Lesson 2: Answer Key 4

Progress Tracker Examples

Below is an example of what students might add to their Progress Tracker. Please note that this is not an exact list of what a student should add, or an exemplar of how to fill out this chart. This is one example of many possible responses based upon how students have engaged in the lesson and their individual learning.

Lesson #	What did you figure out?	Which lenses did you use to figure this out?	How did using these lenses help you figure this out?
2	*The net force on an object is all the forces on an object added together, with direction. Forces are vectors that can be broken into pieces called components. When all the forces on an object balance, it is stable. When forces become unbalanced, changes happen and things are no longer stable. All systems change, but some systems change quickly and some are stable for a long time*	☑ **Stability over time or space** ❑ **Change over time or space** ☑ **Thinking at/across different scales**	*We looked at foam plates with forces from spring scales all pushing from different directions. The plate was stable as long as the forces were balanced. When a scale was taken away, the block suddenly moved and then found a new stable spot. We connected this to Earth's plates and how they are stable for a really long timescale, but then maybe forces change and things like the crack in Afar and earthquakes happen.*
5	*The mantle has different temperatures in different places, which means the matter is different. This could create different unbalanced forces in different locations, which is why some regions*	❑ **Stability over time or space** ❑ **Change over time or space**	*Changing from the global scale of Earth's layers to regional differences within the mantle allowed us to see differences that might be causing matter differences and forces to be unbalanced, to cause different shapes on Earth's surface.*

	have different kinds of surface features than others.	☑ Thinking at/across different scales	
6	The mantle pushes on itself because of differences in density. These differences are caused by temperature differences and cause the matter in the mantle to move around like a lava lamp. Less dense mantle is pushed up by the matter around it.	❑ Stability over time or space ☑ Change over time or space ☑ Thinking at/across different scales	We saw how the matter in the mantle tank and lava lamps moved around over time, and saw that in the mantle tank this could be explained with temperature differences and density. We used the particle-level scale to explain how the matter of the whole mantle pushed on itself based on motion and spacing of particles.
9	Oceanic crust is younger and more dense than continental crust. In the middle of oceans, there are plate boundaries with the youngest rock, and it gets older as you move away from the plate boundary. The rock at Afar is the type of rock we see near these boundaries, young basalt.	❑ Stability over time or space ☑ Change over time or space ☑ Thinking at/across different scales	We saw that the space scales of distance from ocean plate boundaries also showed change over time because the rock got older when it got farther away. This showed that new rock seemed to be forming over time at the plate boundary and pushing the older rock away.
11/12	Gravity, like all forces, has magnitude and direction. When an object is on an incline, we can think of gravity as breaking into components that pull down the incline and into the surface. If the incline gets steeper, the component that pulls down the incline gets stronger. Gravity acts similarly to this at plate boundaries with ridge push and slab pull.	☑ Stability over time or space ❑ Change over time or space ❑ Thinking at/across different scales	We used balanced forces to indirectly measure forces. This was possible because the object was stable. Its motion was not changing. Therefore, the forces on it had to all be balanced, and we could measure the components of gravity by measuring the forces balancing gravity down and into the incline.