

Friends of the Dunes Environmental Education Project

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Problem Background and Statement:

Problem Statement:

Humboldt County lacks environmental education dealing with dune and beach ecosystems within the local elementary schools particularly grades three through six.

Problem Background:

Environmental education helps children to learn about the world that they live in. The California Department of Education (CDE) strongly supports environmental education programs (Evans 2002). According to the CDE, students involved in environmental education programs are more likely to perform better in a variety of subject matters such as math, science, and social studies (Evans 2002). The ultimate goal of environmental education is to produce an environmentally conscious citizen. Many aspects of society are dependent on citizens making informed decisions that affect economic, political, and social issues, therefore environmentally informed citizens are more likely to make environmentally responsible decisions that affect natural resources, sustainable development, and a healthy planet.

Humboldt County recognizes the importance of environmental education and encourages schools to participate in environmental-based programs. Some of the programs address watershed stewardship and management, forest ecosystems, fisheries, birds and migration, plant identification, and recycling. Some of examples of these programs are: Americorp Watershed Stewards Project, Forest Management – Hoopa Tribal Forestry, Mad River Fish Hatchery Tours, Godwit Day Spring Migration Bird Festival, Seasonal Botany Programs, and Arcata Community Recycling Education Program. Even though Humboldt County has a variety of environmental education programs, they still lack dune and beach ecosystem education.

Friends of the Dunes offers a youth educational program called Bay to Dunes that focuses on the dune ecosystem. Bay to Dunes has been running for 9 years and services an average of 1,600 students per year, or about 38% of 3rd-6th graders in Humboldt County. The Bay to Dunes program is an in-class presentation, followed by an all day field trip, where the students spend half the day at the dunes and half the day at the beach. The field trip focuses on adaptation, ecosystem restoration, and the importance of a healthy ecosystem. The program is tailored to fit the curriculum for 3rd through 6th grade students. The different aspects of this program address a variety of different learning methods, from visual to kinesthetic.

The success of the Bay to Dunes program has led to an interest in reaching more schools in Humboldt County. The long term goal of Friends of the Dunes is to institutionalize the Bay to Dunes program to the Humboldt County educational curriculum for 3rd through 6th grade students. Currently the program is funded through grants. The incorporation of the program into the Humboldt County educational curriculum would provide adequate funding for the program.

Another opportunity for elementary school students to get involved with dune ecosystem education is through the Adopt-A-Dune project available through the Service Learning program. The Service Learning program is a way for students to learn from and connect with a community based project. If applied for, the Service Learning program will provide state funding for a variety of learning opportunities.

With increased involvement between Friends of the Dunes and the schools, the lack of environmental education dealing with dune and beach ecosystems could be remedied.

Project Goals and Objectives:

Goal 1: Increase involvement of 3rd – 6th grade students in the Bay to Dunes Program.

Objective 1:

-Inform at least 1/3 (or 8 classrooms) of the 3rd – 6th grade classrooms that have never participated in the Bay to dunes program by June 2006.

Objective 2:

-Increase the rate of return of schools that have attended by 10% by 2008.

Goal 2: Inform more 3rd – 6th grade elementary teachers about options for service learning programs via the Adopt-A-Dune program.

Objective 1:

-Inform at least 1/3 3rd – 6th grade teachers about opportunities of service learning program by September 2006.

Goal 3: Increase involvement of Friends of the Dunes in local elementary schools.

Objective 1:

-Create 2 or more new projects to increase Friends of the Dunes and school relationship by May 2006.

Weighing the Alternatives:

Brainstormed Solutions:

Goal 1:

Objective 1

1. Send flyers to teachers about program.
2. Send a ppt. to teachers – might not reach a large number of teacher.
3. Send a video – time and money to look professional.
4. Inform in person – too much time.
5. Set up meeting – too much time.
6. Inform principles – might not target direct audience of teachers.
7. Workshop with students, teachers, and FOD.
8. Place ad in paper – not hitting target audience directly.
9. Place ad on TV/ radio – not hitting target audience directly.
10. Informative fundraising event.

Goal 1:

Objective 2

11. Questionnaire survey (mail out).
12. Personal interview – time consuming.
13. E-mail survey.
14. Phone survey – too personal.
15. Feed back survey after fieldtrip – kind-of already being done.
16. Feedback from tour guides about student/teacher's interest in tour.

Goal 2:

17. Send flyer about teacher workshop.
18. Have a conference – time consuming.
19. Phone about teacher workshop.
20. E-mail about teacher workshop.
21. Video about teacher workshop – time and money.
22. Power point about teacher workshop – limited to teachers with computer program.
23. Place ad on radio (PSA) – not hitting target audience.
24. Place ad in paper – not hitting target audience.
25. Make a display.

Goal 3:

26. Send invitation to teachers to come to Ocean Day and learn about ecosystems, FOD – they are already coming.
27. Create science fair criteria for a project- time consuming.
28. Develop a cultural history component for B2D program.
29. Follow-up presentation for B2D – not enough time.
30. Assembly to teach kids about ecosystems and FOD – time consuming.
31. Create a “Dunes Day” at each school.
 - During the winter off time.
 - Basic education about dunes, snowy plovers, etc.
 - Do some of the projects in the teacher’s manual.
32. Go to classroom.

Solutions Selected for Criteria Chart:

1. Send flyers to teachers about program.
2. Workshop with students, teachers, and FOD.
3. Informative fundraiser.
4. Questionnaire survey (mail out).
5. Email survey.
6. Feed back from tour-guides about students/teachers' interest in tour.
7. Send flyer about teacher workshop.
8. Phone about teacher workshop.
9. E-mail about teacher workshop.
10. Create science fair criteria for a project.
11. Create a cultural history component for B2D.
12. Create follow-up presentation for B2D.
13. Go to Classroom to help students with service learning and create a display.

Summary Matrix

	Soln. 1	Soln. 2	Soln. 3	Soln. 4	Soln. 5	Soln. 6	Soln. 7	Soln. 8	Soln. 9	Soln. 10	Soln. 11	Soln. 12	Soln. 13
Criteria													
Time	5	2	2	5	5	2	5	2	5	5	4	3	4
Money	4	3	2	3	5	5	4	5	5	5	5	4	5
Does It Meet Our Objectives	5	4	4	5	5	3	5	4	5	5	5	5	5
Is F.O.D Willing To Do It	5	2	2	5	2	2	5	3	5	3	5	5	5
Does It Reach Teachers Effectively	5	4	3	5	4	2	5	3	4	2	5	5	4
Does It Reach Students Effectively	2	3	2	3	3	2	3	3	3	5	5	5	4
Total	26	18	15	26	24	16	27	20	27	25	29	28	27

Key

1= Poor
2= Fair
3= Good
4= Very Good
5= Excellent

Explanation

Explaining the Criteria:

We felt that the following criteria were self explanatory, therefore did not feel the need to explain in depth:

- Time – Is the solution time consuming or would the project go far beyond the timeframe of our semester?
- Money – Is the solution costly?
- Does it meet our objectives?
- Is Friends of the Dunes willing to do the solution?
- Our fifth criterion asks if the solution reaches teachers effectively.

The definition of 'effective' in this criterion had two different meaning for the solutions 1-9 and solutions 10-13. Since solutions 10-13 would have a larger outcome and are projects that connect FOD with the schools, they got more attention and were weighed within their own category. Effective for solutions 10-13 meant does the solution meet teacher's requirements for the curriculum they need to meet. As for solutions 1-9, effective meant how easily can the teachers be reached and how many can be reached.

- Our final criterion asks if the solution reaches students effectively.

Again, the definition of 'effective' has two meanings and is split between solutions 1-9 and solutions 10-13. For solutions 1-9, effective meant does the solution affect the students indirectly. By this, we meant though they might not be affected now, ultimately they will be through the changes that the solutions will bring later. For solutions 10-13, effective meant are the students learning from the solutions, are they having fun, and how involved are they in the solution.

Outcome

Since, solutions 10-13 are the most substantive, we chose the three highest ranked of those 4 potential projects, which were solutions 11, 12, 13. There is a slight possibility that solution 13 will not be able to happen within the timeframe needed, in which case we would select solution 10 to replace it. We will know within a week if solution 13 will play out. Of solutions 1-9, 1, 4, 7, and 9 were selected as complementary to selected solutions 10-13.

Solution 1 will compliment solutions 11, and 12. Solution 4 does not really complement another solution, but we felt that it was important and still helped meet our objectives, goals, and overall problem statement. Solutions 7 and 9 will compliment solution 13. As the different components of the selected solutions start to form, we will be able to better see any potential problems.

Implementation Strategies:

Solution 1:

Stacey created the flyer that will be sent out by Friends of the Dunes by the beginning of next school year (September 2006).

Solution 4:

Kayo created a questionnaire that will be sent out by Friends of the Dunes by June 2006.

Solution 7:

Brendon created a flyer informing teachers about service learning, how Adopt-A-Dune is a service learning program, and about the teacher workshop in September 2006 pertaining to the Adopt-A-Dune service learning program. This flyer will be sent out by Friends of the Dunes by August, 2006.

Solution 9:

The group will compile an e-mail that briefly describes the upcoming teacher workshop. The purpose is to allow ample time to plan to attend. The e-mail will be sent out by September 2006.

Solution 11:

Liz is researching Wiyot cultural history to gather appropriate information to create a cultural component activity for Bay to Dunes. This research involves contacting the Wiyot tribe, and conducting internet and library research. Once this is completed, the activity will be created by May 10th, 2006.

Solution 12:

The group will create an hour long follow up presentation that will involve different activities and lessons about what was learned from the Bay to Dunes field trip. This component will be completed by May 10th, 2006.

Solution 13:

The group will talk to the students at Jacoby Creek School about their experience doing Adopt-A-Dune service learning. The group will design a display that will be used at the service learning teacher workshop. Two members of the group will visit the classroom on May 1st, 2006 and ask the students their opinion about the service learning project and find out how this program has helped the students reach educational criteria. On April 28, 2006, the other two members of the group will go on the field trip with the students to observe the service learning program. We will take pictures to develop the display.

Monitoring and Evaluation:

Solution 1:

FOD will add a question to the existing teachers' evaluation form that teachers fill out during the field trip asking "If this is your first time participating, how did you learn about this program?" The feedback from this form will determine if the flyer was an effective informative outreach tool. The data will be collected and analyzed by January, 2008.

Solution 4:

Assuming that the funding is available to send out the questionnaire, the feedback from the questionnaire will be compiled by FOD by June 2007. The necessary adjustments will be made to the program in response to the feedback received. Measurements of the enrollment for the year 2007-2008 will be compared to years prior to the adjustments made.

Solution 7 & 9:

The feedback will be collected at the teacher workshop by adding a question to the sign-in sheet about how they heard about the workshop. The feedback from the sign-in sheet will determine the effectiveness of the email and/or flyer as an informative outreach tool. The data will be analyzed by January 2007.

Solution 11:

The cultural activity created by our group will be incorporated into the Bay to Dunes lesson plan by the fall of 2006.

Solution 12:

The follow-up in-class presentation for the Bay to Dunes presentation that our group created will be incorporated into the Bay to Dunes program by the fall of 2006.

Solution 13:

This solution fulfills objective 1 of goal 2 and objective 1 of goal 3 because it will inform teachers about service learning through the materials collected from the field trip and classroom activities which will be used as tools for the teacher workshop. It will also increase the schools and FOD relationship by the end result of increased enrollment of schools in the Adopt-A-Dune service learning program. Monitoring of this will be done by FOD, and the success will be determined by the number of enrollment of schools in the program. The monitoring will be completed by 2008.

Timeline:

Date	Time Spent	Things We Worked On
Jan. 25	2 hours during class	
Jan. 30	2 hours during class	
Feb. 1	2 hours during class	
Feb. 6	2 hours during class	
Feb. 8	1 hour during class 1 hour after class	Teacher's conference at Humboldt Bay Wildlife Refuge.
Feb. 13	2 hours during class	
Feb. 15	2 hours during class	
Feb. 20	2 hours during class	
Feb. 22	2 hours during class	
Feb. 27	2 hours during class	Gather information on "problem background and statement".
Mar. 1	2 hours during class	Brainstorm on goals and objectives.
Mar. 6	2 hours during class	Create goals and objectives.
Mar. 8	2 hours during class	Brainstorm on implementation.
Mar. 20	2 hours during class	Brainstorm on implementation.
Mar. 22	2 hours during class	Brainstorm on implementation.
Mar. 27	2 hours during class	Meeting with Maggie, FOD education coordinator, at the office.
Mar. 29	2 hours during class	
Apr. 3	2 hours during class	
Apr. 5	2 hours during class	Exchange information on progress of each implementation.
Apr. 10	2 hours during class	Exchange information on progress of each implementation.
Apr. 12	2 hours during class	Exchange information on progress of each implementation.
Apr. 17	2 hours during class	Exchange information on progress of each implementation.
Apr. 19	2 hours during class	Create monitoring and evaluation plan.
Apr. 24	2 hours during class	
Apr. 26	2 hours during class	
Apr. 28	1.5 hours	Brendon and Kayo observed the Service Learning class field trip to the dunes.
Apr. 30	1.5 hours	Group met at the Manila Community Park to create a cultural activity.
May 1	1 hour	Stacey and Liz went to classroom of service learning group to gather their thoughts and comments on field trip.
May. 3	2 hours outside of class	

Works Cited and Contact Information

Evans, Emily. *Headwaters Forest Reserve Education Curriculum*. Humboldt State University, 2002.

Maggie Donovan-Kaloust. Friends of the Dunes Education Coordinator. 444-1397

Maggie@friendsofthedunes.org

Catherine Girard. Jacoby Creek Elementary School. cgirard@humboldt.k12.ca.us

Appendix

The following documents are the results of our project. These documents will be utilized by Friends of the Dunes to improve the variety of educational programs that reach out to the children of our community. The culmination of our work will help assist Friends of the Dunes accomplish their goal of incorporating their educational programs into the Humboldt County Education System. Overall, the collaboration of our work and Friends of the Dunes efforts will provide the tools needed to create a youth that is educated about the dune and bay ecosystems.

Plover Survival (A Simulation Game)

Materials:

- Area: outdoors or indoors (with room enough to move around freely).
- 1 rope (minimum length: 16 ft).
- 4 small bags or sacks- {sandwich bags or lunch bags will work).
- 1 beach ball or frisbee, small ball, etc. (something two people might typically play with at the beach).
- 1 additional rope (min. 16 ft long marked off in 4 ft. intervals) to establish boundaries that are metaphors for soda cans, candy in wrappers, a couple of bags of chips, or other such snacks.
- 2 bags of dried beans (pinto, kidney, split pea, etc.).
- 1 large sheet of paper or chalkboard for recording data.

California State Standards:

Life Science

3.3 a-d

4.2 b

4.3 a, b

6.5 c, e

Part 1- Feeding Habitat and Behavior:

1. Introduction to the Western snowy plover:

Introduce students to the concept of threatened and endangered species. Tell them that they will be studying the western snowy plover, which is a threatened species. Explain that they are about to participate in an activity that is designed to help them understand some of the western snowy plovers' behavior and needs as well as the aspects that are threatening the lives of these birds.

2. Set-up Information:

- Ask students to describe the wave action at the water's edge of a beach.**
Is the water always at the same level or does it vary? Have them demonstrate this motion by moving the rope to simulate gentle wave action.
- Ask students if they have ever seen small birds along the water's edge.**
If so, what did they observe? Explain that birds move back and forth with the advancing and retreating waves and that they peck and poke with their beak small invertebrates in the mud.
- Ask for four volunteers:** two to model the behavior of adult western snowy plovers and two to model the behavior of the chicks. (You may want to actually label these volunteers so that you can distinguish between the adults and chicks).
- Explain that in this model, or simulation,** the birds (played by the students) will be feeding on beans (the beans, if that's what you've chosen to work with, represent the small invertebrates found in the mud and sand).

Spread the beans near "the water's edge"

Hand *out* small sacks *or* bags to each of the four western snowy plovers.

- Tell the kids that they can only put one bean in the bag at a time.

3. Round 1: Establishing Standards for a Healthy Diet:

Have the student western snowy plovers (adults and chicks) move with the waves and model this feeding behavior for approximately 30 seconds. Count each western snowy plover's beans at the end of this time. It is important that students understand right away that the western snowy plover needs a certain amount of food (beans) to survive. The necessary amount of food determined in this round. Record the amount of beans that each bird obtained *on* a large sheet of paper *or* board. The range of beans collected during this round will be your standard for a healthy diet. As the game progresses, if the plover collects only half this amount, it will survive, but be unhealthy. If the plover collects only one quarter of this number, it may eventually die.

Part 2- Human Impact on Feeding:

1. Set-up Information:

- a. Ask students if this is what the beach is normally like in the summertime (birds feeding *on* a deserted beach).

Ask them to describe different types of people-related activities that occur *on* beaches. (What do you do when you go to the beach? Do they ever leave their garbage behind?) Make sure they include some sort of game activities (like playing frisbee, catch, etc.).

Ask the students what they think will happen to the plovers if people *or* animals, like dogs, come near. The birds will move away. Ask them if the plovers can feed when this happens.

- b. Explain to the students that western snowy plovers are very sensitive to human disturbance. If people approach while the birds are feeding, the plovers will move (by flying *or* running) immediately to a safer area like the dunes *or* vegetation.

Establish an area using a 4 ft. wide rope that will be a "safe haven" for the plovers. This should be located at least 10 feet away from where they are feeding at the water's edge.

- c. Explain to the students that each plover will have a corridor in which to feed and move. He or she must stay (for the sake of the game) within his or her corridor. If a person is in a plover's corridor, that plover has to be in the "safe haven."

In other words, the plovers must anticipate the approach of a human and run to the safe haven before the person is actually in their corridor. Typically, the plovers will first freeze (their coloration will cause them to blend in with the environment and this will help prevent predation from animals) and then they will move quickly to safety.

Note: In real life, western snowy plovers will move long before people get as close as they do in this simulation game. They have been known to respond to pedestrians who are as far away as 50 meters (150 feet)!! It might be interesting to discuss this with the students after playing this next round and estimate how far away that actually is.

Ask for six students to volunteer for the next round (in addition to the plovers).

2. Round 2:

- a. Resume feeding (along with the wave action). **Send two (students) pedestrians to walk along the water's edge** at normal walking pace. When they are through...
- b. **Send two (students) kids** playing ball or frisbee to move through the area. They are to act like

they normally would at the beach (fooling around, etc.).

As they pass out of the area...

- c. **Send two more people** carrying soda cans, bags of chips, and other snacks throughout the area. They should walk along dropping some of their snacks.

Count and record the beans obtained by each plover. Compare the results with those of the first round. Bear in mind more time was spent on this round!

Discuss the number of beans obtained. Will these be healthy plovers? Will they even survive on the beach?

Ask the plovers how they feel physically. Are they tired? Given that real plovers will actually be running further than the 10 feet established in the game, what has the class learned about how much energy the birds must expend to obtain food? Point out to the students (if they don't bring it up) that now (with human interference) the plovers are using more energy to obtain less food.

Part 3- Predation and Survival:

1. Set-Up Information:

- a. Ask the students if the trash left by the pedestrians in the last round affected the plovers' ability to feed. Explain to the students that when people leave trash in an area, it attracts other kinds of animals like cats, raccoons, skunks, foxes, and ravens.

Ravens are fast moving birds that prey on western snowy plover eggs and chicks. When a raven (or other predator) approaches an adult plover (or pair of plovers) feeding with their young chicks, both chicks and adults respond. The adult will move away faking an injury (like a broken wing) with the intent to lead the predator away from the chicks. If both adults are present, the second parent will lead the chicks to safety. Because they are unable to fly, chicks are easy prey for ravens.

Throughout this round, chicks should be squatting on the ground while the adults remain standing. This distinguishes between the adult's ability to actually flee from a raven by flying away and the chick's inability to fly or move fast enough to escape. Assume that adults are parents feeding with their young chicks.

Ask for a volunteer to model the behavior of a raven. He or she will be moving fast through the beach area. If during this time the raven can tag a plover chick, this constitutes an attack (and the plover dies). During this round, as before, whenever possible the plovers are feeding.

2. Round 3:

- a. **Plovers should resume feeding. Allow the raven to enter the area for 30 seconds.** Count and record the beans and living plovers after this time. Discuss the impact of a raven in the area on the ability of a plover to feed and survive. (Note: The adults ability to feed is not affected by the presence of the ravens unless their chicks are with them.) One of the most important aspects for students to understand is that ravens specifically prey on the chicks and eggs. Remind them that the trash we leave behind helps attract predators like the raven. And, when we bring pets like dogs along with us, we are essentially bringing along another predator!

3. Evaluation:

Ask the students to summarize what happened to the plover's ability to obtain food based on number of beans recorded at the end of each round. Ask the plovers (chicks and adults) how they felt during all of

this. Ask the students to translate emotional frustration to physical stress on the birds as they try to meet their biological needs. They may respond by saying they felt tired or frustrated. Then ask them how this interference might affect the plover's ability to feed.

Ask the students to summarize what has happened to the size of the western snowy plover population on this beach. How big is the population now compared to what we started with? Will the plovers continue to nest here? If not, where will they go? What if the same types of problems occur on other beaches? What does this mean for the survival of this bird?

Part 5- Off Road Vehicles:

1. Set-up Information

- a. If students don't know about off road vehicles, or ORV s, explain to them that these are vehicles that some people like to drive on the beach. ORVs affect western snowy plover chicks in a variety of ways. The deep tracks they create generally run parallel to the waters edge, and the chicks sometimes climb in and can't get out. This obviously blocks access to their food. In addition, if they do get stuck in the tire tracks, they are frequently run over by another ORV passing through the area. Another way by which ORVs affect chicks have to do with the fact that the chicks freeze in place when frightened (as they do when people approach). As an ORV approaches, the chicks freeze and are often run over.
- b. **Have two students volunteer to "drive" an ORV** as represented by a large tire, inner tube, or ball. To "drive" it, the students must keep the tire (or substitute) in between them with one hand on it at all times. If the tire touches a plover, it dies. Students are allowed *to* make one fairly direct crossing of the beach. (You may elect *to* give more than one crossing.) The chicks should be squatting for this round.

2. Round 5:

- a. Have the birds **resume feeding and allow the ORV students *to* pass through.** Count and record each western snowy plover's beans and each living plover at the end of the round.
- b. **Discuss attitudes of responsible versus irresponsible ORV operators.** Are there responsible ORV drivers? Explain. If you're a "responsible" ORV operators, does this mean *you* won't hit any western snowy plover chicks? Explain.

Resolutions:

Plovers need space and so do people. Ask the class what can be done so that both the plovers' and peoples' needs can be met. Listen to all of their ideas and try to get the class to agree on one. This idea should involve some sort of beach management. Have the class try and come up with things that might prevent this idea from working.

What happens if people don't want to go along with the management plan? What kinds of things can be done about this? You may want to ~~try~~ have one more round to see if their idea work. Explain to the students that people are implementing management programs right now where western snowy plovers nest. Their programs may not be unlike that which the students themselves have come up. Rotate new students into the roles of the western snowy plovers for additional rounds if you haven't already done so.

Web of Life

Overview:

This is a game that makes very clear the essential interrelationships among all the members of nature's community. The web of life vividly portrays how air, rocks, plants, and animals function together in an interconnected web of life.

Goal:

Habitat, interdependence

Objectives:

The objective of this game is to show the interconnectedness of the plants, animals, microorganisms, etc. found on the dunes.

Time:

15 minutes

Materials:

Ball of string

Dune cards

California state content standards:

Life Science

3.3 a, c, d

4.2 a-c

4.3 a-c

6.5 b-e

Procedure:

1. Give each student a dune card and have him or her place it around his or her neck.
2. Instructor holds the ball of string.
3. Begin by asking, "Who here is wearing a card that needs the sun to survive?" Instructor chooses a student who has answered yes and throws them the ball of string, keeping hold of the string at the end.
4. Ask the student a series of questions. (If for instance the instructor threw it to the rabbit) "Who here would you eat?" "Who here would eat you?" "Who do you need to survive?" "Who here needs you to survive?"
5. Have the student chose which student to throw the ball of string to, depending on what cards are in use. Have them hold the string and throw the ball.
6. Game continues until all students are connected at least once and a Web of Life has been created.
7. Ask one student, "What would happen if the picture on your dune card disappeared from Earth?" Have this student drop the strings.
8. Continue asking students to drop their strings until the Web of Life is not visible.

Wetland Metaphors

Overview:

Use a selection of common objects for investigation as metaphors for natural functions of wetlands.

Goal:

Students will have a better understanding about the function of wetlands.

Objective:

Students will name 4 functions of wetlands.

Time:

10-20 minutes

Materials:

OBJECTS	METAPHORIC FUNCTION
<i>Sponge</i>	Absorbs excess water caused by runoff, retains moisture for a time even if standing water dries up (sponge stays wet even after it has absorbed a spill)
<i>Pillow</i>	A resting place for migratory birds
<i>Mixer</i>	Mixes nutrients and oxygen into the water
<i>Baby Doll</i>	Provides a nursery that shelters, protects, and feeds young wildlife
<i>Strainer</i>	Strains silt and debris from water (keep water supply clean)
<i>Coffee Strainer</i>	Filters smaller impurities from the water (excess nutrients, toxins)
<i>Antacid</i>	Neutralizes toxic substances
<i>Cereal</i>	Provides nutrient-rich food for wildlife and humans
<i>Soap</i>	Helps cleanse the environment
<i>Picture of hotels</i>	Resting or wintering place for migrating waterfowl.

California state content standards:

Life Science

3.3 a, c, d

4.2 a-c

4.3 a-c

6.5 b-e

Procedure:

Explain that a metaphor represents a thing or idea through another thing or idea, such as in "a tree is a home," "the world is a stage," or "books are windows of thought" Ask students to provide examples of other metaphors. The household objects in this activity are tangible symbols of wetland benefits.

Divide the class into groups of four or five. Ask a representative from each group to choose an item from the Mystery Metaphor Container. Each group must decide how the object could represent what a wetland is or does. Allow time for students to discuss their answers in groups before each group presents its objects and ideas to the class.

Discuss each idea as students present to the class. At the end summarize the major roles that wetlands perform.

Cultural Activity

1. (For grades younger than 3rd)

The Wiyot word "wiki"(wee-key) is used for an important body of water near us. What do you think Wiki means? Bay

(For grades 3rd and higher)

In 1860, some European settlers attacked and massacred a group of Wiyot women, children and elders on an island nearby. There was only one survivor, a newborn baby. What is the name of this island? Can you find it with your binoculars?

2. Mills have been running on the Samoa peninsula since the early 1800s. Most of them have closed and only two remain open today. Can you find evidence that a mill used to be right here?
3. The Union Lumber Company built the town of Union in 1850. In 1860, the town which is currently home to Humboldt State University was renamed. What is the name of this town? Using the binoculars, can you locate it?
4. This city has the same name as our state motto. This motto was used when gold miners found gold. This motto also means, "I have found it!" What is the name of this city? Using your binoculars, can you locate it?
5. From 1888 to 1971, a ferry was used for transportation from Eureka to the Samoa peninsula. What structure is used today? Using your binoculars, can you locate it?
6. Oysters have been commercially grown and harvested in Humboldt Bay for more than 100 years. Using your binoculars, can you find evidence that the oyster farms still exist today?

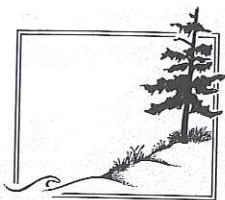
Your Bay to Dunes Field Trip Experience

- **What was your favorite part of the field trip?**

- **What was your least favorite part of the field trip?**

- **What is one thing that you have learned from the field trip?**

Thank You!



Friends of the
DUNES

School/Teacher _____

Dear Teachers,

Grade _____ Number of students _____

We are asking you to fill out this form so we can get feedback on how we can strengthen our Bay to Dunes program to better meet the educational needs of students.

**If you have never participated in Bay to Dunes, please answer questions 1-3.
If you have participated in Bay to Dunes, please start at question 4.**

1. Have you heard of our youth education program, Bay to Dunes? (Yes / No)
2. If so, how did you hear about us, (website, flyer, other teacher, Etc.) and did the program sound interesting to you? Why or why not?
3. What is keeping you from participating in the program?
4. When was the last time you participated in the Bay to Dunes program?
5. About how many times have you participated in the program?
6. What was the most interesting part of the program?
7. How do you think we can improve the program?
8. Would you be interested in joining a Teacher Advisory Panel that meets once a year, to evaluate the Bay to Dunes program?

We appreciate your time and input in helping us improving our Bay to Dunes program.

Adopt-A-Dune Teacher Workshop:



We would like to invite you to the Adopt-A-Dune Service Learning **Teacher Workshop**, held this year on *Saturday, September 16th from 9 a.m.- 4 p.m.*



What is service learning? Service learning is the process of experiential learning and community building that includes academic coursework, directed service, and guided reflection that, taken together, deepen the experience for all partners.

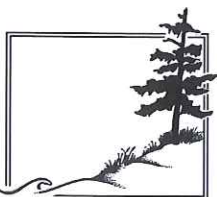
Has your class already done Bay to Dunes this year? Ready for the next step?

Friends of the Dunes' Adopt-A-Dune Service Learning Program provides field trip experiences at **no cost** for Humboldt County elementary schools. The Adopt-A-Dune Service Learning Program offers students in grades 3-6 a fun, hands-on way to learn concepts like:

- Biodiversity
- Coastal and Marine Ecosystems
- Environmental Health
- Land Use
- Natural Resources/Resource Management



In turn these concepts can be incorporated into the Social Science, Science, Interdisciplinary and History core curriculum. This program ends with a culminating group project that gives students the chance to reflect on their stewardship activities.



Friends of the
DUNES

We look forward to seeing you at the workshop! For more information, please contact Friends of the Dunes at 444-1397 or check out our website at www.friendsofthedunes.org

Come Spend the Day with Us!

Bay to Dunes Youth Educational Field Trip

We offer *fun and educational* all day field trips for grades 2 through 6

Kids learn key concepts like:

- **Habitat**
- **Adaptation**
- **Predator and Prey**
- **Native and Invasive Species**

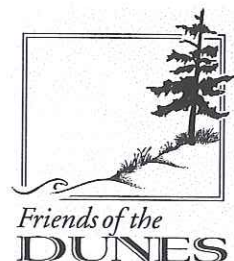
through hands-on activities



Friends of the Dunes will first come to your classroom and prepare the kids for the fun filled trip they will experience the next day through an exciting presentation with a slideshow and hands-on activities!

- ❖ Field trips meet at the Manila Community Center
- ❖ Most field trips run from 9:00am to 1:30pm

To learn more about this program, call Maggie at 444-1397 or email maggie@friendsofthedunes.org



Adopt-A-Dune Observation

3rd grade students from Jacoby Creek Elementary School arrived at the Manila Community Center at 12:30, on April 28th.

Emily from FOD explained the current condition of the dunes and how they have changed from the students' last visit.

The teachers made sure that the students new the purpose of pulling the beach grass.

We walked to the point where the students have been working on restoration for two years.

We visually saw the progress that the students have made.

Explanation was given by Emily about the endangered species that have entered into the dune the students restored during the last visit.

Teachers reminded students to be careful when they were pulling the grasses (not to step on the newly established endangered plant or to pull the wrong grass species and to pull the grass and the roots out).

Students worked for about 30 minutes.

Some students occasionally came to Emily and the teachers to show what they had found.

One student brought a shell to Emily and she asked why the shell was white.

Teachers encouraged the students who lost attention to stay on track pulling the beach grass.

After the activity, teachers gathered students in a circle and had them think about how they felt about the activity. All the students were given the chance to reflect on their experience and to explain the importance of what they were doing.

They came back to the community center at 1:30.

<Comments>

Students had knowledge of the purpose of the activity and seemed to enjoy the work. The first speech from Emily updated the students about their dune and the progress that has been made (with the establishment of the endangered plant). The relationship between students and Emily was well established.

Service Learning Classroom Presentation

On May 1, 2006, Stacey and Liz went to Jacoby Creek School to talk with the third grade classes about their experience with their Service Learning project Adopt-a-Dune. This third grade class has incorporated the Adopt-a-Dune program into an overarching school program called Service Learning. The Adopt-a-Dune program provides an opportunity for classes or grades to "adopt a dune" that they will restore back to the way it was before invasive species took over. The children go out to the dune once month to perform this task. Friends of the Dunes is interested in how the Service Learning project works, so they can encourage more classes or grades from other schools to participate in the Adopt-a-Dune. Our purpose for going to the classroom and on the field trip was to gather information about the service learning program and the students' feelings and opinions about the program.

Before arriving at the classroom, Liz and Stacey developed a brief lesson to discuss with the children. We would allow each child to express what they liked or disliked about the Adopt-a-Dune field trip. We would write these quotes down in order to use them as part of a display we will create for the teacher workshop in the fall. Next the children were able to express their feelings and opinions in the form of a drawing or poem or whatever other way they wanted to on a piece of paper that we would take with us. Their expressive art would also be used in the display.

Once at the classrooms the children were very excited to talk about their experience. All the children loved what they were doing and the feeling of accomplishment they received from restoring the dunes. The teachers were very welcoming and eager to help us out by providing a variety of papers and samples of the children's work associated with the Service Learning program. Overall, we were able to gain a lot of valuable information that will help Friends of the Dunes evolve and expand the Adopt-A-Dunes program.

Adopt-A-Dune Follow Up Presentation

Student Quotes

- “I like pulling out the beach grass to help the native plants grow. It makes me feel good, happy and strong helping the community.”
- “I feel good pulling the beach grass because when we get there it’s full of beach grass and when we leave it’s a big, big blank spot.”
- “We get hot and sweaty from pulling the grass and we get cuts on our hands, but it’s worth it.”
- “I feel victorious because one day all over the beach grass, the ice plant and beach lupine will be gone and disappear from the earth.”

The Dunes

The dunes are proud
We all have fun,
when we pull beach grass in the sun.
Just yesterday we
helped a rare flower
grow back with flower power

Beach grass here, beach grass there, beach grass is everywhere.
We can make it disappear if you listen to me very clear.
Pull it up by the roots
It’s like looking for gold, like digging for loot.
If we keep doing it once a month, if we do it all day long,
then all the beach grass will be gone.

Pulling Beach Grass

Reasons European Beach Grass is bad:

1. European beach grass stops the dunes from moving; a moving dune is a healthy dune.
2. It grows quickly and it grows over the other plants
3. If native plants don’t grow, animals in the dunes won’t have food and they’ll all leave.

The day that we went to the dunes, a proud, proud feeling grew and grew. The kids pulled the roots from the ground, and if we ever come back, Beach Layia will be found!

Crying Dunes

Dunes are bumpy,
Dunes are sandy,
Dunes move all the time.
Dunes are sad when layia does not grow.
The dunes are crying.

Adopt-A-Dune Follow Up Presentation Teacher Interview w/ Catherine Girard and Melanie Nannizzi

1. What do you feel the children are gaining from this experience?

M: They are learning about being responsible and taking care of the community. They learn practical science while having fun outside on the beach doing hands on activities.

C: The students find their own power to make a difference. They learn about team work and working to achieve a goal. They get a real understanding of invasive species and that something hard can be fun. Going out and working on the dunes give the students a personal connection to the dune habitat. Some kids take their parents out to show them the work they've done.

2. What is your favorite thing about Adopt-A-Dune?

M: Many times when you have to add something to your curriculum, you have to take something else out, but Adopt-A-Dune enriches the science program without taking away from other things.

C: Adopt-A-Dune is an authentic activity. It is more than just an assignment the students have to finish. They get to go out, accomplish a goal and learn from their experience.

3. If you could improve anything, what would it be?

M: Nothing. For the teachers, they want to find a way to meet the civic standards some how

C: She would improve the timing. Because they do it at the end of the month, they had too long of a break between trips (October to March). If the students were able to make back to back monthly trips more often, they would remember more and get more out of it.