The Science and Math Investigative Learning Experiences (S.M.I.L.E.) Program

Estuary Curriculum Outline

Elementary

**Vision Statement:** By December, students will know what an estuary is, the different functions it serves, and how pollution and climate change are impacting them.

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| Topic | Activity Summary | Materials | Source | |
| Welcome to SMILE | | | | |
| Welcome to SMILE! – Logistics | * Getting to Know You Icebreaker * Membership Form Collection * SMILE Expectations (Timelines, Attendance, Good Grades, Good Behavior) * SMILE outline of year’s events * Student Club Jobs * Field Trips (explanation and permission forms) * HS – Four-Year Plan Worksheet * Fun Science Inquiry Activity | * Handouts from SMILE website (club curriculum tab) | | [www.uri.edu/smile](http://www.uri.edu/smile) - “Club Curriculum” tab |
| Introduction to Estuaries | | | | |
| Introduction to Estuaries | * Gallery Walk – students will walk around to 6 different stations with different images and questions. This activity is to introduce students to concepts that will be covered in this unit on estuaries and to stimulate thinking and conversation. * Idea Pools * Video - Drop by drop to the sea * Google Earth/Maps | * Colored copies of pictures * Questions for Gallery Walk * 2 different colored post-its * Computer lab (or projector) | | Jo Ann Basel (Gallery Walk)  Video site - <http://www.earthlive.org/tv/index_tv.htm> |
| Soak It Up  (WOW, p. 162) | * Students increase their understanding of wetlands when they use a household sponge to demonstrate how wetlands capture, store, and release water. | * Food coloring * Cardboard * Sponges * Paper cups | | Wonders of Wetlands |
| Wetland Metaphors (WOW, p. 85) | * Students will look at a selection of common objects and figure out physical metaphors for natural wetland functions. | * Items from home: egg whisk, sieve, plant pot with soil, grocery store flyer, pictures, menus, pillow case, etc | | Wonders of Wetlands |
| Wetland Address (WOW, p. 147) | * Students identify plants and animals and their wetland habitats by analyzing clues that describe their adaptations, characteristics, and other species trivia | * Cards from the WOW book | | Wonders of Wetlands |
| Marsh Market (WOW, p. 109) | * Students construct a “living” wetland food web, then create their own web by tracing components of their lunches. | * String/yarn * Paper strips * Markers * Tape | | Wonders of Wetlands |
| Pollution, Contaminants & Runoff | | | | |
| Treatment Plants (WOW, p. 120) | * Demonstrate the uptake of pollutants into plant tissues | * Food coloring * Fresh celery with leaves * Clean bottles/jars (1 per group) | | Wonders of Wetlands |
| Homemade Water Purifier | * Students will build their own water filters to learn what water filtration is, how it works, and what it can and cannot effectively remove. | * 1 liter soda bottles or small water bottles (one per group) * Paper towels/napkins * Gravel * Sand * Activated charcoal * 3 gallon milk jugs (clear) * ‘Pollutants’ – dirt, leaves, etc. to put into milk jug of water to be filtered | | Adapted from <https://extension.usu.edu/files/publications/publication/NR_WQ_2012-6.pdf> |
| A Grave Mistake (Project WET) | * Students analyze data to solve a mystery and identify a potential polluter. | * Pencils * Copies of the Community Map | | Project WET |
| A Drop in the Bucket (WOW, p. 159) | * By estimating and calculating the percent of available fresh water on Earth, students understand that this resource is limited and must be conserved. | * 2 colors of construction paper * Scissors * Sheets of white paper * Markers * Water * Copies of Water Availability Table * 1000 ml beaker * 100 graduated cylinders * Small dish * Salt * Freezer or ice bucket * Eyedropper of stirring rod * Small metal bucket * Globe or world map | | Wonders of Wetlands |
| Recipe for Trouble (WOW, p. 199) | * Conduct a classroom experiment to test the effects of various pollutants on water environments. | Two weeks before   * 5 clear 1 quart or larger containers * Water that contains algae * Plant fertilizer * Aged tap water * Good light source (i.e. sunlight) * Copies of Pollution Sources   For Class   * Plant fertilizer * ‘pollutants’ of student choice * Copies of Recipe for Trouble student page * Long pan * Motor oil | | Wonders of Wetlands |
| Runoff Race (WOW, p. 210) | * This demonstration offers a hands-on demonstration of wetlands ability to improve water quality by filtering out sediments. | * Quart jar with lid * Pebbles, sand, dirt, clay, crushed leaves, etc. * Piece of artificial turf (doormat) * 2 flat pieces of wood or plastic * 2 shallow aluminum pans * 2 containers of water (equal amounts) * Something to prop up models | | Wonders of Wetlands |
| Marsh Mystery (WOW, p. 116) | * Students read a mystery story and, to solve the mystery, play a game that demonstrates bioaccumulation. | * Paper plates (for each student) * Tape or string * Scissors * Markers * 32 red construction paper tokens | | Wonders of Wetlands |
| Trouble with Microbeads | * Students will learn what microbeads are and how to avoid them when using every day hygiene products. Students will also try to filter out the microbeads. Does it work? | * Bring in hygiene products from home (toothpaste, shampoo, facewash, etc.) * Optional: Beat the Microbead application on Smartphone * Coffee filters * Cups | | Info taken from [www.beatthemicrobead.org](http://www.beatthemicrobead.org) |
| Homemade Face Scrubs | * Students will learn about environmentally friendly skin care products that work! They will also make one of the recipes. | * Teacher look at recipes and choose which ingredients you want to make available to students * Containers for students | | By Misty Spinney on Pinterest & [www.sheknows.com](http://www.sheknows.com) |
| Homemade Cleaning Recipes | * Students will learn about environmentally friendly cleaning products that work! They will also try some of the recipes to test their effectiveness. | * Teacher look at recipes and choose which ingredients you want to make available to students * Dirty items to clean! | | [www.rodalenews.com](http://www.rodalenews.com) |
| Climate Change & Green Infrastructure | | | | |
| Climate Change Song | * This can be used to open up the lesson. Lyrics are provided. Class discussion about climate change, sea level rise, and possible solutions. | * Copies of lyrics * Computer to play song | | A Coastal Cabaret:  <http://www.riclimatechange.org/impacts_at_home.php> |
| Hear Ye! Hear Ye! (WOW, p. 253) | * Students conduct a mock public hearing to make a group decision on an important project | * Copy of the script for each student * Enlarged copy of project proposal sketches * Any desired props or costumes | |  |

ADDITIONAL RESOURCES:

Sea Level Rise Visualizations

<http://www.slideshare.net/riseagrant/ri-sealevelrisevisualize2?utm_source=slideshow02&utm_medium=ssemail&utm_campaign=share_slideshow_loggedout>

Recycling Flash Mob

<https://www.youtube.com/watch?v=GYnd5JRu86E>

Providence Stormwater Animation – By Stephanie Yin for the Land & Water Partnership (Meg Kerr)

<https://www.youtube.com/watch?v=OApAaAvDc3g>