Data Exploration in Ecology Project (DEEP)

T. Irish
A. Berkowitz
C. Harris
S. Root
K. Trudeau

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NGSS considers eight practices to be essential elements of the K-12 science and engineering curriculum:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information
Inquiry Practices:
1. Primary research – question/hypotheses, study design, data collection
2. Data manipulation – descriptive statistics, sub-setting data, indices
3. Summarizing results – graphing, diagrams, tables, bottom line, statistical tests
4. Filtering results – selecting salient, relevant, and reliable results
5. Synthesizing – combining, integrating, meta-analysis
6. Communicating and recommending

Critique Practices:
A. Evaluating claims
B. Evaluating the synthesis in the claim
C. Evaluating the filtering of evidence used in the claim
D. Critiquing the representation – right graph? Adequate information about it?
E. Evaluating manipulated data – descriptive statistics, sub-setting data, indices
F. Evaluating questions/hypotheses, study design, data collection
An Evidence- and Reasoning-Based Inquiry and Critique Framework

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- descriptiive statistics, sub-setting
- graphing, diagrams, tables, and tests
- selecting salient, relevant, and
PCK and Skills for Data Exploration Teaching

**CK**
Data Content Knowledge & Skills
- ecology knowledge
- data exploration skills
- evidence- and reasoning-based critique

**PK**
Pedagogy Knowledge & Skills
- DEEP teaching strategies
- how to teach

**LK**
Learning Knowledge & Skills
- how people learn data skills
- how to assess learning

**Data Pedagogical Content Knowledge**

**Data Learning Pedagogical Knowledge**

**Data Learning Content Knowledge**