Ocean Frontiers Educator's Guide:

Ocean Frontiers is a unique documentary about conservation, solutions and community. The stories in *Ocean Frontiers* help audiences understand key principles of ecosystem-based management and coastal and marine spatial planning, which are the cornerstones of the National Ocean Policy. These complex concepts come to life and are easy to grasp through the stories and people featured in *Ocean Frontiers*.

The Ocean Frontiers Educators guide is designed to help teachers blend the stories in the documentary into their curriculum and expose students to positive examples of conservation and complementary science concepts. Teachers should view the documentary to be familiar with the stories and science concepts highlighted. Lists of various activities are provided for teachers to consider using in their classrooms. Ocean Frontiers would easily fit into many subject areas; please share with us how you have used this film in your classroom.

" It is widely agreed that education is the most effective means that society possesses for confronting the challenges of the future. Indeed, education will shape the world of tomorrow. "

Chapter 4 Port Orford, Oregon

Essential Questions:
How are marine protected areas used to protect natural and cultural resources?

Video Summary: Port Orford Fishermen Protect Ocean & Way of Life
In a small fishing community on the coast of Oregon, the people of Port Orford are taking control of their destiny, by conducting their own brand of conservation. They are using local science to inform their fishery management, and protecting upstream forests to save their salmon—a farsighted perspective that considers both their links to the land, and the future of their children

Ocean Literacy:
The video and activities support:

Essential Principle # 5: The ocean supports a great diversity of life and ecosystems.
Essential Principle # 6: The ocean and humans are inextricably linked.
Essential Principle # 7: The ocean is largely unexplored.

Teaching Tips
Engage:
Try this Coastal Sampling Activity from the lesson; All About MPAs
http://www.usc.edu/org/cosee-west/LessonPlans.html

Prepare two buckets with candy in them. One bucket represents the MPA ecosystem and the other bucket represents area that is not protected. The candy represents different species of coastal organisms. The smallest pieces of candy represent plant and larval organisms and the very large pieces of candy represent the larger fishes. The MPA bucket should have a spectrum of large to small candy. The other bucket only has a few types of small candy.
Have a student randomly pick 10 pieces of candy from each bucket.

Explain/Explore:
After examining the difference between the two samples, pose a few of the following questions:
Which ecosystem had a greater biodiversity? Explain your answer.
Why would a protected area have more diversity?
If we weighed each sample of 10 pieces of candy. Which ecosystem has more biomass?
Why would a protected area have a greater biomass?
Why would protected areas have larger sized organisms?
Larger organisms produce more offspring. How would larger organisms impact the density of organisms in a MPA?
Now show the video, and implement one or more of the following activities.

Suggested Activities
The following activities would be complementary to Ocean Frontiers Chapter 4: Port Orford Fishermen Protect Ocean & Way of Life. There are several concepts in this video segment worth exploring in depth with students and making a connection to the real world examples of Port Orford, OR.

1) CONCEPT: MPAs
ACTIVITY: The Importance of Marine Protected Areas: An Overfishing Simulation
Or Where Are All The Fish?
http://www.usc.edu/org/cosee-west/LessonPlans.html
Description:
These lessons were developed by middle and high school teachers who took the MPA/MLPA workshop from COSEE

2) CONCEPT: Oregon Upwelling
ACTIVITY: Wind Driven Oasis
http://smile.oregonstate.edu/SMILEOceanScience/Club_Activities_%26_Resources.html
Description:
The original activity was developed to show the link between upwelling and wind direction at Kitty Hawk, NC. This is an Oregon version of the activity. This activity ties into the eutrophication activity and the current concerns about climate change and how it will manifest itself.

3) CONCEPT: Seaweed

ACTIVITY: Is There Kelp in Your Cupboard?

http://www.montereybayaquarium.org/lc/activities/kelp_cupboard.aspxDescription:

Teacher Background:

Students explore a variety of common food and household items that contain algae derivatives, i.e. kelp and other seaweeds.

Links

Seaweed

http://seaweed.ucg.ie/seaweed.html

California Seaweeds

http://www.biology.ucsc.edu/classes/bio170/seaweeds.html#spring99

4) CONCEPT: Storm Drain and Bioswelle

ACTIVITY: Storm Drain Water Testing - Chemistry Unit Challenge for Integrated Coordinated Science I (high school)

http://www.usc.edu/org/cosee-west/LessonPlans

Description:

A hands-on exercise that

- uses the "5 E's Learning Cycle: Engage, Explore, Explain, Elaborate, Evaluate"
- is correlated to California Science Content Standards, California Environmental Education Principles and Ocean Literacy Standards

Click here to download the Teacher's Handbook.
(http://www.usc.edu/org/cosee-west/LessonPlans/StormDrainWaterTesting_TeacherHandbook.pdf)
Click here to download the Student's Handbook.
(http://www.usc.edu/org/cosee-west/LessonPlans/StormDrainWaterTesting_StudentHandbook.pdf)
Conceived and written by Gary Serbeniuk,
Designed and illustrated by Meredith Morgan

5) CONCEPT: Fishing Practices and MPAs

ACTIVITY: No Fishing

http://oceanservice.noaa.gov/education/classroom/lessons/02_international.pdf

Description:

This research activity introduces students to sources of information about Marine Protected Areas (MPAs) and to some examples of how MPAs are used to manage coastal resources in several countries.

As an Extension Students might want to compare Port Orford Oregon's MPA with another MPA in this lesson.

Extra Ocean Frontiers Video Clip:

http://ocean-frontiers.org/reflections-on-change-port-orford-ocean-resource-team/