Portsmouth Middle School

Metropolitan Greenspaces Environmental Education Grant

Final Report

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Introduction

Portsmouth Middle School Teachers Rob Gibson, Doug Saulter and Chris Wickham received a Metropolitan Greenspaces Environmental Education Grant to write a curriculum guide of lessons and activities which could be used in site restoration projects. The goal was to develop lessons and activities that would enable students coming into Portsmouth at 6th grade to study site restoration projects as they matriculate through Portsmouth. Students would learn to collect native plant seeds, propagate them, transplant them to a native plant nursery, maintain and learn about them and then use them in a site restoration project as a culminating activity in the 8th grade.

There are many groups and organizations that do site restoration projects. These groups have developed written guides that describe the restoration process. We did not wish to duplicate what they have done. Instead, our goal was to develop appropriate lessons and activities that could be used with students in conjunction with those guides.

Goals

In our grant proposal, we had eight stated goals that we hoped to accomplish through this grant. These goals and our efforts to attain them are described in this section.

1. To help students meet State Science, Social Studies and English benchmarks.

   We can not determine quantitatively that the test scores of our students have increased in each of these classes, mainly because we have no test data. We have addressed this issue with a survey asking students what classes this project has helped them in. This information is available in the survey section of this report.

2. Develop an understanding of the stewardship for the North Portland urban Ecosystem.

   This is also something that we addressed through the survey and is available in the survey section.

3. Provide a curriculum guide for other educators that take on similar projects.

   The bulk of our time has been spent on developing a curriculum guide. We have written 8 chapters. Each chapter is a stand alone unit, meaning that it can be done alone or in combination with other activities. We do not have a suggested order because all restoration projects are different and have different components.

4. Allow students to create a web site which communicates their work and learning.

   Portsmouth Middle School was contracted to have internet access by the fall of 1998. The installation was not completed in March of 1999 and the internet connection was not made until May, 1999. Therefore, we have not yet created a web site about the project. However, a web site will be established this summer. This will be added to and maintained by students as we continue to work on our restoration projects.

5. Multimedia presentations such as video, Hyperstudio and slide shows.

We were not successful in having the students create a multimedia presentation. Due to an increased workload to prepare students for the new state benchmarks, there was not sufficient time to devote to such an endeavor.

In addition, technology has now advanced to the point that presentations such as Hyperstudio and slide shows are almost obsolete. Hyperstudio, once an industry standard, has been replaced by web pages, which are available to a wider audience. Digital cameras used with programs such as Powerpoint provide the same visual effects as slides, but are cheaper and easier to use. Digital pictures do not need to be developed and can be downloaded directly into a web site. As this project moves to the maintenance portion of the project, students will use this technology to share our project.

In terms of a video tape, Larry Betton, a production manager with Oregon Public Brodcasting (OPB) came in and worked with us on bringing our video lab up to speed. Larry and I found many problems with the technology in our video lab, and could not get it to work properly without acquiring new equipment. This, in conjunction with the increased workload caused by state required work samples prevented us from pursuing the production of a video.

6. Provide students with the skills and knowledge to be able to identify and propagate native plants.

The students that put more effort into acquiring these skills were the most sucessful. In general, most students learned to identify 5 - 10 native shrubs, trees and ground covers. Some students learned less, some students learned more. Students were also successful at propagating several native trees and shrubs.

7. Allow students to grow these plants with the purpose of transplanting them into local restoration projects.

Students collected the seeds from a wide variety of native plants. We were also given seeds of several other native species. Despite carefully following the directions of a local authority, we were only able to germinate the seeds of two tree species, red alder and Oregon ash, and a native rush. Of these, we were highly successful and should have a large number to transplant to a restoration site when they are large enough.

Plant	Quantity	Location (June 99)
Red Alder	115 Seedlings	Grow table
Oregon Ash	20 Seedlings	Nursery Plot
Juncus	20 clumps	Grow Table

Almost sixty red osier dogwood and willow trees, which had been started as cuttings in the school's Community Garden nursery plot, were transplanted to the Whitaker Pond restoration site. Ten big leaf maples which had grown in the nursery plot were also moved to the Whitaker Ponds site.

8. Students will plant native trees and shrubs with the intention of attracting indigenous wildlife of the North Portland ecosystem.

This was accomplished at two different sites; Whitaker Ponds and the Peninsula Crossing Trail. On these two sites students planted the following plants:

Penninsula Crossing Trail

10 Grand Fir, BR
10 Western Red Cedar, BR
10 Cascara, 1 gal
10 Red Elderberry, BR
10 Vinemaple, BR
10 Indian Plum, 1 gal
10 Oceanspray, 1 gal
20 Tall Oregon Grape, BR
10 Red Flowering Current, BR
30 Snowberry, BR
20 Sword fern, BR
30 Salal, 4" pot

Whitaker Ponds

6 Sword Fern
150 Oregon Grape
25 Western Red Cedar
5 Red Elderberry
50 Snowberry
6 Red Flowering Current

From the PMS Native Plant Garden

10 Big Leaf Maple
25 Red Osier Dogwood
33 Willow

Restoration Projects

Whitaker Ponds

The Whitaker ponds project was started when Jennifer Devlin of the Bureau of Environmental Services set aside some land for restoration. Jennifer agreed to come to Portsmouth and teach my class plant identification lessons, as well as water chemistry and macroinvertebrate lessons. In exchange my class would restore a section of Whitaker Ponds.

The first thing we did was schedule Jennifer to come to Portsmouth to teach Plant Id lessons. She came twice in the late fall to teach plant id and four times in the winter to teach two sections of water chemisrty and Macros. My class went to Whitaker Ponds twice in the winter to practice plant id, water quality and to do site preparation. My class was split into three groups and they rotated among the three activities.(Water quality, site prep and plant id.) I used three volunteers from PSU's Urban Ecosystem Project and Jennifer to man the stations.

The students went to Whitaker ponds in the spring to begin the restoration work. When the students arrived they broke into three teams. They rotated around three stations. The first station was the actual planting of native plants in the restoration area. The BES provided the plants for the restoration. Portsmouth community garden provided approx. 10 large (5-10 ft.) Big leaf Maples, 25 2-year old Red osier Dogwoods and 33 2 year old willows. The tree teams of students planted those plants plus 6 Swordferns, 150 Oregon Grape, 25 Red Cedars, 5 Red Elderberries, 50 Snowberries and 6 Red Flowering Currents provided by the BES. The other two teams were a site preparation teams and a site mapping team. The day went really well because the students were fresh and the BES provided them with directions on what to plant and where.

Peninsula Crossing Trail

Portland Parks and Recreation is responsible for the construction and maintenance of the Peninsula Crossing Trail. David Evans and Associates, a landscape architecture firm, was hired to construct and plant the trail. In the spring of 1998, Jim Sjulin and Steve Bricker (Parks and Recreation), Jim

Seeley (David Evans & Associates), Rob Gibson, Chris Wickham and I walked the entire trail, looking for possible planting sites. We found a suitable site with a water source. To build the trail, David Evans and Associates bulldozed the entire site, leaving only rocks and soil. This was nice because that meant we did not have to do the prep work before planting.

We discussed the possibilities for the site. Including what types of plants, how many, when to plant and how to involve the students. Because it was a Parks and Recreation project, they had the final say on many of these details. We decided to let the students research the site, then make recomendations about what plants should be planted there. Parks would make changes as they saw fit.

The first activity we worked on was the site map. We practiced mapping skills in the class then mapped the site. This gave us the dimensions of the entire site and the types of vegetation within the site. This was not too difficult because the area had been bulldozed and there was very little vegetation. Mainly, there were several sets of Cottonwood and Cherry trees. As we discussed what plants need to survive, we realized the best planting space would be under the sets of trees. With the help of Parks and the landscape architects, we settled on four different planting sites. Each site was mapped and plant reccomendations were made. A final plant list was settled on. Then students made their own planting plans. These plans were presented to Steve Bricker and James Seeley. They used some of the student recommendations in their final plan.

Planting day was February 18, 1999. Rob Gibson and Doug Saulter met with the landscape architect, Steve Bricker and the Americore volunteers at the site before school started. We organized the plants according to the plan so that when the students arrived they could begin planting. The day went very smoothly. We were able to plant over 350 plants and trees (see attached plant list).

We did not return to the site until the end of April, 1999. The site was overgrown with 1-2 foot blackberry bushes. We began an intensive blackberry removal plan. Each student was responsible for digging up 25 blackberry plants with the roots each day we visited. By the end of May our calculations show we pulled up over 1000 blackberry bushes.

We also did some mapping and plant identification of the sites while we were pulling blackberries. Our estimates show that to this point we were within the 90% survival rate of the plants we planted.

Long-term maintenance

We realize the success of this restoration project lies in the continued

maintenance of the site. Our school has adopted this site and has committed to maintain the site for at least the next three years. However we do have more long term goals. We will be using the site as an outdoor classroom. We will continue to pull blackberries and plant additional plants within our current planting sites and we hope to extend the boundaries of the sites as well as adding other sites.

Parks and Recreation will mow the border of the site which will keep large areas of blackberries from encroaching on our planting site. Arrangements for summer watering have also been made.

Maintenance Plan Outline

July 1999	Water as needed by Parks and teachers from Portsmouth Middle School.
August 1999	Water as needed by Parks and teachers from Portsmouth Middle School.
September 1999	Water as needed by Parks and teachers and students from Portsmouth Middle School. Blackberry removal and weeding as needed Vegetation mapping and survival rate determination
November 1999	Water as needed by Parks and teachers and students from Portsmouth Middle School. Blackberry removal and weeding as needed Vegetation mapping and monitoring of survival rates
January 2000	Site prep for February planting
February 2000	Plant 100 trees and shrubs
May 2000	Site Monitoring & blackberry removal
June 2000	Site Monitoring & blackberry removal
July 2000	Water as needed by Parks and teachers from Portsmouth Middle School.

Conclusion

What Worked

- The partnership between Portsmouth Middle School, Parks & Recreation and David Evans & Associates worked wonderfully. The project met expectations and will last beyond the life of this grant and may even be extended to include other teachers and students from Portsmouth Middle School.

- The partnership between Portsmouth Middle School & the Urban Ecosystems Project worked well. Urban Ecosystems staff was instrumental in helping plan and develop activities and providing support for field work.

What Didn't Work

- The partnership between Oregon Public Broadcasting and Portsmouth Middle School did not work for a variety of reasons. The technology in our school was very old and could not be brought on line. This was frustrating for students, OPB and the teachers at PMS.

Project

Survey

The following data is taken from a survey developed for this grant. for comparative reasons, it was give to students who participated in the grant and as well as students who did not participate in the grant. It focuses on the students' attitudes about their neighborhood environment.

1. I am aware of my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	44%	40%	16%	0%
	6	Scott	23%	58%	19%	0%
X	7	Saulter	20%	70%	5%	5%
	7	Baglein	24%	69%	7%	0%
X	8	Wickham	27%	57%	8%	8%
X	8	Gibson	14%	69%	17%	0%

2. I am concerned about my neighborhood environment

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	17%	25%	54%	4%
	6	Scott	1500%	38%	42%	4%
X	7	Saulter	5%	55%	40%	0%
	7	Baglein	16%	51%	24%	9%
X	8	Wickham	16%	54%	19%	11%
X	8	Gibson	14%	37%	37%	11%

3. I can help my neighborhood environment

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	17%	42%	42%	0%
	6	Scott	8%	50%	42%	0%
X	7	Saulter	20%	75%	5%	0%
	7	Baglein	16%	69%	9%	7%
X	8	Wickham	14%	62%	14%	11%
X	8	Gibson	14%	48%	28%	10%

4. I am part of the solution to improving my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	13%	33%	50%	4%
	6	Scott	15%	35%	35%	15%
X	7	Saulter	30%	70%	0%	0%
	7	Baglein	24%	29%	33%	13%
X	8	Wickham	8%	49%	35%	8%
X	8	Gibson	3%	34%	51%	11%

5. I want to be part of improving my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	21%	21%	58%	0%
	6	Scott	12%	50%	31%	8%
X	7	Saulter	45%	55%	0%	0%
	7	Baglein	18%	49%	24%	9%
X	8	Wickham	11%	57%	16%	16%
X	8	Gibson	6%	47%	30%	18%

6. My ideas about our neighborhood environment are important to people in the community.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	13%	38%	46%	4%
	6	Scott	19%	50%	15%	15%
X	7	Saulter	15%	55%	25%	5%
	7	Baglein	22%	47%	18%	13%
X	8	Wickham	11%	43%	30%	16%
X	8	Gibson	6%	29%	60%	6%

7. I can name reasons why native plants are good for my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	17%	33%	46%	4%
	6	Scott	12%	23%	35%	31%
X	7	Saulter	20%	40%	35%	5%
	7	Baglein	22%	40%	22%	16%
X	8	Wickham	5%	62%	19%	14%
X	8	Gibson	6%	43%	40%	11%

8. I am interested in in participating in projects that help my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	33%	29%	33%	4%
	6	Scott	18%	38%	38%	4%
X	7	Saulter	29%	67%	0%	5%
	7	Baglein	29%	33%	24%	13%
X	8	Wickham	16%	38%	41%	5%
X	8	Gibson	3%	46%	40%	11%

9. I have had experience working to improve my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	4%	46%	50%	0%
	6	Scott	15%	38%	42%	4%
X	7	Saulter	50%	50%	0%	0%
	7	Baglein	18%	29%	31%	22%
X	8	Wickham	24%	43%	27%	5%
X	8	Gibson	9%	50%	30%	9%

10. I am good at restoring my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	8%	46%	46%	0%
	6	Scott	8%	58%	31%	4%
X	7	Saulter	15%	75%	5%	5%
	7	Baglein	7%	53%	18%	22%
X	8	Wickham	11%	41%	38%	11%
X	8	Gibson	6%	26%	54%	14%

11. I am satisfied with the condition of my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	13%	58%	17%	13%
	6	Scott	12%	38%	38%	12%
X	7	Saulter	5%	25%	60%	10%
	7	Baglein	16%	31%	36%	18%
X	8	Wickham	3%	32%	51%	14%
X	8	Gibson	3%	23%	57%	17%

12. My classes at school have helped me learn about the importance of improving my neighborhood environment.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	25%	54%	17%	4%
	6	Scott	15%	46%	19%	19%
X	7	Saulter	40%	55%	5%	0%
	7	Baglein	27%	47%	11%	16%
X	8	Wickham	19%	46%	27%	8%
X	8	Gibson	9%	60%	26%	5%

13. Circle any classes that apply to the question above.

Grant Participant	Grade	Teacher	Science	SS	Math	Reading	Art	L.A.
X	6	Nelson	83%	4%	13%	13%	0%	25%
	6	Scott	42%	23%	23%	12%	4%	12%
X	7	Saulter	10%	50%	40%	30%	0%	40%
	7	Baglein	60%	58%	9%	16%	70%	47%
X	8	Wickham	92%	33%	19%	6%	17%	11%
X	8	Gibson	89%	11%	23%	23%	9%	3%

14. My experiences working in my neighborhood have helped me understand subjects at school.

Grant Participant	Grade	Teacher	Strongly Agree	Agree	Disagree	Strongly Disagree
X	6	Nelson	8%	50%	42%	0%
	6	Scott	4%	31%	35%	31%
X	7	Saulter	15%	70%	15%	0%
	7	Baglein	21%	21%	21%	37%
X	8	Wickham	8%	54%	19%	19%
X	8	Gibson	0%	41%	41%	18%

15. Circle any classes that apply to the question above.

Grant Participant	Grade	Teacher	Science	SS	Math	Reading	Art
X	6	Nelson	63%	13%	4%	21%	21%
	6	Scott	27%	31%	15%	15%	23%
X	7	Saulter	50%	45%	50%	10%	15%
	7	Baglein	51%	49%	22%	29%	22%
X	8	Wickham	78%	14%	6%	8%	14%
X	8	Gibson	66%	3%	14%	3%	9%

Baglein

I am aware of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
11	31	3	0	45
24.44%	68.89%	6.67%	0.00%	

I am concerned about my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
7	23	11	4	45
15.56%	51.11%	24.44%	8.89%	

I can help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
7	31	4	3	45
15.56%	68.89%	8.89%	6.67%	

I am part of the solution to improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
11	13	15	6	45
24.44%	28.89%	33.33%	13.33%	

I want to be part of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
8	22	11	4	45
17.78%	48.89%	24.44%	8.89%	

My ideas about our neighborhood environment are important to people in the community

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
10	21	8	6	45
22.22%	46.67%	17.78%	13.33%	

I can name reasons why native plants are good for my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
10	18	10	7	45
22.22%	40.00%	22.22%	15.56%	

I am interested in in participating in projects that help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
13	15	11	6	45
28.89%	33.33%	24.44%	13.33%	

I have had experience working to improve my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
8	13	14	10	45
17.78%	28.89%	31.11%	22.22%	

I am good at restoring my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	24	8	10	45
6.67%	53.33%	17.78%	22.22%	

I am satisfied with the condition of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
7	14	16	8	45
15.56%	31.11%	35.56%	17.78%	

Baglein

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
12	21	5	7	45
26.67%	46.67%	11.11%	15.56%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Language Arts	Answers
27	26	4	7	3	21	45
60.00%	57.78%	8.89%	15.56%	6.67%	46.67%	

My experiences working in my neighborhood have helped me understand subjects at school

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
7	7	7	12	33
21.21%	21.21%	21.21%	36.36%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Answers
23	22	10	13	10	45
51.11%	48.89%	22.22%	28.89%	22.22%	

Saulter

I am aware of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	14	1	1	20
20.00%	70.00%	5.00%	5.00%	

I am concerned about my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
1	11	8	0	20
5.00%	55.00%	40.00%	0.00%	

I can help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	15	1	0	20
20.00%	75.00%	5.00%	0.00%	

I am part of the solution to improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
6	14	0	0	20
30.00%	70.00%	0.00%	0.00%	

I want to be part of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
9	11	0	0	20
45.00%	55.00%	0.00%	0.00%	

My ideas about our neighborhood environment are important to people in the community

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	11	5	1	20
15.00%	55.00%	25.00%	5.00%	

I can name reasons why native plants are good for my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	8	7	1	20
20.00%	40.00%	35.00%	5.00%	

I am interested in in participating in projects that help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
6	14	0	1	21
28.57%	66.67%	0.00%	4.76%	

I have had experience working to improve my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
10	10	0	0	20
50.00%	50.00%	0.00%	0.00%	

I am good at restoring my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	15	1	1	20
15.00%	75.00%	5.00%	5.00%	

I am satisfied with the condition of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
1	5	12	2	20
5.00%	25.00%	60.00%	10.00%	

Saulter

My classes at school have hgelped me learn about the importance of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
8	11	1	0	20
40.00%	55.00%	5.00%	0.00%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Language Arts	Answers
20	10	8	6	0	8	20
100.00%	50.00%	40.00%	30.00%	0.00%	40.00%	

My experiences working in my neighborhood have helped me understand subjects at school

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	14	3	0	20
15.00%	70.00%	15.00%	0.00%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Answers
10	9	10	2	3	20
50.00%	45.00%	50.00%	10.00%	15.00%	

SCOTT

I am aware of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
6	15	5	0	26
23.08%	57.69%	19.23%	0.00%	

I am concerned about my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	10	11	1	26
15.38%	38.46%	42.31%	3.85%	

I can help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	13	11	0	26
7.69%	50.00%	42.31%	0.00%	

I am part of the solution to improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	9	9	4	26
15.38%	34.62%	34.62%	15.38%	

I want to be part of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	13	8	2	26
11.54%	50.00%	30.77%	7.69%	

My ideas about our neighborhood environment are important to people in the community

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
5	13	4	4	26
19.23%	50.00%	15.38%	15.38%	

I can name reasons why native plants are good for my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	6	9	8	26
11.54%	23.08%	34.62%	30.77%	

I am interested in in participating in projects that help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
5	10	10	1	26
19.23%	38.46%	38.46%	3.85%	

I have had experience working to improve my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	10	11	1	26
15.38%	38.46%	42.31%	3.85%	

I am good at restoring my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	15	8	1	26
7.69%	57.69%	30.77%	3.85%	

I am satisfied with the condition of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
3	10	10	3	26
11.54%	38.46%	38.46%	11.54%	

SCOTT

My classes at school have hgelped me learn about the importance of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	12	5	5	26
15.38%	46.15%	19.23%	19.23%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Language Arts	Answers
11	6	6	3	1	3	26
42.31%	23.08%	23.08%	11.54%	3.85%	11.54%	

My experiences working in my neighborhood have helped me understand subjects at school

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
1	8	9	8	26
3.85%	30.77%	34.62%	30.77%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Answers
7	8	4	4	6	26
26.92%	30.77%	15.38%	15.38%	23.08%	

Gibson

I am aware of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
5	24	6	0	35
14.29%	68.57%	17.14%	0.00%	

I am concerned about my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
5	13	13	4	35
14.29%	37.14%	37.14%	11.43%	

I can help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	14	8	3	29
13.79%	48.28%	27.59%	10.34%	

I am part of the solution to improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
1	12	18	4	35
2.86%	34.29%	51.43%	11.43%	

I want to be part of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	16	10	6	34
5.88%	47.06%	29.41%	17.65%	

My ideas about our neighborhood environment are important to people in the community

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	10	21	2	35
5.71%	28.57%	60.00%	5.71%	

I can name reasons why native plants are good for my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	15	14	4	35
5.71%	42.86%	40.00%	11.43%	

I am interested in in participating in projects that help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
1	16	14	4	35
2.86%	45.71%	40.00%	11.43%	

I have had experience working to improve my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	18	11	3	35
8.57%	51.43%	31.43%	8.57%	

I am good at restoring my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	9	19	5	35
5.71%	25.71%	54.29%	14.29%	

I am satisfied with the condition of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
1	8	20	6	35
2.86%	22.86%	57.14%	17.14%	

Gibson

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	21	9	2	35
8.57%	60.00%	25.71%	5.71%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Language Arts	Answers
31	4	8	3	1	2	35
88.57%	11.43%	22.86%	8.57%	2.86%	5.71%	

My experiences working in my neighborhood have helped me understand subjects at school

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
0	14	14	6	34
0.00%	41.18%	41.18%	17.65%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Answers
23	1	5	1	3	35
65.71%	2.86%	14.29%	2.86%	8.57%	

Nelson

I am aware of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
11	10	4	0	25
44.00%	40.00%	16.00%	0.00%	

I am concerned about my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
4	6	13	1	24
16.67%	25.00%	54.17%	4.17%	

I can help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
4	10	10	0	24
16.67%	41.67%	41.67%	0.00%	

I am part of the solution to improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
3	8	12	1	24
12.50%	33.33%	50.00%	4.17%	

I want to be part of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
5	5	14	0	24
20.83%	20.83%	58.33%	0.00%	

My ideas about our neighborhood environment are important to people in the community

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
3	9	11	1	24
12.50%	37.50%	45.83%	4.17%	

I can name reasons why native plants are good for my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
4	8	11	1	24
16.67%	33.33%	45.83%	4.17%	

I am interested in in participating in projects that help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
8	7	8	1	24
33.33%	29.17%	33.33%	4.17%	

I have had experience working to improve my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
1	11	12	0	24
4.17%	45.83%	50.00%	0.00%	

I am good at restoring my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
2	11	11	0	24
8.33%	45.83%	45.83%	0.00%	

I am satisfied with the condition of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
3	14	4	3	24
12.50%	58.33%	16.67%	12.50%	

Nelson

My classes at school have hgelped me learn about the importance of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
6	13	4	1	24
25.00%	54.17%	16.67%	4.17%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Language Arts	Answers
20	1	3	3	0	6	24
83.33%	4.17%	12.50%	12.50%	0.00%	25.00%	

My experiences working in my neighborhood have helped me understand subjects at school

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
2	12	10	0	24
8.33%	50.00%	41.67%	0.00%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Answers
15	3	1	5	5	24
62.50%	12.50%	4.17%	20.83%	20.83%	

Wickham

I am aware of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
10	21	3	3	37
27.03%	56.76%	8.11%	8.11%	

I am concerned about my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
6	20	7	4	37
16.22%	54.05%	18.92%	10.81%	

I can help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
5	23	5	4	37
13.51%	62.16%	13.51%	10.81%	

I am part of the solution to improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	18	13	3	37
8.11%	48.65%	35.14%	8.11%	

I want to be part of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	21	6	6	37
10.81%	56.76%	16.22%	16.22%	

My ideas about our neighborhood environment are important to people in the community

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	16	11	6	37
10.81%	43.24%	29.73%	16.22%	

I can name reasons why native plants are good for my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
2	23	7	5	37
5.41%	62.16%	18.92%	13.51%	

I am interested in in participating in projects that help my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
6	14	15	2	37
16.22%	37.84%	40.54%	5.41%	

I have had experience working to improve my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
9	16	10	2	37
24.32%	43.24%	27.03%	5.41%	

Wickham

I am good at restoring my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
4	15	14	4	37
10.81%	40.54%	37.84%	10.81%	

I am satisfied with the condition of my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Ansers
1	12	19	5	37
2.70%	32.43%	51.35%	13.51%	

My classes at school have hgelped me learn about the importance of improving my neighborhood environment

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
7	17	10	3	37
18.92%	45.95%	27.03%	8.11%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Language Arts
33	12	7	2	6	4
91.67%	33.33%	19.44%	5.56%	16.67%	11.11%

My experiences working in my neighborhood have helped me understand subjects at school

Strongly Agree	Agree	Disagree	Strongly Dissagree	Answers
3	20	7	7	37
8.11%	54.05%	18.92%	18.92%	

Circle any classes that apply to the question above

Science	SS	Math	Reading	Art	Answers
28	5	2	3	5	36
77.78%	13.89%	5.56%	8.33%	13.89%	

Budget

Greenspaces Environmental Education Grant Final Project Budget

Category / Item	In-Kind	Matching	Spent/Metro	Budget	Balance
Personnel:					
Teachers	$2,002.00				
Students and Volunteers	$9,573.00				
Professional Services	$2,124.00				
Trans. Services					
Tri-Met bus tickets			$150.00	$500.00	$350.00
Printing /Binding			$0.00	$200.00	$200.00
Supplies				$1,575.00	$398.67
Grow Table			$768.90		
Plants			$303.00		
Paper			$104.43		
(City) Mulch		$100.00			
(PPS) School To Work		$55.00			
Computer Software				$800.00	$182.20
Camera			$219.00		
Photoshop			$398.80		
Total	**$13,699.00**	**$155.00**	**$1,944.13**	**$3,075.00**	**$1,130.87**

Total Match	**$13,854.00**
Amount Spent	**$1,944.13**
Latch Ratio	**7:1**

OBJECT DESCRIPTION	BUDGET STRING	TOTAL BUDGET	EXPENDITURES TO DATE FISCAL YEAR	EXPENDITURES TO DATE TOTAL PROJECT	BALANCE
FUND 864 PORTSMOUTH GREENSPACES PROJECT					
AGENCY GRANT	FROM 01/01/98 TO 06/30/99				
EXPENDITURES					
TUDENT TRANS SERVICES	864-182-13/20B-E-513	500	150.00	150.00	350.00
RINTING/BINDING SERVICES	864-182-13/20B-E-551	200	.00	.00	200.00
UPPLIES	864-182-13/20B-E-611	1,575	303.00	1,071.90	503.10
OMPUTER SOFTWARE	864-182-13/20B-E-618	800	219.00	219.00	581.00
DIM/PROGRAM TOTAL	13/20B	3,075	672.00	1,440.90	1,634.10
ORTSMOUTH MIDDLE	182	3,075	672.00	1,440.90	1,634.10
TOTAL EXPENDITURES		3,075	672.00	1,440.90	1,634.10
TOTAL PORTSMOUTH GREENSPACES PROJECT		3,075	672.00	1,440.90	1,634.10

* Note* Three orders not posted on this statement:

Software $199.40 Software Budget Ballance $581.00
Software $199.40 - $398.80
$398.80 $182.20

Supplies 104.43 Supply Budget Ballance $503.10
- $104.43
$398.67

DETAIL TRANSACTION LISTING
FOR MONTH ENDING 04-30-99
GRANT ACCOUNTING

FND CC DIM/PR T OBJ	TRANSACTION CD	DATE	VENDOR #	NAME	REQ #	P.O.#	INV #	CHECK#	OBLIGATION	EXPENDITURE
PROJECT 864 PORTSMOUTH GREENSPACES PROJECT										
PROJECT EXPENSES										
864-182-13/20B-E-611	76	04-26-99	43718	PORTLAND PARKS & RECREATION		26917	ORDER	49819		303.00
OBJECT 611 SUPPLIES				TOTAL						303.00
OBJECT CLASS 600 SUPPLIES				TOTAL						303.00
TOTAL PROJECT EXPENSES										303.00
TOTAL FOR PROJECT PORTSMOUTH GREENSPACES PROJECT										303.00

864-182-13/20B-E-611 Parts & Repl. Pet - Plants

E 10

ALR252
RUN DATE 06-01-99 TIME 11.2448

GRANT FUNDS Y-T-D DETAIL
SELECTED TRANSACTION
REGISTER

AS-OF 05-31-99
PAGE 778

FD -CC -DN/PRG-T-OBJ	DATE CODE	TRANS DESCRIPTION	DOC	H.O. #	ACCT	TRANS AMOUNT	EXPENDITURE	OBLIGATION	YNN	FUND
864-182-13/20B-E-611	04-26-9	76 0489 49819437180RDER	26917		60200 D	303.00	303.00		904	864
864-182-13/20B-E-611	05-20-9	57 REQ 000F00000F647400	13869	-	60200 D	104.43	104.43	-	905	864
					DETAIL TOTAL	407.43	407.43	.00		
864-182-13/20B-E-618	10-12-8	86	66666		60200 D	219.00	219.00		A10	864
864-182-13/20B-E-618	05-25-9	86	05051		60200 D	199.40	199.40	-	905	864
					DETAIL TOTAL	418.40	418.40	.00		
					FUND TOTAL	825.83	825.83	.00		

Procurement Card

per Suzanne -

- Cancel

Invoice @ 199.40

Doug S. @ 452-4636

*** FRAME K05 ***

ALR252 GRANT FUNDS Y-T-D DETAIL P-5
RUN DATE 03-11-99 TIME 23.1506 SELECTED TRANSACTION REGISTER AS-OF 06-30-98
PAGE 719

FD -CC -DM/PRG-T-OBJ	DATE CODE	TRANS DESCRIPTION	DOC	W.O. #	ACCT	TRANS AMOUNT	EXPENDITURE	OBLIGATION	YMN	FUND
864-182-13/208-E-611	05-18-8	72 0320 2146663053119 33	97492		60200 D	768.90	768.90		805	864
		NATIONW			DETAIL TOTAL	768.90	768.90	.00 **		
		GARDENIN			FUND TOTAL	768.90	768.90	.00 ***		

GROW CARE

TOTAL P.02

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching: Teacher	Students	Prof.	Supplies
3/17/98	Doug Saulter		PCT Ground Breaking	1	2	2			
3/17/98	Kate Machell		PCT Ground Breaking	1	2	2			
3/17/98	Jim Martin		PCT Ground Breaking	1	2			2	
3/17/98	Students		PCT Ground Breaking	20	2		40		
3/19/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
3/19/98	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
3/19/98	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
3/19/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
3/19/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
3/24/98	Doug Saulter		Whitaker Ponds	1	4	4			
3/24/98	Jennifer Devlin (BES)		Whitaker Ponds	1	4			4	
3/24/98	Loren Walker		Whitaker Ponds	1	4			4	
3/24/98	Jim Martin		Whitaker Ponds	1	4			4	
3/24/98	Students		Whitaker Ponds	32	4		128		
3/25/98	Doug Saulter		Whitaker Ponds	1	4	4			
3/25/98	Jennifer Devlin (BES)		Whitaker Ponds	1	4			4	
3/25/98	Loren Walker		Whitaker Ponds	1	4			4	
3/25/98	Jim Martin		Whitaker Ponds	1	4			4	
3/25/98	Students		Whitaker Ponds	29	4		116		
3/26/98	Heather Nelson	Planning/Chapter Review		1	0.5	0.5			
3/26/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
3/26/98	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
3/26/98	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
3/26/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
3/26/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
			March 1998 Hour Totals			15.5	284	28	0
			March In-Kind Totals			$232	$1420	$700	$0
			Project Totals by Category			$232	$1,420	$700	$0
			Project Total In-Kind Match			**$2,352**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching: Teacher	Students	Prof.	Supplies
4/2/98	Doug Saulter		Whitaker Ponds	1	2	2			
4/2/98	Loren Walker		Whitaker Ponds	1	2			2	
4/2/98	Students		Whitaker Ponds	32	2		64		
4/3/98	Doug Saulter		Whitaker Ponds	1	2	2			
4/3/98	Loren Walker		Whitaker Ponds	1	2			2	
4/3/98	Students		Whitaker Ponds	29	2		58		
4/5/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
4/5/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
4/5/98	Ron Baglien	Planning/Chapter Review		1	0.5	0.5			
4/5/98	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
			April 1998 Hour Totals			5.5	122	4.5	0
			April In-Kind Totals			$82	$610	$112	$0
			Project Totals by Category			$368	$2,030	$812	$0
			Project Total In-Kind Match			**$3,210**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching			
						Teacher	Students	Prof.	Supplies
9/21/98	Linda Hill	Chapter Development		1	0.5			0.5	
9/21/98	Doug Saulter	Chapter Development		1	0.5	0.5			
9/21/98	Rob Gibson	Chapter Development		1	0.5	0.5			
9/21/98	Chris Wickham	Chapter Development		1	0.5	0.5			
9/21/98	Jim Martin	Chapter Development		1	0.5			0.5	
9/28/98	Linda Hill	Chapter Development		1	0.5			0.5	
9/28/98	Doug Saulter	Chapter Development		1	0.5	0.5			
9/28/98	Heather Nelson	Chapter Development		1	0.5	0.5			
9/28/98	Rob Gibson	Chapter Development		1	0.5	0.5			
9/28/98	Chris Wickham	Chapter Development		1	0.5	0.5			
9/28/98	Jim Martin	Chapter Development		1	0.5			0.5	
			September 1998 Hour Totals			3.5	0	2	0
			September In-Kind Totals			$52	$0	$50	$0
			Project Totals by Category			$368	$2,030	$862	$0
			Project Total In-Kind Match			**$3,260**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching: Teacher	Students	Prof.	Supplies
10/02/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
10/02/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
10/02/98	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
10/02/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
10/02/98	Heather Nelson	Planning/Chapter Review		1	0.5	0.5			
10/02/98	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
10/16/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
10/16/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
10/16/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
10/16/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
10/16/99	Heather Nelson	Planning/Chapter Review		1	0.5	0.5			
10/16/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
10/21/98	Jennifer Devlin (BES)		WP Field Survey	1	2			2	
10/21/98	Chris Wickham		WP Field Survey	1	6	6			
10/21/98	Students		WP Field Survey	25	6		150		
10/22/98	Doug Saulter		PCT Field Survey	1	0.75	0.75			
10/22/98	Steve Bricker		PCT Field Survey	1	0.75			0.75	
10/22/98	Jim Schline		PCT Field Survey	1	0.75			0.75	
10/22/98	James Seeley		PCT Field Survey	1	0.75			0.75	
			October 1998 Hour Totals			10.75	150	6.25	0
			October In-Kind Totals			$161	$750	$156	$0
			Project Totals by Category			$529	$2,780	$1,019	$0
			Project Total In-Kind Match			**$4,328**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching: Teacher	Students	Prof.	Supplies
11/12/98	Students		PCT Site Mapping	27	3		81		
11/12/98	Jim Martin		PCT Site Mapping	1	3			3	
11/12/98	Doug Saulter		PCT Site Mapping	1	3	3			
11/13/98	Loren Walker	Planning/Chapter Review		1	0.5			0.5	
11/13/98	Heather Nelson	Planning/Chapter Review		1	0.5	0.5			
11/13/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
11/13/98	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
11/13/98	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
11/13/98	Rob Gibson	Planning/Chapter Review		1	0.5				
11/13/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
			November 1998 Hour Totals			4.5	81	4.5	0
			November In-Kind Totals			$68	$405	$112	$0
			Project Totals by Category			$596	$3,185	$1,131	$0
			Project Total In-Kind Match			**$4,912**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching: Teacher	Students	Prof.	Supplies
12/04/98	Rob Baglien	Planning/Chapter Review		1	0.5	0.5			
12/04/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
12/04/98	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
12/04/98	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
12/04/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
12/04/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
12/10/98	Students		PCT Plant ID	29	3		87		
12/10/98	Jim Martin		PCT Plant ID	1	3			3	
12/10/98	Doug Saulter		PCT Plant ID	1	3	3			
12/11/98	Rob Baglien	Planning/Chapter Review		1	0.5	0.5			
12/11/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
12/11/98	Jim Martin	Planning/Chapter Review		1	0.5				
12/11/98	Linda Hill	Planning/Chapter Review		1	0.5				
12/11/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
12/11/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
12/18/98	Rob Baglien	Planning/Chapter Review		1	0.5	0.5			
12/18/98	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
12/18/98	Jim Martin	Planning/Chapter Review		1	0.5				
12/18/98	Linda Hill	Planning/Chapter Review		1	0.5				
12/18/98	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
12/18/98	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
			December 1998 Hour Totals			9	87	4	0
			December In-Kind Totals			$135	$435	$100	$0
			Project Totals by Category			$731	$3,620	$1,231	$0
			Project Total In-Kind Match			**$5,582**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching			
						Teacher	Students	Prof.	Supplies
1/08/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
1/08/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
1/08/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
1/08/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
1/08/99	Ron Baglien	Planning/Chapter Review		1	0.5	0.5			
1/15/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
1/15/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
1/15/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
1/15/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
1/21/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
1/21/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
1/21/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
1/21/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
1/21/99	Jim Seeley	Planning/Chapter Review		1	0.5			0.5	
1/21/99	Doug Saulter	Planning/Chapter Review		1	4	4			
1/21/99	Rob Gibson	Planning/Chapter Review		1	4	4			
1/21/99	Jim Martin	Planning/Chapter Review		1	4			4	
1/21/99	Chris Wickham	Planning/Chapter Review		1	4	4			
1/21/99	Heather Nelson	Planning/Chapter Review		1	4	4			
			January 1998 Hour Totals			20	0	7	0
			January In-Kind Totals			$300	$0	$175	$0
			Project Totals by Category			$1,031	$3,620	$1,406	$0
			Project Total In-Kind Match			**$6,058**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching			
						Teacher	Students	Pro□	Supplies
2/05/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
2/05/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
2/05/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
2/05/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
2/05/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
2/05/99	Ron Baglien	Planning/Chapter Review		1	0.5	0.5			
2/05/99	Heather Nelson	Planning/Chapter Review		1	0.5	0.5			
2/12/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
2/12/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
2/12/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
2/12/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
2/12/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
2/18/99	Doug Saulter		PCT Planting	1	5	5			
2/18/99	Rob Gibson		PCT Planting	1	3	3			
2/18/99	Jim Martin		PCT Planting	1	3			3	
2/18/99	Linda Hill		PCT Planting	1	3			3	
2/18/99	Americore Volunteers		PCT Planting	10	6		60		
2/18/99	Students		PCT Planting	75	3		225		
2/18/99	Jim Schline		PCT Planting	1	3			3	
2/18/99	Steve Bricker		PCT Planting	1	6			6	
2/18/99	Jim Seeley		PCT Planting	1	3			3	
2/19/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
2/19/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
2/19/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
2/19/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
2/26/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
2/26/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
2/26/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
2/26/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
2/26/99	Heather Nelson	Planning/Chapter Review		1	0.5	0.5			
			February 1998 Hour Totals			14.5	285	22	0
			February In-Kind Totals			$218	$1425	$330	$0
			Project Totals by Category			$1,249	$5,045	$1,736	$0
			Project Total In-Kind Match			**$8,030**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching			
						Teacher	Ptudents	Pro□-	Supplies
3/05/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
3/05/99	Ron Baglien	Planning/Chapter Review		1	0.5	0.5			
3/05/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
3/05/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
3/12/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
3/12/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
3/12/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
3/12/99	Ron Baglien	Planning/Chapter Review		1	0.5	0.5			
3/19/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
3/19/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
3/19/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
3/19/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
3/19/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
			March 1998 Hour Totals			4.5	0	2	0
			March In-Kind Totals			$68	$0	$50	$0
			Project Totals by Category			$1,316	$5,045	$1,786	$0
			Project Total In-Kind Match			**$8,148**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching			
						Teacher	Students	Prof.	Supplies
4/02/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
4/02/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
4/02/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
4/02/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
4/02/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
4/16/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
4/16/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
4/16/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
4/16/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
4/16/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
4/23/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
4/23/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
4/23/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
4/23/99	Rob GibsoÓ	Planning/Chapter Review		1	0.5	0.5			
4/23/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
4/30/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
4/30/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
4/30/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
4/30/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
4/30/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
			April 1998 Hour Totals			6	0	4	0
			April In-Kind Totals			$90	$0	$100	$0
			Project Totals by Category			$1,406	$5,045	$1,886	$0
			Project Total In-Kind Match			**$8,338**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching			
						Teacher	Ptudents	Prof.	Pupplies
5/07/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
5/07/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
5/07/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
5/07/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
5/07/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
5/11/99	Doug Saulter		PCT BB Removal.	1	3	3			
5/11/99	Students		PCT Black Berrie Remova	27	3		81		
5/13/99	Doug Saulter		PCT BB Removal.	1	3	3			
5/13/99	Students		PCT Black Berrie Remova	28	3		84		
5/14/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
5/14/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
5/14/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
5/14/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
5/14/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
5/17/99	School to Work	Money for shovels							$55.00
5/18/99	Doug Saulter		PCT BB Removal.	1	3	3			
5/18/99	Students		PCT Black Berrie Remova	27	3		81		
5/20/99	Doug Saulter		PCT BB Removal.	1	3	3			
5/20/99	Students		PCT Black Berrie Remova	25	3		75		
5/21/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
5/21/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
5/21/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
5/21/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
5/21/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	

Continued on next page

Portsmouth Middle School In-Kind Funds Log

May continued...									
5/24/99	City of Portland		Mulch						100
5/25/99	Doug Saulter		PCT BB Removal.	1	3	3			
5/25/99	Students		PCT Black Berrie Remova	30	3		90		
5/27/99	Doug Saulter		PCT BB Removal.	1	3	3			
5/27/99	Students		PCT Black Berrie Remova	26	3		78		
5/28/99	Jim Martin	Planning/Chapter Review		1	0.5			0.5	
5/28/99	Chris Wickham	Planning/Chapter Review		1	0.5	0.5			
5/28/99	Doug Saulter	Planning/Chapter Review		1	0.5	0.5			
5/28/99	Rob Gibson	Planning/Chapter Review		1	0.5	0.5			
5/28/99	Linda Hill	Planning/Chapter Review		1	0.5			0.5	
			May, 1998 Hour Totals			24	489	4	155
			May In-Kind Totals			$360	$2445	$100	$155
			Project Totals by Category			$1,766	$7,490	$1,986	$155
			Project Total In-Kind Match			**$11,398**			

Portsmouth Middle School In-Kind Funds Log

Date	Name	Lab / Activity	Site / Activity	# of	Hrs	In-Kind Matching: Teacher	Students	Prof.	Pupplie
Rob	Students	Mapping Training		55	1.5		82.5		
Gibson's	Rob Gibson	Mapping Training		1	1.5	1.5			
hours	Students		PCT Mapping	4	2		8		
without	Rob Gibson		PCT Mapping	1	2	2			
dates.	Students	Mapping Training	PCT Site Plan	55	2		110		
	Rob Gibson	Mapping Training	PCT Site Plan	1	2	2			
	Jim Martin		PCT Site Plan	1	2			2	
	Students		Native Plant Nursery	8	5		40		
	Rob Gibson		Native Plant Nursery	1	2	2			
	Jim Martin		Native Plant Nursery	1	1			1	
	Linda Hill		Native Plant Nursery	1	1			1	
	Americore Interns		Native Plant Nursery	2	3		6		
	Students		Transplant from nursery to WP	6	5		30		
	Rob Gibson		Transplant from nursery to WP	1	5	5			
	Americore Intern		Transplant from nursery to WP	2	3				
	Students		Seed collection	40	1.5		60		
	Rob Gibson		Seed collection	1	1.5	1.5			
	Jim Martin		Seed collection	1	1.5			1.5	
	Students	Seed Dissection Lab		40	0.75		30		
	Rob Gibson	Seed Dissection Lab		1	0.75	0.75			
	Students	Native Plant Garden Maint.		50	1		50		
	Rob Gibson	Native Plant Garden Maint.		1	1	1			
			Misc. 1998 Hour Totals			15.75	416.5	5.5	0
			Misc. In-Kind Totals			$236	$2082	$138	$155
			Project Totals by Category			$2,002	$9,572	$2,124	$155
			Project Total In-Kind Match			**$13,854**			

Park Operations
6437 SE Division St.
Portland, OR 97206
Phone (503) 823-1600
Fax (503) 823-2246

PORTLAND PARKS & Recreation

Dedicated to enriching the lives of citizens and caring for Portland's natural beauty

Steve Bricker
Portland Parks
Natural Resources

6437 SE Division St
Portland, OR 97206-1240
(5030 823-4404
Fax (503) 823-1668

P.O. Number:

Quanity	Description	Rate	Amount
10	Grand Fir, BR	$1.00	$10.00
10	Western Red Cedar, BR	$1.00	$10.00
10	Cascara, 1 gal	$3.00	$30.00
10	Red Elderberry, BR	$1.00	$10.00
10	Vinemaple, BR	$1.00	$10.00
10	Indian Plum, 1 gal	$3.00	$30.00
10	Oceanspray, 1 gal	$3.00	$30.00
20	Tall Oregon Grape, BR	$1.00	$20.00
10	Red Flowering Current, BR	$1.00	$10.00
30	Snowberry, BR	$1.00	$30.00
20	Sword fern, BR	$1.00	$20.00
30	Salal, 4" pot	$1.50	$45.00
4	Vinemaple, BR	$1.00	$4.00
6	Red Elderberry, BR	$1.00	$6.00
6	Blue Elderberry, BR	$1.00	$6.00
2	Red Flowering Current, BR	$1.00	$2.00
24	Snowberry, BR	$1.00	$24.00
6	Tall Oregon Grape, BR	$1.00	$6.00

Make check payable to: City of Portland

TOTAL $303.00

Mail to: Portland Parks
Attn: Steve Bricker
6437 SE Division St
Portland, OR 97206-1240

Curriculum Guide Activities

Site Preparation

Site Mapping

Plant Identification

Soil Study

Planting

Native Seed Collection

Seed Propagation

Weather

These chapters were written by the following teachers at Portsmouth Middle School; Ron Baglien, Rob Gibson, Heather Nelson, Doug Saulter and Chris Wickham.

If you have any questions or comments please feel free to contact us at:

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5103 N. Willis Blvd.
Portland, Or. 97203

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Fax: (503) 916-2663
Email: saulter@teleport.com

About The Curriculum Guide

As interest in environmental education has grown over the years, teachers and students have moved from raising awareness to taking action on environmental issues. One of the more interesting areas of action has to do with restoration projects. Restoration projects generally focus on habitat areas that have been disturbed and consequently overgrown with invasive weeds. These areas have little biological diversity and offer very little usable habitat for the local wildlife. Restoration projects usually involve weed removal, careful planning and then replanting with appropriate native species. Maintenance and monitoring of the site help insure greater survival of the plants.

There are many organizations involved in site restoration projects. If you are thinking about beginning work on any kind of restoration project, we highly recommend that you contact local governmental and environmental agencies. There are almost always people who are eager to support you in your work. There is also a large body of information available about the different steps of the restoration process. This curriculum guide is an attempt to start converting the steps of the process into meaningful, usable classroom activities.

The curriculum guide is organized into nine chapters; each can be used alone or in combination with other chapters and ideas. These chapters are not in a specific order since this is an open-ended process with many different entry points and learning goals. We have tried to include lessons that cover what we found to be important components of a restoration project. Each chapter includes information about learning goals, suggested teacher and student preparation, chapter connections and where appropriate, resource listings. This document is intended to be a work in progress. These lessons are only suggestions. Please feel free to add to, or change them to suit your curricular needs. We hope that this information will be of value to you. These lessons will be available on the internet. For information regarding the internet address, contact Doug Saulter (email below) or Portsmouth Middle School.

Site Preparation

Project: Site Preparation

Purpose: To prepare the site for planting

Learning Goals: To learn how to properly remove unwanted materials and vegetation from a restoration site. Students will be able to differentiate between native and non-native plant species and begin to improve or maintain the biological diversity of their site.

Teacher Preparation: Teachers should have an inventory of the materials the students will be removing. Some possible materials include glass, metal objects and some possible chemically hazardous substances. Hazardous substances should be removed prior to students working at the site. The land owner should remove those materials. Unwanted vegetation will most likely be the most common materials that will need to be removed. Examples of these are Reed Canary Grass, Scotch Broom, and Himalayan Black berry.

Materials	Skills
Clippers	Use of clippers
Gloves	Use of loppers
Lopers	
2-4 small tarps	
Plastic bags	
Plastic cans or buckets	
Flagging tape	

Student Preparation: Prior to this activity, students should have learned the reasons for removing unwanted materials and vegetation.

Activity 1: Blackberry removal. This activity can be modified for any materials or vegetation that need to be removed.

1. Review reasons for removing unwanted materials and vegetation.
2. Identify materials and vegetation that will be removed and vegetation that will not be removed.
3. Designate an area to haul materials and to count tools
4. Walk group and field gear over to their adopted site. MODEL clipping blackberries at the base, tossing them onto tarp for easy removal from the

site. Impress the students with the idea of TOOLS and tool care! It is impossible for us to recover tools that volunteers set down under shrubs...all tools must be in students' hands or back at a main area that you designate!!!!

5. Point out native plants and flag them so that the groups does not cut down natives.

(The whole group can be involved in this process: give each student some flagging and have them flag a native plant in the area in which you will be working)

6. Divide the groups up into teams...too many kids clipping in one spot leads to behavioral problems...most students clipping and tossing onto tarps with several kids hauling full tarps back and forth to the pile works great. WORK WITH the students...it keeps their morale up! COUNT TOOLS BEFORE YOU LEAVE AND BRING THEM ALL BACK.

Connections:

Site Mapping: During the site mapping activity, an inventory of the materials and vegetation present at the site will be developed.

Plant ID: Students will learn some of the impacts of non-native invasive species on native plants and thus, understand the importance of removing these species.

Site

Mapping

Project: Site Mapping

Purpose: To assess the physical and biological attributes of a site in order to create a restoration plan.

Learning Goals: Scale, perimeter, area, geometry, model to real life.

Teacher Preparation: Teachers should practice using compass readings to make a map before instructing students. We have included a practice map that could be used as both teacher and student practice.

Materials	Skills
Compass (1 per student)	Compass Reading
Stakes, landscape flags	Measuring in inches and feet
Protractors, rulers	Understanding of area & perimeter
1/4 " Grid Paper	Understanding of scale
Pencil	Converting from feet to inches
Protractor	

Student Preparation: Practice compass reading and mapping techniques in class before mapping actual site.

Activity 1: Mapping Practice

1. Place a transparency of a compass on an overhead projector.
2. Ask students to sketch the compass.
3. Discuss the location of North, South, East, West and the degrees with which they relate.
4. Have students label these on their compass sketch.
5. Discuss the idea of back sight.
6. Have students plot data chart 1 (see below). (NOTE - use pencil)
   - Step 1: Start with point A. Put a dot in the middle of a blank sheet of paper. Label it point "A".
   - Step 2: Put the center of the compass or protractor on the the dot labeled "A"
   - Step 3: Find the 90° angle on the compass or protractor and put a dot.
   - Step 4: Line the two dots up along the 90° line using a ruler.
   - Step 5: Measure 5 inches from point A, put a dot and label it point "B" and erase the first dot.
   - Step 6: Draw a line between point A and point B.
   - Step 7: Repeat Steps 1 - 5 for each data point.

Data Chart 1

From Point	To Point	Distance	Angle	Back Sight
A	B	5 inches	90°	270°
B	C	5 inches	180°	0°
C	D	5 inches	270°	90°
D	A	5 inches	0°	180°

Activity 2: Sample Plot

1. Give each student a copy of the Sample Plot (next page), some 1/4 inch grid paper, a ruler and a compass or protractor.
2. Discuss with students the concept of scale. This activity uses a scale of 1:50, inches to feet.
3. Have students convert the distance of point P to C which is 315 feet to inches. Divide 315 by 50. The answer is 6.3. Have the students round to 6 1/4". Fill in the Sample Plot data chart. Repeat for points P to H and H to F, rounding off to the nearest 1/4 inch.
4. Place a dot in the bottom right hand corner of the paper two inches up and two inches over from the corner. Label that dot point "P".
5. Plot each point on the Sample Pot just as in Activity 1 Mapping Practice.

NOTE

Only three lines have distances labeled on the Sample Plot data chart. The rest can be run wild. Eventually all lines will run together. An example of this is line P to T. Run this line to the edge of the page. Later, when line H to T is plotted, it will run into line T. The intersection of these two lines is point T. Now the line can be measured, converted into inches and labeled on the Sample Plot data chart.

Sample Plot

FROM Point	TO Point	Compass Reading	Compass Backsight	Distance in Feet	Distance in Inches
P	C	315°	136°	315	
P	T	221°	40°		
P	H	134°	315°	60	
H	F	0°	179°	91	
H	T	268°	89°		
F	R	0°	178°		
T	L	271°	90°		
C	R	73°	244°		
C	L	185°	21°		
T	S	0°	180°		
F	S	270°	88°		

What we did:

The following description is written by 8th grade students. The students did activity 1 and 2 prior to mapping in the field. This description is of their experience while mapping at Whitaker Ponds.

"We made two types of maps. A physical site map and a vegetation site map. The first thing you have to do is pick a place where you want to do your mapping. We chose Whitaker Ponds. Then you have to measure the perimeter of your site. You do this by taking a stick, putting it in the ground and calling it point A. From there you decide where you want point B and put a stick there. Then you need to take a measuring tape and measure from point A to point B, and that gives you the length of your first line. You use the same method to find the angle and length of point c, d and so on. After you find all of the points at your site you make a map according to the angles and lengths, on grid paper. In order to make the map you have to use rulers, compasses and protractors. Then you go back to your site and you measure from point A to all of the trees and label them on your map. "

Connections:

The site map will be used to identify any plants that need to be removed. Examples of plants that may need to be removed are English Ivy and Himalayan Blackberry. It will also be used to create the blue print for the site planting.

FROM Point	TO Point	Compass Reading	Compass Backsight	Distance in Feet	Distance in Inches

Plant Identification

Project: Plant Identification

Purpose: Teach students to correctly identify a wide variety of native plants. For example, to identify plants for correct propagation methods, to help identify plant maintenance/ monitoring needs.

Learning Goals:
1) Understand, construct and use a dichotomous key
2) Use tools (keys, books, herbarium) to identify plants
3) Learn to identify plant characteristics for identification purposes
4) Learn to use botanical terms.

Teacher Preparation: Teachers should study and collect a variety of dichotomous keys. Teachers should also study and compile a list of botanical terms and definitions. Find an area that you or someone else can easily identify a wide variety of native plants. Try to find an area that is similar to one that you will be using for your restoration project.

Materials
Plant ID Books
Dichotomous keys
Plant samples or herbarium collections

Student Preparation:

Activity 1: Shoe Sort (Whole group activity)

Step 1: Each students puts a shoe in a pile
Step 2: Each student make a list of observations about the shoes.
Step 3: Ask the students for suggestions about how to sort shoes using their observation list.
Step 4: Use suggestions to discuss the characteristic that you will you use to begin sorting the shoes.
Step 5: Repeat the activity using other characteristics as necessary until all shoes are sorted.

Main idea is that there is a choice to be made. Example: Is the shoe a dress shoe or not a dress shoe? What makes it a dress shoe? If it is a dress shoe it goes into one pile. If it is not a dress shoe it stays with the main pile. This is where you would define the characteristics of a dress shoe. Is it made of leather? or is it brown etc.

Project: Plant Identification

Purpose: Teach students to correctly identify a wide variety of native plants. For example, to identify plants for correct propagation methods, to help identify plant maintenance/ monitoring needs.

Learning Goals:

1) Understand, construct and use a dichotomous key
2) Use tools (keys, books, herbarium) to identify plants
3) Learn to identify plant characteristics for identification purposes
4) Learn to use botanical terms.

Teacher Preparation: Teachers should study and collect a variety of dichotomous keys. Teachers should also study and compile a list of botanical terms and definitions. Find an area where you or someone else can easily identify a wide variety of native plants. Try to find an area that is similar to one that you will be using for your restoration project.

Materials
Plant ID Books
Dichotomous keys
Plant samples or herbarium collections

Activity 1: Shoe Sort (Whole group activity)

Step 1: Each students puts a shoe in a pile
Step 2: Each student make a list of observations about the shoes.
Step 3: Ask the students for suggestions about how to sort shoes using their observation list.
Step 4: Use suggestions to discuss the characteristic that you will you use to begin sorting the shoes.
Step 5: Repeat the activity using other characteristics as necessary until all shoes are sorted.

Main idea is that there is a choice to be made. Example: Is the shoe a dress shoe or not a dress shoe? What makes it a dress shoe? If it is a dress shoe it goes into one pile. If it is not a dress shoe it stays with the main pile. This is where you would define the characteristics of a dress shoe. Is it made of leather? or is it brown etc.

Activity 2: Object Sort (in this example we will use writing utensils)

Step 1: Break kids into small groups.
Step 2: Students place writing utensils in a pile.
Step 3: Ask students to discuss characteristics of objects.
Step 4: Have students develop and write dichotomous key questions to sort objects.
Step 5: Have students change groups, leaving objects and key behind.
Step 6 : Ask students to use each other's key to sort objects.
Step 7: Discuss results as a large group

Activity 3: Plant Sort

Step 1: Break kids into small groups.
Step 2: Students will get a small collection of plants (either real samples or from a herbarium) and make observations about the plants. Showing slides is another good way to familiarize students with the plants.
Step 3: Students develop a dichotomous key for the plants just as they did in activities 1 and 2.
Step 4: Discuss results with the students. Begin to integrate botanical terms and descriptions with their own observations about the plants. Start building vocabulary.
Step 5: Students will be given a dichotomous key or plant ID card.
Step 6 : Rotate the collection of plants around the room and ask students to ID the plants. Note: A good idea is to put the name of the plant on the back of a herbarium so students can check their work

Activity 4: Plant Identification in the field

Step 1: Have the students familiarize themselves with the ID cards or Key they will be using.
Step 2: Find an area they can practice identifying plants. Make sure that it is an area that you know and can identify some plants. You may even flag plants that you know so students can ID those plants.
Step 3: Have student teams identify the plants. Record their results.
Step 4: Discuss the results as a group.

What we did:

We did the first 2 activities as they were written. The Third activity was done with the help of Jennifer Devlin of the BES. She provided the sample collection, Id cards, and presented the activity. Since we had a plant list for the restoration project we really concentrated on those plants as well as the those pesky invasive species. Jennifer also provided a slide show to help students familiarize with those plants.

In between the third and fourth activity I had students practice mapping skills from the site mapping unit. We practiced mapping and used the Portland Plant list book to make quizzes and tests about Whitaker Ponds. We did the fourth activity along with 3 other activities, so students rotated around four stations. Jennifer Devlin and volunteers from Portland State's Urban Ecosystems Project helped run the stations.

Connections: Plant ID is crucial to seed collection, plant propagation, plant mountains/ monitoring lessons.

Resources:

Guard, Jennifer B. Wetland Plants of Oregon & Washington Redmond: Lone Pine Publishing., 1995

Jensen, Edward, C Trees to Know In Oregon. Portland: Timber Press., 1995.

Simpson, Lenore B. A field guide to common Plants, Birds and Mammals of the Portland-Beaverton Area Portland:Beaverton School District No. 48., 1997

Kruckeberg, Arther R. Gardening with Native Plants of The Pacific Northwest. Seattle:University of Washington Press

Soil Study

Project: Soil layers and pH

Purpose: 1) Discover the importance of quality top soil.
2) Identify the soil texture and pH necessary for restoration plantings.

Learning Goals:
1) Identify the different layers of soil
2) Compare and contrast the physical properties of soil
3) Learn the importance of soil texture and pH in a successful planting process

Materials	Student Skills
Map from restoration area (soil sample locations on map)	Knowledge of soil layers
Soil samples from restoration areas (about 1c. for each lab team)	Knowledge of soil nutrients
pH testing equipment	Knowledge of photosynthesis

Activity 1: Soil Texture

Procedure:

Step1: Spread your soil sample on a price of paper. What do you see?

Step2: Pick out any leaves, stones, or sticks and set them aside. Use a spoon or your thumb to crush any soil clumps until they are no larger than the size of a pea.

Step3: Wet your clean index finger with some water.

Step4: Rub a little bit of soil between your wet index finger and thumb.

How does the soil feel?

Sand particles feel grainy or gritty. Silt particles feel like powder even when they are wet. Clay feels sticky and can be made into "snakes" between your fingers.

Most soils are a mixture of these particles and organic matter, but some samples may have more than one type than the others. If a sample has equal amounts of all three particles it is called loam. Most plants grow and propagate best in loam, however native plants may require more sand, silt or clay. Is the soil texture adequate for the plants you are using in your restoration area?

(in resources section)

Step 5: Estimate where your soil sample would fall on the texture triangle and record that information for the "class" of soil. If you want to improve the texture of the soil in your restoration area, what additives would you recommend? Plants need a good start and the first step is healthy topsoil.

can you include that?

Activity 2: SOIL pH

Materials

LaMotte Soil pH Test Kit
(see Resources)
Distilled water
Plastic spoons
15 2 liter bottles
30 coffee filters
15 plastic baggies
15 test bags
15 pH range test tabs
Topsoil tour poster

Procedure:

Step 1: Pour 1/2 cup distilled water into a quart sized zipper top baggie. Check for leaks!

Step 2: With a plastic spoon ~~ass~~ add 5 teaspoons from your soil sample.

Step 3 Close the bag (make sure there is a little air in the bag) and shake briskly for 1 minute. (You add the distilled water so that the soil makes a mixture that more accurately measures pH.)

Step 4: Let the bag bag sit for two minutes so the soil can settle to the bottom of the bag.

Step 5: Flatten two coffee filters and place one on top of the other and place those filters on the soda bottle filter.

Step 6: Pour the soil solution into the filter leaving the sediment in the bottom of the baggie.

Step 7: Let the filtrate drip until oily sediment remains in the baggie.

Step 8: Fill the test bag to line C with the soil solution. (Throw the rest of the solution away along with the used coffee filters.

Step 9: Add 1 pH Wide Range Tab. Roll the bag down and shake until the tablet disappears.

Step 10: Compare your soil solution color to the color range chart and record your pH.

What is the pH of your soil? Is that range appropriate for your restoration area? (See the attacked charts for common garden plantings. Native plants require specific research)

Do you need to raise the pH of your soil? Add a little powdered limestone. To lower it add alum.

Resources: LoMotte Company
PO Box 329 Chestertown,
Maryland 21620

Research Contract

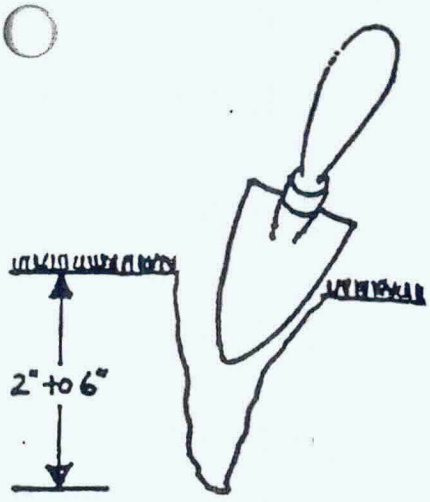
The members of _____'s class are about to begin an exciting research project on topsoil. They will be collecting soil samples and bringing them to class to measure pH and nutrient levels using new, safe, tablet methods. Upon completion of this research, they will bring home a report on their soil samples.

Please remind your student to collect a soil sample for _____ in the following manner:

Soil Sample Collection

Soil samples can be collected in a school yard, flower garden, lawn, park, vegetable garden, flower pot, planter box, or sports field. Be sure to get permission first!

Collecting soil samples -



1. Use a clean trowel, spoon or dull knife to loosen the soil sample.
2. Collect soil from a depth of 2 to 6 inches.
3. Collect several small samples from a single place and mix them together to get an "average" sample.
4. Collect a total of about 1 cup of soil.
5. Put the soil sample in a clean paper or plastic bag and bring to class.

Questions:

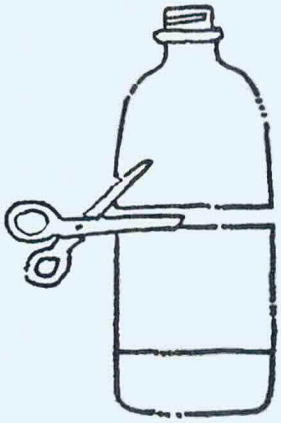
1. Where did you collect your soil sample?

   _____

2. What kind of plants (if any) were growing there?

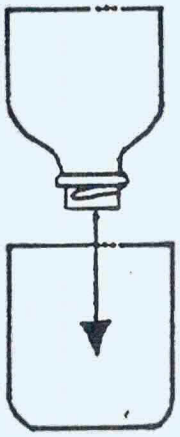
   _____

Making a Soda Bottle Filter Funnel

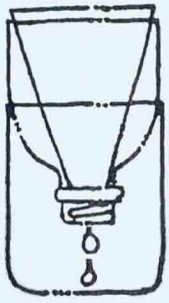


One for each student:

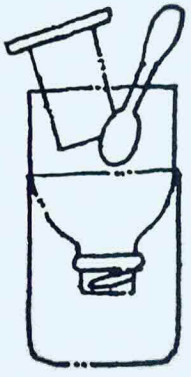
1. You will need one 2 liter plastic soda bottle for each student or each soil sample. Bottles should be rinsed with water and labels removed.
2. Carefully cut the bottle in half about 5" from the top with scissors or a knife. *(Safety scissors can be used if the teacher "starts" the cut with a knife or sharp scissor point.)*
3. Label the apparatus with the students name or initials.



The top portion of the bottle will be the funnel and the bottom portion will hold the funnel during the extraction and collect the extract. Between nutrient tests, the funnel top serves as a cover for the extract in the bottom portion. The funnel can also be used to store test bags between activities.



HANDOUT: Matching Game



What we did:

SOIL TEXTURE

Procedure:

1) Spread your soil sample on a piece of paper. What do you see?
2) Pick out any leaves, stones, or sticks and set them aside. Use a spoon or your thumb to crush any soil clumps until they are no larger than the size of a pea.
3) Wet your clean index finger with some water.
4) Rub a little bit of soil between your wet index finger and thumb.

How does the soil feel?

Sand particles feel grainy or gritty. Silt particles feel like powder even when they are wet. Clay feels sticky and can be made into "snakes" between your fingers.

Most soils are a mixture of these particles and organic matter, but some samples may have more than one type than the others. If a sample has equal amounts of all three particles it is called loam. Most plants grow and propagate best in loam, however native plants may require more sand, silt or clay. Is the soil texture adequate for the plants you are using in your restoration area?

5.) Estimate where your soil sample would fall on the texture triangle and record that information for the "class" of soil.

If you want to improve the texture of the soil in your restoration area, what additives would you recommend?

Plants need a good start and the first step is healthy topsoil.

Scientist's Name _____ Date _____

Class: _____

Data Sheet

Soil Texture

1. How does your soil sample feel?

_____

Did it feel grainy or gritty?

_____

Did it feel smooth or silky, like powder or flour?

_____

Did it feel sticky when moist?

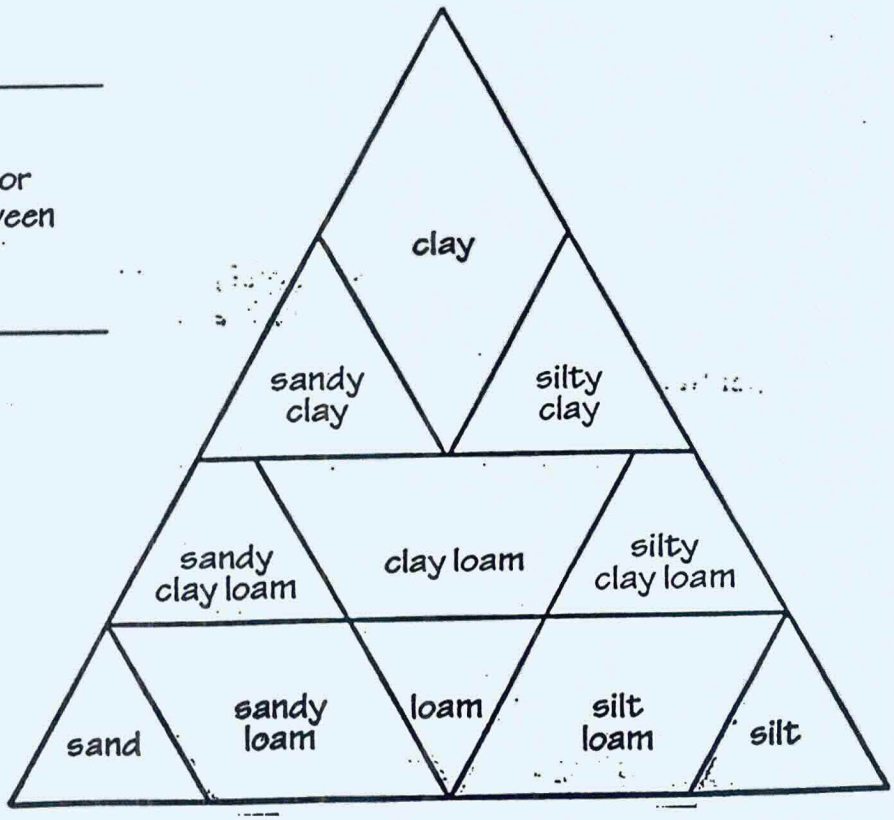
_____

When moistened, could you press or squeeze it into small ribbons between your thumb and finger?

_____

2. Does your sample contain mostly sand, silt, or clay particles?

_____



SOIL pH

Materials	Skills
I used a pH test from the LaMotte Company, however and pH test will work and the materials will vary with that test.	A knowledge of pH.

If you wish to contact the LaMotte Company the address is:

LaMotte Company
PO Box 329
Chestertown, Maryland 21620

distilled water
plastic spoons
15 2 liter bottles
30 coffee filters
15 plastic baggies
15 test bags
15 pH range test tabs
topsoil tour poster

Procedure:

1. Pour 1/2 cup distilled water into a quart sized zipper top baggie. Check for leaks!
2. With a plastic spoon ass 5 teaspoons from your soil sample.
3. Close the bag (make sure there is a little air in the bag) and shake briskly for 1 minute. (You add the distilled water so that the soil makes a mixture that more accurately measures pH.)
4. Let the bag sit for two minutes so the soil can settle to the bottom of the bag.
5. Flatten two coffee filters and place one on top of the other and place those filters on the soda bottle filter.
6. Pour the soil solution into the filter leaving the sediment in the bottom of the baggie.
7. Let the filtrate drip until only sediment remains in the baggie.
8. Fill the test bag to line C with the soil solution. (Throw the rest of the solution away along with the used coffee filters.
9. Add 1 pH Wide Range Tab. Roll the bag down and shake until the tablet disappears.

10. Compare your soil solution color to the color range chart and record your pH.

What is the pH of your soil? Is that range appropriate for your restoration area? (See the attached charts for common garden plantings. Native plants require specific research)

Do you need to raise the pH of your soil? Add a little powdered limestone. To lower it add alum.

A neutral pH allows nutrients to reach your plant and assisting in its' progression. With a neutral pH and a healthy loam your restoration plants have the best chance at survival.

Scientist's Name _____ Date _____

Data Sheet

Soil pH

1. Your soil sample pH test result:

color _____ pH _____

2. Circle some plants that would prefer this pH soil.

Alfalfa	6.0-7.0	Cotton	5.5-6.5	Peanut	5.0-6.0
Apple	5.5-6.5	Cucumber	6.0-8.0	Petunia	6.0-8.0
Asparagus	6.0-7.0	Daffodil	6.0-6.5	Phlox	5.0-6.0
Azalea	4.0-5.0	Douglas Fir	6.0-7.0	Pitcherplant	4.0-5.0
Banana	7.0	Geranium	6.0-8.0	Potato	4.8-6.5
Beech	6.0-7.0	Grapefriut	5.0-7.0	Radish	6.0-8.0
Beet	5.8-7.0	Grass	6.0-7.0	Rice	6.0-7.0
Broccoli	6.0-7.0	Holly	5.0-6.0	Rose	6.0-8.0
Cabbage	6.0-7.0	Kentucky Bluegrass	6.0-8.0	Soybean	6.0-7.0
Camelia	4.0-5.5	Lemon	5.5-7.0	Spinach	6.5-7.0
Carnation	6.0-8.0	Lettuce	6.0-7.0	Spruce	5.0-6.0
Carrot	5.5-6.5	Lima Bean	5.5-6.5	Strawberry	5.0-6.0
Cauliflower	6.0-7.0	Maple	6.0-8.0	Tomato	6.0-7.0
Chestnut	5.0-6.0	Mint	6.0-8.0	Venus Flytrap	4.0-5.0
Clover	6.0-7.0	Orchid	5.0-6.0	Wheat	6.0-7.0
Coleus	6.0-8.0	Pea	6.0-8.0	Zinnia	6.0-8.0
Corn	6.0-7.0				

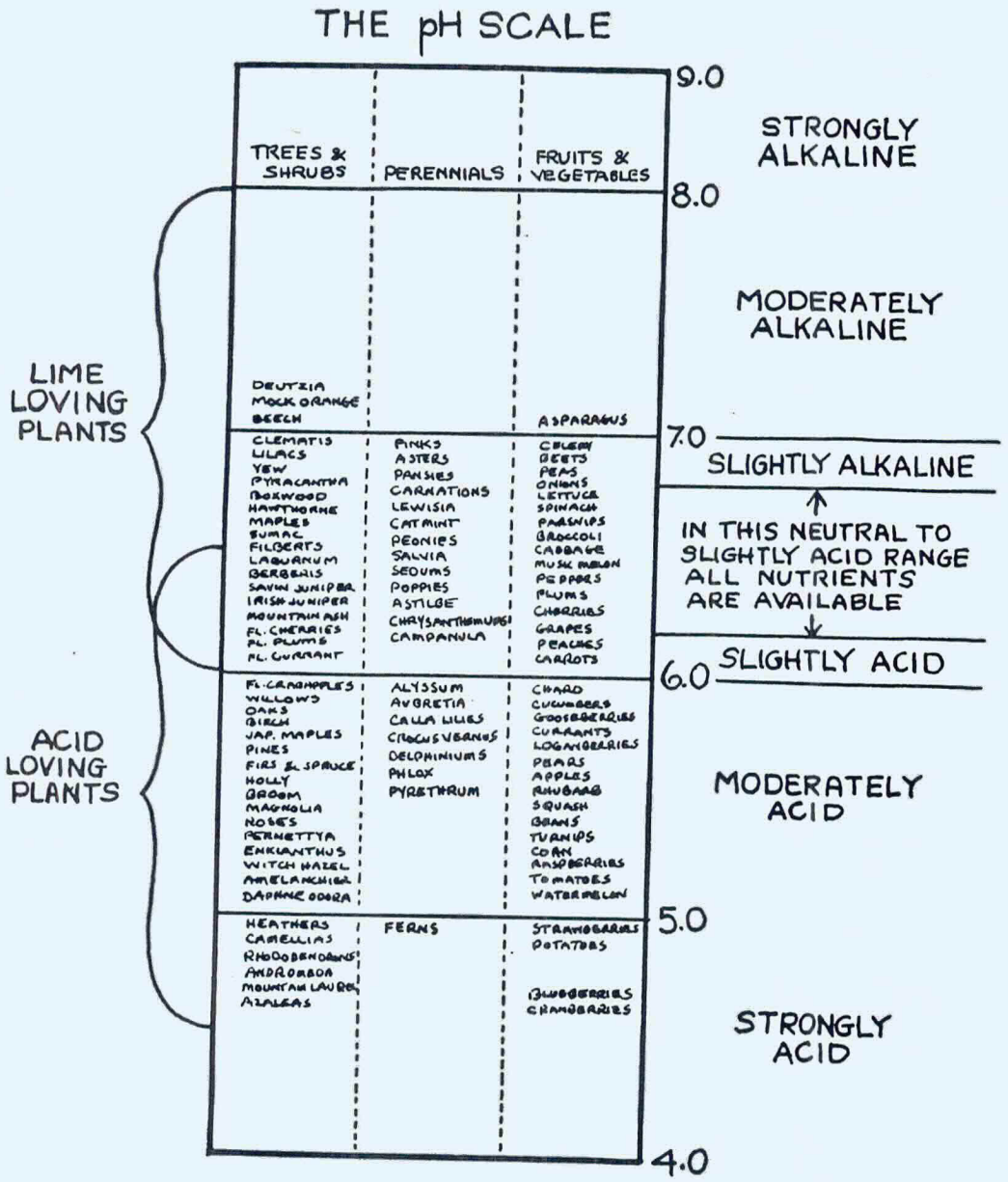


FIG. 2.

The Pacific Gardener A. R. Willis

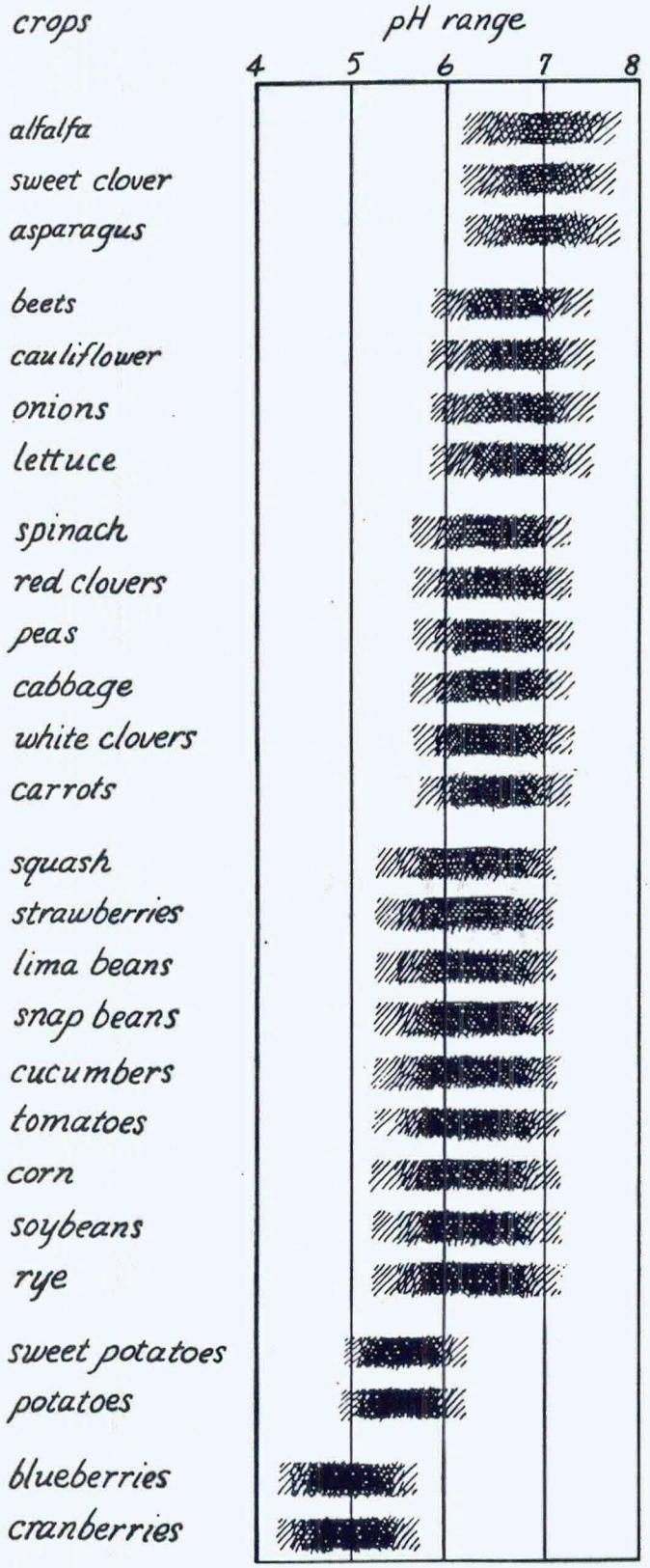


Figure 45 *The pH preferences of common crops.*

Planting

Project Planting

Purpose: Students will learn to plant trees, shrubs or ground covers.

Learning Goals:
1) Learn to plant bare root plants
2) Learn to plant potted or burlapped plants

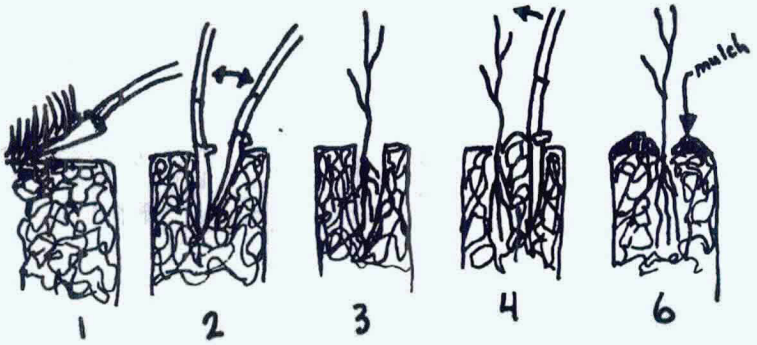
Teacher Preparation: Review planting techniques for the type of plant to be planted.

Student Preparation: Review safety precautions for using shovels.

Materials	Skills
Shovel	Understanding of plant vascular system
Water	Understanding of hole size
Mulch	Understand importance of mulch

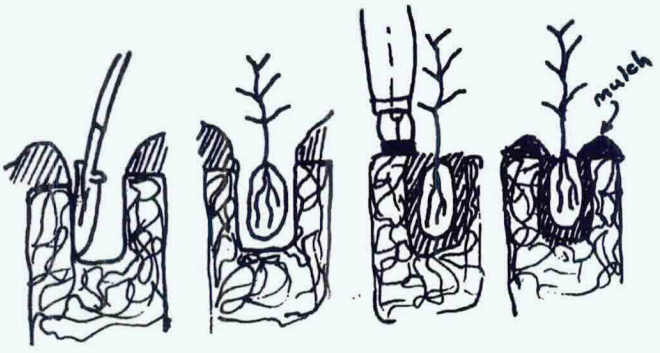
Bare Root Planting

1. Scalp ground
2. Make a planting slot
3. Insert bare root plant
4. Backfill and compact soil
5. Water
6. Mulch around plant



Potted or Burlapped Planting

1. Scalp ground
2. Dig a whole 2.5 times the diameter of the root ball
3. Insert root ball
4. Backfill
5. Water
6. Mulch around plant



Native Seed Collection

Project: Native Seed Collection and Preparation

Purpose: To collect the seeds of native plants for propagation purposes and to get them ready for storage/propagation.

Learning Goals: To apply plant identification skills to the collection of appropriate seeds for propagation. To organize and prepare seeds for storage. To help recognize the changes in the plants over the course of the year.

Teacher Preparation:

Step 1: Getting Ready.

Teachers should visit potential sites ahead of time to check for availability of seeds. Several guides list the fruiting period, including duration of the fruit on the branch. It would be advisable to look at a propagation guide book to select seeds which will be suitable for your particular class room and age group. While some species are fairly simple to germinate, others require combinations of chemical, temperature and physical treatments over wide spans of time in order to germinate. Pick seeds which you believe your students will be able to germinate. (see **Resources**)

Step 2: Seed Cleaning.

Most seeds need to be cleaned from the fruit. There are two ways to clean seeds. The first is to use an air screen process, where your shake your seeds through various screens to clean it. Another way, is to immerse it in water and physically separate the fruit from the seed (by hand), and collect the remaining seed from the bottom of the container. Most viable seeds will sink in water.

Step 3: Seed Storage.

The most common problem associated with seed spoilage is moisture. Too much moisture will allow molds and mildew to grow and destroy your seeds. Minimize the seeds moisture and exposure to sun (heat). Most seeds will need to be stored at or slightly below freezing. Try to store them in airtight plastic bags or plastic lined cardboard boxes also work well. Remember to research your plants specific needs!

Student Preparation: It is ideal if the students are already familiar with the native plants that you are interested in propagating. This allows students to exploit the discovery of unexpected plants during your field trip. However, students can be assembled in teams once they are at the site and each team can be trained to recognize and collect one or two types of seeds. After collecting, students should set seeds out to dry if they were collected on a damp day, or if the fruit enclosing the seeds has a high water content. This will help prevent mildew from destroying the seeds.

Materials

Zip Lock bags with I.D. Tags for each species of plant and blank tags for unexpected species.

Most seeds need to be stored for some period in a refrigerator.

What We Did: We were on the snowberry team. When we got to Whitaker Pond we learned how to recognize the snowberry plants. It was pretty easy because the berries are bright white on the branches. We went from plant to plant pulling the berries off. We decided not to take all of the berries from any bush so that there would be some seeds left over for birds and so that some of the seeds can grow new bushes. We put the seeds in baggies that had labels telling what kind of seeds they were.

Connections:

Seed collection is an important bridge between the plant identification lessons and the seed propagation experience.

Resources:

"Plants of the Pacific Northwest"

"Propagation of Native Plants"

Seed Propagation

Project: Seed Propagation

Purpose: Prepare seeds for germination and grow them out until they are ready to be transplanted to nursery or restoration site.

Learning Goals:

1) Students will understand the processes, and some of the requirements, of pollination, seed formation, and germination.
2) Students will learn that different seed dispersal mechanisms can affect the seed requirements for germination. (These activities dovetail nicely with any plant physiology or horticulture unit.)

Teacher Preparation:

Teacher should study structure and function of the parts of a seed. Practice dissection procedures. Know the terms stimulus, response and tropisms. Teachers should be aware of the calender. Different seeds require widely varying treatment, germination and grow out times. It would be wise to work backwards from a desired "plant-out" time, to determine when to begin these activities.

Native seed germination. This chapter is dedicated to native seed propagation. There are a few points to discuss before trying to propagate native seeds:

First, native seed propagation is an inexact science and many techniques presented here are just suggestions. Native seed propagation is very technical and the success rates vary greatly. Please think about what you want to accomplish. Don't try it if you want to have easy success. If you are looking to capture and preserve genetic variation then it is an excellent idea.

Second the techniques presented here will be a survey of very basic skills and practices to help you start. The most important thing to do is to find your target species and do as much research on that plant as possible. Plant requirements vary greatly according to species, climate, and geographical region.

The last point is that native plant propagation requires some experimentation and innovation so use that to your advantage. Make sure that students record their findings and share their results.

Treatments for non-dormant seeds.

Seeds that are ready to be sown usually need to be soaked in water for 1-2 days to start the germination process. One method is to place the seeds in a mesh bag in a tub with running water. The running water provides two functions 1) it softens the seed coat and 2) it provides the seed with fresh oxygen. Soaking the seeds in water tell the seed to start the metabolic process of germination.

Treatments for dormant seeds.

Some seeds need to under go a period of dormancy, this is an ecological adaptation to insure that the seed will germinate in conditions that are favorable to its survival. This means that you may have to simulate some conditions to break the seed out of dormancy in order for it to germinate. Here a few common techniques.

Hot Water Soak: Bring a container of water to a boil, immerse the seeds and then allow it to cool. Some seeds whose embryo can be damaged by high heat should have water that is heated to only 65 to 70 degrees Centigrade. Remove and dry the seeds when they swell. Some seeds tend to stick together so place them in peat moss for a couple of days.

Scarification: This is the process of weakening the seed coat to allow germination to begin. Some ways to achieve this is to scratch the seed coat with a file, sandpaper, or even put them in a blender. Another way to is to put the seeds in an acid solution to simulate the digestive tract of an animal.

Techniques for double dormancy.

Some seeds need to overcome what is known as double dormancy which is the seeds need to have a moist, warm period followed by a cold dry period (to simulate spring to winter). This means that the seeds need to be subjected to a water rinse and a period of time in the freezer. Again check your resources and be creative.

Materials

Seeds

Seed Treatments (may include hot water soaks, refrigeration, sandpaper scarification or acid baths. See Resources for specific directions and materials.

Planting medium (a 3:2 Potting soil:sand mix seems to work well)

Plastic pots and trays

Labeled sticks or tags if several species are grown

A well lit area ; " grow-light" set up is probably crucial for good success.

Fertilizer after the seeds germinate

A nursery plot would be helpful to grow out the seedlings before

transplanting them to the restoration site. Easily available water is a must.

Mulch

Student Preparation:

The seed dissection lab is quite helpful in getting students to understand what is happening inside the seeds.

Activity 1:Seed Dissection(Study the structure and function of seeds).

Students should be provided with a dissection kit (Scalpel or knife, Probe, scissors) and a loupe or magnifying glass. Students will dissect the seed, (A bean seed is the one of the best seeds to use.) identify the seed coat, the cotyledons, and the plant embryo. The seeds should be soaked in water overnight to make the dissection easier.

1) Using a scalpel, or even a thumbnail, remove the seed coat. After soaking, the seed coat is soft and rubbery.
2) The two cotyledons are exposed. Gently open them. This will expose the embryo. Sometimes the embryo is damaged in this step so have extra bean seeds on hand.
3) The embryo can be seen to already have undeveloped leaves, stem and roots.(See Resources.)
4)This activity can be carried forward for up to a week to watch the development of the embryo. If you do this be sure to keep the seeds moist and have plenty of extra beans.

Activity 2: Seed Germination Inquiry Activity. Students should brainstorm all ideas regarding the question," What do seeds need to germinate?" List them on the overhead and discuss their answers. Introduce the topic of growth responses or stimuli (Any condition that produces a response). Define stimulus and give examples. In your examples, introduce and discuss tropism (growth movements toward or away from a stimulus). Have students brainstorm a list of tropisms that plants may exhibit. [Phototropism (light), Geotropism (gravity), Thigmotropism (touch), and Hydrotropism (water) are the most common]. Have the students come up with an inquiry question regarding seed tropisms. For example, "Which direction will a seedling grow in the dark?" Let the students test out their questions using beans seeds. Have them record their results. Discuss the results with regard to germinating native plants.

Getting the students ready to work with native seeds.

Discussion of different seed dispersal mechanisms help explain the need for some of the treatments; e.g.,. seeds requiring acid baths or sandpaper scarification are usually from berries which are swallowed, digested and deposited by birds.

If several different species of plants are being grown, it may be easier to divide the students into different teams, each learning the techniques for their own seeds.

After the seed treatment, the students will need to be shown how deeply and densely the seeds should be planted in the pots. This will largely depend on the seed size.

What We Did:

Our team worked on planting the Oregon Ash seeds. These seeds are inside of little "helicopter" things like a maple seed. First we had to carefully peel the outside layer off to get to the long skinny seed. We had to be careful not to break them. Next we had to look and see if there were any little worms in the seeds because of a few of them had the worms. When we had all of the seeds out of their shells we filled a large beaker with hot water which was around 105 degrees. We let the seeds cool off and sit over night. The next day we planted the seeds about half an inch deep in the pots. We put six seeds in each pot. We wrote "Oregon Ash" on little sticks and stuck those in the side of the pots. When we were done we watered the seeds and stuck them on the grow table.

Connections:

This links The Plant I.D., Seed Collection and Transplanting Chapters
An understanding of plant physiology is increased with this chapter.
The Soil chapter would help the students understand how and why to prepare the nursery plot.

Weather

Project: Mapping January and August temperatures in the Pacific Northwest

Purpose: To recognize and identify the influence that the Pacific Ocean has on seasonal temperatures in the Pacific Northwest

Learning Goals:

1) Enter data in a table and interpret data from a table
2) Understand the concept of heat capacity
3) Collect temperature data from the internet
4) Plot temperature data on a map
5) Interpret data on temperature maps
6) Relate interpretation to understanding of heat capacity

Teacher Preparation:

Materials

Energy from the Sun experiment handout
Experiment materials (as listed on experiment handout)
Internet access
Pacific Northwest maps for average January and August temperatures
Colored pencils
Study guide - The Pacific Ocean and It's Effect on Temperatures in the Northwest

Student Preparation:

Activity 1: Understanding of the heating effect of the sun on the earth

Students should follow the procedures outlined in the experiment handout

Main idea is that water and land (sand in the experiment) have different heat capacities and this difference impacts the air temperatures we feel/experience when we are near land or water.

Activity 2: Temperature Mapping

Step 1: Have students locate climate/ave. temperature data on the internet (the sample data packet and six digit weather station codes were gathered from http://www.wrcc.dri.edu)

Step 2: Have students plot data for average January and August max temperatures on the corresponding maps.

Step 3: Have students color-code the different temperature ranges on their maps and look for any patterns that emerge.

Step 4: Have students complete study guide - The Pacific Ocean and It's Effect on Temperatures in the Northwest.

Resources: Unisys Weather
http://weather.unisys.com

http://www.atmos.washington.edu

Western Region Climate Center
http://www.wrcc.dri.edu

ENERGY FROM THE SUN Name: _____

Period: _____

Purpose: The purpose of this experiment is to . . . . .

Hypothesis: My hypothesis is that . . . (what do you think will happen - BE SPECIFIC!) . . . . .

Materials:

- 2 styrofoam cups
- aluminum foil
- black paper
- scissors and tape
- one thermometer
- sand
- water
- heat lamps
- clock or watch

Procedure:

1. Wrap one styrofoam cups in aluminum foil.
2. Place the second cup inside the one wrapped in foil.
3. Fill the second (inner) cup half way up with either sand or water; as instructed by the teacher.
4. Cover the top of the cup with black paper and tape it in place. Put your group members' names on one of the pieces of tape.
5. Poke a hole through the center of the black paper and slide the thermometer through the hole down into the test substance (sand or water).
6. Place cups either under the heat lamps or in the shade; as instructed by the teacher.
7. Read the thermometer every two minutes and record the temperature on the appropriate line of the data table on the other side of this page.
8. Get the information to fill in the other lines of your data table from members of other groups.

Project: Mapping the Portland Area Climate

Purpose:

1) To recognise and identify the influence of various geographic land features on the Portland area climate
2) To compare the Portland area climate to climates of areas immediately surrounding Portland

Learning Goals:

1) Use the internet to gather climate data
2) Plot gathered data on a map
3) Interpret plotted data to understand how the Portland climate varies from surrounding areas and what geological land features may account for the differences

Teacher Preparation:

Materials
Internet access
Portland area map
Colored pencils
Study guide - The Portland Area Climate

Student Preparation:

Step 1: Have students gather Portland area climate data (ave. max. temp., ave. min. temp., annual precipitation) on the internet
*** Sample data was gathered from http://www.wrcc.dri.edu. More specific information from local school sites, however, may be available beginning with the '99-'00 school year through the Horizons Project. Contact Doug Saulter at the email address on title page for more information.

Step 2: Have the students plot the gathered data on the Portland area map.

Step 3: Have the students complete the study guide - The Portland Area Climate

Resources: Western Region Climate Center
http://www.wrcc.dri.edu

The Horizon Project
contact Doug Saulter at the email address listed on the title page, or go to the Portland State University website under the Center for Science Education and locate the HORIZONS Project.

NAME: _____

CLASS: _____

DATE: _____

THE PORTLAND AREA CLIMATE:

1. What happens to annual precipitation totals as you move from Haskins Dam to Forest Grove, Dilley, & McMinnville; and then on to Hillsboro and Beaverton?

_____

2. What reason or geographic land feature can you name to account for this change?

_____

_____

_____

3. What happens to the annual precipitation totals as you move from Oregon City to Estacada & Eagle Creek, and then on to Headworks & Three Lynx?

_____

4. What reason or geographic land feature can you name to account for this change?

_____

_____

_____

5. What happens to the annual precipitation totals as you move from Salem to Silverton to Silver Creek Falls & Scotts Mills?

_____

6. What happens to the temperatures as you from Salem to Silverton, and on to Silver Creek Falls & Scotts Mills?

_____

7. What reason or geographic land feature can you name to account for the changes listed in questions #5 and #6 above?

_____

_____

_____

_____

8. What stations have the three highest average August temperature on the Portland Area Climate Map? _____

9. What three stations on the map have the lowest annual precipitation totals?

_____

10. Why would these three locations be so much hotter and drier than the rest of the map?

_____

_____

_____

_____

Project: Mapping Annual Precipitation in the Pacific Northwest

Purpose: To recognise and identify the influence of geological land features on annual precipitation totals in the Pacific Northwest

Learning Goals:

1) Understand the processes behind cloud formation and precipitation, including the terms condensation nuclei and dewpoint.
2) Collect precipitation data from the internet
3) Follow a key to appropriately enter data (color) on a map
4) Interpret color-coded data on precipitation map

Teacher Preparation:

Materials

Cloud in a Bottle experiment handout
Experiment Materials (as listed in experiment handout)
Internet access
Pacific Northwest precipitation map
Study guide - Precipitation in the Pacific Northwest

Student Preparation:

Activity 1: Cloud in a Bottle experiment

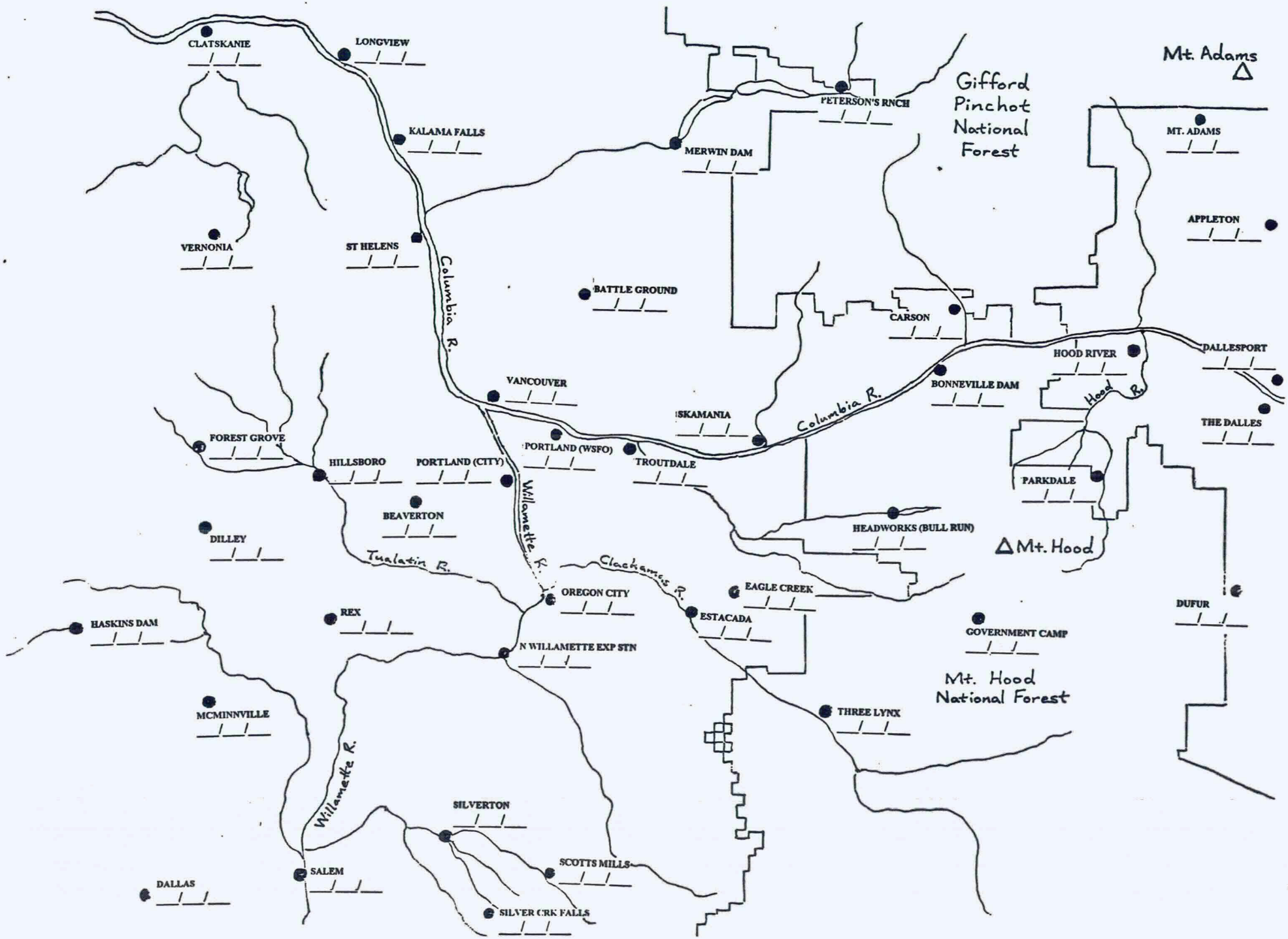
Students should follow the procedures outlined in the experiment handout

Main idea is that the following things are necessary for cloud formation (and, as a result, precipitation): condensation nuclei, moisture, reduction in temperature to the dewpoint.

Activity 2: Mapping Precipitation

Step 1: Have students use internet to locate annual precipitation data and/or maps for the Pacific Northwest (http://www.wrcc.dri.edu)
Step 2: Plot gathered data on Pacific Northwest precipitation map
Step 3: Have students complete study guide - Precipitation in the Pacific Northwest

Resources: Western Region Climate Center
http://www.wrcc.dri.edu


CLATSKANIE
LONGVIEW
KALAMA FALLS
VERNONIA
ST HELENS
Columbia R.
BATTLE GROUND
VANCOUVER
FOREST GROVE
HILLSBORO
PORTLAND (CITY)
BEAVERTON
DILLEY
Tualatin R.
Willamette R.
PORTLAND (WSFO)
TROUTDALE
SKAMANIA
Columbia R.
PETERSON'S RNCH
MERWIN DAM
Gifford Pinchot National Forest
Mt. Adams
MT. ADAMS
APPLETON
CARSON
HOOD RIVER
DALLESPORT
BONNEVILLE DAM
Hood R.
THE DALLES
PARKDALE
HEADWORKS (BULL RUN)
Mt. Hood
OREGON CITY
Clackamas R.
EAGLE CREEK
ESTACADA
REX
HASKINS DAM
N WILLAMETTE EXP STN
GOVERNMENT CAMP
DUFUR
Mt. Hood National Forest
MCMINNVILLE
THREE LYNX
Willamette R.
SILVERTON
SCOTTS MILLS
SALEM
DALLAS
SILVER CRK FALLS

NAME: _____

BLOCK: _____

DATE: _____

The Pacific Ocean and It's Effect on Temperatures in the Northwest:

I. AVERAGE JANUARY TEMPERATURES:

1. How do the average winter (January) temperatures in Forks, Aberdeen, Astoria, Seaside, Newport, and Brookings compare to the average winter temperatures in Bellingham, Tacoma, Olympia, Centralia, Longview, Vancouver, Portland, Salem, Eugene, and Medford?

_____

_____

_____

_____

_____

2. How do the average winter (January) temperatures in Forks, Aberdeen, Astoria, Seaside, Newport, and Brookings compare to those in Conconully, Spokane, Kennewick, Pendleton, Ontario, Boise, and Lakeview?

_____

_____

_____

_____

_____

3. Which communities, those on the coast or those farthest inland, have the coldest average temperatures in January? _____

What reason can you give to account for this?

_____

_____

_____

4. Which communities, those on the coast or those farthest inland, have the mildest (warmest) average January temperatures? _____

What reason can you give to account for this?

_____

_____

_____

II. AVERAGE AUGUST TEMPERATURES:

5. How do the average summer (August) temperatures in Forks, Aberdeen, Astoria, Seaside, Newport, and Brookings compare to those in Bellingham, Tacoma, Olympia, Centralia, Longview, Vancouver, Portland, Salem, Eugene, and Medford?

_____

_____

_____

_____

_____

Cloud in a Bottle:

NAME: _____

BLOCK: _____

DATE: _____

PURPOSE:

The purpose of this activity is to .....

_____

_____

_____

_____

HYPOTHESIS (an <u>educated</u> guess):

My hypothesis is that .....

_____

_____

_____

_____

_____

MATERIALS:

- **2*l* pop bottle**
- **hot water**
- **matches**

PROCEDURE:

1. Rinse the pop bottle in hot water.
2. Have one partner try to suck the air out of the bottle while the other partners watch the air inside the bottle.
3. Record your observations:

   _____

   _____

   _____

   _____

4. Rinse the bottle in hot water again.
5. Turn the bottle upside down, light a match and hold it under the bottle opening as the match burns down.
6. Have on partner try again to suck the air out of the bottle while the other partners watch the air inside the bottle.
7. Record your observations:

   _____

   _____

   _____

   _____

NAME: _____

CLASS: _____

DATE: _____

PRECIPITATION IN THE PACIFIC-NORTHWEST:

Purpose: The purpose of this activity is to ....

_____

_____

_____

Hypothesis: What areas on the precipitation map do you think will show the highest amounts of annual precipitation? WHAT FACTORS DOYOU BELIEVE WOULD BE RESPONSIBLE FOR THIS?

_____

_____

_____

_____

_____

_____

Procedure:

1. Color all the areas on the precipitation map that are labelled with a **1 - purple**.
2. Color all the areas on the map that are labelled with a **2 - blue**.
3. Color all the areas on the map that are labelled with a **3 - green**.
4. Color all the areas on the precipitation map that are labelled with a **6 - yellow**.
5. Color all the areas on the map that are labelled with a **7 - orange**.
6. Color all the areas on the map that are labelled with an **8 - red**.
7. **Check with your teacher to determine the color of any small unmarked areas on the map.**
8. Shade in the "annual precipitation key" at the bottom of the map with the appropriate colors.
9. Use you map and an atlas as resources to answer the following questions.

Questions:

1. Find where Mt. Baker, Mt. Rainier, Mt. Hood, and Mt. Jefferson would belocated on the precipitation map. What are the annual precipitation totals at these locations? _____

   _____

2. Find the cities of Pasco, Washington: Boise, Idaho: and Winnemucca, Nevada on the map. What are the annual precipitation totals at these locations? _____

   _____1.

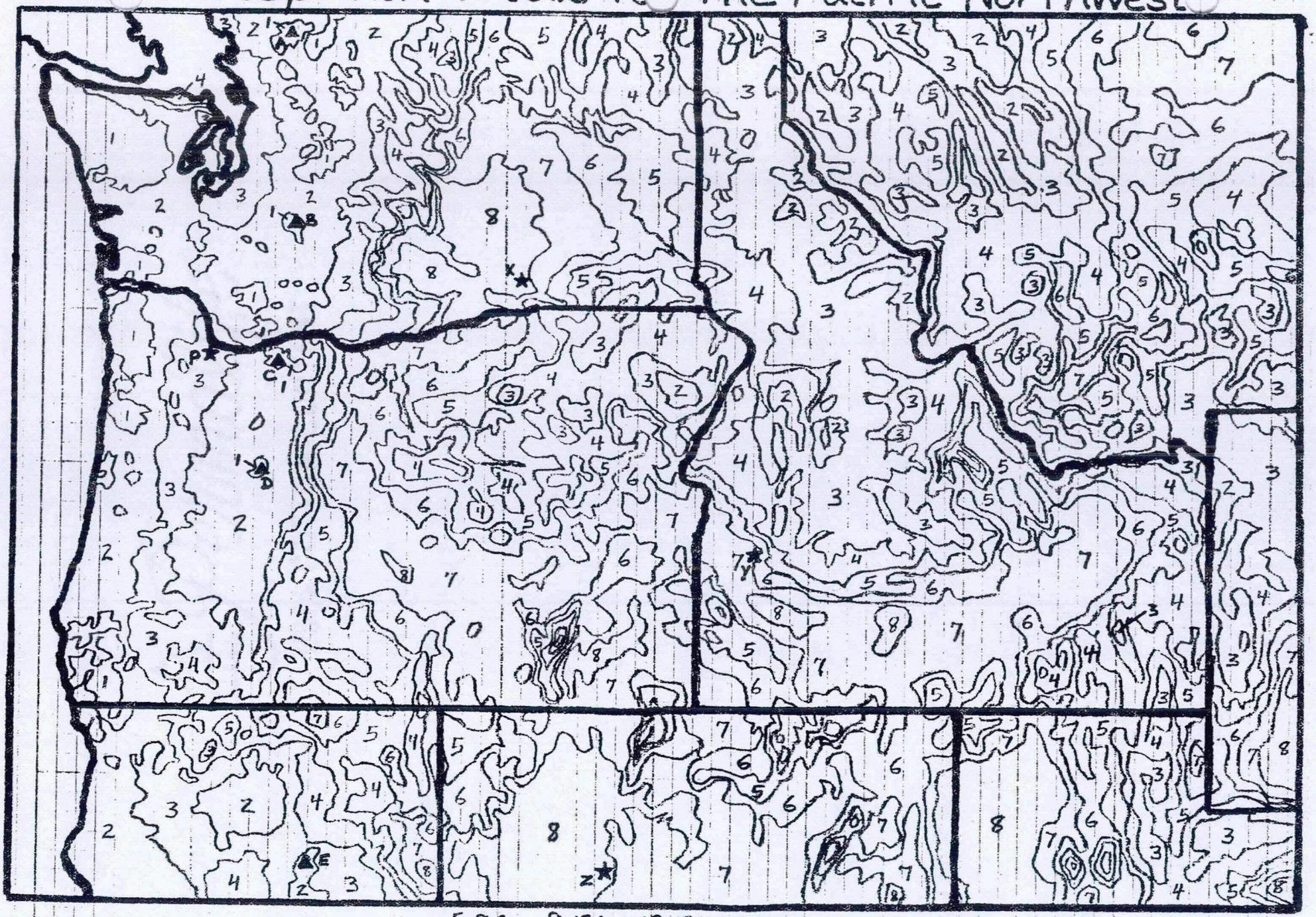
3. In general, where on the precipitation map do annual precipitation map do annual totals seem to be the highest (50 in. or more)? _____

   _____

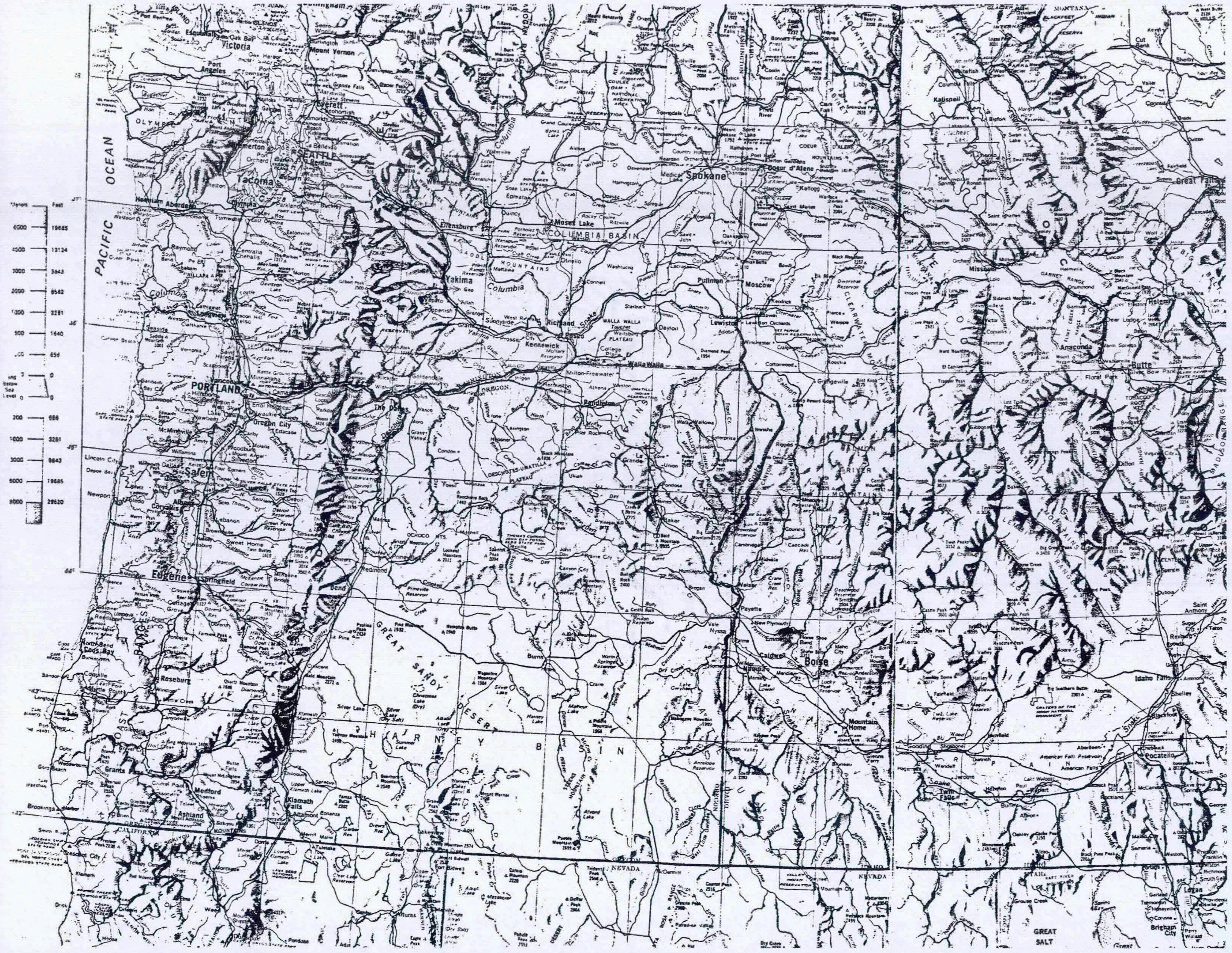
   What geograhic land feature is located to the east of this area? _____

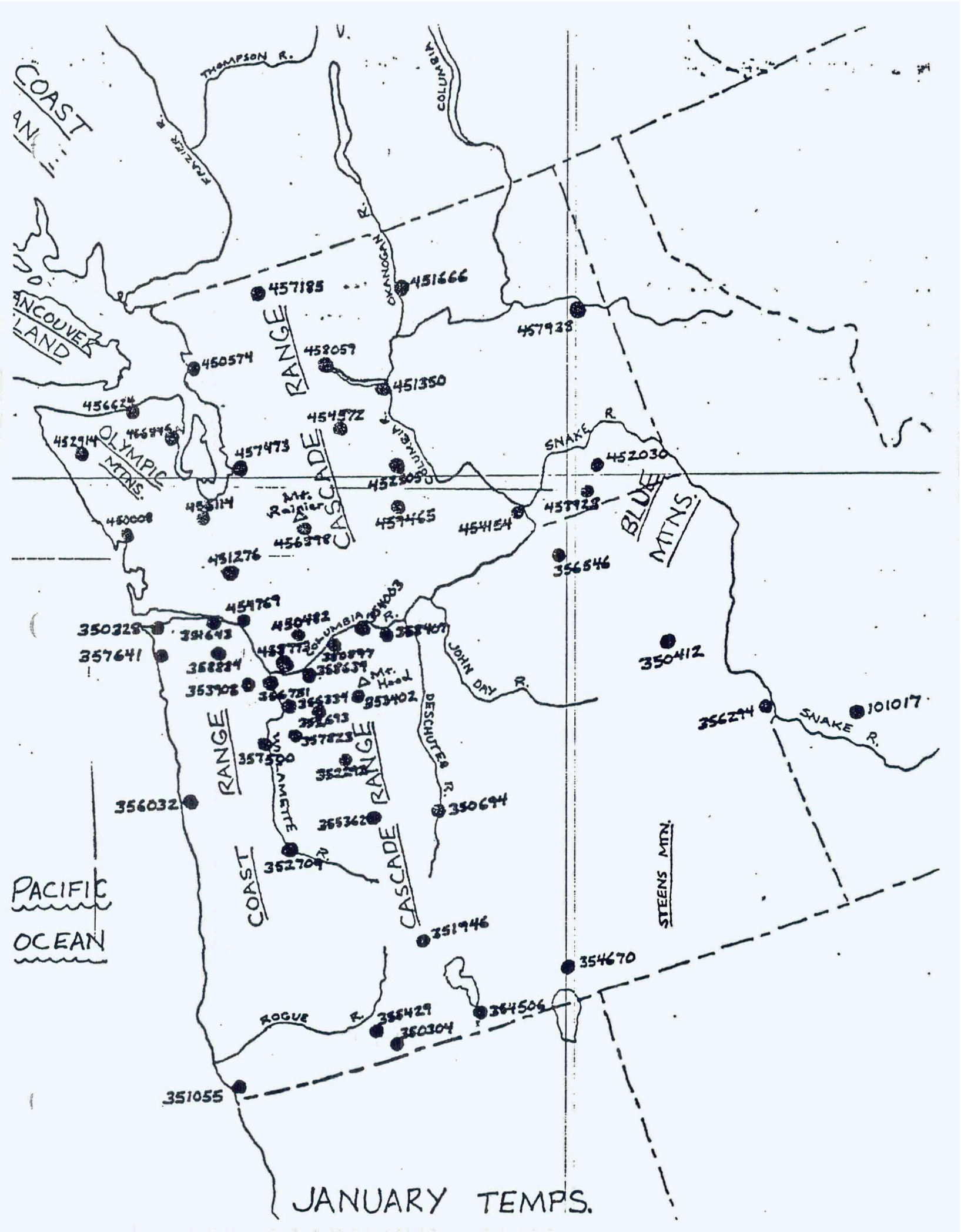
   _____

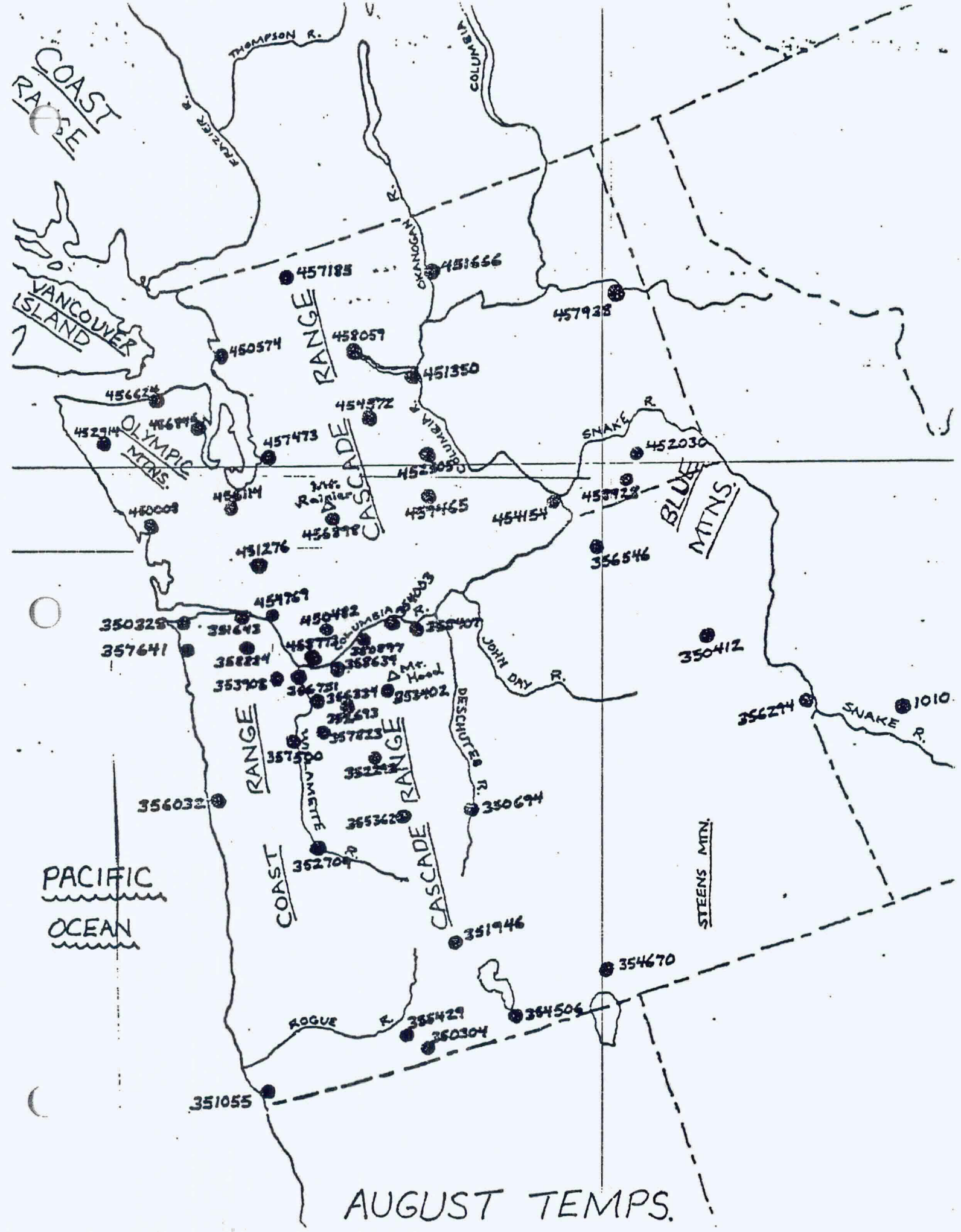
Annual Precipation Totals for the Pacific-Northwest



Annual Precipitation Key:	5-9 in.	9-12 in.	12-15 in.	15-20 in.	20-30 in.	30-50 in.	50-100 in.	OVER 100 in.
	8	7	6	5	4	3	2	1


PACIFIC OCEAN
Victoria
Port Angeles
Mount Vernon
Everett
SEATTLE
Tacoma
Olympia
Aberdeen
Ellensburg
Moses Lake
COLUMBIA BASIN
Yakima
Columbia
Richland
Kennewick
Pasco
Walla Walla
WALLA WALLA PLATEAU
Spokane
Coeur d'Alene
Pullman
Moscow
Lewiston
CLEARWATER MOUNTAINS
Kalispell
Great Falls
Missoula
Helena
Anaconda
Butte
PORTLAND
Oregon City
The Dalles
Pendleton
Salem
Corvallis
Albany
Eugene
Springfield
Bend
Redmond
OCHOCO MTS.
Burns
GREAT SANDY DESERT
HARNEY BASIN
Roseburg
Medford
Grants Pass
Ashland
Klamath Falls
Coos Bay
North Bend
Brookings
Crescent City
CALIFORNIA
NEVADA
OREGON
Boise
Nampa
Caldwell
Payette
Mountain Home
Twin Falls
Pocatello
Idaho Falls
Logan
Brigham City
GREAT SALT
MONTANA


COAST
RANGE
THOMPSON R.
FRASER R.
COLUMBIA R.
OKANOGAN R.
457185
451666
457938
458057
450574
451350
456674
454572
452914
466996
457473
OLYMPIC MTNS.
CASCADE RANGE
COLUMBIA R.
452305
SNAKE R.
452030
457923
454154
BLUE MTNS.
Mt. Rainier
455114
457465
450008
456398
451276
356546
454769
350328
351643
450482
COLUMBIA R.
358407
357641
358824
358639
Mt. Hood
353708
353402
JOHN DAY R.
350412
356294
SNAKE R.
101017
357823
357500
WILLAMETTE R.
352298
RANGE
COAST
CASCADE
RANGE
DESCHUTES R.
356032
350644
352709
PACIFIC OCEAN
STEENS MTN.
351946
354670
ROGUE R.
355429
350304
364506
351055
JANUARY TEMPS.



AUGUST TEMPS.