
What's Going On?

Understanding Systems



Purpose:

- This activity highlights the interconnectedness of ecosystems and how an organism depends on others for survival. It also demonstrates how keystone species can determine the success of an ecosystem.

Objectives:

- Students will define what a system is and explain how its parts work together through in-class discussion.
- Students will simulate how an ecosystem functions through an activity using role cards to help determine interactions.
- Students will determine what a keystone species is using observations gathered during the activity.

Time Required: 30 minutes - 1 hour

Appropriate grades: 3rd - 8th

NGSS and Common Core Standards:

5-LS1-1: Develop a model to describe the movement of matter among plants, plants, decomposers, and the environment.

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Materials:

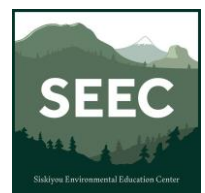
- Game instructions in lesson plan (provided)
- Organism necklaces - 30 (provided)
- Open space

Activity:

Introduction	
	Begin by asking students what a system is. Record their answers on a board so that the whole class can see. A basic definition of a system is "a set of connected things or parts forming a complex whole." Once the students understand what a



**ENVIRONMENTAL
EDUCATION** GRADUATE
PROGRAM
SOUTHERN OREGON UNIVERSITY



Seaside Environmental Education Center

	<p>system is, ask them for examples of systems (i.e. the solar system, skeletal system, their classroom, etc.) You may choose to pick one of the examples and discuss its parts and how they work together.</p>
Body	<p>Now it's time for an activity to showcase the complexity of systems. Gather the students in the playing area and have them form a circle.</p> <p>Activity Rules:</p> <ol style="list-style-type: none"> 1. Tell participants to silently pick two other participants without letting them know that they have been picked. 2. Tell participants to move so as to keep an equal distance between them and each of the two people they have chosen at all times. 3. Have the participants begin circulating, each movement triggering many others in an active, interdependent fashion. 4. Occasionally tell participants to speed up or slow down. 5. Continue game for approximately 5 minutes. 6. After the game is over, ask students what they experienced and what they noticed. * 7. After discussion, the game will start again, with a twist. About two minutes into the game, tap a student (or assign this role to another student). The participant who is tapped waits 5 seconds and then sits down. Then anyone who chose that player must wait 5 seconds and sit down. And so on, and so on until everyone sits down. <p>*You may choose to continue this process for several rounds before moving on to step 8. You can randomly select students to perform tasks such as jumping, clapping, etc. to show the connectedness of the whole system.</p>
Closure	<p>After the game is over, point out that what was witnessed was an ecosystem and the person that was originally tapped was an example of a keystone species. Ask students what they think a keystone species is - it's obviously very important because the whole system fell apart without it! A keystone species is defined as "a species on which other species in an ecosystem largely depend, such that if it were removed the ecosystem would change drastically." A prime example of a keystone species is the beaver. (By building a dam, beavers create pools of water suitable for many other plants and animals). You can continue the conversation by asking students for examples of other keystone species and how they shape the environment.</p>



**ENVIRONMENTAL
EDUCATION** GRADUATE
PROGRAM
SOUTHERN OREGON UNIVERSITY



Modifications:

- **Elementary:**

- Give students ecosystem character cards to help guide the game. Instruct students to still silently select 2 other character cards that they would depend on for food, shelter, pollination, etc. (i.e. if given Dark-eyed Junco card they would depend on a Douglas Fir for habitat and and Metallic Wood-boring Beetle for food or if given a Black-tailed deer, they would depend on Idaho Fescue and Thimbleberry for food.) It's okay if students select the wrong organisms, the activity will still run as it should.

- **Middle School:**

- Have students select a keystone species and write a report on how its presence affects its ecosystem.

