Web of Life
(Grades 4-8)

Tennessee's endangered and threatened species depend on one or more of our wonderfully complex ecosystems. Each part of an ecosystem is connected to the species that depend on it. Ecosystems fall apart when species disappear. This activity will illustrate the "web of life" to the students and prepare them for a more in-depth exploration of Tennessee's ecosystems.

Objective
Students will be able to explain the interconnectedness of living and nonliving parts in the ecosystem.

Age
All levels

Time
One or more class periods of 50 minutes.

Setting
A large open space, preferably outside.

Correlation
Grade 4

C: Life Science
D: Earth Science
E: Science and Technology
F: Science in Personal and Social Perspectives

Grades 5-8
C: Life Science
F. Science in Personal and Social

Materials
- Copies of the ecosystem fact sheets
- Copies of "web of life" cards
- Scissors
- Tape, or hole-punch and string, or address labels (ex. Avery #5160)
- Ball of string

Preparation
- For beginner students, follow the preparation recommendations as written. For intermediate students, see the "Variation for Intermediate Students" section, pg.129.
- Read the ecosystem fact sheets found in this guide pgs. 24-79. As you read through the fact sheets, read over the "web of life" cards for each ecosystem, pgs. 130-137. The cards represent the living and nonliving parts of each ecosystem.
- Prepare sets of "web of life" cards for each ecosystem by making copies of the master "web of life" cards provided and cutting them out of each page. The cards can be taped to the students shirts or you can punch holes in each card, run string through them and they can hang them around their neck. Another option is to print them on address labels such as Avery #5160.
- The number of cards prepared for each ecosystem should correspond to the number of students in your class. Should you be working with a large group, consider making two or more sets of cards per ecosystem and dividing the class into two or more groups.
- Add the following abiotic (nonliving) and biotic (living) terms to the ecosystem card set. Please note these terms are listed on page 137 and can be copied directly for cards.
  - Water
  - Sunshine
  - Soil
  - Climate
  - People
  - Omnivores*
  - Herbivores*
  - Decomposers*
  - Wind
  - Rocks
  - Air

* defined in the glossary

Procedure
1. Decide with the class which ecosystem will be illustrated first. Give each student one labeled "web of life" card for that ecosystem. Review the ecosystem fact sheet with the class, so students can become familiar with the ecosystem and their role.

2. Have the students attach the cards to the front of their shirts with tape. Explain that each student will represent that part of the ecosystem during the game. Discuss with the students where the ecosystem is found in Tennessee before beginning the game. This information is found in each fact sheet in the ecosystem comparison chart. Ask them if they have ever visited this type of ecosystem.

3. Have the group members form a circle. Have one member of the \group hold the end of the ball of string and pass the ball around the circle. Always pass the string ON TOP of other strings. Explain that as the string is uncoiling the members are joining the ecosystem. Make sure each person holds onto the string.

4. Once the circle is connected by the string, explain that the class will now illustrate how parts of ecosystems are connected.

5. Have the student with the string hand the ball to any student within the group. (This time do not just pass it around the circle, but create a web.) While this pass is being completed, have the student describe the connection between the two parts. For example, the student can say, "I am a Royal Snail, and I am connected to you, the Sun, because you provide light and warmth." Have the students pass the ball of string until all the different ecosystem parts are connected. Make sure the string stays taut! Have the ball returned to the first student with the end of the string. Now the "web of life" is complete.

6. Have everyone keep still and tell them that if they feel a tug on their string, they should **gently** tug in response. Ask the student with the end of the string to **gently** begin tugging. Keep reminding everyone that if they feel a tug, they should tug in response. Soon the vibration will spread through the web and the whole web will shake.

7. Ask the students how the tugging might illustrate what happens when one link in an ecosystem is damaged through natural or human-made stress. (The rest of the ecosystem feels the effects.) The tugging can also illustrate how each ecosystem part is connected to every other part; they all depend on each other.

8. Ask the students to pick one or two organisms or general items that seem less important than the others, and have them drop the string while remaining in the circle. Repeat the tugging procedure.

9. Have several more students drop the string, notice and point out how the web begins to come apart. As the components are eliminated, discuss extinction and the effects it can have on an ecosystem.

10. Have a student rewind the ball of string and give them an opportunity to stretch. Repeat the game again using a different ecosystem.

Extensions and Variations

Variation for Intermediate Students

1. Before playing the game, divide the students into groups responsible for one or more ecosystems. Have the groups read through the appropriate ecosystem fact sheet(s) and create lists of terms for their ecosystem.

2. Once they have created lists for each ecosystem, have them make a set of "web of life" cards for their ecosystem, making sure that they create enough cards for each student in the class to have one. Should you decide to break the class into two or more groups when playing the game, have the students make two or more of each card.

3. Follow the procedure as written.

Extension

By representing characteristics from all seven ecosystems, the students will demonstrate the connections between all ecosystems. As students drop out, explain that when a species is lost from any ecosystem, anywhere in the world, the "web of life" of worldwide biodiversity is affected.

Evaluation

Have students draw pictures of the "web of life" of a Tennessee ecosystem.

Add more parts (circles) to the ecosystem mobiles based on what the students have learned.

Variation

Instead of playing the game, use the "web of life" cards to have students add components to their ecosystem mobiles or to make concept maps on poster board to illustrate and explain the connections they draw between the cards.

Spring/Seep Web of Life Cards

Royal Snail	Plant
Spring Salamander	Tennessee Yellow-eyed Grass
Dead leaves, twigs, insects	Groundwater
Slackwater Darter	Rock opening
Frog	Insect
Barren's Topminnow	Deer

River Web of Life Cards

Plants along the river bank	River Otter
Nashville Crayfish	Great Blue Heron
Pallid Sturgeon	Cumberland Monkeyface Pearlymussel
Caddisfly	Brook Trout
Mosquitos	Snails
Bass	Northern Parula (bird)

Mountain Bog Web of Life Cards

Nutrient poor soils	Cranberry
Sphagnum	Bog Turtle
Bog Lemming	Green Pitcher Plant
Seepage water	Slugs
Flat topography	Nashville Warbler (bird)
Wood Frog	Dragonflies

Cave Web of Life Cards

Indiana Bats	Blind Cave Fish
Tennessee Cave Salamander	American Hart's-tongue Fern
Eastern Wood Rat	Eastern Phoebe
Darkness	Barn Owl
Blind Crayfish	Dead leaves, insects, plants
Cave Glow Worm	Karst topography

Cedar Glades Web of Life Cards

Thin layer of soil	Indigo Bunting (bird)
Prairie grasses	Pyne's Ground Plum
Leafy prairie clover	Tennessee Coneflower
Nashville Breadroot	Limestone Fameflower
King Snake	Southeastern Five-lined Skink
Limestone bedrock	Extreme light and temperature

Barrens Web of Life Cards

Fire	"hardpan soils" (allow grasses to grow, but not trees)
Prairie Grass	Snowy Orchids
Eggert's Sunflower	Insects
Prairie Warbler	Wild Turkey
White-tailed Deer	Oak Tree
Pale-purple Coneflower	Grasshopper Sparrow

High-elevation Web of Life Cards

Canadian climate (cool, moist)	Fraser Fir
Rock Gnome Lichen	Peregrine Falcon
Spruce-fir Moss Spider	Fog
Carolina Northern Flying Squirrel	Canada Warbler (bird)
Black Bear	Grass
Insects	Roan Mountain Bluet (plant)

Terms for All Ecosystems Web of Life Cards

Water	Sun
Climate (temperature, moisture)	People
Omnivore	Herbivore
Decomposer	Wind
Rain	Plant
Insect	Soil