

Succession Lesson Plan

Objective	Warm Up	Reminders	Key Concepts
Describe how events and processes that occur during ecological succession can change populations and species diversity.	What adaptations do we have that help us to survive in our environment ?	Test corrections due next time	Understand the concept of facilitation through game simulation Analyze the hardships of emerging species in a newly traumatized environment Compare and contrast primary and secondary succession React to varying succession events in a game simulation

B.12.F. describe how environmental change can impact ecosystem stability. Readiness Standard

preAP Biology 9.27.12

- Agenda
 1. Ecological Succession Notes
 2. Adaptations Notes
 3. Review WS
 4. Succession game
- Homework
 - Exam Next Class Period
 - Test Corrections must be completed by TOMORROW
- Objective
 - Describe how events and processes that occur during ecological succession can change populations and species diversity.
- Warm Up
 - What adaptations do we have that help us to survive in our environment?

Daily Expectations

- C – Conversation – No talking during notes
- H – Help – I will help you
- A – Activity – Succession and adaptation notes
- M – Movement – Stay in your seat
- P – Participation – Individual note taking
- S – Success – Take notes on your note sheet, no talking during notes nor chatting on joinme

Daily Expectations

- C – Conversation – On-task conversation allowed
- H – Help – Your team mates will help you
- A – Activity – Succession Game
- M – Movement – No moving from your seats
- P – Participation – Group work
- S – Success – Follow the rules, keep noise levels down

Materials:

Succession game boards: see attached sample

Succession game pieces

Succession student handouts – notes and game practice

Activities: **Independent Practice** – **Modeling** – **Group Practice** – **Check for Understanding**

(5 min – before bell)

Students have their binders out and are writing down the objective and warm up for the day.

(3 min)

Students are writing down their objective and warm up and turning in their homework from the day before.

(1-2 min)

“Please discuss with your shoulder partner the answer to the warm up: What adaptations do we have that help us to survive in our environment?” Allow the students to discuss for only a short amount of time to avoid off-topic conversation. **Independent Practice** “Raise your hand if you would like to tell the class what you and your partner had to say about this relationship.” Confirm or correct their answer. Maybe call on someone else if they are too far off. **Check for understanding**

(2-3 min)

Go over the days agenda and objectives as well as any important deadlines or due dates. Remind the students to turn in their work from last time. “Today you will need to turn in your homework and then we will take notes about succession, a very important rebirth process by ecosystems after a major disaster has occurred. Finally, we will end with some notes on adaptation and see how organisms adapt to their changing environment. Does anyone have any questions about what we are doing today? **Check for understanding** Remember your next exam is on the first of October. Any test corrections need to be completed by September 28th.”

(20 min)

Pass out notes sheet. “Today we will be taking notes on succession, please log into join me and type in the code on the board.” Go through the notes with the students; walk around to make sure they are all on the same page. Explain and expand with necessary information. **Group practice**

(8-10 min)

“We will now play a Succeeding to Succession game to understand how the organisms interact in a brand new, clean slate environment.” Pass out game instructions, boards and cards. Tell the students to leave the materials alone until instructed to sort them. “Everyone has a role in this game and everyone is going to represent a different species. **Modeling** If you are the card manager, you make sure all of the cards are in order and don’t get lost. If you are the time keeper, you make sure the game is moving efficiently and remind the students about the time. If you are the enforcer, you make sure all the players move according to each card and don’t try to cheat. If you are the rule reader, you make sure everyone understands the rules and abides by them. I will only take questions from the enforcer. You will also be representing a plant species that will try their turn in succession. The four species are *Carya aquatica* or Water Hickory, *Pinus taeda* or loblolly pine, *Podocarpus macrophylla* or Yew shrub, and *Berberis thunbergii* or Japanese barberry. The water hickory piece is the plastic tree, the loblolly pine is the small Christmas tree, the yew shrub is the brown pom pom and the Japanese barberry is the green pom pom. Now I will number you off and see who plays which role and represents which species.” Assign each player a role and species based on their seating and the random spinner assignment.

(10-15min)

Students play through the game. Put timer on for 10 minutes, if there is good on-task behavior, add 5 minutes. **Group practice**

(12 min)

Pass out reflection sheets “Put the pieces in the plastic bag and put everything in the center of the table. Keep your cards out but make a neat pile with them. Have this succession practice sheet out in front of you. I need you to listen very carefully because I am not going to repeat myself, this is for a grade, and you have only ten minutes to complete it. This is independent, silent work. **Independent practice.** I have indicated next to each question how much points they are worth. I suggest you spend your time wisely and pay attention to how you answer the questions worth more points. Be specific, quote actual wording from the game cards, and stay on task.” Set the timer for 10 minutes.

(5 min): Wrap up

Collect the game boards, pieces and papers from students. Allow the students some time to talk about the game. Remind them of upcoming test dates, correction deadlines and pass out any work that has been graded.

Guiding Critical Thinking:

Students simulate the effects of succession on a community and specific species through a board game. The game is intended to explain the aspect of facilitation, where the successes of one community type change the environment gradually so as to not favor their own (or their children's) continued dominance, but rather favor the success of some new, different community members. This analogy comes through when the students are required to think analytically about why certain species move forward in an event and why others move backwards or are unaffected during an event. Some of the questions require applying a specific gaming card scenario to questions concerning the success of other species in a community. See attached student sheet for examples.

Differentiation:

General	Learning Style	Special Needs
I try to accomplish equity in the classroom by setting up ipads at the front of each table during note taking. This gives every student a closer look at the board right in front of them, avoiding the strain needed to see it at the front of the room. Game play in general has shown major success in appealing to the different needs of students.	The visual learners receive visual stimulation from the game pieces progressing or digressing through the board. The card scenarios also give the learners a reference point for information. The auditory and verbal learners are able to talk and listen throughout the game. Discussion is pertinent to the productivity of the game since each player is affected by every players cards. The kinesthetic learner is accompanied by the game pieces and the physical moving through the game board.	Large print on the cards helps learners with reading issues. The ipad at each table gives each student an equal view of the information. Students struggling will have access to their peers for help. Each student is given a role that provides equal dedication to the moving forward of the game.

Assessment:

Students will turn in their Succession Practice worksheets as a formative assessment. Assessing the conversations throughout the game give another informal test of the student's ability to retain the information and apply it.

Reflection:

Students were on task and enjoying the game. Some students were unclear as to when they should draw a card. To clarify, I added tips to the game to leave up on the board and ipads to remind them of pertinent rules in the game (See Figure 1). One of the available roles in the game was the enforcer, whose job was to ensure all players moved through the game according to the card. He/she enforced the outcomes of the succession events. I believe I need to change the role name to something less negative.

The noise level in the room was high, but it was frequently on-task conversation about the game and questions. Several of the students were concerned with filling out the worksheet while they played the game. I assured them that I wanted them to play first and answer the questions later. This may not have been the best approach to accomplish a connection between the game and the material, but students were fairly successful with the worksheet questions. I also enjoyed hearing the students talk through things before leading them to the concepts I wanted them to learn. The notes tied more into the questions in the worksheet than I had originally planned. When students were confused about a specific worksheet question, I was able to direct them to their notes and specific gaming material to assist them. The next time I give this lesson, I will need to assure that I give clear instructions, find an efficient method for distributing materials and name the responsibilities more carefully.

Tips for Success

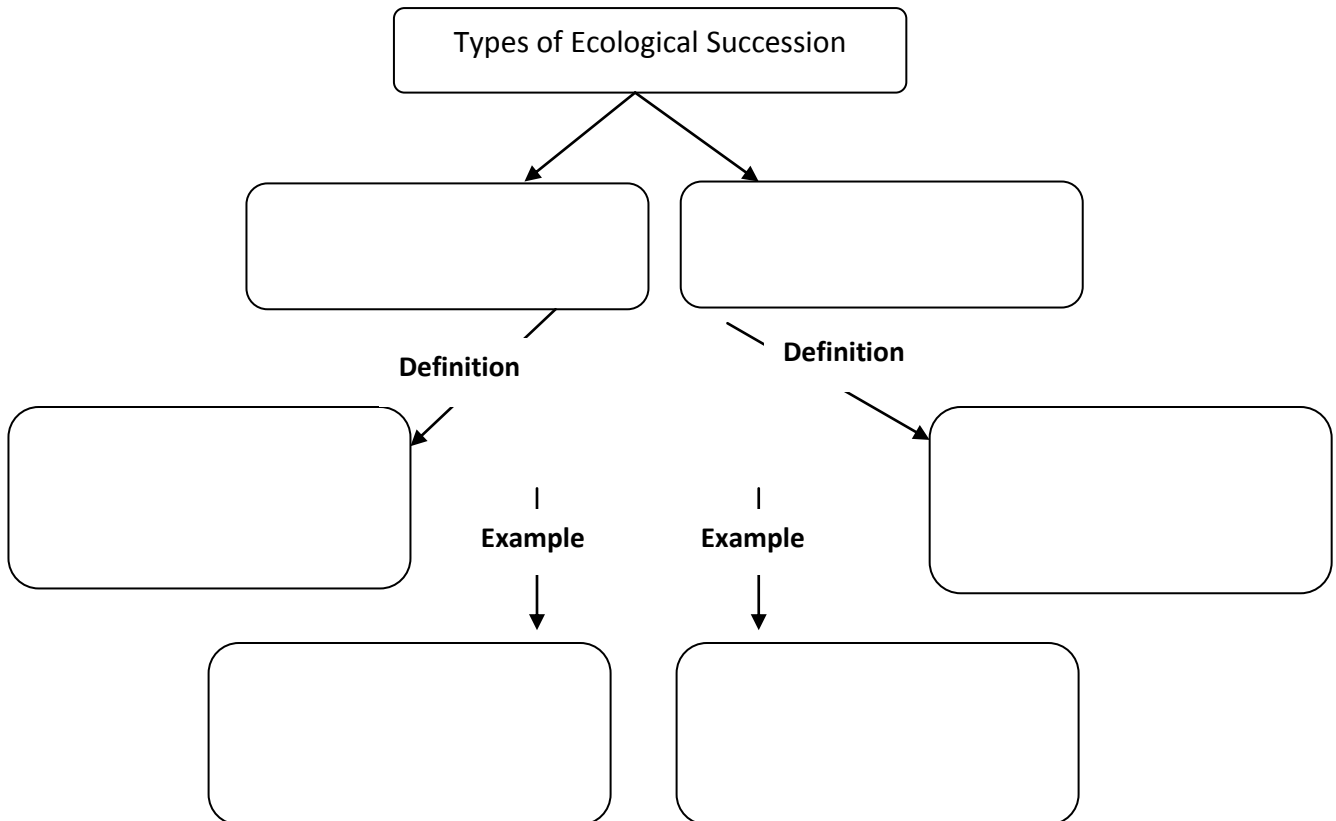
- Only when it is your turn and you've rolled the dice can you draw a red card after landing on a red space
- Do not draw a card if you land on a red space resulting from a card dictation in another player's turn
- Follow all rules on the cards drawn from EACH player

Name _____ Date _____ Per _____

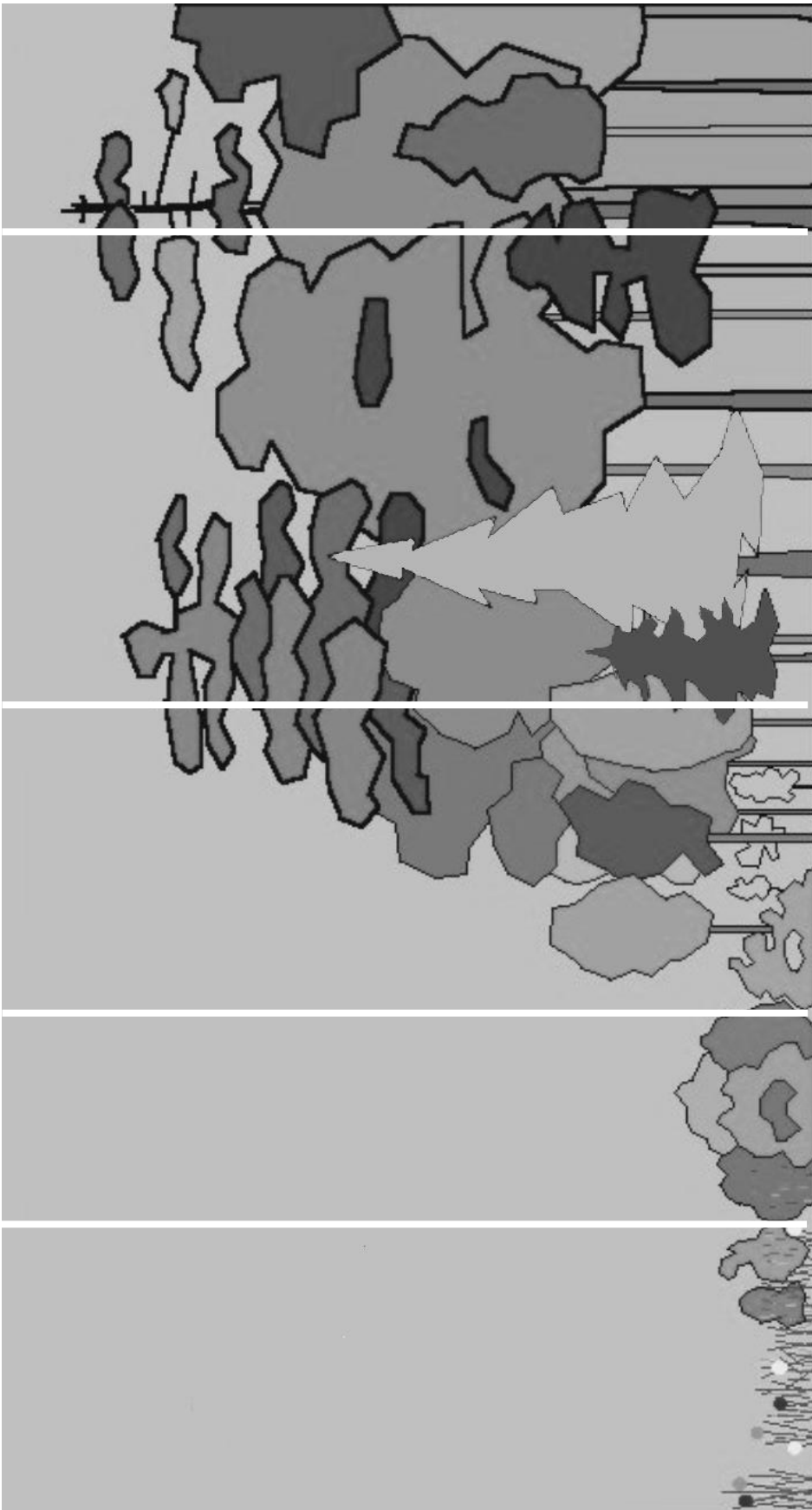
preAP Biology

Ecological Succession Notes

1. What is succession?
2. Give examples of abiotic factors that can cause change in a community.
3. Give examples of biotic factors that can cause change in a community.
4. The first organisms to arrive during primary succession are called _____ .
Give examples:
5. The next species that come in take advantage of the work done by the pioneer species. These are called _____ .
Examples:
6. Describe what happens to the biodiversity of a community as it ages.
7. A community that reaches a stable state of maturity is called a _____ .
8. Complete the concept map.



9. Describe what is happening in each stage in the diagram below.



Succeeding in Succession Game Rules

Game pieces:

Loblolly Pine (*Pinus taeda*)

Water Hickory (*Carya aquatica*)

Yew Shrub (*Podocarpus macrophylla*)

Japanese barberry (*Berberis thunbergii*)

Rules:

1. Each player chooses a game piece and rolls the dice to see who moves first. The person who rolls the highest number goes first and turns continue in a clockwise rotation.
2. To move through the game board, players roll a dice and follow the squares. When a player lands on a red square they draw a card. The card will designate the next move of EVERY player.
3. After a card has been played, the next player starts his/her turn from their current position depending on what the last turn assigned. Some players may be affected in other players' turns depending on the card.
4. If two players end up on the same square, no matter the color, they will have to duel for survival. In a duel, the person who rolls the highest number wins. The winner moves up one space, the loser moves back one space.

<p>A volcano covers the area with ash (primary succession) – everyone goes back to start</p>	<p>A broken dam sends a flood through the forest – Japanese barberry move back two spaces</p>
<p>Lightning strikes and causes a fire – <i>Loblolly pine</i>, <i>Yew shrub</i> and <i>Japanese barberry</i> move back 3 spaces, <i>Water Hickory</i> move back one space</p>	<p>A glacier edges through the area scraping down to bare rock. (primary succession) – everyone goes back to start</p>
<p>A harsh winter freezes the ground – <i>Loblolly pine</i>, <i>Water Hickory</i> and <i>Yew shrub</i> moves back one space</p>	<p>A logging company strips the forest of hard wood trees for lumber – <i>Water hickory</i> move back 3 spaces</p>

<p>Overcrowding!! The soil has been depleted of nutrients – the person who rolls the highest number gets to thrive, all others perish. Highest roller moves up three spaces, lowest rollers move back two spaces</p>	<p>A large rodent population depletes the shrubs for nutrients – <i>Yew shrub</i> and <i>Japanese barberry</i> move back two spaces</p>
<p>A tornado rips through the forest – <i>Loblolly pine</i> and <i>Japanese barberry</i> move back 3 spaces, <i>Yew shrub</i> and <i>Water hickory</i> move back one space</p>	<p>Thousands of locusts migrate through the forest – <i>Yew shrub</i> and <i>Japanese barberry</i> move back two spaces, <i>Loblolly pine</i> and <i>Water hickory</i> move back one space</p>
<p><i>Water hickory</i> thrives as time passes – <i>Water hickory</i> move up two spaces</p>	<p>A thriving canopy provides heavy shade for the underbrush – <i>Yew shrub</i> move up one space, <i>Japanese barberry</i> move up two spaces</p>

<p>A warm fall causes the leaves from the pine and hickory to fall, shading and rotting the understory – <i>Yew shrub</i> and <i>Japanese barberry</i> move back one, <i>Water hickory</i> and <i>Loblolly pine</i> move up one</p>	<p>Overcrowding!! The soil has been depleted of nutrients – the person who rolls the highest number gets to thrive, all others perish. Highest roller moves up three spaces, lowest rollers move back two spaces</p>
<p>The <i>Japanese barberry</i> overpopulates and changes the pH in the soil – <i>Water hickory</i> moves back two spaces, <i>Loblolly pine</i> and <i>Yew shrub</i> moves back three spaces, <i>Japanese barberry</i> moves up one space</p>	<p>High winds take out the tops of hard wood and soft wood trees. <i>Water hickory</i> and <i>Loblolly pine</i> move back two spaces</p>
<p>A development company clears the forest to build houses, everyone move back four spaces</p>	<p>Overcrowding!! The soil has been depleted of nutrients – the person who rolls the highest number gets to thrive, all others perish. Highest roller moves up three spaces, lowest rollers move back two spaces</p>

<p><i>Ceratocystis fimbriata</i>, a deadly plant fungus, infected the pollen development of all hard wood trees – <i>Water hickory</i> move back 3 spaces</p>	<p>Disease depletes the mammal populations, shrub grazing decreases. <i>Yew shrub</i> and <i>Japanese Barberry</i> move up 2 spaces</p>
<p>Contaminated run-off water causes severe soil erosion – everyone moves back two spaces</p>	<p>A rare parasite infects the bark of soft wood trees – <i>Loblolly pines</i> move back two spaces</p>
<p>Five years after a primary succession event allows shrubs to flourish while trees are still seedlings and immature – <i>Yew shrub</i> and <i>Japanese barberry</i> move up three spaces</p>	<p>Litter from fallen trees enriches the soil for all species. Everyone move up one space</p>

Succession Practice

Give one example based on the cards when the success of one species positively affected the success of another species.(5 points)

Give one example based on the cards when the success of one species negatively affected the success of another species. (5 points)

Reflect on the process of the game by answering all of the following questions:

1. What plant species were you?(1 point) _____
2. Was your plant included in the community climax?(Yes or no)(1 point) _____
3. Which plants succeeded in succession during your game? (1point) _____
4. Do you think all of the plants would have been able to reach community climax, explain why or why not. (2 points)

A very important concept of succession is facilitation, where the successes of one community type change the environment gradually so as to not favor their own (or their children's) continued dominance, but rather favor the success of some new, different community members. Why do you think organisms would facilitate the success of other organisms when it would be at the expense of their own success? (10 points)
