Ecological Succession Lab

Name _____

Date _____

Period _____

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A community of living things is never finished. Fast-forward bare places and time how communities come back.

☐ I can compare primary and secondary succession using numbers for time and soil.

☐ I can use inertia and resilience to predict how a community changes after a disturbance.

Part 1. Fast-forward a place (Tab 1)

SEP 5 · CCC Scale, Proportion, and Quantity

Pick **Bare rock**. Press **Play** (or use the slider) all the way to the end. Then do the same for **Empty city lot**. The **Stages reached** box fills in as you go. To get exact numbers, set a year and press **Measure this year**.

1. The year each stage begins. Then divide: rock year ÷ lot year.

Stage	Bare rock (year)	City lot (year)	Rock takes how many times as long?
1. Pioneers			
2. Grasses and wildflowers			
3. Shrubs			
4. Sun-loving trees			
5. Mature forest			

2. Measure each place at year 20 and year 100.

Place and year	Soil depth (cm)	Plant species	Tallest plant	Plant cover (%)
Bare rock, year 20				
Bare rock, year 100				
City lot, year 20				
City lot, year 100				

READ FIRST. In the lab, find the green **Learn It** box and read it. Then answer 3 to 5.

3. Name the **pioneer species** you saw on bare rock. In your own words, how do they start to make soil?

4. The lot reaches a mature forest about 5 times faster than the rock. Use a soil number from Q2 to explain why.

5. Graph **Plant species** for the lot. Species peak at _____ around year 40, then fall to _____ by year 150. Use the word **shade** to explain the drop.

Part 2. Disturb it (Tab 2)

SEP 2, 5 · CCC Stability and Change

Pick the community, the disturbance and **Large (all)**. Choose your prediction in **Predict first**, then press **Run** or **Skip to the end**. **Change** = how much it dropped. **Back to 90%** = years to recover.

6. Fill in from **Your runs** .

Community	Fire: change (%)	Fire: years back to 90%	Cleared: change (%)	Cleared: years back to 90%
Grassland				
Temperate forest				
Rain forest				

7. Two more runs. Temperate forest, **Windstorm** . Change when it hits **Small (25%)** : _____% **Large (all)** : _____%. Temperate forest, **Invasive plant** , Large. Native plants at year 80: _____%.

READ FIRST. In the lab, find the green **Learn It** box and read it. Then answer 8 to 11.

8. Which community has the highest **inertia** to fire? Give its number.

9. Which community is most **resilient** after clearing? Which is least? Give numbers.

10. A classmate says, "An ecosystem that is hard to damage will also bounce back fast." Use the rain forest's two numbers to argue for or against.

11. Use your Q7 numbers. (a) How does the size of a disturbance change the effect? (b) Why does the forest not come back after the invasive plant the way it does after a fire?

Part 3. Mount St. Helens (Tab 3)

SEP 4, 7 · CCC Stability and Change

These are real measurements from study plots after the eruption of May 18, 1980. Pick a site, move the year slider, and press **Record this year**. If a year has no survey, the lab shows the last one.

12. Plant cover (%) at each site.

Site	First year measured: cover	1990 cover	Last year measured: cover	First year at 10% or more	Years after 1980
Studebaker Ridge					
Pine Creek					
Butte Camp					

READ FIRST. In the lab, find the green **Learn It** box and read it. Then answer 13 to 15.

13. Read what 1980 left at each site. Tick one box in each row, then give your evidence for one row.

Site	What it is
Studebaker Ridge	☐ primary succession ☐ secondary succession ☐ plants mostly survived
Pine Creek	☐ primary succession ☐ secondary succession ☐ plants mostly survived
Butte Camp	☐ primary succession ☐ secondary succession ☐ plants mostly survived

Evidence: _____

14. At Studebaker Ridge from 1984 to 1994, the most common plant was _____. Use **nitrogen fixation** to explain why it is a good pioneer species.

15. Predict Studebaker Ridge in 2040. Will cover be higher, lower or about the same as in 2009? What will move in next? Use the pattern in the graph.

Wrap it up

SEP 7 · CCC Stability and Change

16. A classmate says, "When a forest is destroyed, it always grows back the same way, at the same speed." Use one number from Part 2 and one from Part 3 to argue against this claim.

NYSSLS: building toward HS-LS2-1, HS-LS2-2 and HS-LS2-6 (DCI LS2.C Ecosystem Dynamics, Functioning, and Resilience). Environmental Science, Chapter 5, Lesson 5.2: How Do Ecosystems Respond to Changing Conditions? Tags: SEP = Science and Engineering Practice, CCC = Crosscutting Concept. Tab 1 and Tab 2 numbers come from tuned models; Tab 3 numbers are real data from Roger del Moral's Mount St. Helens plots.