Background on Wetlands

Wetlands can be found in virtually every county of every state in the nation, from arctic tundra wetlands in Alaska, to peat bogs in the Appalachians, to riparian wetlands in the arid West. A wide variety of wetlands have formed across the country due to regional and local differences in climate, geology, topography, hydrology, soils, vegetation, water chemistry, and other factors. Although there are many different wetland types, they can be divided into two broad categories:

1. Tidal wetlands are found along our nation's coasts within reach of the ocean tides; typically vegetated by grasses and other emergent plants adapted to salt water, they can range from narrow fringes on steep shorelines to nearly flat expanses several miles wide.

2. Non-tidal wetlands account for most of the wetlands of the United States, and are found throughout the nation's interior beyond tidal effects.

Peat lands are inland wetlands containing thick deposits of slowly decaying plant material called peat. "Bogs" and "fens," the major types of peat lands, occur in old lake basins or other topographic depressions in the Great Lakes states, portions of the Northeast, the Appalachian Mountains, much of Alaska, and along the Southeastern Coastal Plain. Unusual plants such as sphagnum moss, pitcher plants, sundews, Venus flytraps, and a number of orchid species are uniquely adapted to the nutrient-poor acidic conditions found in bogs. Fens are richer in nutrients and less acidic than bogs, and are typically covered by sedges, willows, grasses, and reeds.

Southern deep water swamps are wooded wetlands of the Southeastern U.S. that have standing water for most, if not all, of the growing season. Characteristic trees in these swamps are bald cypress, Tupelo gum, and water oak.

Inland freshwater marshes, like Tavasci Marsh, include a variety of wetlands that are full of soft-stemmed plants like grasses, rushes, cattails, and water lilies. They can form in isolated depressions such as the "prairie potholes" of the upper Midwest, as fringes around lakes and ponds, or as nearly flat expanses of emergent wetlands such as those found in Everglades National Park. Wet "mountain meadows" are high-elevation freshwater wetlands found in forested and non-forested mountain regions.

Riparian wetlands form on the floodplains of rivers and streams, and are often dry for portions of the growing season. In the Southeastern U.S. "bottomland hardwood forests" are the most common type of riparian wetland. In the arid regions of the West they are common along rivers and springs and often contrast noticeably with the surrounding upland vegetation.

Environmental Quality

Water quality: Wetlands act as natural water purifiers, filtering sediment and absorbing many pollutants in surface waters. In some wetland systems, this cleansing function enhances the quality of groundwater supplies as well.

Shoreline and streambank stabilization: Shorelines and riverbanks reduce erosion by absorbing the energy of storm waves and slowing water currents.

Flood control and streamflow maintenance: Wetlands along rivers and streams store excess water during rainstorms. This reduces downstream flood damage, and lessens the risk of flash floods. The slow release of this stored water into rivers and streams helps keep them from drying up during periods of drought.

Erosion control: Wetland vegetation binds the soil and slows the downstream movement of sediment.

Wildlife habitat: Wetlands provide habitat for many species of amphibians, reptiles, birds, and mammals that are uniquely adapted to wet environments. Upland wildlife such as deer, elk, and bear commonly use wetlands for food and shelter. Wetlands are particularly vital to many migrating bird species. For example, wood ducks, mallards, and sandhill cranes winter in flooded bottomland forest and marshes in the southern U.S., and prairie potholes serve as breeding grounds for over 50% of North American waterfowl.

Fish and shellfish habitat: Freshwater and marine life, including trout, striped bass, pike, sunfish, crappie, crab, and shrimp, rely on wetlands for food, cover, spawning, and nursery grounds. Between 60% and 90% of U.S. commercial fisheries depend on wetlands.

Habitat for threatened and endangered species: About 35% of all plants and animals listed as endangered species in the United States depend on wetlands for survival, including the whooping crane, bald eagle, American crocodile, dwarf lake iris, and Eastern prairie fringed orchid.

Specialized plant habitat: Nearly 7,000 plant species live in U.S. wetlands, many of which can only survive in these wet environments.

Ecosystem productivity: Some wetland types are among the most productive ecosystems on earth. A stand of common cordgrass in a salt marsh can produce more plant material and stored energy per acre than any agricultural crop except cultivated sugarcane. Nutrients and plant material flushed from some wetland systems during storms provide essential food for plants, fish, and wildlife in estuaries and other downstream ecosystems.

Reduction of coastal storm damage: Coastal wetlands help to blunt the force of major storms. Mangrove wetlands, such as those along shorelines in Biscayne National Park in Florida, reduce flooding, coastal erosion, and property damage.

Recreational opportunities: Many wetlands contain a diversity of plants and animals that provide beautiful places for sightseeing, hiking, fishing, hunting, boating, bird watching, and photography.

Water supply: Some wetlands help provide clean, plentiful water supplies. For example, wetlands in Florida's Everglades help recharge the Biscayne aquifer, the sole source of drinking water for the Miami metropolitan area.

Education: Ecological, cultural, and historical resources are abundant in our nation's wetlands, providing countless opportunities for environmental education and public awareness programs.

Wetland origins: Although some of our wetlands have been created in as short a span as a human lifetime, many others took thousands of years to develop. Tavasci Marsh is a nontidal riparian wetland fed by springs from limestone layers of rock.

Flooding of coastal lowlands: Flooding from gradually rising sea levels has created broad coastal marshes in areas protected from wave action by barrier islands, harbors, or reefs. Coastal wetlands also form when silt is carried down river and deposited as it reaches the sea. Plants then take root and hold the soil deposits firm against the force of the tide.

River floodplains: Floodplains develop through erosion processes and through deposition of sediment or adjacent lands during floods. Wetlands form on floodplains where periodic flooding or high water tables provide sufficient moisture. These "riparian" wetlands may undergo constant change as rivers and streams form new channels and when floods scour the floodplain or deposit new material.

Glaciers: Glaciers helped to create wetlands in the northern states 9,000 to 12,000 years ago. Large wetlands formed when glaciers dammed rivers, scoured valleys, and reworked floodplains. Smaller wetlands were created when large ice blocks were left behind by receding glaciers and formed pits and depressions in the land.

Beavers: Beavers once played a more significant role in forming smaller inland wetlands by damming rivers and streams. Though trapping had greatly reduced the number of beaver in the U.S., recent wildlife protection measures have resulted in the recovery of beaver populations. Beaver dams may last in excess of 100 years, though many are shorter-lived.

Other forces of nature: Wind action in the sand hills of Nebraska formed depressions, many of which have become wetlands. Wetlands may also form in "sinkholes" and other areas where percolating water has dissolved in bedrock. Montezuma Well is a limestone sinkhole formed by the collapse of an underground cavern. Earthquakes can create wetlands by damming rivers or causing land to drop down near the water table or shoreline. Waterfalls often have lush vegetation under and around them, sustained by the spray.

People: Some "incidental" wetlands are formed when highway and dam construction, irrigation projects, or other human activities alter drainage patterns or impound water. In recent years government agencies, conservation groups, and individuals have been intentionally creating and restoring wetlands. Research is continuing to improve methods for replacing lost wetlands and the important functions and values associated with them.

OBJECTIVES

After completing this exercise the student will be able to

1. observe by using their senses
2. describe the nature of their environment

GRADES: 6 TO 8

AZ CURRICULUM STANDARDS:
Science Standard 1 — Science as inquiry

GROUP SIZE: 25

DURATION: 1 to 2 hours

SETTING: Tavasci Marsh

MATERIALS: Paper and pencil.

Educator's Outline for

WETLANDS ACTIVITIES

BACKGROUND: Observation is the focus for inquiry as inquiry is the basis for observation.

PROCEDURE:

1. Have the children walk through an area and write down what they observe with their senses, such as sunlight through leaves, a bird song, the rough texture of bark.

2. Perhaps have the children spread out in an area and sit or stand quietly while they observe and then come together in small groups to share their observations.

3. A focus may be provided, such as how many green things did we see or how many kinds of rocks or animal tracks.

4. As a classroom exercise, count the observations and note how many are visual observations and how many smells were counted, etc.

Educator's Outline for

CHAIN OF LIFE

BACKGROUND: One thing leads to another and we often forget how interactive our world is and how great things depend on the small. Students will observe the world around them and describe the relationships they see and what forces strengthen and weaken the links between those relationships.

PROCEDURE:

1. Have the students consider the food chain of who eats what.

2. Ask what would happen if a link were taken away in the food chain – for example, if one considers the mosquito larva eaten by fish, which in turn are eaten by herons, what would happen to the other links in the chain?

3. What would other factors such as pollution or dams have on the environment and the food chain?

OBJECTIVES

After completing this exercise the student will be able to

1. see and understand how the world is a vast network of links and interactions.

GRADES: 6 TO 8

AZ CURRICULUM STANDARDS:
Science Standard 4 —Life science
Science Standard 5 —Physical science

GROUP SIZE: 25

DURATION: 1 hour

SETTING: Classroom

MATERIALS: Paper and pencil, listing of plants and animals for a given area.

OBJECTIVES

After completing this exercise the student will be able to

1. use their imagination and observations to figure out how animals might perceive their environment.

GRADES: 6 TO 8

AZ CURRICULUM STANDARDS:
Science Standard 4 —Life science
Language Arts Standard 2 — Writing

GROUP SIZE: 25

DURATION: 1 to 2 hours

SETTING: Classroom

MATERIALS: Paper and pencil, imagination.

Educator's Outline for

HOW ANIMALS SEE THEIR WORLD

BACKGROUND: Animals live in and use the world in different ways. The students may use their imaginations to understand and describe the animals that live in an area and how they might live; for example, how a bird might choose nesting material, or how an owl might hear mice running through the grass at night.

PROCEDURE:

1. One way to proceed would be to have a grab bag of animals and plants in the area. Have children choose one and consider what the animal/plant must have to live—food, water, shelter, safety, etc.

2. Have students consider how various animals interact; e.g., a deer with various browse plants, a fish with predators such as a bald eagle, two birds in the same nesting area, etc.

3. Have the students create a world in which their animal or plant lives; they can do this through illustration or by writing a short essay or poem.

Educator's Outline for

WHAT WOULD HAPPEN IF?

BACKGROUND: In the arid Southwest water is often used faster than it can be replenished.

PROCEDURE: Students make use of a water table model. Set up trays with ice and soda or kool-aid. Replenish the liquid at a given rate (i.e. 1 cup per minute) while more and more students use straws to drain the reservoir.

- As the 'water table' drops encourage the students to think about how we are using our liquid resources.
- Are there other ways to recharge the ground water?

OBJECTIVES

After completing this exercise the student will be able to

1. learn about finite resources
2. the danger of over-use.

GRADES: 6 TO 8

AZ CURRICULUM STANDARDS:
Science Standard 4 –Life science
Science Standard 5 – Physical Science

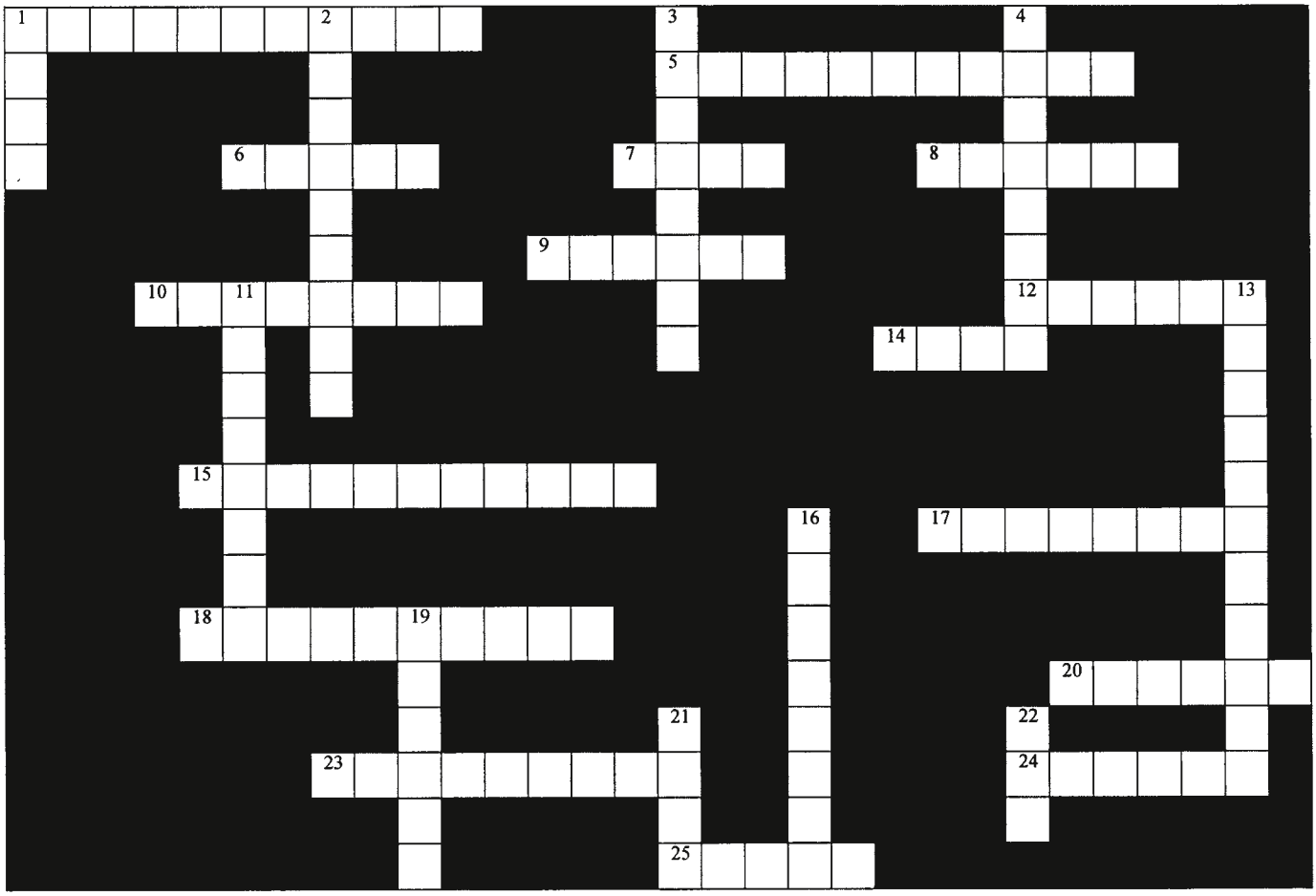
GROUP SIZE: 25

DURATION: 1 hour

SETTING: Classroom

MATERIALS: Trays of ice chips or cubes, straws, bottles of colored soda or kool-aid, water, paper and pencils.

PLANTS & ANIMALS CROSSWORD



Across

1 Cultivating crops for food
5 Poisonous viper
6 Food, "FRIJOLES"
7 Food grown on a stalk
8 Plant grown for weaving
9 Clever mammal
10 Tree with bean pods
12 Gourds grown for food
14 Food caught in the creek
15 Cactus with flat pads
17 Arachnid with tail-stinger
18 Poisonous "hour-glass" spider
20 Cotton-tailed mammal
23 Creepy crawler with 42 legs
24 Small, long-tailed reptile
25 Large black bird

Down

1 Picnic pests
2 Friendly, furry spider
3 Bush, "drugstore of the desert"
4 Bush with salty-tasting leaves
11 Small, long-tailed rock dweller
13 Tiny, colorful bird
16 Large, strong, thirsty tree
19 Black nut from a tree
21 Large mammal, "Bambi"
22 Large deer-like animal