

Bringing Data & Research into the Classroom

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Our backgrounds

- **Josh:** Taught at Montclair State (public university in NJ) for 8 years
 - Interdisciplinary department that has undergrad through PhD students
 - Variety of courses from Intro courses for non-majors up through graduate course
 - Specializes in hydrology and watersheds
 - Attempts to use data in about 1/3 of all class meetings
- **Jennifer:** Taught at Winona State Univ. (4-yr public university in MN) for 13 years
 - Primarily undergraduate institution
 - Intro/Gen Ed, upper-level majors, and science courses for future teachers
 - Specializes in planetary geology and geoscience education
 - Has used some data-rich activities but aspires to do more
- **Your level of experience with data/research?**

Why incorporate data/research into the classroom?

- Think of and then pair up and generate a quick list of the benefits

Why incorporate data/research into the classroom? (example responses)

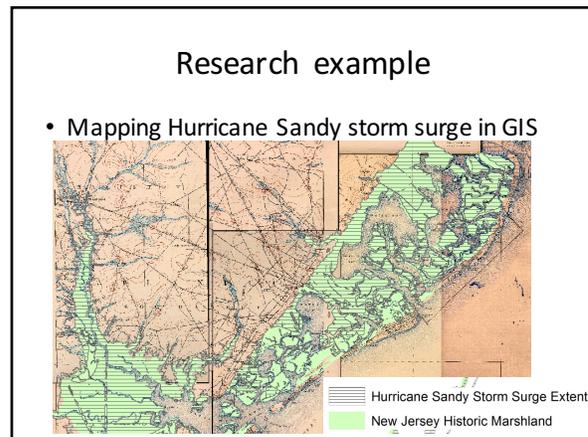
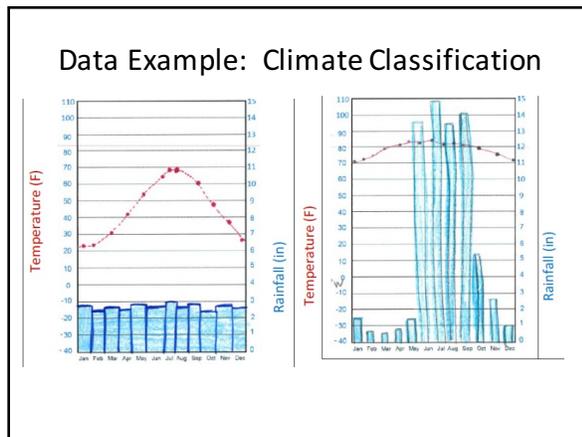
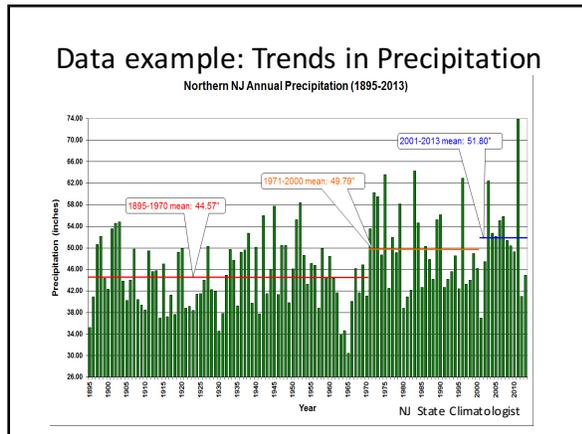
- Cognitive growth
 - gain in knowledge and critical-thinking skills
 - think and work like a scientist (if made explicit)
 - communicate effectively
 - think analytically and critically
 - increase retention in the course and/or discipline
- Personal growth
 - gain confidence
 - feel more independent
 - Become more self-motivated
- Professional growth
 - enhance interests in a science career
 - develop ties to the scientific community

Objectives for this session

- Make the case for using data and conducting research in the classroom.
- Give examples at a variety of scales.
- Have you generate exercises that incorporate data/research into your teaching.

Various scales and outcomes of classroom activities

- Data & Research
 - Using data as a piece of the research process
- Time involved: 10 minutes, a class/lab, a semester?
- Individual vs. group
- Outcome: thinking (TPS), writing, presentation, homework...



Research Example

- Finding shocked quartz in new samples from an impact crater.

New Jersey, WL

- ### Tips and Recommendations for Data
- Set the tone early: begin on the first day of class
 - Start with the basics: define axes, look at units, trends, etc.
 - Be sure students are prepared to do what you're asking them to do
 - Ensure students see the relationship between the topic and course content.
 - Incorporate group work.
 - Make it clear how the use of data fits into the process of science.
 - Use local examples.

Tips and Recommendations for Research

- Give detailed and clear directions at the beginning of the research experience.
- Frequent deadlines are necessary and important.
- Make clear the purpose of each component within the project and within the course.
- Build in time for flexibility.
- Give students freedom to choose a topic, with guidance.
- Ensure students see the relationship between the topic and course content.
- Peer review is helpful to provide formative feedback.
- Students should communicate results beyond the professor.
- Incorporate group work.
- Prepare students by using data in the classroom

Individual reflection

- Think of example datasets to present in class
- Think of possible research projects to incorporate in a classroom
 - What level of class?
 - How long for discussion?
 - What will the students actually do? Will they write, do homework, share something

Develop something that will work best for you!

Additional Resources

- On the Cutting Edge Undergraduate Research as Teaching Practice
(http://serc.carleton.edu/NAGTWorkshops/undergraduate_research/index.html)
- Council for Undergraduate Research (CUR); On the Cutting Edge Teaching with Data, Simulations, and Models
(http://serc.carleton.edu/NAGTWorkshops/data_models/index.html)