Diggin’ Through Time

**SC.7.L.15.1** Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.

**SC.7.L.15.3** Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.

**ACT 1**

Characters: Narrator, Professor Johnson, LeBron, Dwayne, Taylor, Solange, Dr. Neutron

*In the hot, dry desert of the Bahariya Formation, in northern Egypt, Professor Johnson and her six student scientists are looking for signs of fossils.*

**LeBron:** Dr. Johnson! Dr. Johnson! I think I found something!

*The group rushes over to LeBron*

**Dwayne:** It looks like some animal’s leftovers from lunch. Yuck!

**Taylor:** Is it a dinosaur? Look at how its spine curves.

**Professor Johnson:** Remember Taylor, dinosaurs walked the earth millions of years ago, and this fossil is at the very top layer of sand, meaning it has to be a recent fossil.

**Taylor, Dwayne, Solange, LeBron:** Huh?! What do you mean Dr. Johnson?

**Professor Johnson:** This can be explained by the law of superposition that tells us the youngest layer of rock, or fossils, is found at the very top, while the oldest layer of rock is found at the very bottom. Think about when you put different colors of sand into a bottle. What sand has been there the longest?

**Solange:** The one I put in first, the one at the bottom!

**Professor Johnson:** Exactly, the sand that was deposited first is the oldest, and it remains on the bottom. The youngest layer is on top. Now let’s figure out what this animal is.

*The group extracts the fossil and its surrounding rock and brings it back to the laboratory where another scientist, Dr. Neutron, is able to examine the fossilized rock under a microscope.*

**Dr. Neutron:** Come over here students. I have just found evidence that this fossil is not a lizard, but in fact a mammal! Look into the microscope, do you see the imprints of what looks like fur?
LeBron: Oh yeah! This animal looks like it had fur, four limbs, it had bones and was clearly multicellular for it to be that big of an animal with all those bones! And on top of all that, it was found in the top layer of rock, meaning it must be a recent animal in evolutionary time.

*The group turns to the back of their packets and fills out the table.*

**ACT 2**

Characters: Narrator, Professor Johnson, LeBron, Dwayne, Taylor, Solange, Dr. Neutron

*The students and the professor return to the desert where they first found fossils.*

Professor Johnson: Let’s keeping digging students! This is a hint that there may be other fossils in this area.

Dwayne: It’s so hot out here, and dry. Anyone want to do my half of the digging?

Solange: Geez Dwayne, you are THE HEAT after all! And besides, this weather makes it perfect for fossil preservation. And quit your complaining Dwayne, this is exciting stuff!

Taylor: Whoa, look at how the sedimentary rock we are digging into just changed color.

Professor Johnson: Good point Taylor, you’re so swift! That means we’ve just started digging into sand from a different time point, an OLDER point in time.

Dwayne: This is such a snooze. When’s lu-WHOA! WHAT’S THIS!?

The students rush over to Dwayne’s site.

Solange: Well it has four limbs, just like our last fossil did.

LeBron: Do you think it had fur like the last fossil?

Dr. Neutron: I’ll take this back to my laboratory. Give me a minute.

Professor Johnson: Let’s keep digging!

*The group continues working until the sun sets and they find one more species.*

Dwayne: CLEARLY this is a fish. Looks like something I am about to eat for dinner tonight. Mmm Mmmm!

Professor Johnson: That’s correct Dwayne. It has to be an ancestor of modern day fish. Notice how we are in an even older rock layer and now our animals no longer have four limbs. Let’s call it a night after we finish filling out our tables.
The group turns to the back of their packets and fills out the table.

ACT 3

Characters: Narrator, Dwayne, Taylor, Professor Johnson, Solange

After getting some rest at the research station, the group returns for another day of digging.

Dwayne: Yawns. I thought this was going to be boring, but finding a fossil yesterday really changed my mind! LETS DO THIS!

Professor Johnson: We did some great work yesterday students. Let’s keep it up today. We found three fossils yesterday, that we can use as an index to determine how old those layers of sedimentary rock are. For example, four limbed animals didn’t evolve until 400 million years ago, so we know the age of the rock is somewhere around there.

Solange: Whoaaaa that’s older than my grandma!

Taylor: I haven’t found any fossils yet, today is going to be my day!

The group digs for a few hours until....

Taylor: Got something!!! It looks like a needle pointing out of the ground! Ew...

Dwayne: Is it a fish? No it can’t be, it has no bones!! Weird!

Professor Johnson: Be careful students, we don’t want anyone tampering with the fossils! They can be the key to answering our questions about evolution!

Dwayne: Evolution? Like how monkeys became people?

Solange: No Dwayne! That’s not possible! Evolution is the theory that explains how living organisms have developed into the species from earlier forms, they share a common ancestry that went extinct.

Professor Johnson: That’s correct Solange, we have only found extinct ancestors of species we see today. Let’s try to make a cladogram, like scientists do every day, to understand how and when traits evolved.

The group begins to dig and uncovers a strange animal.

Professor Johnson: Millions of years ago, before animals had bones, they were made out of cartilage that didn’t fossilize. This animal is multicellular and it looks aquatic. Let’s fill out our table to understand where it fits in evolutionary time.
The group goes back to their tent to fill out their tables and to make their cladograms.