

**MITIS 2008 – Headline Science
Cape Cod Region: July 7 – July 11
Draft Syllabus**

Extra! Extra! Read all about it!

Explore what you know and what you can do to excite your students with current events in science, math and writing. Participants will work with Kathy Mullin, OceanQuest and Pat Harcourt, Waquoit Bay National Estuarine Research Reserve. This one-week institute is jammed packed with engaging activities applying current trends in education research relating to how students view their world. Topics will include recognizing bad science, life cycles, ocean currents, and using argument with inquiry in the classroom.

Course focus: Recent research on climate change and its consequences. Teachers will explore the topic of climate using activities for teaching about climate change impacts on coastal and inland areas of Massachusetts. This course will help teachers learn how to explore the facts and explode the myths associated with climate, weather, biodiversity, habitat changes, adaptations, extinctions and new species.

Course Objectives: *These are objectives of the entire institute, and each presenter will incorporate these objectives into their workshops. Additional objectives pertaining specifically to each day's activities will be identified during each workshop.*

- Clarify understanding of concepts outlined in the Massachusetts Science/Engineering/Technology Curriculum Framework.
- Model inquiry learning and teaching throughout the week and carry this model back to the classroom.
- Engage in problem-solving processes as a part of group or team learning.
- Keep a reflective journal and design inquiry-based lessons that will evidence change in teaching approaches.
- Learn how to access science and math resource information and people associated with museums, and state and federal agencies.
- Develop lesson ideas to enrich, revive, and rethink existing curriculum.
- Share experiences, ideas, and resources with other teachers.
- Activities will include using the Internet, graphing, data analysis, group decision-making and debate.

Framework connections for this course:

Gr. PreK –Data analysis, statistics and probability – 3; Life Science – 1,3,5,6, & 8; Physical science – 1; Technology and Engineering –1.3 & 2.2

Gr. 3 – 5: Data analysis, statistics and probability – 1,2&3; Life Science – 1,3,7, & 8; Physical Science – 11; Energy and Living Things – 11, 12 & 13; Technology and Engineering – 2.2

Gr. 6 - 8: Data analysis, statistics and probability – 1, 2 & 3; Life science – 6, 10, 11, 13, & 17; Physical science – 1, 2, & 3; Technology and Engineering – 1.2 & 1.3

Day One

Sturgis Public Charter High School, 247 Main Street, Hyannis, MA

Kathy Mullin, Executive Director, OceanQuest, Inc

The first part of the day will be meet and greet, administrative “stuff” and hearing from a guest scientist.

The remainder of the day will include activities that explore “Ocean Weather Patterns”

- Currents – surface vs. deep water
- Gradients – salinity, temperature and density
- Primary and secondary forces
- Activities:
 - Ocean and Climate-the Odd Couple
 - North Atlantic Oscillation vs Southern Oscillation (El Nino)

Day Two

Waquoit Bay National Estuarine Research Reserve, 149 Waquoit Highway Waquoit (Falmouth), MA 02536

Pat Harcourt

Teachers will explore the topic of climate using activities for teaching about climate change impacts on coastal and inland areas of Massachusetts.

Day Three

Sturgis Public Charter High School

Kathy Mullin

Now that you know all the major climate and weather concepts and how the ocean and atmosphere interact let’s look at specifics. Teachers will focus on the life cycles of various plants and animals and explore the chances these organisms have with looming climate changes.

Guiding questions:

- How might climate changes drive evolution?
- Will organisms become extinct or change in response to environmental changes?
- Activities:
 - Life Cycles
 - Turtle Hurdles

Day Four

Sturgis Public Charter High School

Kathy Mullin

- How does an organism’s life cycle influence its chance of survival?
- Does changing mean a new species?
 - Acid and Aliens
 - Migration Headaches
- How might diversity change? Increase, decrease, no way to know.
 - Aquatic Roots
 - Diversity Index

Day Five

Sturgis Public Charter High School

Kathy Mullin

The theme for your last day will be discerning bad science. Guiding questions:

- How do we recognize quality data?
- What is the Precautionary Principle?
- Facts and Falsehoods

Bibliography

Great Explorations in Math and Science (GEMS) series

Lawrence Hall of Science

University of California at Berkeley

Global Warming and the Greenhouse Effect (1990)

Of Cabbages and Chemistry (1989)

Convection a Current Event (1988)

Liquid Explorations (1986)

Involving Dissolving (1986)

Discovering Density (1988)

Project Wild Aquatic

Council for Environmental Education and the Western Association of Fish and Wildlife Agencies; 1992

How to...ask the right questions

NSTA Press; ISBN 978-0-87355-102-1

Resources:

Bad Greenhouse Effect: <http://www.ems.psu.edu/~fraser/Bad/BadGreenhouse.html>

Callendar Effect: http://en.wikipedia.org/wiki/Callendar_effect

Global Warming: A Closer Look at the Numbers:

http://www.geocraft.com/WVFossils/greenhouse_data.html

In mosquito, a small tale of climate change:

http://www.boston.com/news/local/maine/articles/2007/04/29/in_mosquito_a_small_tale_of_climate_change/

Rising temperatures throw nature a curve:

http://www.boston.com/news/science/articles/2007/11/13/rising_temperatures_throw_nature_a_curve/

Carbon confusion: http://www.boston.com/news/nation/articles/2007/03/13/carbon_confusion/

Winter warm-up costing N.E. region:

http://www.boston.com/news/local/articles/2007/01/28/winter_warm_up_costing_ne_region/

Indicators of Climate Change in the Northeast 2005:

<http://www.cleanair-coolplanet.org/information/pdf/indicators.pdf>

Climate Science from Climate Scientists: <http://www.realclimate.org/>

Climate Change Produces (Icky) New Species:

http://blog.wired.com/wiredscience/2007/05/climate_change_.html

Species Explosion - What happens when you mix evolution with climate change?:
<http://www.smithsonianmag.com/science-nature/species.html>

Climate Change Disrupting Life Cycles With Fatal Results:
<http://www.countercurrents.org/cc-kirby080307.htm>

Invasive species problem to grow - Climate change will accelerate the wipe out of native species: http://environmentalism.suite101.com/article.cfm/invasive_species_problem_to_grow

Ecological Impacts of Climate Change: <http://www.aaas.org/news/releases/2004/0615Field.pdf>