## INQUIRY ACTIVITY 1.1

### Exploring Your Initial Ideas about Science Teaching

Later in this book, you will discover that secondary students come to science class with existing ideas about the science content that you will teach. Novices in a field of study, like students in your future science classes, possess initial conceptions of fields such as earth science or physics. Many of these ideas or initial conceptions are actually misconceptions or naive ideas. Indeed, we might call them "alternative frameworks." Nevertheless, these initial ideas represent a good place to begin instruction. Thus, this activity is designed to help you think about and *explore your existing ideas or your frameworks about science teaching*. It is not a pre-test, but rather an opportunity to discuss your initial ideas about science teaching from a problem-oriented vantage point.

### Materials

- Index cards
- Information in Table 1.1

**Table 1.1** Exploring Your Initial Conceptions of Science Teaching

| Unifying Theme of Science Teaching | Problem Situation | Assessing Your Initial Conception |
|---|---|---|
| Nature of Science | Carl Sagan says, "science is a way of thinking, much more than it is a body of knowledge." | What is your view of science? Do your agree or disagree with Sagan? What are the implications of Sagan's definition for science teaching? |
| Inclusion: Science for All | A number of schools around the country with large numbers of at-risk students have adopted an approach called "integrative learning." This holistic approach appears to be successful with students who are disinterested in school and normally end up dropping out. | How would you teach the at-risk student, the student who has had a continuous record of failure in school, and clearly is prone to drop out of school? Can all students learn science? |
| Goals | According to a report on science teaching written by a prestigious group, the main goal of science teaching is to produce a scientifically literate society. | Do you agree with this? Are there other goals that are worthy and should be an integral part of science teaching? |
| Curriculum | The title of a keynote address at a major conference on science teaching is "The Science Curriculum: A Nonchanging Phenomenon!" | What is the science curriculum anyway? Is it nonchanging, or has the curriculum changed over the years? Should it? |
| Learning | You overhear a science teacher explaining to her eighth-grade earth science class that intelligence is incremental, not fixed. She believes that this will encourage students to try harder, especially when learning new and difficult ideas and concepts. | What is your view of intelligence? Do you think teaching students about human intelligence might help them learn science? |
| Models | A first-year teacher uses a nontraditional teaching model during the first week of school. It is a small group activity with hands-on materials. Students were asked to use meter sticks to measure various heights and lengths. Students were confused. How could they measure something bigger than the meter stick? One pair of students carved symbols and words in the meter stick and another group couldn't decide whether the smallest marks were centimeters or millimeters. | Are nontraditional models of teaching prone to problems and the unexpected? Should first-year teachers avoid them until they get their feet wet? |

**Table 1.1** (*cont'd*)

| Unifying Theme of Science Teaching | Problem Situation | Assessing Your Initial Conception |
|---|---|---|
| Planning | At a conference between a student science teacher and her college supervisor, the student expresses anger that the students didn't enjoy the lesson that she had spent three hours planning. She just cannot believe they were rude during a lesson she worked so hard to plan. | How important is planning for lessons? Does this student teacher have expectations that are too high? How would you react in such a situation? |
| Assessing | A teacher announces that he is going to let students work in small teams on three quizzes each term. The students will turn in one paper, and each will receive the group's grade. | Do you think this is a good idea? Why? Would you employ such an assessment plan in your class? |
| Strategies | The most common strategy used in high school science teaching is lecture and discussion. Many science teachers claim that this is an inadequate strategy for most students, and suggest other strategies. | What do you think? Isn't lecture an efficient way to teach science? Are there other strategies that might reach more students? What are they? |
| Management and Facilitation | A fellow student returns from observing high school science classes with two maps drawn of the classrooms visited. | What can you infer about the teachers' view of classroom management? How does their view of facilitating learning compare? |
| Science, Technology, Society (STS) | A science teacher announces at a departmental meeting that she is going to include the following topics in her survey biology class: ethics and animal rights, birth control methods, abortion, and AIDS counseling. One teacher objects, saying, "these are too controversial, we'll have half the parents in here." | What do you think? Should topics like these be part of the science curriculum? Why? |
| Technology | At an urban high school, the mathematics and science departments have decided to offer online versions of their courses. Students at the high school can choose either the fact-to-face course or the online course. | What do you think of this idea? Do you think that offering science courses online would be a better alternative to courses offered in a classroom? |

## Procedures

1. Read each of the situations given for the conceptual themes listed in Table 1.1.
2. Write the themes on individual index cards. Shuffle the cards and place them face down on a table around which four to six students are sitting.
3. Select one person to start. The person selects an index card from the top of the pile to identify the unifying theme. Read the problem situation associated with the theme aloud to your group. Use the questions listed in the third column to guide your exploration of the theme. To explore the theme, you can:
   a. Give your initial point of view and share it with the group. You can ask other group members if they agree or disagree.
   b. Ask each group member to write a brief statement and then read them aloud to the group.
   c. If the problem situation merits it, role play the situation with other members of your group. The person drawing the card and selecting the method asks for volunteers and directs the role-playing scene. The enactment should take no more than two or three minutes. Follow the role play with a discussion session.

## Minds-On Strategies

1. How do your initial ideas compare with other students in your class?
2. What is a framework? How do frameworks develop? How can they change?
3. In what ways do you think your initial ideas or frameworks about science teaching reflect the most recent research and practice of science teaching?