction that differs from what is on your chart, then you must make a decision. Ask yourself if you now have a better understanding of the plate interaction and should change your chart, or if there are inaccuracies in the group’s presentation. Ask questions to clarify, or share your disagreements. Remember to be respectful when you disagree. If you cannot come to an agreement through class discussion, develop a question for the *Project Board*. 
Reflect

1. Describe how differences in the type of crust can affect how two plates interact.

2. How do you think the type of interaction at one plate boundary might affect the type of interaction found at another plate boundary?

3. What do you now understand better about the relationship between earthquakes and volcanoes?

4. What else do you need to learn to understand better what is happening at different plate boundaries?

5. What else do you need to learn to understand better how earthquakes and volcanoes are related?

Update the Project Board

As a class, update the Project Board. List what you think you know about plate boundaries and how different types of interactions relate to geologic activity in the What do we think we know? column. Use questions developed during presentations and discussions to help determine what you need to investigate further. Any questions that remain about the relationship between earthquakes and volcanoes should be added to the What do we need to investigate? column.

What’s the Point?

You saw in the animations what happens at different plate boundaries when they interact. The ways that the plates interact and the resulting geologic activity depend on several factors, including how the plates are moving and the type of crust involved. You are beginning to see the relationship between earthquakes and volcanoes. As you explore more about the different types of plate boundaries and the interactions that occur, you will be able to connect them to the patterns of geologic activity you have identified in your regions. In this Learning Set, you will learn about other factors that determine what happens at each type of plate boundary. With this information, you will be able to determine the processes within Earth that cause geologic activity and understand the resulting changes to Earth’s crust.