

FRONTIER CLIMATE SCIENCE CLASS CURRICULUM

Updated 6-19-20

Session 1: What Have You Heard About Climate Change

Session 2: Sources of CO₂ in the Atmosphere

- Gathering Carbon Dioxide
- Detecting Carbon Dioxide

Session 3: The Greenhouse Effect

- The Interaction Between Photons and Molecules
- Additional Models for the Greenhouse Effect

Session 4: Fact or Phony: Scientifically Evaluating Data

- Effective Data Analysis – CO₂ Levels from Our Recent and Distant Past
- Understanding Misconceptions About Climate Change

Guest Speakers and Topics:

- *Global Climate Change and Regional Climate Projections; Ambarish Karmalkar or Shaina Sadai, from Northeast Climate Adaptation Science Center*

-Northeast Climate Center can cover the following topics:

- *Indicators of global climate change*
- *Warming and precipitation trends in Massachusetts*
- *Emissions scenarios*
- *Climate change projections for Massachusetts: temperature, precipitation, sea level rise, extreme flooding*

-Ambarish may not be in the area this fall, but if not, will try to find another staffer at NCASC to cover

Session 5: Conducting Research on Current Climate Change Topics

Session 6: Climate Change Conference

- Setting the Stage for a Mock Conference and Presentations on Climate Change

Session 7: Climate Change Challenges

- Climate Change Outcomes: Primary, Secondary and Tertiary Effects

Guest Speakers and Topics:

- *Forest and Wildlife Impacts of Climate Change: Emily Boss, Land Protection Specialist, Franklin Land Trust*

-Emily can cover the following topics:

- *Why are forests important?*
 - *Changes to our forests over time, and in the future*
 - *Current forest development pressures*
 - *Wildlife habitat changes*
 - *Town and landowner actions to protect forests*
 - *Model forestland conservation at Walnut Hill, Buckland*
 - *Forest carbon storage and growth cycles*
- Emily can do a classroom lecture, and also run a field trip to Walnut Hill in Buckland to illustrate forest changes*
- *Wildlife Corridors for Climate Adaptation: Laura Marx, The Nature Conservancy*
-Laura has slides, is not certain of fall availability
 - *Birds and Forests: Jennifer Fish, DCS Service Forestry or Jeff Ritterson, Mass Audubon*

Session 8: Climate Change Solutions

- *Climate Change Solutions: Near and Far*

Guest Speakers and Topics:

- *Ecosystem Climate Adaptation: Melissa Ocana, Climate Adaptation Coordinator, Massachusetts Ecosystem Climate Adaptation Center, UMass Amherst*
- Melissa can speak about many climate adaptation topics, such as:
 - *climate adaptation as a field of practice with fundamental concepts,*
 - *real examples of adaptation work across the state,*
 - *examples of climate adaptation careers,*
 - *importance of networks and collaborative groups for adaptation.**-Melissa may be available in the fall as a speaker, but remotely by video conferencing, or other staff or grad students could stand in*
- *Building Resilient Soils with Climate Change: Kate Parsons, NRCS*
-Kate can cover the following topics:
 - *Projected effects of climate change: higher temperatures, increased precipitation and soil erosion, crop loss and ponding*
 - *Characteristics of cultivated soil, importance of soil aggregates and organics*
 - *Impacts of tillage, reduction of soil capacity*
 - *Farming approaches to minimizing soil disturbance and maximizing soil cover**-Kate is available as a speaker for a class in the fall*
- *Forest Carbon and Forest Resiliency: Paul Catanzaro, UMass Amherst*

Session 9: Connecting to Your Community

- *Calculation Your Carbon Footprint*
- *Creating Change at Your School and in Your Community*

Guest Speakers and Topics:

- *Deerfield Municipal Climate Action and Adaptation: Chris Curtis, Conservation Works*
-Chris has a powerpoint presentation on all of Deerfield's climate resiliency efforts, including green infrastructure, culvert replacement, floodplain protection, public education, and others. He can also take students on a field trip to visit green infrastructure projects and culvert replacements for climate resiliency
- *Solutions at Frontier High School: Jason Curtis, Tighe and Bond* -Jason can discuss development of plans for a rainwater harvesting system and green parking lots at Frontier. He can engage students and show them on site changes being made.

Use of the Climate Curriculum at Frontier in 2020

At Frontier High School, the guest speakers for this year were Chris Curtis from Conservation Works, Emily Boss from Franklin Land Trust, and Shaina Sadai from Northeast Climate Adaptation Science Center at UMass. Chris Curtis' talk fit in with our look at local impacts of climate change and how to take action, students learned about ongoing infrastructure projects in Deerfield and surrounding towns which gave them deeper insight into how climate change affects different areas (floodplain, etc.) and how to mitigate these issues. Emily's talk fit in with our unit on local ecology, she helped students understand how climate change can change/threaten the makeup of local woodlands. This followed student's study of different New England forest types and preceded their research project on species migration or invasive species (choice). Shaina's talk kicked off our 'understanding climate change,' where she gave a broad look through past trends and future predictions, both globally and locally. She ended her talk with concrete actions for students to take, focused on civic engagement rather than individual action.

Emily Boss and Shaina Sadai were also used in all of 8th grade science classes. They participated during remote learning in the spring when we worked on our carbon reactions unit. Emily spoke about New England Forests when we were learning about photosynthesis, while Shaina aligned with the beginning of our discussions on climate change.

For the environmental club, the Deerfield Forum was an exciting event for students to participate in as speakers and as the audience. Four students were able to present about their actions at the school and how adults can help facilitate amplifying student voices. In general, the environmental club felt excited and supported as a result of the grant.