



Goals Related to *Benchmarks for Science Literacy (Benchmarks)*

KNOWLEDGE

Participants should know that . . .

1. *Benchmarks* resulted from a collaboration among staff, school-district teams, and consultants in science and in educational research.
2. Research findings dealing with how and when students learn specific concepts and skills are not plentiful, but are summarized in *Benchmarks* when they exist.
3. *Benchmarks* is derived from the exposition of major ideas in *SFAA*, but is not a substitute for its coherent description of the picture science paints of the world.
4. *Benchmarks* adds ideas not explicitly in *SFAA* as precursors for ideas that are.
5. *Benchmarks* recommends a threshold for all students, with the expectation that most students will go further.
6. *Benchmarks* specifies major connections between chapters and sections.

POSSIBLE MISCONCEPTIONS

- Benchmarks was written by (a) Washington staff or (b) the school district teams.*
- Research basis is provided for every benchmark.*
- Every idea in SFAA appears in Benchmarks, which replaces it.*
- Benchmarks merely sorts SFAA ideas by grade level.*
- Benchmarks limits what more able students will learn.*
- Benchmarks specifies connections between individual benchmarks.*

7. Essays give some flavor for what learning relevant to a section would be like.

Essays lay out how to teach all the ideas in a section.

8. Project 2061 intends that learning experiences (and assessments) usually will target multiple benchmarks drawn from several different sections and chapters.

Project 2061 intends that each benchmark will be learned (and assessed) by itself.

ATTITUDES

Participants should believe that . . .

1. The careful crafting of *Benchmarks* required eight years of deliberation by scientists and K-16 educators on what was important and possible for all students to learn.

*State and district groups can start from scratch and develop a set of learning goals comparable to those presented in *Benchmarks* in a very short time.*

2. Study and use of *SFAA* and *Benchmarks* can improve the quality of decisions about selecting curriculum activities.

Activities can be chosen pretty much the same way as before, just under new headings.

3. Study and use of *SFAA* and *Benchmarks* can increase users' science literacy—their knowledge of science, mathematics, and technology and their connections.

The most efficient way to improve science literacy is to take advanced science courses.

4. Study and use of *SFAA* and *Benchmarks* can make the work of science educators more intellectually stimulating and more rewarding.

*Study of *SFAA* and *Benchmarks* is not worth the effort.*

POSSIBLE MISCONCEPTIONS

- | | |
|---|---|
| 5. <i>Benchmarks</i> complements the National Research Council's <i>National Science Education Standards (NSES)</i> and the National Council of Teachers of Mathematics' <i>Curriculum and Evaluation Standards for School Mathematics</i> . | <i>The science and mathematics standards contradict or supplant Benchmarks.</i> |
| 6. <i>Benchmarks</i> , <i>NSES Standards</i> , and Project 2061's comparison of the two can help users to gauge how well a state or district framework addresses national science literacy goals or to guide the development of such a framework. | <i>In using Benchmarks and NSES to create a framework, states and districts can pick and choose what they like from either.</i> |
| 7. Use of <i>SFAA</i> and <i>Benchmarks</i> can inform the design of assessments to measure progress toward science literacy. | <i>Assessments are a completely different issue from goal specifications.</i> |
| 8. Use of <i>SFAA</i> and <i>Benchmarks</i> can inform the design of activities for science literacy curricula. | <i>Design of instruction is a completely different issue from goal specifications.</i> |
| 9. Use of <i>SFAA</i> and <i>Benchmarks</i> can promote more effective teaching. | <i>Goals are a separate issue from good teaching.</i> |