

TIDES master outcome list

March 25, 2007

Activity 1 - Welcome to the Estuary

- 1) Students will be able to identify and describe, in simple terms, the three basic life zones of the estuary and the watershed as the main parts of the ecosystem.
- 2) Students will be able to describe at least two physical factors that influence life forms in the estuary.
- 3) Students will be able to locate the major life zones and sources of estuary inputs on a map they and their classmates have drawn.

Activity 2 - An introduction to the "Tide of the Heron"

- 1) Students will be able to define the terms identified in the vocabulary for this activity.
- 2) Students will be able to successfully answer at least 80% of the study questions included in the Tide of the Heron study guide.
- 3) Students will have selected, read, and reported on at least one article from the Estuaries Feature Series.

Activity 3 - Estuary Connections - Watersheds to the Ocean

- 1) Students will understand and be able to describe at least two naturally occurring conditions that have caused estuaries to change before the arrival of humans.
- 2) Students will be understand and be able to describe at least three changes that have occurred in estuaries since the arrival of human beings.
- 3) Students will be able to describe and interpret the impacts of a particular action, event, or change in the estuary.

Activity 4 - Tides of Change

- 1) Students will be able to describe the tides and the forces that influence their height and frequency.
- 2) Students will be able to accurately read a tabular and graph form tide table and identify at least two high tides and two low tides by time and elevation.
- 3) Students will be able to describe at least three ways the tides influence life and activities in the estuary.

Activity 5 - Life in the Waters of Productivity and Change - Physical Environments

- 1) Students will be able to name and describe three important physical factors that affect life in the waters of the estuary.
- 2) Students will be able to explain how changes in at least one physical factor in the estuary waters can influence other physical factors.
- 3) Students will be able to describe how changes in at least one physical factor can influence flora and fauna of the estuary.

Activity 6 - Life in the Waters of Productivity and Change – Estuary Survival

- 1) Students will be able to describe a predator-prey interaction and the factors that influence survivorship.
- 2) Students will be able to identify at least two characteristics that a crab or salmon possesses that contribute to the animals survival.
- 3) Students will be able to identify an interaction of at least three conditions that describe the ecology of the estuary.

Activity 7 - Humans and the Estuary – Clams Enough for Everybody

- 1) Students will be able to describe how tides affect distribution and abundance of organisms in the estuary.
- 2) Students will be able describe a method to quantify and assess an impact to a resource.
- 3) Students will be able to name and describe two possible management methods to protect a population.

Activity 8 - Preparations for a Field Experience

- 1) Students will be able to describe the importance of proper preparation for a field study.
- 2) Students will be able to name at least three essential items they bring to complete the investigation they are planning to undertake.
- 3) Students will complete a field plan worksheet with accurate, detailed information about their proposed field study.

Activity 9 - Mapping Watersheds, Habitat & Uses of the Coast

- 1) Students will be able to describe what an orthographic photo is and why it is useful.
- 2) Students will be able to explain in simple terms what GIS is and how it can be used to interpret data.
- 3) Students will be able to explain what remote sensing is and why it can be useful in understanding estuaries.

Activity 10 - Tidal Marshes - Richness & Diversity

- 1) Students will understand a simple way to test diversity within one zone of the estuary.
- 2) Students will gain experience making careful observations to distinguish physical differences and characteristics between species of marsh plants.
- 3) Students will understand how sampling a subset is used to make observations about a larger area.

Activity 11 - Tidal flats - A Hidden World Revealed by the Tides

- 1) Students will understand that the tide flats are covered twice a day by salty estuary water.
- 2) Students will understand that the tidflats are made of sediment which may be sand, mud, or gravel.
- 3) Students will understand that the type of sediment and the elevation determine what lives where.
- 4) Students will understand that most animals burrow below the mud to stay wet, protected, and to feed on the tidewater.
- 5) Students will understand that different animals have different types of adaptations for life in the mud.

Activity 12 - Waters of Life - A Journey into the Microworld

- 1) Students will be able to differentiate between producers and consumers and associate primary productivity with phytoplankton.
- 2) Students will be able to identify at least two kinds of phytoplankton and two kinds of zooplankton.
- 3) Students will be able to describe how some plankton are larval forms and some are adult forms.

4) Students will be able to describe the process of upwelling and various water quality factors that may influence the productivity of plankton.

5) Students will be able to describe the purpose of several anatomical features commonly found in plankton.

Activity 13 - Waters of Life - Eelgrass and a Community of Creatures

1) Students will be able to describe several adaptations that eelgrass plants possess allowing them to thrive within their niche in the estuarine environment.

2) Students will be able to name several animals and plants that benefit from eelgrass beds and describe the ways in which these plants and animals benefit.

3) Students will be able to identify several activities which threaten eelgrass beds and suggest possible remedies.

4) Students will use a simple, widely accepted monitoring technique to assess the relative health of eelgrass beds.

Activity 14 - Protect, Conserve & Restore - A Connection to your Community

1) Students will be able to define the importance of the estuary through a personal statement.

2) Students will be able to identify at least three actions that are necessary to maintain and improve the health of the estuary.

3) Students will identify and participate in a project that supports protection, conservation, or restoration of the estuary.

4) Students will share the results of this project with the South Slough NERR.