

## Overview

Students will identify their perception of the relative degree of risk associated with technologies, environmental hazards, and everyday activities. They will also have the opportunity to share their ideas as they compare and contrast their perceptions with those of others, including experts and lay people.

## Background

**Risk perception** examines people's attitudes toward risk, their levels of acceptable risk, and their behavior in response to their perceptions of risk. Risks of varying types are often perceived differently by different individuals or groups of people. **Lay people** tend to judge risks according to a series of characteristics they associate with the risk, for example, (1) risks individuals expose themselves to voluntarily, (2) risks under an individual's control, (3) new risks, or (4) risks scientists understand.

Individuals also judge risks according to their personal values. **Values** can be defined as the relative worth an individual places on something, such as clean air, clean water, or wilderness areas. Studies of risk perception suggest that **mass media** (often considered to be very influential) are more likely to set the agenda of *which* risks will be evaluated, whereas interactions with friends and family are more likely to shape *what* people think about those risks. Because different people focus on different risk characteristics and have different values, their perceptions of a risk may not be the same.



Risk perception plays an important role in people's willingness to support risk reduction and mitigation programs (Flynn, Slovic, and Mertz 1996, C). But what if those risk perceptions are not accurate? At times, our perceptions of the real degree of risk associated with common daily activities are incorrect. Those misperceptions are largely the result of (1) a lack of knowledge of existing data or a lack of available data, (2) emotionalism associated with various risks, (3) distortions or misconceptions conveyed by mass media, or (4) other factors such as uncertainty or personal bias. When risk perceptions are not accurate, resources may be wasted. For example, as a result of misperceptions, more money may be spent managing a very small risk rather than a larger, more serious risk.

### Subjects

Chemistry, Civics, Communications, Debate, Ecology, Environmental Science, Health, Human Anatomy & Physiology, Language Arts, Physics, Social Studies

### Concepts

- ▶ The application of scientific knowledge and technological systems can have positive and negative effects on the environment. (8.1)
- ▶ Most cultures have beliefs, values, and traditions that shape human interactions with the environment and its resources. (9.1)
- ▶ Effective citizen involvement in the environmental decision-making process involves a careful study of all sides of the issues, along with the ability to differentiate between honest, factually accurate information and propaganda. (9.4)

### Skills

Collaborating, Comparing and Contrasting, Debating, Discussing, Evaluating, Identifying Main Items

### Objectives

Students will (1) develop an understanding of the differences in risk perception between lay people and experts (as well as among their classmates), (2) identify what characteristics influence people's perceptions of risk, and (3) learn about different environmental risks.

### Materials

Copies of the Student Pages "Perceived Risk for 30 Activities and Technologies," "Risk Perception Factors," "Ordering of Perceived Risk for 30 Activities and Technologies," "Experts vs. Lay People: Discussing the Differences," "Environmental Research Needs," and "Environmental Risks: Research Priorities" on pages 27–32; 4–5 blank overhead transparencies.

### Time Considerations

Preparation: 20 minutes per part  
Activity:  
Part A—one 50-minute period  
Part B—40 minutes  
Part C—one 50-minute period



# Part A

## EVERYDAY RISKS

### GETTING READY

Duplicate the Student Pages “Perceived Risk for 30 Activities and Technologies” and “Ordering of Perceived Risk for 30 Activities and Technologies” for each member of the class. Make one overhead transparency of each of the Student Pages “Perceived Risk for 30 Activities and Technologies” and “Risk Perception Factors.”

### DOING THE ACTIVITY

1. Ask students for definitions of **experts** and **lay people**. Visually record their answers.
2. Ask students how they define **values** and **perceptions**. Do they think that values and perceptions affect how experts and lay people view risks? (At this point solicit “yes” or “no” responses. Then explain to students that they will explore their predictions as they continue this activity.)
3. Distribute the Student Page “Perceived Risk for 30 Activities and Technologies.” Ask each student to rank the listed risks from most dangerous to least dangerous. If desired, divide the class into cooperative learning groups of 4–5 students and have them rank the list as a group. Continue this part of the activity in groups.
4. Ask several students to do the following:
  - ▶ Share their rankings with the rest of the class.
  - ▶ Explain their rankings.
  - ▶ Explain how they interpreted the word “dangerous.”

Write their rankings on the overhead transparency of the Student Page “Perceived Risk for 30 Activities and Technologies” so that the rest of the class can see them. (Write each student’s response in a separate column so that several students’ rankings can be displayed at once.)

In contrast to lay people, who focus on a variety of **qualitative** risk characteristics, risk analysts evaluate risks by using scientifically derived estimates of the risk’s severity and likelihood of injury or death. For example, a study that compared the judgments of experts and lay people regarding chemical risks indicated that the public tended to view chemicals as harmful or safe regardless of **dose** and **exposure**. Conversely, **experts** were more likely to take into account the quantitative measures of dose and exposure to a chemical when evaluating the risk (Krause, Malmfors, and Slovic 1992, B). Some regulations (such as listing endangered species or setting national ambient air quality standards) require the government to control those risks that a team of scientists has determined as the most severe. These differences in perception have resulted in some disagreement between experts and lay people over what risks are acceptable and to whom.

When managing risks, experts may not take into account the public’s perceptions. This approach might be justified for risks such as smoking or drunk driving, which studies and actual data have shown to result in a great number of injuries and deaths. But for risks that are more difficult to quantify (for example, loss of an endangered species), the consideration of values and perceptions is relevant to the management process. Therefore, the most effective way to manage risks may be to educate people on the science behind risk assessments and then to combine the scientists’ risk estimates with lay people’s perceptions and values.

