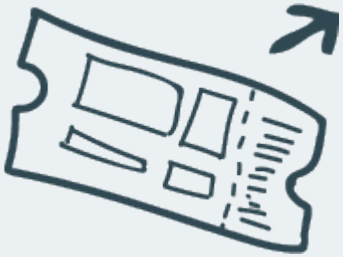
Navigate



Exit Ticket

Which other force(s) should we investigate that could help us explain why some plates change motion differently than others?

➔ Be ready to share your ideas with the class.

Considering the Role of Gravity

With your class

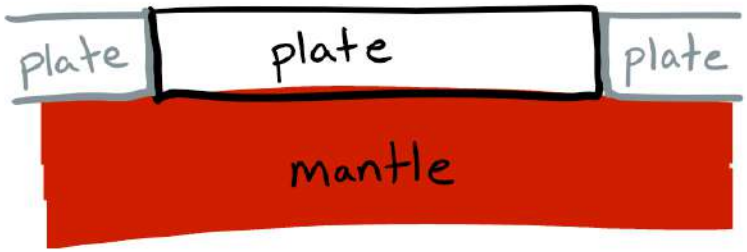
What do we know about how the force of gravity acts on objects?

Diagramming Gravitational Force

On your own

Consider the simplified, stable plate system of a plate squeezed between 2 plates, all sitting on top of the mantle.

- Draw a free-body diagram of the forces on the middle plate.
- If the plate motion is not changing, what do we know about the forces?

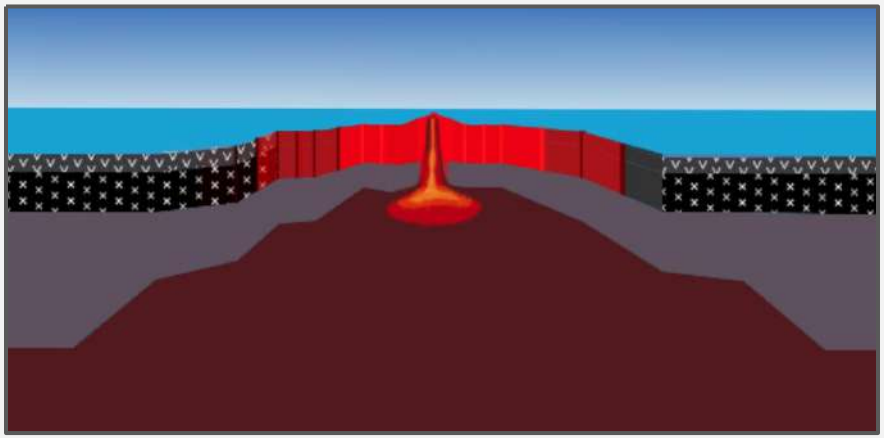


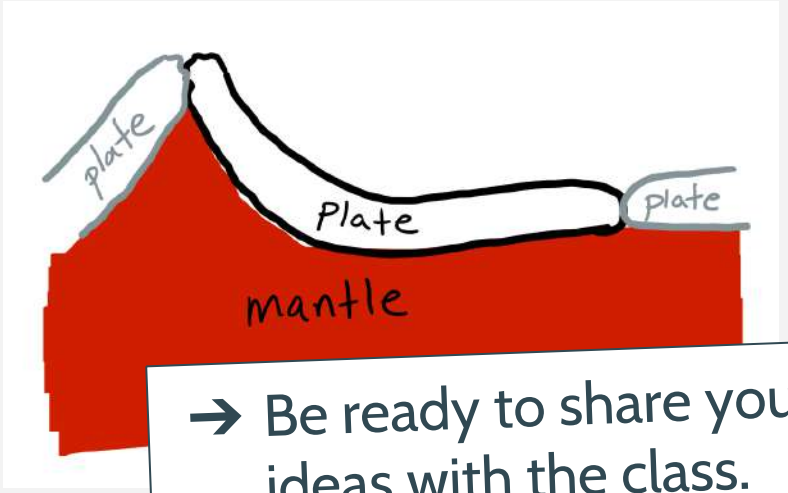
➔ Be ready to share your ideas with the class.

Diagramming Gravitational Force

With a partner

- Draw a free-body diagram for the forces on the middle plate.
- When might the forces on this plate be balanced? Unbalanced?



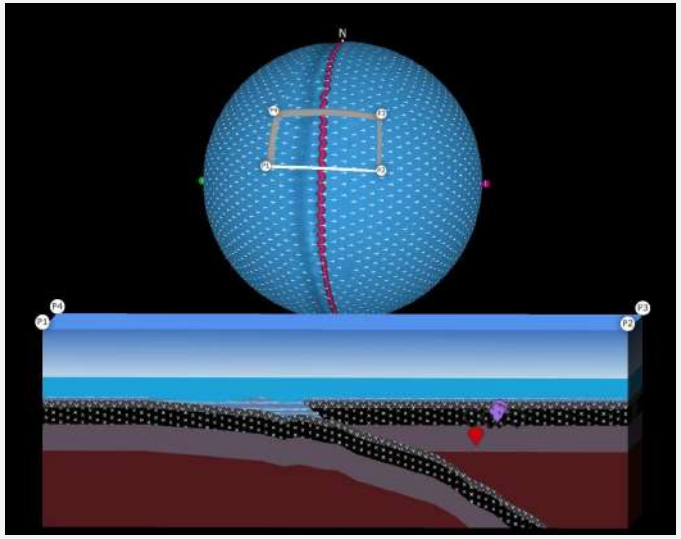


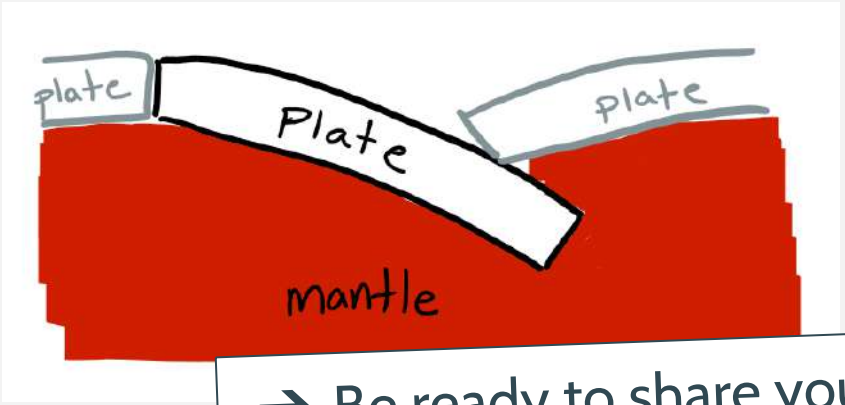
→ Be ready to share your ideas with the class.

Diagramming Gravitational Force

With a partner

- Draw a free-body diagram for the middle plate.
- When might the forces on this plate be balanced? Unbalanced?



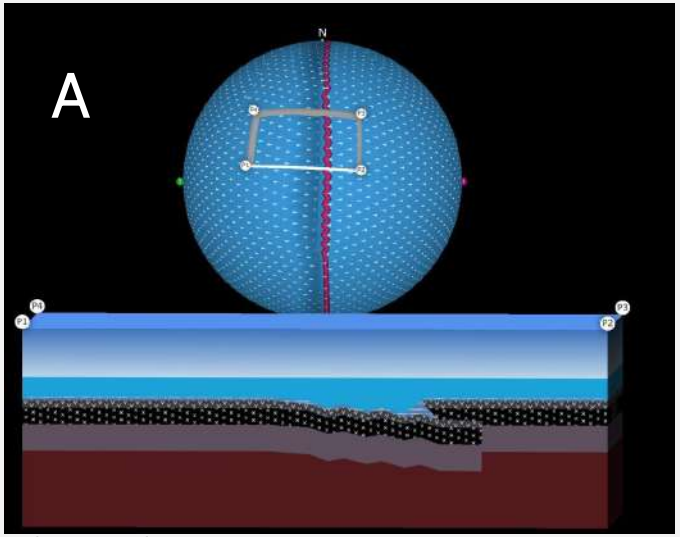


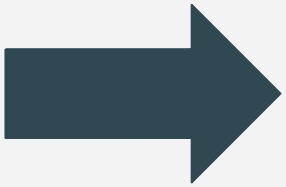
➔ Be ready to share your ideas with the class.

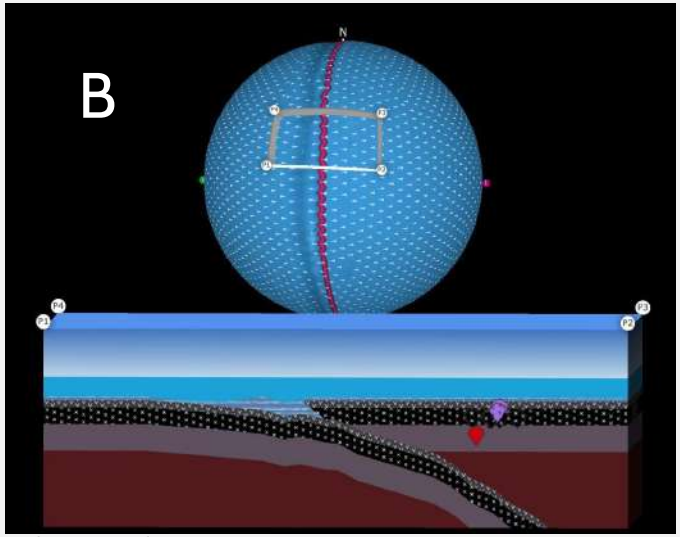
Considering Forces on Inclines

With your class

What do we think are the differences in the forces acting on the plate at points A and B?



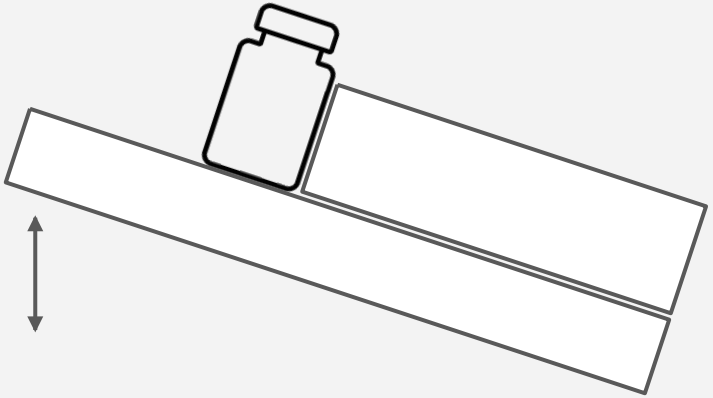




Simplifying the System

On your own

- Draw a free-body diagram for the bottle.
- If the bottle stays sitting there, are the forces balanced or unbalanced?
- What would happen if the incline were increased?



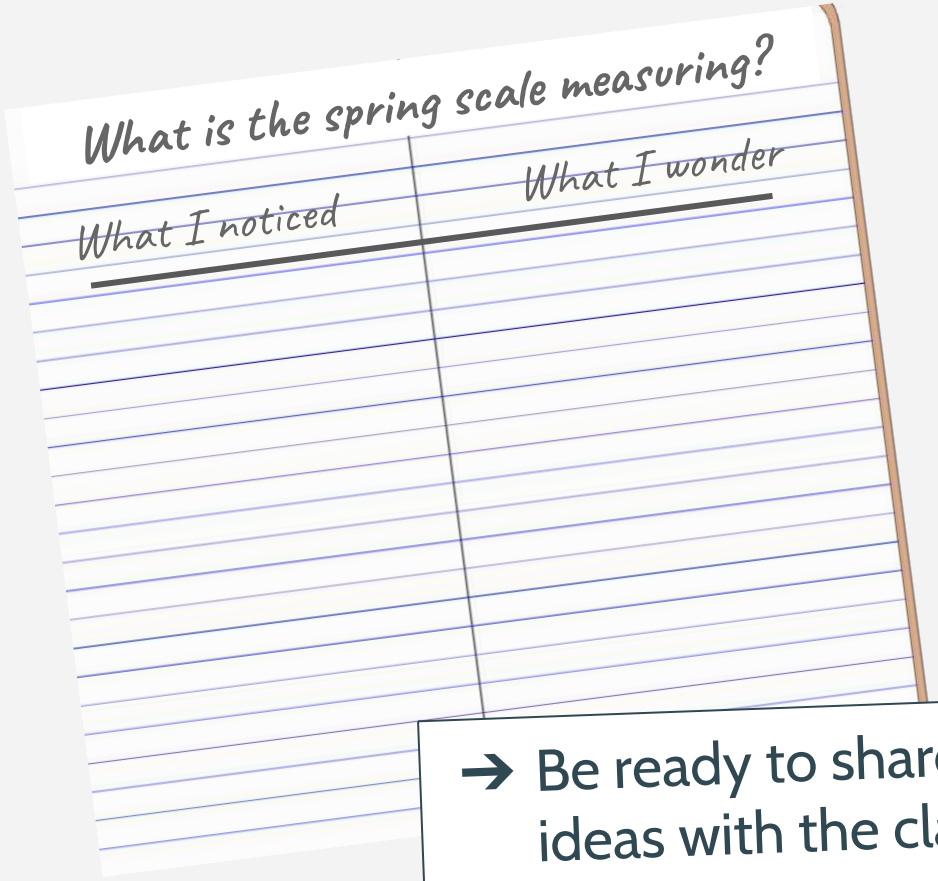
→ Be ready to share your ideas with the class.

Measuring Forces

With your class

- What tools have we used to measure forces in the past?
- How could we use these tools to measure how much gravitational force is acting on an object?
- How could we use them on the incline?

Measuring Forces

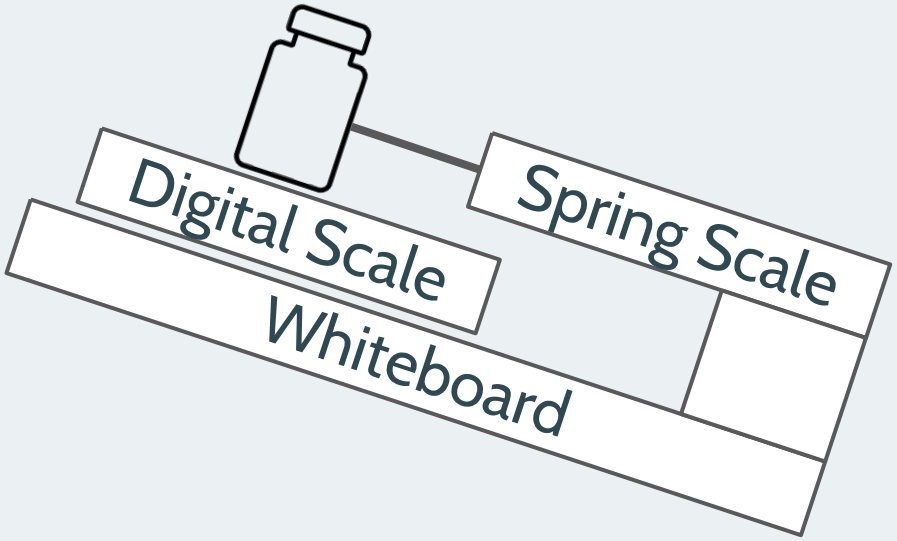


➔ Be ready to share your ideas with the class.

Considering Forces on Inclines

With your class

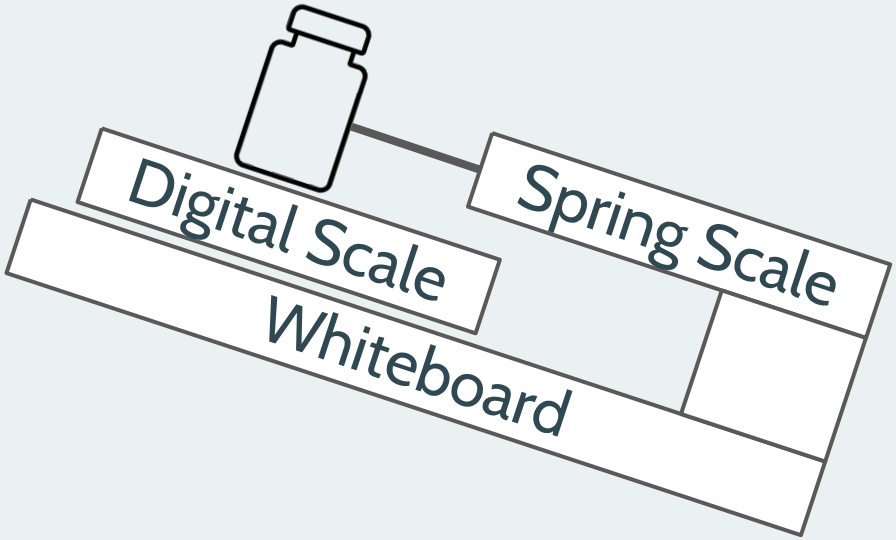
- What force is the digital scale measuring? What force is the spring scale measuring?
- What is the direction for each force?
- When are the forces acting on the bottle balanced?



Considering Forces on Inclines

With your class

Besides *inclination* (a.k.a. tilt angle), are there any other variables that could affect the forces we read with our scales?



Carry Out an Investigation

With your group

1. Your group needs to choose which mass to work with.

2. Use the setup to produce data about the forces acting on the bottle.

3. Record your data on the handout.

4. Compare your results with groups who investigated the other mass amount.

Navigate

On your own

Complete **Section 2** on the lab handout.

Navigate

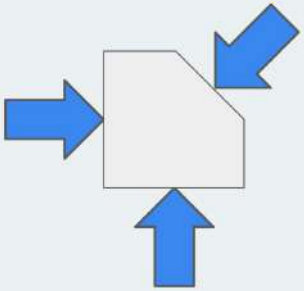
On your own

Review the investigation question and what you had noticed about your data on your handout.

Represent Data

With your class

How have we dealt with forces at angles before?

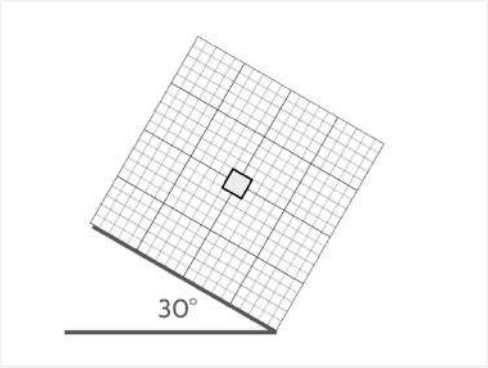


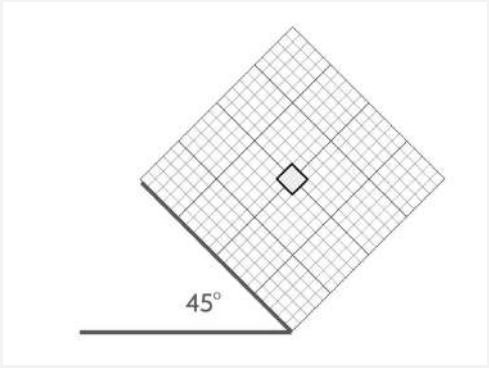
Represent Data

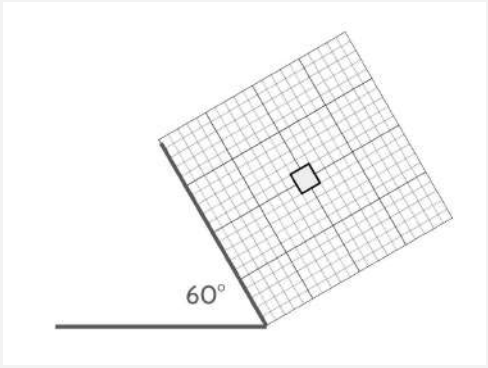
On your own

Draw quantitative free-body diagrams for 30-, 45-, and 60-degree angles on your handout, showing the force components of gravity.

➔ Be ready to share your ideas with the class.







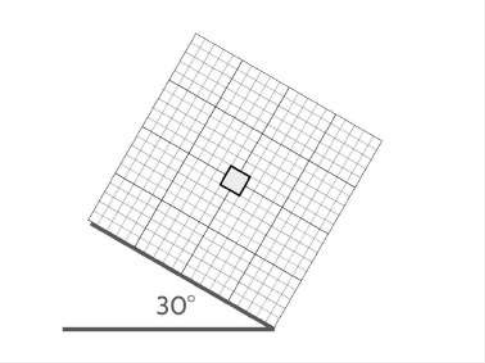
Represent Data

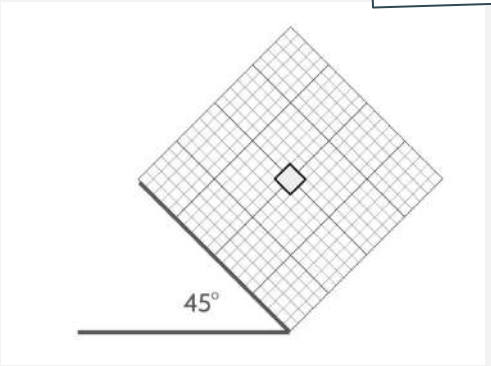
Turn and Talk

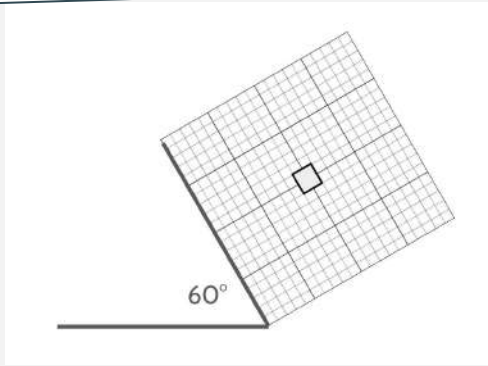
Compare free-body diagrams.

- How do the forces of gravity at each angle compare?
- How do the components compare?

➔ Be ready to share your ideas with the class.







Analyze Force Vectors

On your own

- Use the Pythagorean theorem to add the force components together to calculate the force of gravity that the 2 scales are balancing out.
- Compare these values to the force of gravity you measured/calculated at the beginning of the lab.

Make Sense of Data

With your class

As the angle changes, what happens...

- ...to the force of gravity acting on the bottle?
- ...to the force on the bottle from the digital scale?
- ...to the force on the bottle from the spring scale?

Connect Back to Mass

Turn and Talk

Consider mass on an incline:

- What would happen to the component of gravity pulling down the ramp if the mass were doubled?
- What if the mass were decreased to half?

➔ Be ready to share your ideas with the class.

Connect Back to Mass

With your class

- How could one plate have more mass than another?
- How can plates at convergent boundaries still slide down inclines when they are sliding into the mantle?

Consider Unbalanced Forces

With your class

- What happened to the foam plates squished between the spring scales in Lesson 2 when we removed 1 of the spring scales?
- What would this look like on an incline/with plates?

Connect Gravity and Plate Motion

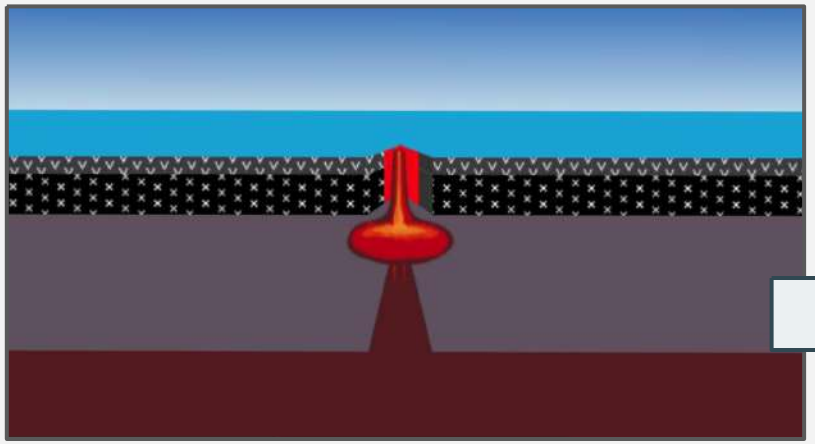
On your own

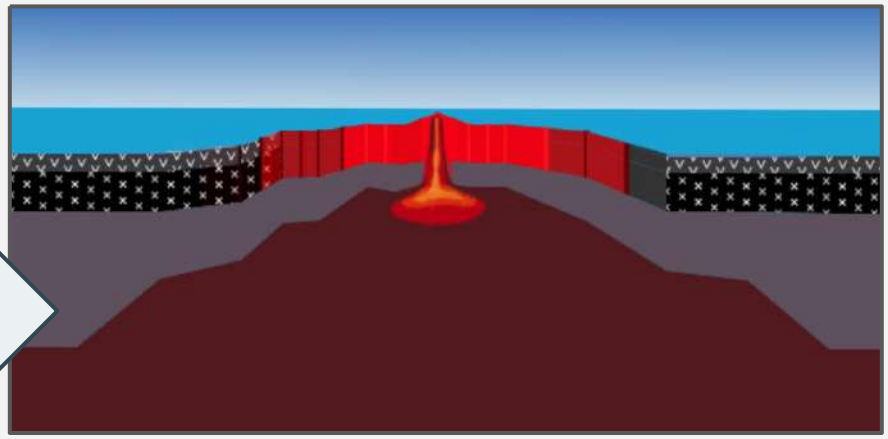
What do our lab results tell us about the more complex plate systems?

Connect Gravity and Plate Motion

With your class

- How is an incline being formed at this divergent boundary?
- How is gravity acting on the plates at this boundary?

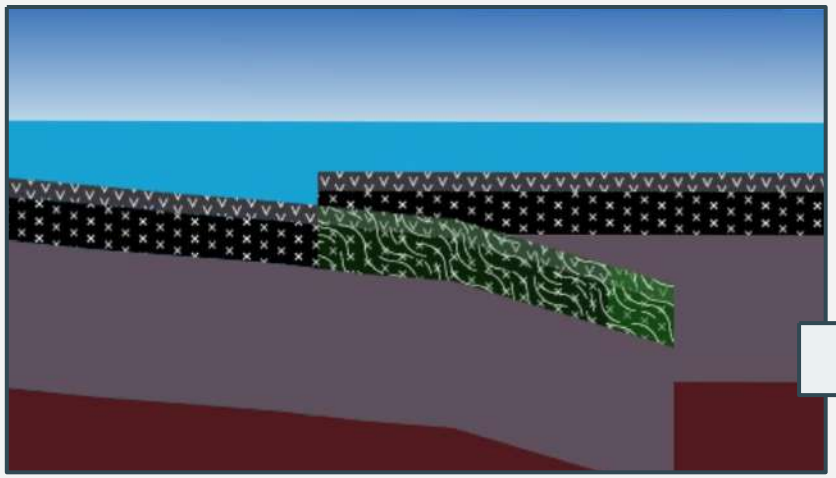


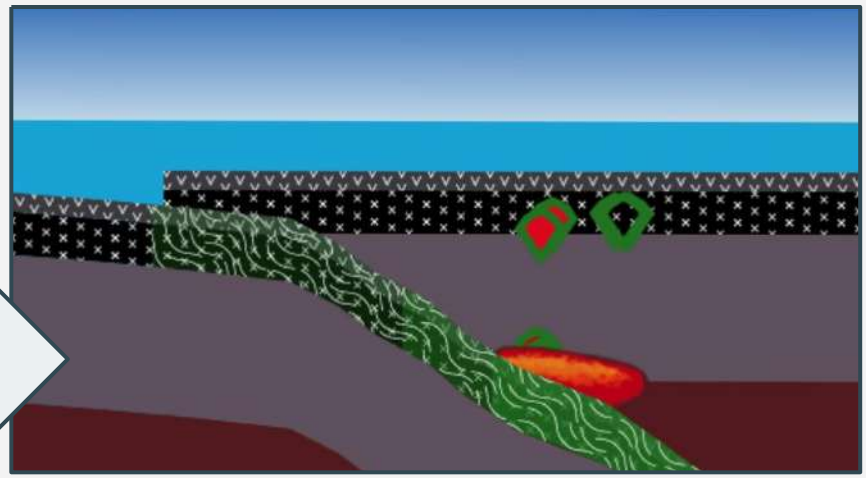


Connect Gravity and Plate Motion

With your class

- How is an incline being formed at this convergent boundary?
- How is gravity acting on the plates at this boundary?

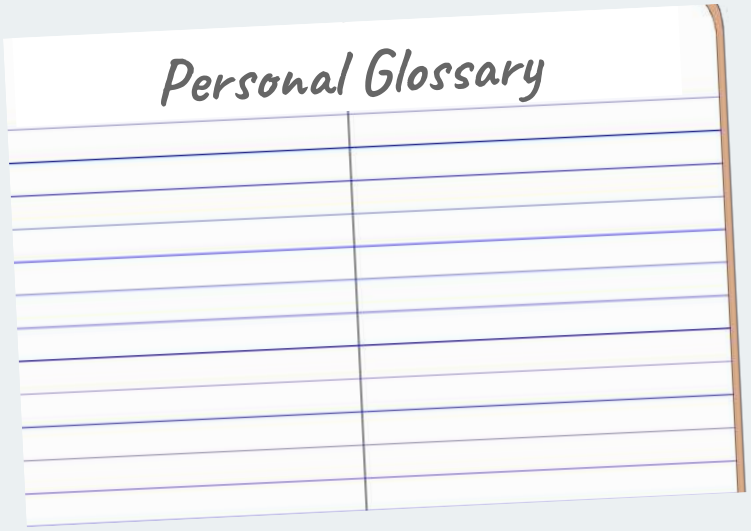




Update Personal Glossary

On your own

Use words and drawings to add new meanings for terms.



Add to Consensus Model

Individual Think Time

Review what we have on our consensus model about plate boundaries from Lesson 10.

What should we add now that we have investigated friction and gravity?

Add to Consensus Model

With your class

What should we add now that we have investigated friction and gravity?

Progress Tracker

On your own

Update your Progress Tracker.

Lesson #	What did you figure out?	Which of these lenses did you use to figure this out?	How did using these lenses help you figure this out?
11-12		❑ Stability over time ❑ Change over time ❑ Thinking at/across different scales	

Licensing Information