NGSS Aligned Data-Rich Learning Materials for the Next Generation Scientists

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### Lessons & Modules

#### Tectonic Setting
- As a suite, the educational materials cover the major tectonic settings
- Free to educators & public
- Middle & High-school students are engaged in the practice of science
- Data-rich: providing experiences with scientific practices and cross-cutting concepts
- Includes GPS data from the EarthScope Plate Boundary Observatory plus additional data
- Place-based and geographically relevant

#### Alignment Matrix: Coverage & Gaps
- Coverage in this suite of resources draws on strengths of available data. As lessons and modules become more complex, additional NGSS alignment occurs.
- Gaps (absence of an X) highlight areas to focus with future resources. Connecting to high quality resources is a priority.

#### About the Table

**Tectonic Setting**
- Measuring Plate Motion with GPS
  - How does GPS work to pinpoint a location on Earth?
  - What can GPS tell us about Iceland?
  - Extent: Exploring East Africa plus basin & range in Western United States
  - Apply your knowledge

**Transform Boundaries**
- Exploring Plate Motion and Deformation in California with GPS
  - Analyze GPS time series data
  - Investigate deformation - what happened
  - Extensions: Explore more GPS data

**Convergent Boundaries**
- Detecting Cascadia's Changing Shape (Module)
  - Cascadia tectonic setting
  - Deformation & strain
  - Earthquakes
  - Tsunamis

**Hot Spots**
- Taking the Pulse of Yellowstone's "Breathing" Volcano: Problem-Based Learning in America's First National Park (Module)
  - Monitoring volcanic activity
  - Jigsaw:
    - Eruptive history
    - Seismic activity
    - Hydrothermal activity
  - Using GPS to view how Yellowstone is inflating & deflating over time
  - Analysis, Decision Making, Presentation

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**Disciplinary Core Ideas**
- **ESS1.C: The History of Planet Earth**
  - Understanding the geological timeline
  - Plate tectonics and Earth's dynamic systems

**Crosscutting Concepts**
- **1. Patterns:**
  - **2. Cause and effect:**
  - **3. Systems and system models:**
  - **4. Energy and matter:**
  - **5. Structure and function:**

**Science and Engineering Practices**
- **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. Constructing explanations and designing solutions:**
  - **6. Obtaining, evaluating, and communicating information:**
  - **7. Engaging in argument from evidence:**

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- **Standards:**
  - **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. Constructing explanations (for science):**
  - **6. Constructing explanations (for engineering):**
  - **7. Engaging in argument from evidence:**

- **Data-rich: providing experiences with scientific practices and cross-cutting concepts

**References and acknowledgements**
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