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
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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>