



# Brown University Department of Geology

## Learning Outcomes



### Basic Skills (properties and processes)

- Core knowledge of essential facts, theories, paradigms, uncertainties
- Core knowledge of fieldwork: observations, interpretations
- Core knowledge of laboratory work: observations, interpretations
- Visualization Skills, including reason and visualize in 3D
- Ability to predict Earth system responses to specific changes
- Understand the role of geoscience in society

### Inquiry / Process Knowledge "Thinking like a scientist"

- Differentiate observations (facts, evidence) from interpretations
- Understand the purpose & process of science: hypothesis testing
- Understand geoscience as an historical science
- Understand the depth of geologic time and its role in Earth evolution
- Understand the variable spatial scales and temporal rates of geologic processes
- Identify and evaluate assumptions
- Make generalizations, formulate hypotheses to explain observations
- Place current research questions in perspective

### Problem Solving / Creativity

- Verbalize the question; identify what is known (isolate key factors)
- Identify what is not known, and how to obtain that information
- Identify & access appropriate bibliographical resources, archives, & other sources of relevant information
- Apply principles of chemistry, physics & biology to solution of geologic problems
- Formulate original ideas and creative solutions
- Evaluate advantages/disadvantages of possible courses of action
- Function effectively as a member of a team - both giving and receiving feedback
- Identify and make new key observations and/or measurements – generate new knowledge
- Analyze and integrate new information, verbalize the 'result'
- Test new interpretations against prior work or other observations

### Analytical Skills / Data Interpretation

- Test ideas through quantitative calculations or theoretical models
- Integrate and evaluate data from multiple sources
- Extrapolate observations and concepts appropriately
- Critically evaluate results for completeness, reproducibility
- Understand the difference between consistency and proof
- Use information technology appropriately for database management, recording and presenting information

### Field and Laboratory Skills

- Make field observations and measurements that permit interpretation of the geological record
- Knowledge of the appropriate instrumentation to use for specific problems/questions
- Understand the use of standards, and appropriate analytical procedures
- Understand the application of statistical treatments to data



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## Learning Outcomes



### Synthesis and Evaluation

- Integrate knowledge from multiple sources and sub-disciplines
- Transfer knowledge and skills from one course or study to another
- Design and perform independent research

### Communication

- Communicate effectively through professional writing (logical argumentation; clear & concise)
- Use of proper attributions & citations of literature in writing
- Communicate effectively through oral presentation (PP, blackboard, poster)
- Visual representation of data & ideas (graphs, freehand, Illustrator etc.)
- Communicate effectively to a general audience

### Metacognition

- Ability to summarize, document, report and reflect on progress
- Ability to assess and revise one's approach to learning
- Ability to identify one's strengths and weaknesses
- Ability to identify one's own desired learning outcomes