

Workshop 4

Conceptual Change

DESCRIPTION

In this workshop we will explore the role played by prior knowledge when learning new science ideas. Only when a new idea is understood, accepted, and found to be useful does it begin to be exchanged for a previously held scientific belief. The workshop will also examine how teachers' ideas about teaching and learning may be altered as they engage students in strategies designed to promote conceptual change.

DR. PETER HEWSON

Professor of science education at the University of Wisconsin-Madison, Peter Hewson studies how students learn science, how teachers teach science, and how people become teachers of science. In doing so, he uses ideas about conceptual change as a common theme in understanding the complexity of practice in classrooms with diverse human beings. He is a co-author of *Designing Professional Development for Teachers of Science and Mathematics*, published in 1998, and is currently working on teacher professional development in a joint collaboration between the U.S. and South Africa.

Workshop 4 Timeline

Getting Ready

30 minutes

Children's Science Ideas

Share with your colleagues your thinking about working with children's alternative science ideas. As you discuss these ideas, write down in your journal anything that you hear from your colleagues that you might find of use in your classroom.

- Describe some ideas that your students hold that may often hinder their learning as you teach a particular topic.
- Discuss the methods that you use (or could use) to find out what students' existing beliefs are as you teach a new concept.
- How do you create an atmosphere in which students are willing to share their thinking?

Workshop 4 Timeline

Watch the Workshop Video

60 minutes

Going Further

30 minutes

Conceptual Exchange

In this workshop, we have seen that if students are to accept a new scientific concept, it must be intelligible (they must know what it means), plausible (it is believable), and fruitful (it is useful to them).

In your group, discuss the following questions:

- Is this concept of teaching science intelligible to you? (Can you describe and explain what is necessary?)
- What in today's workshop has made this idea of science teaching plausible or not plausible for you? (i.e., do you believe that teaching for conceptual change really assists students in learning science concepts?)
- In the classroom footage, what atmosphere was created to encourage students to freely express their thinking?

For Next Time

Ongoing Activity

Reflective Journal

In this workshop, Peter Hewson discussed the need to “lower the status” of alternative science ideas held by students, while “raising the status” of the science idea that you want students to attain.

In your journal explain how you might go about lowering the status of an “incorrect” science idea. You might want to make specific reference to helping children in your class to change their ideas about a concept you have taught recently.

Homework

A part of our work as teachers is to assist students in the development of their thinking skills. But what do we mean by thinking skills?

Make a list of all the terms that you associate with the term “thinking skill”—e.g., analysis, creative thinking, etc.

How would you define each of these terms, or what would you expect your students to be able to do if they possessed the thinking skill?

Reminder: Sign up for a Web Buddy (see Workshop Components, p. 11).

Reading Assignment

To prepare for Workshop 5, please read the article, “Critical and Creative Thinking in Science” written by Robert Swartz and taken from his book *Infusing the Teaching of Critical and Creative Thinking into Secondary Science*. The article can be found in the Appendix.

For your information

The Genetics Construction Kit (GCK) is published as part of The BioQUEST Library. For further information about The BioQUEST Library, please contact the BioQUEST Curriculum Consortium at:

BioQUEST Curriculum Consortium
700 College Street
Beloit College
Beloit, WI 53511
bioquest@beloit.edu
608-363-2743
<http://bioquest.org>