

PROBABILITY: THE LANGUAGE OF RISK ASSESSMENT

DIRECTIONS: After completion of the reading lesson answer the following questions in complete sentences. Use your own words whenever possible.

1. Besides using people's feelings about risk, what else do scientists do in order to "discuss and compare risks related to science and technology" in a more scientific manner?

(Scientists quantify relationships among risks by developing mathematical probabilities.)

2. What is "probability"? How are most probabilities about everyday activities determined?

(Probability is how likely something is to occur. Most probabilities that we use in everyday life have been determined from simply observing what happens every time certain conditions arise or from repeating an experiment many times.)

3. Why are the probabilities of health and safety risks to humans more difficult to determine than those of everyday activities? Give two reasons.

(These are more difficult to determine because a large body of knowledge may be needed in order to make these predictions or testing of the whole system is not possible.)

4. What is the "common rule" used by regulators in determining the human health risks associated with a new technology? Based on your own experience, discuss one reason why this rule may not always be accurate or certain.

(A technology [new chemical, new industrial plant] is "safe" if exposure to the technology does not raise the health risk of the human population by more than one chance in one million [1/1,000,000 or 0.000001], which is about the chance of being struck by lightning or a meteorite.)

5. Besides the "quantifiable" (countable) viewpoint provided by probabilities, how else is the "acceptability of risk" determined? (Use the example of the person and the umbrella for insight.)

(Subjective judgment is an inevitable element in selecting criteria for determining probabilities and in determining whether or not a given level of risk is acceptable.)

6. Why are there limitations to using probability as a tool for discussing risk when it comes to making major societal decisions about risks?

(Most societal issues in which risk is a factor are so complicated and complex that a significant problem may be discounted or underestimated. Also, many probabilities are estimated because it is not possible to perform controlled experiments to measure them. Furthermore, human behavior, and therefore human error, are even less predictable than physical or biological events.)