TABLE OF CONTENTS

ACKNOWLEDGMENTS

Special thanks go the Metropolitan Service District which funded this project through their Metropolitan Greenspaces Education Grant program. This program supports projects to make people aware of greenspaces and their contribution to the ecological integrity and quality of life in the Portland area.

Leadership of field trips and restoration activities is provided by the Northwest Service Academy, an Americorps program. We are particularly appreciative of the contributions of Sherri Fischer, team steward, and Americorps volunteers Dana Hyland and Dave Frankunas who assisted with curriculum compilation and the coordinated of restoration activities in the spring of 1995.

Pat Willis of the Jackson Bottom Wetlands Preserve, Dick Hollenbeck of the Rock Creek Environmental Studies Center (PCC) and Jim Rapp the Sherwood city manager, are developing the restoration projects and hosting the field trips. Without them, this project would not be possible.

GOALS

If Urban Greenspaces are to survive into the 21st century, the students of today must not only gain an appreciation of the importance of metropolitan greenspaces to the quality of life for all individuals, but they must also understand their personal role in the preservation of these greenspaces. These understandings can only come through education and hands-on experiences. This education and experience cannot be a one time workshop or assembly where a speaker lectures to a large group of students. Instead, students must have the opportunity to learn concepts, practice those concepts, and see the results of their work.

The major goal of this project is to provide a program for a large number of fifth and sixth grade students that will provide both education and hands-on restoration experiences in urban greenspaces through service learning activities.

The program will introduce the students to the important role of urban greenspaces in the natural and human ecosystem through in-class and field-based activities. The students will follow-up this educational experience with a full day working on a greenspace restoration project. Restoration activities will take place at the Jackson Bottom Wetlands Preserve (Hillsboro), Rock Creek Environmental Education Center (Beaverton) and the City of Sherwood.

Specific goals are to:

- develop student understanding of ecological concepts,
- develop student understanding of greenspaces, particularly wetlands,
- develop student appreciation of their role in the development and maintenance of greenspaces,
- utilize the philosophy and strategies of service learning to integrate activities
- with the school curriculum and students' lives, and
- assist classes in raising funds to use for attendance at Outdoor School.

CURRICULUM FRAMEWORK

The curriculum is divided into two parts, the classroom activities and the field trip.

CLASSROOM ACTIVITIES The classroom activities include twelve lessons to develop understandings of ecology and greenspaces. Teachers are encouraged to use the lessons provided but also to change, add, modify and delete to meet the needs of their own classes. Each student will be provided with a workbook to document their learning, record observations and reflect on their experience. As the primary goal of this project is to reach large numbers of students and since there is already a large amount of curriculum already available, many of the activities have been collected from other sources. As a result, this book is done in a "cut and paste" format.

In addition, Americorps volunteers will visit each class in preparation for the field trip. This visit will introduce the restoration project including, clothing, safety and organization.

The classroom lessons are as follows. Detailed lesson plans are found in later sections of this book.

Lesson 1. Population In the Portland Area.
- Population trends in the metropolitan areas.
- Impacts of population growth on life and livability.

Lesson 2. History of the Local School Community.
- Urbanization.
- Why people choose to live where they do.

Lesson 3. "Centerplace City" -- A Land Use Simulation.
- Interest groups.
- Planning and tradeoffs.

Lesson 4. The Metro 2040 Plan.
- Metro's priorities and plans for the next 50 years.

Lesson 5. Open Spaces, Parks and Rivers.
- Metro's greenspace plans.
- Greenspaces in the local community.

Lesson 6. The May 16 Metro Greenspaces Election.
- What the election means for greenspaces.
- Identifying positive and negative impacts.
- Taking a position on the greenspaces issue.

Lesson 7. Water Cycle and Watersheds.

- Review of the concept of the water cycle.
- Definition of watershed.

Lesson 8. Where Does Water Go After School.

- Watersheds.
- Rainfall and runoff.

Lesson 9. Discovering Your Local Watershed.

- Mapping the Tualatin River watershed.
- Local watersheds.

Lesson 10. What Is a Wetland?

- Definition of wetland.
- Characteristics of wetlands.

Lesson 11. Wetland Habitats.

- Different kinds of wetlands.

Lesson 12. Dragonfly pond.

- Relationship of land use on wetlands.
- Individual lifestyle impacts on wetlands.

FIELD TRIP The field trip will be divided into two parts. The first part will include field studies about ecology and wetlands. The second part will involve students in restoration and enhancement activities. These could include trail construction, planting of native species, placement of birdhouses and snags, and elimination of exotic species. Throughout the day students will work in small groups under the leadership of the Northwest Service Academy Americorps volunteers.

SERVICE LEARNING

School-based and community-based service-learning initiatives have much in common, and both are served by attention to standards of good practice. Each desires to serve and educate young people. Both are strengthened by community service activities that are recognized by the community and the youth as meaningful. Subtle differences exist, however. Where school-based initiatives can benefit from intentionally linking the service experiences of students to what they are studying in the classroom, community-based initiatives can be strengthened by developing specific learning objectives fitted to the mission of the sponsoring or recipient agency. Yet, even when these differences exist, school-based and community-based service-learning initiatives can each be strengthened by better understanding the language, objectives, interests, and issues faced by the other. The presentation of the two sets of standards together helps identify areas of significant overlap and subtle divergence, and underscores the opportunities for schools and community agencies to work together for common goals.

Community service is a powerful tool for youth development. It facilitates the transformation of a young person from a passive recipient to an active service provider and consequently helps redefine the perception of youth in the community from a cause of problems to a source of solutions. When combined with formal education (school-based) and/or when thoughtfully organized to provide concrete opportunities for youth to acquire knowledge and skills and to make a positive contribution (community-based) service becomes a method of learning or "service-learning." Service-learning enables teachers and youth development professionals to employ a variety of effective teaching strategies that emphasize youth-centered, interactive, experiential education. Service-learning integrates curricular concepts with "real-life" situations and empowers youth to analyze, evaluate, and synthesize these concepts through practical problem-solving, often in service to the community.

Service-learning connects young people to their community, placing them in challenging situations where they associate with adults and accumulate experiences that can strengthen traditional academic studies. Service-learning also makes classroom study relevant, as young people apply their skills in the world beyond the school's walls with work in math, social studies, language arts, and science.

Service activities provide an opportunity for youth and adults to work together in solving community problems and improving the quality of life. In the process of working toward common goals, youth and adults engage in meaningful dialogue and develop trust and respect for each other. They recognize both have needed skills and knowledge to contribute to society. Awareness and acceptance of significant roles for youth in the community are powerful forces in dispelling the sense of isolation and alienation so many young people suffer today.

Although the terms "service-learning" and "community service" are sometimes used interchangeably, they are not synonymous. Community service can be, and often is, a powerful experience for young people, but community service ripens to service-learning when there is a deliberate and explicit connection made between service and learning opportunities which are then accompanied by conscious and thoughtful occasions to prepare for and reflect on the service experience.

Effective service-learning responds to the needs of the community as well as to the developmental and learning needs of youth. Duration of the service role, type of service, desired outcomes, and the structure for reflection must all be designed to be age-appropriate. Service-learning is most effective when it combines community needs and youth's interests and is compatible with their skills and abilities.

The following standards of service-learning are not a list of absolutes or even a complete inventory of the elements that contribute to high quality. In developing these standards, recognition was given to the wide diversity of regions, populations, communities, and programs they will embrace. They are designed to be broad-reaching in their scope, yet concrete enough to be translated into action as a measure of success in the use of service-learning.

What is Service-Learning?

Service-learning is a method by which young people learn and develop through active participation in thoughtfully organized experiences that...

School-Based

- Meet actual community needs.
- Coordinate in collaboration with the school and community.
- Integrate into each young person's academic curriculum.
- Provide structured time for a young person to think, talk, and write about what he/she did and saw during the actual service activity.
- Provide young people with opportunities to use newly acquired academic skills and knowledge in real life situations in their own communities.
- Are a practical application of what is taught in the school.
- Help to foster the development of a sense of caring for others.

Community-Based

- Meet actual community needs.
- Coordinate in collaboration with the school and community
- Support the learning objectives of the organizations.
- Provide structured time for a young person to think, talk, and write about what he/she did and saw during the actual service activity.
- Provide young people with opportunities to use newly acquired academic skills and knowledge in real life situations in their own communities.
- Expand the young person's learning environment to include the broader community.
- Help to foster the development of a sense of caring for others.

PREPARING FOR THE FIELD TRIP

Details of your class field trip will be sent to you in near future. It will include information on location, bus billing, and other details. When possible, it will include information on the actual project your class will be doing. If your have questions, call Jim Gorter at 690-5404.

Field trips will go on as scheduled, regardless of weather. Because of commitments to other classes and activities, rainchecks are not possible. Please be sure your students are prepared for the weather.

Also, spring is pollen season. If you have students who are susceptible to allergies and hay fever , encourage them to take their medication for two full days ahead of the field trip.

The field trip is an integral part of this unit. As the time approaches, work with your students so they can eagerly anticipate the activity. Also work with them to identify the connections between the restoration project and the content of the classroom curriculum.

In the background materials section of this book, you will find information on "service learning" including suggestions for integrating these strategies into your teaching.

FUND RAISING FOR OUTDOOR SCHOOL

This greenspaces project is an ideal opportunity for your class to raise money for Outdoor School. Instead of a jog-a-thon or read-a-thon, the students could conduct a "serve-a-thon", obtaining pledges for their greenspace restoration efforts.

Money earned by your class will remain with your individual school for the students' Outdoor School fund.

You may wish to involve your room parents or parent club in managing the fund raising activities.

To be more effective, students need to develop strategies for soliciting pledges. Pledge appeals can take the form of written letters and verbal presentations. In either case the presentation needs to be thoughtful, polished and practiced. Students should address the following issues:

- What will you be doing to improve the greenspace?
- Why is it important?
- How long will you be working?
- What is the money going to be used for?
- What is Outdoor School
- Why is Outdoor School important?
- Who will get the money?
- How much do you want me to pledge?

If these questions are not answered in their written material, students should be prepared to answer them verbally. Students may wish to brainstorm other questions they might be asked.

Students may find it helpful to practice their verbal appeals as a classroom learning experience in persuasive speaking.

As the greenspaces restoration activities will not be unit driven e.g. number of trees planted or birdhouses built, pledges should be solicited for the day's activities.

LESSON 1. POPULATION IN THE PORTLAND AREA

Objectives: The student will be able to:

- Construct and interpret graphs showing population trends in the Portland area.
- List positive and negative impacts of population growth.

Time: One class period.

Background: Population is projected to increase rapidly in the Portland area over the next few decades. As a result of these projections, state, local and regional governments are working hard to ensure that the metropolitan area will grow in ways that enhance the livability of the region. Plans address such things as land use planning and urban sprawl, development of transportation and infrastructure systems, economic planning, openspaces and other quality of life issues.

Summary of activities:

- Introduction of Greenspaces unit.
- Graph population trends.
- Brainstorm impacts of population growth, both positive and negative.

Preparation: None.

Materials:

- Student workbooks.
- Overhead of map of Oregon.
- Population data sheet for Oregon and Washington County.

Procedures:

1. Introduce Greenspaces unit.

2. Discuss population in Washington County and the Portland region. Perhaps have students guess what the population is in the area. The population is increasing rapidly in this area. As a result there will be many changes in the region. There will be many more houses and apartments, traffic could get much worse, providing clean water and sewage disposal could become more expensive, there may be many more jobs for people, etc.

3. Using the overhead (or maps for students), review the map of Oregon and the metro region so students will have a geographic framework. Find Washington County and their home town or community.

4. Pass out workbooks. Have students put names on them!!!

5. Discuss the population figures for Washington County and the region. Individual students prepare bar graphs of the population trends.

6. Individual students answer the workbook questions.

7. As a class, brainstorm impacts of projected trends of population growth. Identify which ones are positive, which ones are negative and which could be both.

Handouts and teacher materials:

- Student workbooks.
- Oregon map (Master for overhead).
- Population data sheet (Master foroverhead).

Background materials:

- Population background information.

LESSON 2. HISTORY OF YOUR COMMUNITY

Objective: The student will be able to:

- Interview adults to collect information.
- Describe recent history and changes in the local community.

Time: 30 minutes for class planning, homework and 20 minutes for sharing.

Background: Students often think that their community has been there forever. In many parts of Washington County, this is not so. There are new houses popping up all over, and last year's farms are this year's subdivisions. Often, students think that all the new construction is bad, not realizing that where they live now may be the result of very recent changes.

Preparation: None.

Materials: None.

Procedures:

1. Introduce the concept of local history and the idea that there are recent changes in the community. Ask students how long they have lived in their current house or in the immediate area. Ask if they know how old their house is and what was in the area before their house was built. Tell students they will be interviewing their parents and others to learn about the history of their community.

2. Students work in small groups to develop interview questions to ask their parents, and if possible, any "old timers" in the community. Include such things as how long their family has lived in the area and house, why they moved to the community, how old their house is and what was in the area before their house was built. From "old-timers" they can learn what the area was like in the past.

3. If available, students can compare old street maps of the community with current ones. It is amazing to look at a 1960 map of Washington County!

4. Students conduct interviews. (Homework.)

5. Students share their interview results. Hopefully there will be enough data from this sharing, that the teacher can help the students develop a sense of time for their local community and a sense of change as well.

Handouts and teacher material: None.

Background material: None.

Lesson 3. "CENTERPLACE CITY" -- A LAND USE SIMULATION

Objectives: The student will be able to:

- Identify factors which influence a land use decision.
- Discuss how opposing interests might affect a land use decision.

Background: This activity is from Investigating Your Environment, Teaching Materials for Environmental Education, published by the US Forest Service. The detailed lesson is found on the following pages.

This is an excellent simulation activity, however it was designed for an older age group. Please review it and modify it accordingly for your class. You may want to simplify some of the issues. With sufficient time, fifth and sixth grade students can have a lot of fun with this lesson. Ideally, the lesson is done in one session, probably of 90 - 120 minutes, however, it can be done over successive days.

Simulations and games are great for getting students to identify issues and interests and to prepare and present arguments. It also presents students with the opportunity to develop understandings of positions that are not in line with
their own.

Summary of activities:

- Identify possible land uses for a square mile of land.
- Develop plans for a use of the land and prepare and present oral arguments to support the plan.
- Evaluate their plans and arguments.

Preparation:

- Collect materials (see lesson plan)
- Make copies of handouts:
  - Activity A: one per student
  - Activity B: one per group of five of six
  - Activity C: five of six copies per class

Materials: (See lesson plan.)

Procedures: (See lesson plan.)

Follow-up: Students discuss with their groups how they might do their presentations differently to make them more effective.

Handouts and teacher materials:

- Handouts: Activities A, B, and C.

Background materials: None.

LAND USE SIMULATION GAME -- CENTERPLACE CITY -- NAME, RECORD AND CLASSIFY POSSIBLE LAND USES AND GIVE PRESENTATIONS

CONCEPT

Cause/Effect, Change, Population, Evolution, Interaction, Model

PRINCIPLE

Participants become involved in trying to solve some land use issues for this city. They role play common interests and find out how land use decisions are often made.

OBJECTIVE

- As a result of this activity, the student will be able to predict or postulate at least three different possible points of view on any given environmental issue.
- The student will be able to identify at least 3 factors which would influence a land use decision.
- The student will be able to discuss how opposing interests might effect a land use decision.

PREPARATION

1. Arrange for a room large enough to accommodate five to six tables that will seat up to eight participants per table. The room also needs to accommodate an additional large table with chairs and an easel large enough to be seen from anywhere in the room.
2. Look up population figures for the towns in your area, so that Centerplace's population has meaning for the students.
3. Arrange for a smaller room nearby to accommodate up to 10 persons, a large table and easel.

MATERIALS NEEDED

- Large tables (number depends on number of participants)
- One chair per participant
- One set of four to five different colored markers for each table
- One set of markers for facilitators and one set for use in small room
- Two easels with easel paper
- Two sheets easel paper or newsprint for each table
- One roll masking tape or way to fix paper to walls
- Population figures for local communities
- Activity Sheet A: Brainstorming Possible Land Uses, B: Develop & give Presentations, C: County Board Members

PROCESSES USED

- Observe
- Interpret data
- Classify
- Question
- Predict
- Infer
- Communicate

CURRICULUM CORRELATIONS

See unit introductions under "Activities" for Oregon Common Curriculum Goals (CCG's) for Science and Washington Environmental Education Guidelines (EEG's). Each activity is also cross-referenced on matrices in the appendix.

TIME

60 to 75 minutes, longer if you prolong the discussion.

DOING THE ACTIVITY

A. Set Stage:

Review quickly what will take place, i.e. "During this activity we will participate in simulation game concerning land use in a hypothetical community, analyze what we have done and discuss some ideas and ways to develop your own simulation game about local environmental issues or concerns."Techniques used combine elements of simulations, role-playing and games. You will assume roles of decision-makers in a simulated environment and compete for certain objectives according to specified procedures and rules."

B. Procedure:

1. Distribute activity A. Read the problem to the group: "The problem is to identify some possible uses for the one-square mile (640 acres) of county farmland, four miles northwest of the city. It is now available for the city's use."
2. Ask participants to read the information given on the activity sheet and list possible uses of the land to meet the city's needs.
3. You have 10 minutes. Work individually.

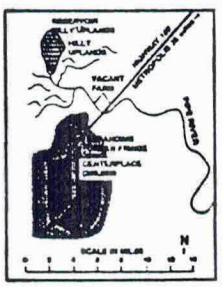
ACTIVITY A: Brainstorming Possible Land Uses — 10 min. Individual

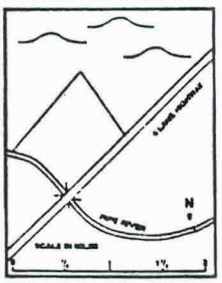
"One square mile (640 acres or 259 hectares) of unused country farmland, 4 miles (6.4 k) northeast of the city, is now available for the city's use."

Read the background information for Centerplace City, and then list some possible uses of the vacant farmland.

Background Information Sheet For Centerplace City:

- The population is 250,000 and rapidly increasing.
- The city's boundaries are being extended, but the suburban fringe is expanding even more rapidly.
- The rapid population growth is accompanied by demands for more housing, more jobs, additional city services, and recreational areas.
- The power for industrial uses, adequate public transportation, and a skilled labor force are available.
- The city is located near forests, to the north. The land to the east is devoted mainly to farming.
- The Pipe River is unpolluted and is the source of irrigation water as well as the municipal water supply.
- The river is too small for freight transportation, but logs could be floated on it.
- The gravel bed of the river is appropriate raw material for concrete manufacture.
- The present sewage treatment plant and garbage disposal area are at maximum capacity.
- The citizens of Centerplace are concerned about the maintenance of a scenic regional environment.
- The County Board of Commissioners is the authority for land zoning, and many citizens' groups are being formed to influence zoning decisions





List possible uses of the land

_____ _____

_____ _____

_____ _____

Investigating Your Environment
Land Use Simulation

C. Retrieve Data:

When most people have started to write down uses, go ahead and ask question 1.

1. "What are some possible uses for the undeveloped land? As people respond, write all comments just as they are said, don't paraphrase. If they are too wordy, ask: "How shall I write that on the chart?" List all suggestions, specific or general. Number the items to simplify identification later. When you feel you have enough material, ask the next question.
2. Ask "Which of these possible uses are similar?" Designate similar uses by letters, symbols, or colors. When most are designated, or the group seems to run out of thoughts, STOP. Change items among categories if the participants change their minds. Don't get bogged down in the details of grouping, i.e. if some people think one use should be in another category, then put that use in both categories and go on to the next step.
3. Ask "What title could we give to all the items in the same category?" e.g. Recreation, Industrial, Utilities, Housing, Commercial.

D. Procedure:

Develop and Give Presentations (Activity B)

1. Have the group separate into the number of land use categories. Groups should not be more than eight persons. Assign one of the categories to each group for them to represent. One way to set up groups is to have the total group count off by the number of categories identified.
2. Hand out activity B. Inform participants they have 10 minutes to list and analyze the advantages and disadvantages of possible uses for the vacant land in the assigned category. They may consider those listed on the board plus any other possible uses they can think of in their category. It is important to stress that this activity is to analyze the uses of the land.

ACTIVITY B: Develop and Give Presentations — 20 min. small groups

Group _____ **Assigned Category of Land Use** _____

Your only task is to analyze and list possible consequences of different land uses within your assigned land use category. Do not decide which is the best use.

Use	Advantages to land/ people/resources	Disadvantages to land/ people/resources

Investigating Your Environment
Land Use Simulation

3. Tell the groups their next activity is to develop a land use plan for the area in their assigned land use category (about 20 minutes)

4. NOTE: See 7 for additional direction after each group has started planning. If all directions are given at first, many groups start drawing a map before considering different land uses.

5. Five minutes into their planning make the following announcements:
   a. "We have just received word that due to the current workload from reading environmental impact statements the members of the Board of County Commissioners have all been resigned. Each group has one minute to elect one member to represent them on the Board."
   b. "Will the new Board representatives please follow_____out of this room?"

6. A staff person takes the new Board to another room, hands out and reviews activity C with them.
   a. Tell them they have 15 minutes until the meeting begins.
   b. Have them concentrate on evaluation criteria first.
   c. Have them elect a chairperson to preside over the group presentations.
   d. Have chairperson read the announcements at bottom of activity C.

ACTIVITY C: County Board members only 15 min.

"One square mile of unused country farmland, four miles northeast of the city, is now available for the city's use."

1. Using this information, your task is to:
   a. Develop criteria to evaluate the proposals.
   b. Develop a system to record your evaluation of each proposal.

Background Information Sheet For Centerplace City:

The population is 250,000 and rapidly increasing.

The city's boundaries are being extended, but the suburban fringe is expanding even more rapidly.

The rapid population growth is accompanied by demands for more housing, more jobs, additional city services, and recreational areas.

The power for industrial uses, adequate public transportation, and a skilled labor force are available.

The city is located near forests, to the north. The land to the east is devoted mainly to farming.

The Pipe River is unpolluted and is the source of irrigation water as well as the municipal water supply.

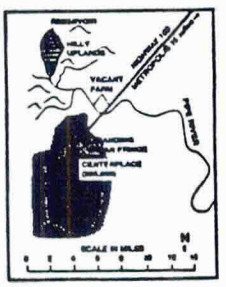
The river is too small for freight transportation, but logs could be floated on it.

The gravel bed of the river is appropriate raw material for concrete manufacture.

The present sewage treatment plant and garbage disposal area are at maximum capacity.

The citizens of Centerplace are concerned about the maintenance of a scenic regional environment.

The County Board of Commissioners is the authority for land zoning, and many citizens' groups are being formed to influence zoning decisions.



Group Missing Presentation (use category)	Criteria to Evaluate Proposal (Rating)					
	1	2	3	4	5	6

Elect a chairperson to preside during the presentations to the group and to run the meeting in an orderly manner. (5 minutes). Announcements to be made by chairperson:

- Because of time constraints, there will be no rebuttal after presentations.
- The board may ask two or three clarifying questions of each group after all presentations.
- You have 3 minutes to give your presentation. You will be given a warning when you have 1 minute left.

Investigating Your Environment
Land Use Simulation

7. After the new Board members leave the main room, announce to the planning groups, "You have about 15 minutes to finish your plan and develop a three minute presentation to be made to the County Board of Commissioners. The presentation must include a visual display such as a land use map and more than one person in each group must participate in making the presentation."

    a. Pass out felt pens and large paper.

    b. You may have to give some extra time to finish plans and maps.

8. NOTE: Allow 40-50 minutes depending upon number of groups. If you are doing this in a classroom, you can have students develop the presentations one day and present them the next.

9. When all groups are ready, the County Board enters and sits at the front. A time-keeper is appointed to cut off all presentations at three minutes (one minute warning). Chairperson announces criteria on Activity C announcements and adheres to them.

10. When presentations are complete, the Board retires to select the best proposal (5 to 10 minutes).

11. While Board is meeting, each small group develops a list of criteria which they think should be used in choosing among the plans submitted. (See previous page)

12. County Board re-enters the room and reads their criteria aloud.

13. County Board announces their decision and gives their reasons. Board adjourns.

14. NOTE: Person in charge must move rapidly to the next question to avoid shouting matches between losing groups. Have Board members return to the groups who selected them. The main purpose is to evaluate the process, not to get bogged down in the content of the issue.

Lesson 4. THE METRO 2040 PLAN

Objectives: The student will be able to:
- Explain the importance of planning.
- Understand the Growth Concept plan for the Metro region and for their home community.
- Write a vision statement for their own community or neighborhood.

Time: One class period.

Background: The Metropolitan Service District is in the midst of planning for the future of the Portland region over the next 50 years. Metro is working very hard to make people aware of its efforts and to involve as many people as possible. Late last year, the Metro Council adopted a growth concept plan which addresses the basic framework for the growth of the region and includes such things as natural areas, transportation, land use inside the urban growth boundary, etc. The next step is the adoption of a Future Vision which outlines the region's long-term values and goals.

Summary of activities:
- Discussion of goals, planning and vision.
- Metro Regional Growth Concept map
- Development of an individual vision for the local community.

Preparation: None.

Materials:
- Metro's 2040 Framework brochure.

Procedures:

1. Write on blackboard: "If you don't know where you are going, how will you know how to get there?" Discuss with students. From discussion, generate the ideas of goals and plans. How does these apply to their lives now, in school, home, etc.?

2. Review population trends for Washington County. What will happen if there will be about 200,000 more people in the county in the next 25 years? What will the impact be on housing, transportation, open spaces, natural areas, schools, shopping, etc. What do the students think would happen if there were no planning for this growth? How can planning help make life better in Washington County in the future?

3. Small groups of students study the 2040 Growth Concept map and find out as much as they can about the Metro region and about their local community. (The map is on pages 2 and 3 of the 2040 Framework brochure. Share their discoveries with the whole class.

4. Have the students think about a vision for the future. What should a vision include? It should be short, only, one or two sentences long. It should address what they see as the desired future condition. It may be based on some core values. Metro addresses values such as individual liberty, regional identity, vibrant cities, healthy economy, conservation on natural areas, etc.

5. Have individual students write a vision for their local community values. They may want to address it from what kind of community they would want to live in. It may only address one part of their community vision for example safety, nature, family, etc.

6. If time permits, students may want to illustrate their vision statements.

7. Post visions on the wall for all to see. Allow time for looking, sharing and discussion.

Handouts and teacher materials:

- Metro's 2040 Framework brochure (1 per small group).

Background materials: None.

Lesson 5: OPEN SPACES, PARKS AND RIVERS

Objectives: The student will be able to:
- describe values of greenspaces
- use a map to identify and locate greenspaces in his/her community

Time: One class period.

Background: Metro has developed a greenspaces master plan for the identification and preservation of regionally significant open areas and stream corridors. The plan was developed with the assistance of many citizens, community leaders and scientists. The goal is to achieve the development of a system of interconnected pieces of land which will be preserved for the benefit of present and future generations.

Summary of activities:
- Introduction of concept of greenspaces.
- Identification of why greenspaces are important.
- Identification of local greenspaces.

Preparation:
Make handouts for students.

Materials:
- Brochure: "Natural Areas, Important for Wildlife and People"
- Handouts: Why greenspaces are important (intro) (1 per student).
- Handouts: Why greenspaces are important (sets for student groups).
- Greenspaces map.
- Student workbooks.

Precedures:

1. Introduce concept of greenspaces. Students brainstorm what they think a greenspace is. List on blackboard. Share Metro's definition of greenspaces (from brochures; reprint included).

2. Students identify greenspaces they are familiar with in their community and describe their experiences there.

3. "Jigsaw" activity. Arrange students in small groups. Pass out "Why greenspaces are important" benefit handouts to each group. Give each group a different benefit to consider. Students read and discuss. See if they can add to the list. of benefits. "Jigsaw" and share with the other groups.

4. Students examine greenspace map to identify areas in their community and other greenspaces they may have visited. Note: Metro is very low on Greenspaces maps. There is only one copy available for each class.

5. In their workbooks, students describe a greenspace experience they have had.

Handouts and teacher materials:

- "Natural Areas, Important for Wildlife and People".
- "Why greenspaces are important" information sheets.
- Metro Greenspaces map.

Background material:

- Excerpts from Metro Greenspace master plan.

Lesson 6. 1995 BALLOT MEASURE 26-26

(NOTE: This lesson was prepared prior to the May 16 election date. Depending on the results of the election, teachers may wish to modify the activities to some extent.)

Objectives: The student will be able to:

- Identify local areas to be acquired as greenspaces if the measure passes
- Describe how the money would be raised to pay for the purchase of the property.
- List arguments for and against the measure.
- Write a persuasive letter to the editor stating his/her position regarding the election and arguments for that position.

Background: On May 16 voters will be asked to approve a measure which would authorize the sale of bonds to raise $135.6 million to acquire 14 regional park sites totaling 6000 acres and 5 regional trail and greenway sites. Funds would also be available for local governments to acquire and additional 90 sites.

Summary of activities:

- Summary of ballot measure.
- Identification of local sites using map.
- Arguments for and against the measure.
- Letter to the editor.

Preparation:

- Duplication of ballot measure summary (1/student) and arguments(1 set/small group).

Materials:

- Maps of proposed acquisitions.
- Ballot measure summary.
- Editorials, letters to editor, etc.
- Student workbooks

Procedures:

1. Students read summary of ballot measure. Share and check for understanding.

2. Working in small groups, students use maps to identify local areas proposed for acquisition.

3. Use "Jigsaw" strategy. Students read an article, editorial, voter's pamphlet or letter to the editor about the Greenspaces ballot measure. In the workbook, identify the position of the author and the arguments the author uses to support that position.

4. "Jigsaw" and share their article with another group.

5. In workbook, student writes a letter to the editor of the local paper stating his/her position and arguments for that position. Share letters with others.

Handouts and teacher materials:

- Maps of sites proposed for acquisition.
- Ballot measure summary and explanation.
- Articles, editorials, letters to the editor.

Background material:

- Ballot Measure 26-26 fact sheets.

Lesson 7. WATER CYCLE AND WATERSHEDS

Objectives: The student will be able to:

- Label a picture of the water cycle and explain it.
- Describe a watershed.
- Understand how much water people use.

Background: This activity transitions from the previous lessons dealing with greenspaces to the scientific aspects of the unit, those ideas centering around wetlands. The water cycle and watersheds are two concepts basic to the understanding of these areas.

Summary of activities:

- Review the water cycle and label its parts.
- Diagram watersheds.

Preparation:

- Refer to your science text for related activities, experiments, etc.
- Jackson Bottom Wetlands Preserve has a classroom visitor program about watersheds. They can be reached at 681-6206.

Materials:

- Water cycle overhead.
- Student workbook.

Procedures:

1. Using the overhead, review the water cycle. Most students are already familiar with the water cycle. This activity provides only a review. If needed, more instruction can be added, including experiments and demonstrations. Water moves through the environment in a closed cycle. The same water molecules move through the cycle over and over again. No water is added to the system or removed from it. The water goes in the same direction all the time. The time it takes water to move through the cycle depends on many factors, temperature, winds, volume of water, etc. Two additional factors are key to understanding the cycle: the sun provides energy for the evaporation and transpiration of water into water vapor and the movement of the vapor up into the atmosphere. Gravity provides the force which brings the water back to the earth.

2. Students label water cycle diagram in workbook.

3. Students complete watershed pages in workbook. Following the directions, in the book, the lesson is self explanatory. Students may want to work together or check their work against each other.

4. Students may want to construct a model watershed using modeling clay, sand or soil.

Handouts and teacher materials:

- Water cycle overhead.

Background materials:

- Watershed information.

Lesson 8. WHERE DOES WATER GO AFTER SCHOOL?

Refer to Project Wild, Aquatic, pages 75-77. One copy of Project Wild Aquatic is provided for each school. Please share with your colleagues.

Objectives: The student will be able to:

- Describe relationships between precipitation, runoff and aquatic habitats.

Time: One to two class periods.

Background: (See lesson plan.)

Summary of activities:

- Measure school grounds.
- Calculate amount of rainfall on the school grounds.
- Discuss what happens to the water after it leaves the school grounds.

Preparation: (See lesson plan.)

Materials:. (See lesson plan.)

Procedures: (See lesson plan.)

NOTE: The average annual rainfall for Hillsboro is 37.57 inches, for Portland the average is 36.60 inches.

Handouts and teacher materials: (See lesson plan.)

Background materials: None.

Lesson 9. DISCOVERING YOUR LOCAL WATERSHED

Objectives: The student will be able to:

- use a map to identify streams and watershed boundaries.
- Make connections between the local watershed and the Columbia River watershed.

Time: One class period.

Background: Locating your local watershed might be challenging for the student and teacher alike. By personally discovering his/her own watershed, the student could realize he/she has a vested interest in maintaining water quality. Almost all of Washington County lies in the Tualatin River basin or watershed. It is a major wildlife area and is the major exit point for treated water leaving sewage treatment plants. Indeed, in the summer, over half of the water in the Tualatin is treated effluent. Many smaller tributaries flow into the Tualatin River. In turn, the Tualatin flows into the Willamette and then into the Columbia River.

Summary of activities:

- Trace Tualatin River and watershed boundaries on map.
- Locate local tributary watersheds.
- Using map of the Northwest trace the Willamette and Columbia River watersheds.

Preparation:

- Make copies of "Know Your Watershed" map.
- Make copies of Northwest map or locate appropriate maps in an atlas.

Materials:

- "Know Your Watershed" maps. one for each group of 3 to 4 students.
- Map of Northwest or atlas.

Procedures:

1. Review concept of watershed. Check for understanding.

2. Small groups of students use colored pencils or markers to:
    a. Trace the Tualatin River from its source to the Willamette River.
    b. Outline the boundaries of the Tualatin River Watershed.
    c. Locate their home community.
d. Locate the tributary stream/watershed their home community is in and trace it on the map

3. Students use atlas or map of Northwest to locate the Willamette and Columbia Rivers and their watersheds. (This could be a good library research project for interested students.

4. Answer questions in the workbook.

Handouts and teacher materials:

- "Know Your Watershed"

Background materials:

- "Discovering the Tualatin River"

Lesson 10. WHAT IS A WETLAND?

Note: See Project Wild Aquatic, pages 49-52. One copy of Project Wild Aquatic is provided for each school. Please share with your colleagues.

Objectives: The student will be able to:
- Describe characteristics of wetlands.
- Explain the importance of wetlands to wildlife and humans.

Time: One class period.

Background: Wetlands, rich and complex ecosystems, are a natural resource. They provide critical habitat for wildlife, reduce water pollution and alleviate flooding. In terms of biological productivity, they produce life on the same scale as the rainforest. Wetland lock up large amounts of carbon that would normally enter the atmosphere as carbon dioxide - a main culprit of global warming.

Wetlands are habitats for a third of our country's resident bird population and more than half of the migratory bird population. Another fascinating fact is that one out of three plants and animals listed as endangered and threatened species are located in wetlands of our country.

Wetlands absorb and filter pollutants that would normally go into our lakes and rivers. Wetlands also absorb storm water that could cause flooding; they also stabilize riverbanks and shorelines.

Summary of Activities:
- Introductory wetlands questionnaire.
- Wetlands metaphors (Project Wild Aquatic, pages 49-52.)

Preparation: See lesson plan.

Materials: See lesson plan.

Procedures:
1. Students complete wetlands questionnaire in workbook. Teacher leads discussion with goal of getting out lots of information.

2. Wetland Metaphors. (See Project Wild Aquatic, Pages 49-52.

Handouts and teacher materials:
- Project Wild Aquatic

Background materials:

- From "A World in Our Backyard":
  - Wetland Science
  - Wetland Functions
  - Threats To Wetlands
  - Protect Your Wetlands

Introducing Wetlands

Before getting into the nitty gritty of wetland studies, your students may need an introduction to wetlands, or even the outdoors, on a more casual level. Here are a few ideas to get you started....

A Breath of Fresh Air

Today many youngsters spend their free time in front of a screen -- TV, video games, or computers -- or doing other things indoors. Because they don't spend much time outdoors or in natural areas, many of these children may be reluctant to dive in to an outdoor activity. Before going on a full-length field trip, try some short activities to get the group oriented to the outdoors. If possible, make a brief visit to the wetland you plan to study, before the longer trip. If time is limited, do one of these activities when you first arrive at your field trip site. Once they are more comfortable in a natural setting, they'll spend more time learning.

➪ **Likes and Dislikes:** Have each student make a list of things that he or she likes and dislikes about the environment. The term *environment* may mean different things to different students -- a neighborhood, the yard at home, the world, or even the school building (the immediate environment). Let individuals choose a definition -- after they have made their lists, ask a few to report what they have written and to describe or define the environment that they called to mind. Answers will vary widely.

Take the class outside for ten minutes. For the first five minutes, have the students look around and write down five things that they see that they like and five that they dislike. Spend the last five minutes sharing responses. There are no right or wrong answers. Then return to the classroom and ask the students to write a poem or short story about one thing that they'd like to change about their environment, telling how they would go about making that change. Display their work on a bulletin board.

➪ **Treasure Hunt:** What better way is there to overcome uneasiness in an unfamiliar environment than to be driven to searching for something rewarding? Hide things that students will drool over among the bushes, trees, under rocks, buried in the soil, etc. -- be creative. Some ideas: "coupons" for a class film or video on a Friday, a free bonus point on the next test, a free ice cream sandwich or soda, a position as line leader for the day (for the younger kids); tangible treasures (especially for young students) such as neat erasers and pencils, candy, stickers, or a coloring book. Make treasure maps to the different prizes or leave a trail of clever clues. The kids will have so much fun that they'll forget where they are!

➪ **Marsh Soup:** Send younger students off in a small, designated wetland area with a cup and spoon in hand, and ask them to bring back a delicious cup of "marsh soup" -- full of colorful and odorous ingredients! This takes some imagination, since many will not find mud and plants particularly appetizing. If your class is very young, remind them that this is just pretend -- no tasting! This will give them an opportunity for a self-conducted sensory introduction to the wetland.

➪ **Use Your Ears:** Take the class outside briefly to two different settings, for instance the city and a forest, near a street and in a park, or the school grounds and the field trip site. This may be done on two occasions. Have them sit quietly with eyes closed and listen to the sounds. Older students may make notes of the sounds heard. After a designated length of time (appropriate to the age group), have them share what they heard. Compare and contrast the sounds in the two sites. Which did they find more pleasing?

Another way to tune your class in to the sounds of nature is to listen to recordings. Try the Solitudes Series tapes, available from nature and specialty stores or The Moss Music Group, Inc., 48 West 38th St., NY, NY 10018 -- includes Vol. 1- *By Canoe at Loon Lake/ Dawn by a Gentle Stream*, Vol. 4- *Among the Ponds and Streams of Niagara Falls*, Vol. 6- *Storm and Night On a Wilderness Lake*, and Vol. 7- ***Night In a Southern Swamp/ Don't Feed the Alligators*. Can they identify the sounds? After listening, ask the class to describe or write a poem about how the tape(s) made them feel.

➪ **Get Messy!:** Yes! Children need to experience the sights and sounds of wetlands first hand to really appreciate them. Take them out in old clothes and let them get a real feel for the mud! Have them scoop up a handful of mud. What does it feel like? How does it smell? Bring along some paper for mud finger paintings, or let the kids draw mud designs on themselves! If mud is not readily available, make a few buckets of your own! And have fun!

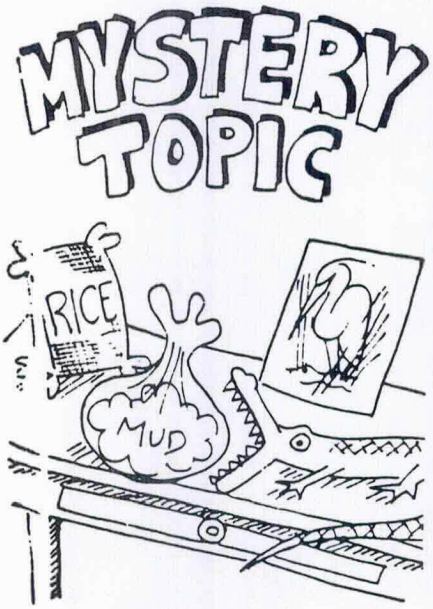
[continued...]

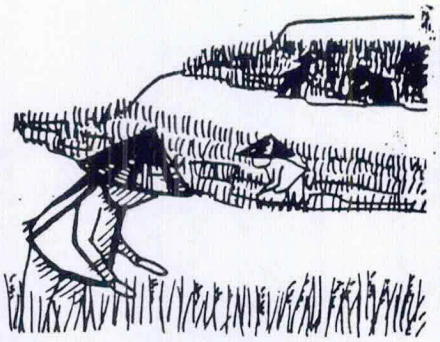
Wetlands – A Changing Image

Wetlands have been given a bad rap. For many students, the idea of studying wetlands may bring to mind very unsettling thoughts. So why not begin the unit by addressing those thoughts, and studying how wetlands have been perceived throughout history?

⇨ Mysterious Topic: For several days before you begin a wetlands unit, display a new clue about wetlands each day -- see if the students notice, then see if they can guess what the "Mystery Topic" is. You might bring in a package of rice, a bag of mud, a toy frog or alligator, a picture of some seafood, a clam or oyster shell, or play a bit of a tape of bird songs or other natural sounds (see previous page), anything that has to do with wetlands; on the last day, hang up a wetland poster (with the title covered up), then use the poster to introduce the topic on the first day of the unit. For poster information, see p. 159.

⇨ What Do You Think?: Find out what kind of prior knowledge students have about wetlands. Before discussing wetlands at all, ask them to write a poem or short paragraph about a wetland and how wetlands make them feel. Then try the activity again after studying and visiting wetlands -- have their attitudes changed?





⇨ Wetlands Around the World: Many cultures throughout history have centered around wetlands, which occur on every continent except Antarctica. Have students research and report on how wetlands have been used by different societies worldwide for a source of food and other resources, housing, and economic gains. Two good sources of information are *National Geographic* and encyclopedias.

Ideas:

1) Cajuns of coastal Louisiana's Atchafalaya Swamp and the lumbering industry;

2) archaeologists in the U.S. and Europe study ancient bodies found preserved in peat bogs to learn more about early Man and religious practices;

3) uses of peat in gardening, as insulation and an energy source -- U.S., Russia, Ireland, Germany, Belgium, Netherlands, Denmark;

4) rice production -- Thailand and other Asian countries;

5) mangrove wetlands as a source of timber and other resources -- Indo-Malaysia, East Africa, Central and South America;

6) use of salt marshes for grazing livestock, hay production, and thatching for roofs -- Europe, British Isles, U.S. (New England);

7) the cranberry industry -- northern U.S. (NJ, MA, and WI);

8) [Irish] folklore tells of the will-o'-the-wisp, strange lights that led men astray on the bogs -- the lights are actually methane gas, also called swamp or marsh gas, that sometimes catches fire briefly when released from many wetlands as a product of their chemical reactions;

9) Colonial America, where towns and cities grew up around rivers for transportation and trade.

[Sources of some of the above ideas were Wetlands, a text by Wm. Mitsch and James Gosselink, and National Geographic, Vol. 171, No 3, March 1987]

⇨ Fact or Fiction?: Read stories, newspaper and magazine articles about wetlands, and watch movies that may contain a wetlands theme (or take place in a wetland area). Use at least two with contrasting views of wetlands. Discuss the way wetlands were presented in each and compare. Which are fact and which are fiction? Do students agree with the ways that wetlands are depicted in these works? For suggestions, see the resource list on p. 159.

⇨ Lift Up Your Voices: Sing songs about wetlands. An old favorite is given below, the tune is left to your memory. Or play recordings for students to sing along with:
Romp In the Swamp, upbeat songs for all ages by Billy "B." Brennan, includes *Along the Coast, The Bog Jogs,* and *Wild Wetlands* , from Jenson Publications, 2770 South 171st St., New Berlin, WI 53151.
For young children, *Freddie the Fly-Eating Frog* on the Monsters In the Bathroom tape, by Bill Harley, Round River Records, 301 Jacob St., Seekonk, MA 02771.

Rattlin' Bog

(an add-on song, like the *12 Days of Christmas*, with actions to fit words)

Chorus:
Hey, ho, the rattlin' bog,
Bog down in the valley-o,
Hey, ho, the rattlin' bog,
Bog down in the valley-o.

Well in this bog, there was a tree,
A rare tree, a rattlin' tree,
A tree in the bog
And the bog down in the valley-o.
Chorus.

Well on this tree, there was a limb,
A rare limb, a rattlin' limb,
A limb on the tree and a tree in the bog
And a bog down in the valley-o.
Chorus.

And on this limb, there was a branch,
A rare branch, a rattlin' branch,
A branch on the limb and a limb on the tree and a tree in the bog
And a bog down in the valley-o
Chorus....

Add: branch, twig, leaf, bug, smile, and so on (let kids think of more).

Lesson 11. WETLAND HABITATS

Objectives: The student will be able to:

- Name several types of wetlands and some of their characteristics.
- Discuss that not all wetlands are the same.

Time: One class period.

Background: (See attached lesson from "WOW!: The Wonders of Wetlands") When we think of wetlands, we often think of the cattail marshes and ponds we find in our local areas. Throughout the country there is a whole variety of kinds of wetlands all ranging all the way from salt marshes to cypress swamps.

Summary of Activities:

- Use of a flow chart.
- Classification of wetlands.
- Wetland photographs.

Preparation:

- Make one set of habitat cards and one flow chart for each pair of students.
- Collect a variety of magazines (travel magazines, Audubon, Ranger Rick, etc.) with pictures of wetlands.

Materials:

- Habitat cards and flow chart
- Magazine pictures

Activities: (See attached lesson plan)

Handouts and teacher material:

- Habitat cards
- Flow chart

Background materials: None.

Wetland Habitats

This activity introduces and sorts out the common types of wetlands. Using a flow chart is a valuable skill; sorting habitats offers practice in observation and classification.

Objectives: Students will be able to: 1) name and describe several wetland types; 2) discuss the fact that wetlands are not all the same -- their salinities, "wetness," and inhabitants vary.

Methods: Use a flow chart and clue cards to classify wetland types.

Grades: 6 - 12.

Time: 45 minutes

Materials: copies of flow chart (p.23) and habitat cards (below and next page); pictures of wetlands (magazines, books, posters); paper and pencils.

Background: A *habitat* is the place where an animal finds food, water, shelter and space in a particular arrangement. Wetlands offer a wide variety of habitat types for many species of wildlife.

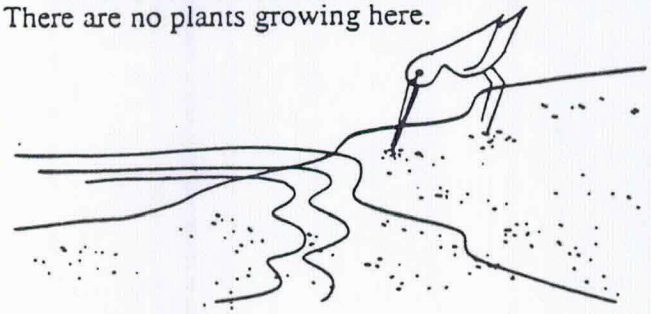
An area does not always have to be wet to be considered a wetland -- many wetlands are only covered by water during a rainy spring season, others are regularly or infrequently flooded by tides, while others may be covered by water most or all of the time. Some wetlands have salty water, while others are wetted by freshwater streams, rivers, ponds or lakes, or rainwater. Differences in salinity and wetness, as well as slope, elevation, and climate, cause different plant communities to develop in these areas. Wetlands are classified by the type of water, frequency and degree of inundation, and type of vegetation most prevalent there.

Procedure: Discuss the preceding, using pictures of wetlands as examples; define *habitat*. Explain that students will be classifying some wetlands using cards that describe different habitats. Review the use of a flow chart and practice as a group with one of the photographs. Students may work individually or in pairs to identify the 10 wetlands depicted on the cards; advanced students may be able to identify photographs using the flow chart -- they will have to infer the salinity by the types of plants shown. *Can they classify a real wetland on a visit?*

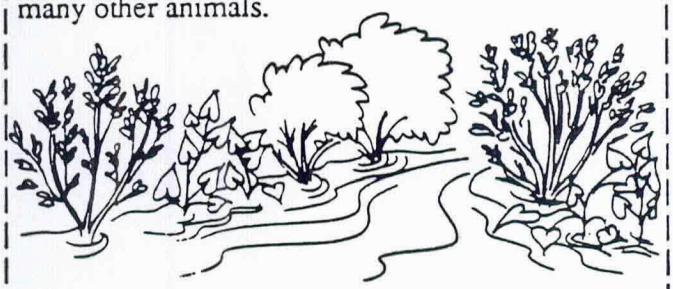
[Credit/ adapted from "Classifying Habitats of the Chesapeake Bay," The Changing Chesapeake, pp. 19-22]

Answers: 1. sandy beach; 2. shrub swamp; 3. aquatic plant bed; 4. wet meadow; 5. mud flat; 6. tidal freshwater marsh; 7. forested wetland; 8. seagrass bed; 9. bog; 10. salt marsh.

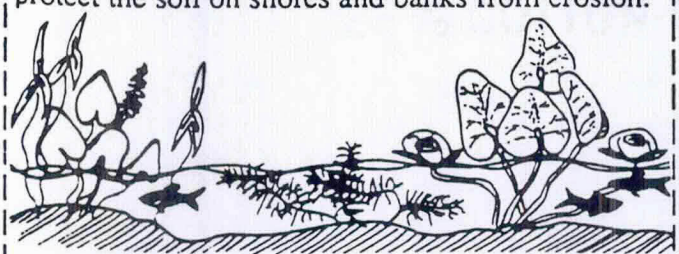
1. The waves during storms push the grains of sand in ever-changing patterns. During low tide the animals that live among the sand grains feel the summer heat or the winter cold. Shorebirds search along the water's edge for these animals and for bits of food that wash in from the water. There are no plants growing here.



2. Scrubby, low-growing thickets of shrubs grow here, in places that may have started out as wet meadows. You might find these places near the coast, or where lakes, streams, rivers, marshes and forested swamps overflow; they are not always covered with water. This type of wetland offers good habitat for fish, reptiles, amphibians and many other animals.

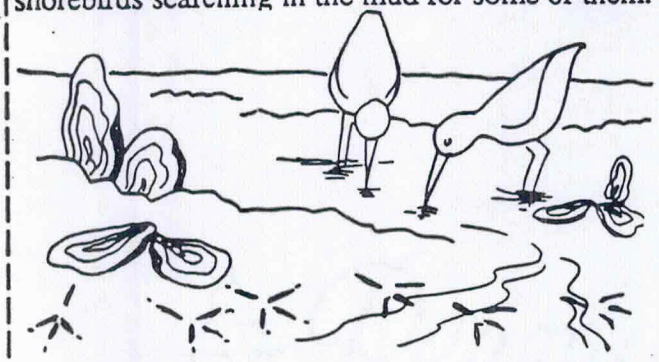


3. In the shallow water edges of ponds, lakes, rivers and streams, where there is good light and the water has little salt, underwater plants and plants with floating leaves grow. Some of these plants are valuable as food for many kinds of waterfowl such as ducks, geese and swans. All make places for little fish and other animals to live and feed. These plants slow water movement and protect the soil on shores and banks from erosion.

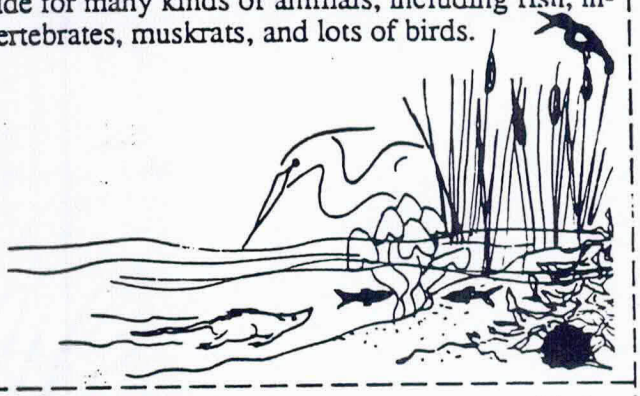


4. Depressions in the ground may fill with rain and groundwater and stay wet for several days or weeks. Landowners often mow or plow around these spots to avoid getting tractor wheels stuck in the soft ground. On spring evenings, these puddles often seem alive with the high-pitched calls of spring peepers (tiny frogs) looking for mates among the rushes and sedges that grow here. In the heat of the summer, these places will usually dry up for a while.

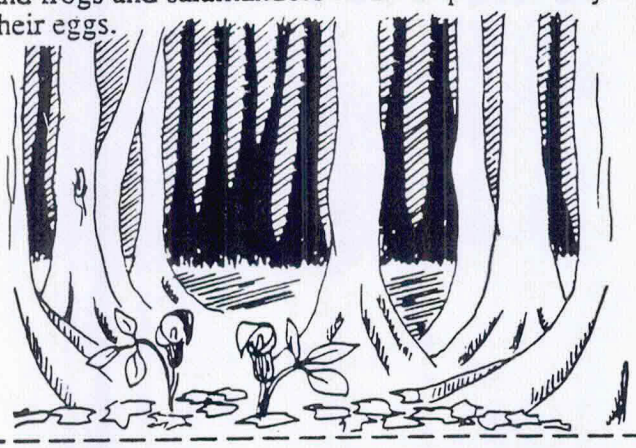
5. Fine bits of dirt make mud when they settle out of the water. Where the muddy bottom is very shallow, it is uncovered at low tide. While this area may not look like home to many animals, and few or no plants grow here, there are lots of creatures living down in the mud. Watch for hungry shorebirds searching in the mud for some of them.



6. Tall grasses and other kinds of plants grow up out of the water. Even though the water has little or no salt, the tides push up the rivers far enough to cause the water level to change, here, so the ground is sometimes flooded and sometimes dry or exposed. The plants provide food and places to hide for many kinds of animals, including fish, invertebrates, muskrats, and lots of birds.

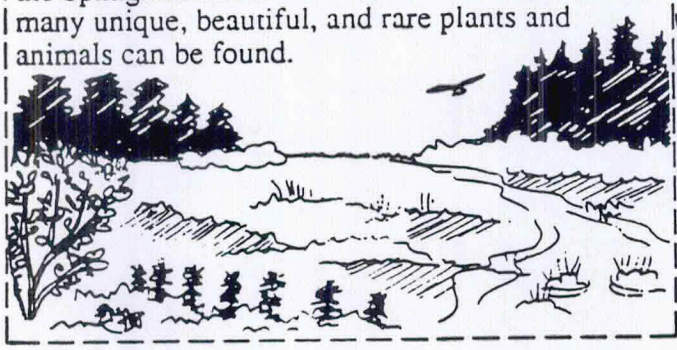


7. Where trees grow in low-lying areas, the ground may hold water for part of the year. In the spring, many beautiful wildflowers grow here and frogs and salamanders find wet places to lay their eggs.

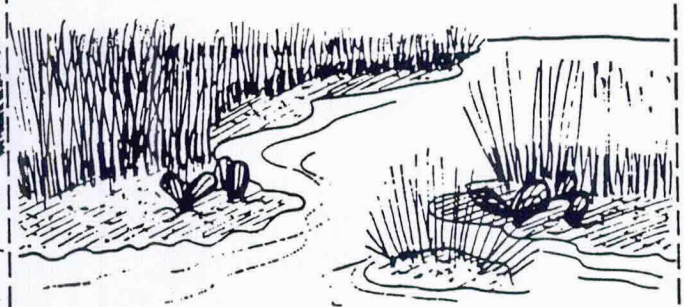


8. In salty bays or at the ocean's edge, two kinds of plants may grow under the shallow water. They can only live where it is shallow because they are rooted on the bottom and need light to make food. The plants are eaten by many animals and many more find a safe place to live among the plants. These plants protect the shore and reduce the muddiness of the water by slowing the waves.

9. Old lakes and low areas that fill with rainwater sometimes fill in with layers of partially decayed plants, called *peat*. At first glance these places might look dry, but the moss-covered floor actually holds a good deal of fresh water just below the surface. The ground here feels very spongy. Some shrubs and evergreen trees also grow above the Sphagnum moss. In these unusual conditions, many unique, beautiful, and rare plants and animals can be found.



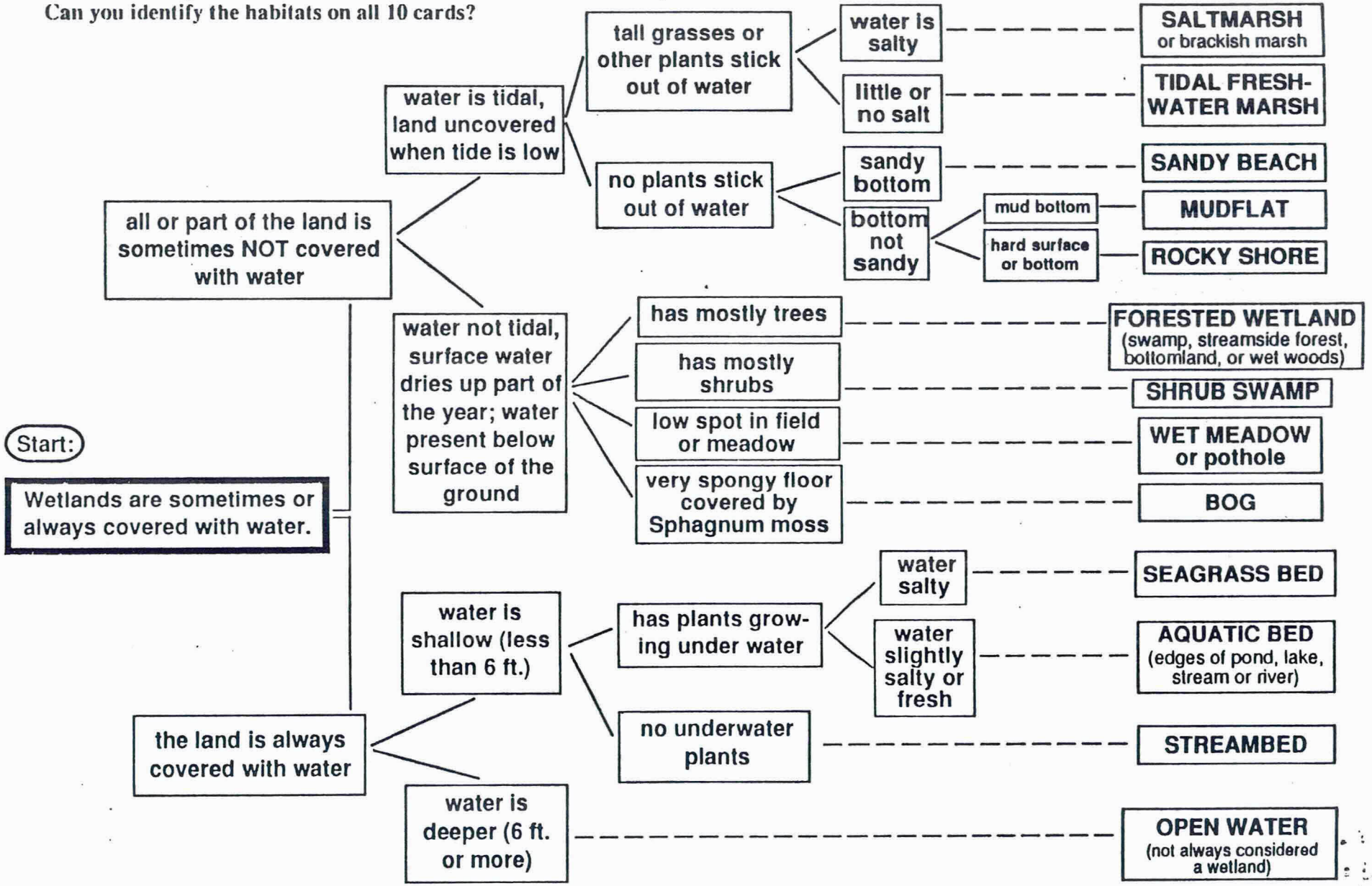
10. Along the shore where the water is salty, tall grasses grow up out of the water. Tides move in and out, but some places are flooded only during storms and very high tides. When the tough plants here die, they break down in the water to form little bits of food called *detritus*. Many animals eat detritus by filtering it out of the water.



Wetland Habitats

Carefully read each of the habitat cards, then use this flow chart, or key, to identify each habitat. Start at the left side of the page at the first box. There are two boxes connected to that box -- choose the one that matches the description on the card. Then move on to the next set of boxes, following the lines, and make another choice. Continue until you reach the name of the habitat on the card.

Can you identify the habitats on all 10 cards?



Lesson 12. THREATS TO WETLANDS: DRAGONFLY POND

See Project Wild Aquatic, pages 143 - 148.

Objectives: The student will be able to:

- Evaluate the effects of different kinds of land use on wetland habitats.
- Discuss and evaluate lifestyle changes to minimize damaging effects on wetlands.

Time: One to three class periods.

Background: In the 1600's there were 215 million acres of wetlands in the United States. 50% to 60% of these are now lost. They have been dredged for harbors and river channels, filled for agriculture, filled for urban developments, polluted by chemicals, silted in by agricultural runoff and washed away by storms. Today, there are many efforts to conserve the remaining wetlands. But there is also a major battle going on in the Congress. Many people think the cost of saving some wetlands is too high and there are too many government restrictions on the rights of individuals and property owners. It will be interesting to see what happens over the next few months.

See also Project Wild Aquatic, page 143.

Summary of Activities:

- Students create a collage of human land-use activities around an image of a pond.

Preparation: (See Project Wild Aquatic, page 144.)

Materials: (See Project Wild Aquatic, page 144.)

Procedures: (See Project Wild Aquatic, page 144-148.)

Handouts and teacher material: None.

Background materials: None.