SEPUP: Issue-Oriented Science

SGI Field Test Conference
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SEPUP: Issue-Oriented Science

• In SGI, the theme of sustainability and global issues related to this theme unify the program.
• Ecology: Living on Earth
  – fisheries and fishery management
• Cell Biology: World Health
  – global infectious diseases
Why use issue-oriented science?

• Science for all students.
• Integrates sciences and integrates science with other subjects.
• Makes real-world connections and shows students how science is useful in many careers and in daily life.
• Encourages and prepares students to use scientific evidence to make decisions.
Issue-oriented science
SEPUP-style

• The issue is not an add-on, but is woven into the curriculum and the issues and content are closely related.

• In most cases, does not advocate a particular decision, but does advocate the use of scientific evidence and concepts in the decision-making process.

• Encourages students to look at both sides of an issue and evaluate the trade-offs involved in a complex decision.
Evaluating issues

The strongest issues:

• Require knowledge and understanding of important scientific concepts and processes
• Require an application of relevant scientific evidence
• Relate to scientific concepts and processes appropriate to grade level and subject matter
• Engage diverse groups of students
• Are complex enough to foster discussion and debate (Is there more than one solution or response?) OR clearly illustrate how science can inform a decision.
Instructional model for issue-oriented science

**COLLECT SCIENTIFIC EVIDENCE**
Gather scientific evidence through inquiry activities and readings.

**CHALLENGE**
Focus on a specific question. What do we need to know?

**ANALYZE THE EVIDENCE**
Interpret and/or evaluate the nature of scientific evidence.

**USE EVIDENCE**
Apply the evidence to address the original issue or problem.

**BUILD KNOWLEDGE AND MAKE CONNECTIONS**
Build conceptual understanding of important scientific ideas. Connect new learning to previous ideas.

**MOTIVATE**
Create a context with an issue or problem.
Literacy and assessment strategies are tied to issues

- **Literacy strategies**
  - Discussion strategies
  - Writing strategies
  - Reading strategies
  - Concept building strategies

- **Assessment**
  - Conceptual Understanding
  - Analyzing Data
  - Evidence and Trade-offs
  - Group Interaction
## Assessing Issue-Oriented Science
### Scoring Guide: Evidence and Trade-offs

<table>
<thead>
<tr>
<th>Level 4</th>
<th>Student accomplishes Level 3 and goes beyond in some significant way.</th>
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<tbody>
<tr>
<td>Level 3</td>
<td>Student compares options using accurate and complete evidence and takes a position supported by the evidence. Student describes trade-offs of his/her decision.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Student discusses one or more options using accurate or relevant evidence and takes a position supported by the evidence BUT reasoning is incomplete and/or part of the evidence is missing.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Student takes a position BUT provides reasons that are subjective, inaccurate, or nonscientific.</td>
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<tr>
<td>Level 0</td>
<td>Student’s response is missing or irrelevant.</td>
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## Issue-oriented Science and Inquiry in SEPUP

<table>
<thead>
<tr>
<th>Less Emphasis On</th>
<th>More Emphasis On</th>
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<tbody>
<tr>
<td>Discussing science in isolation</td>
<td>Discussing science concepts and understanding in the context of personal and societal issues</td>
</tr>
<tr>
<td>Working alone</td>
<td>Working with a group that simulates the work of a scientific community or policy group</td>
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<tr>
<td>Acquiring scientific information</td>
<td>Acquiring conceptual understanding and applying information and conceptual understanding in making personal, societal, and global decisions</td>
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<tr>
<td>Testing students for understanding at the end of the unit</td>
<td>Embedded assessments throughout the unit and culminating assessment activities</td>
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<tr>
<td>Closed questions with one correct answer</td>
<td>Open-ended questions that require students to explain phenomena or take positions backed by evidence</td>
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