**Succession**

**Section 1**

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| 00:00:00 | TEACHER: Remember that our lesson question is what is ecological succession? And if you think back, we learned that a community is all the populations living together in a particular area. So does a community always remain the same? Definitely not. Communities can be destroyed by a major disruption |
| 00:00:18 | such as a volcanic eruption. New communities can then develop in areas that have been destroyed or in areas where a community never existed. Next, you will learn how communities develop in an area when very few resources are available, such as this gravel-covered mountain you see here left from a moving glacier. |

**Section 2**

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| 00:00:00 | TEACHER: Succession is the gradual or slow change in the types of species that live in a community. It happens when a barren area-- meaning, an area with hardly any plants-- develops into a community of living things over time. It can take anywhere from one year to millions of years for ecological succession to happen in an environment. |
| 00:00:23 | Let's look at an example of succession. This forest that you see here had a wildfire a few years ago. It suffered from a lot of damage. But if you look at the pictures, you can notice a lot of changes that have occurred in the forest. The first picture was one year after the fire happened. See the weeds and grass that are just starting to form on the forest floor? |
| 00:00:49 | Now if you take a look at the second picture two years after the fire, you'll see that there are even more weeds and grass on the forest floor. The third picture is three years after the fire. Notice how green the forest floor is becoming. The changes that a community go through during succession can be predicted. Why? |
| 00:01:10 | Because succession follows the same basic steps in all different environments. Now let's take a closer look at succession. There are two types of succession, primary succession, and secondary succession that we'll learn about later. So don't worry about that one for now. They differ by the state of the environment |
| 00:01:32 | and the resources that are available when succession begins. So let's talk about primary succession. Primary succession is the gradual introduction of species in an area where no soil or organisms exist. Many of these environments are newly exposed to Earth's surface. Can you think about how this could have happened? |
| 00:01:53 | The image you see here shows an island that is forming from the eruption of an undersea volcano. The environment is newly exposed to Earth's surface. It has no topsoil and no living things. Primary succession may occur on this island. Primary succession may also occur in areas where the soil has been destroyed or removed, |
| 00:02:17 | such as areas that have been covered by glaciers-- like that image we saw earlier-- and areas that have experienced certain types of mining. |

**Section 4**

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| 00:00:01 | TEACHER: There are three main steps to primary succession. It begins with the growth of a pioneer species. Pioneer species are the first species to populate an uninhabited area. They are called pioneer species because they are the first species to move into an area that contains no living things. One of the most common pioneer species are lichens. |
| 00:00:25 | A lichen is a fungus and an alga or bacterium growing together in a mutualistic relationship. Lichens are able to grow on bare rock, like you see growing here, making them ideal pioneer species for primary succession. Now, let's move on to step step. As pioneer species like lichen and moss grow, they break open cracks in the rocks. |
| 00:00:51 | Over time, the rocks are broken down into smaller pieces due to the lichens and also erosion that eventually become part of the newly-forming soil. When pioneer species die, their materials decompose, adding nutrients to the soil. The soil becomes rich with nutrients for other plants to grow. As the soil enriches, different types of plants |
| 00:01:14 | are able to grow within it. This leads us to step three of primary succession. Over time, a few plants can become a field and eventually turn into a forest. The seeds, flowers, and fruits of the new plants attract animals in search of food. For example, bees come to the forest in search of nectar. The larger trees also provide nests and burrows |
| 00:01:38 | for different types of forest animals. Over time, a community of plant and animal populations form. |

**Section 6**

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| 00:00:00 | TEACHER: So we're still working on answering our lesson question, what is ecological succession? Think back. Do you remember the two types of succession we're learning about? If you guessed primary and secondary, you are right. Primary succession occurs in areas where there are no remains of a previous community, |
| 00:00:28 | such as this lava field. Sometimes an ecosystem suffers from a major catastrophe or is hit by a natural disaster like a forest fire. But a few parts of the previous community remain. So although the ecosystem changes dramatically, succession doesn't have to start from scratch. We see an example of that here. Succession that occurs from this type of situation |
| 00:00:56 | is called secondary succession. Let's look at how secondary succession compares to primary succession and see what the final stage of succession looks like. Ready? |

**Section 7**

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| 00:00:00 | TEACHER: Let's talk more about secondary succession. Secondary succession is the gradual change in the species of an area after a disturbance. It occurs when an ecosystem is disturbed but some of the previous plant or animal species remain. Because of the starting point, secondary succession happens much quicker than primary succession. Another important aspect of secondary succession |
| 00:00:28 | is that the soil remains. Sometimes, it even becomes enriched with nutrients through the changes it went through when it was disturbed. Can you think of a disturbance that could lead to secondary succession in an environment? The image you see here shows a forest after a wildfire. The forest ecosystem and the community that lived within the forest have |
| 00:00:53 | been dramatically disturbed. A lot of the community is gone. But there are a few remains. And the soil is still intact. In fact, there are some species that become activated by the heat of a wildfire. These may be some of the first organisms to reappear in the community. |
| 00:01:16 | Secondary succession can occur in many environments that have been disturbed, either through natural disaster, human interference, or neglect. Secondary succession often occurs in fields, parks, mines, and farms that were once used for human activity but were then abandoned. This picture that you see here shows an amusement park |
| 00:01:42 | in Pripyat, Ukraine. It was abandoned after a nearby power plant exploded in 1986. Secondary succession also occurs in forests where most or all of the trees have been cut down. This is what's called a clear cut forest. Since the topsoil remains intact in all of these instances, and there are likely some plant and animal |
| 00:02:12 | species in the ecosystem, secondary succession can quickly begin. It doesn't take too long for wildflowers and grasses to cover the soil. Then, after a few more years, saplings and small trees grow tall in the soil that has been enriched by the grasses and flowers. After many years, more and more trees grow into a forest. |
| 00:02:32 | The same pattern of secondary succession occurs in environments disrupted by natural disasters. Can you think of some natural disasters? Natural disasters can include hurricanes, tornadoes, floods, and fires. |

**Section 10**

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| 00:00:00 | TEACHER: When A community has progressed so much that it's stable and balanced, it is considered a climax community. A climax community is made of several plant and animal species. Take a look at the picture you see here. You can see that there are lots of different types of plant species. |
| 00:00:18 | A climax community marks the final stage of both primary and secondary succession. It can mark a community's complete return after destruction from a natural disaster or the establishment of a thriving community from nothing. Now let's take a look at some of the main differences between pioneer species and climax communities. |
| 00:00:44 | Pioneer species mark the start of primary succession only. While climax communities mark the end of both primary and secondary succession. There are only one or two pioneer species that begin succession compared to the many different types of plant and animal species in a climax community. Most pioneer species are small and simple and can survive only on very little. |
| 00:01:23 | The species in a climax community tend to be larger and more complex and use more resources. Most pioneer species also reproduce in large numbers. While many of the species in a climax community reproduce in small numbers. |