Benchmarks for Lesson Plan: Introduction To Risk Analysis (9–12)

CENTRAL BENCHMARK

3B Design and Systems (9-12)#4
Risk analysis is used to minimize the likelihood of unwanted side effects of a new technology. The public perception of risk may depend, however, on psychological factors as well as scientific ones.

RELATED BENCHMARKS

1C The Scientific Enterprise (9-12)#6
Scientists can bring information, insights, and analytical skills to bear on matters of public concern. Acting in their areas of expertise, scientists can help people understand the likely causes of events and estimate their possible effects. Outside their areas of expertise, however, scientists should enjoy no special credibility. And where their own personal, institutional, or community interests are at stake, scientists as a group can be expected to be no less biased than other groups are about their perceived interests.

2B Mathematics, Science, and Technology (9-12)#3
Mathematics provides a precise language for science and technology—to describe objects and events, to characterize relationships between variables, and to argue logically.

3A Technology and Science (6-8)#3
Engineers, architects, and others who engage in design and technology use scientific knowledge to solve practical problems. But they usually have to take human values and limitations into account as well.

3B Design and Systems (6-8)#2
All technologies have effects other than those intended by the design, some of which may have been predictable and some not. In either case, these side effects may turn out to be unacceptable to some of the population and therefore lead to conflict between groups.

6E Physical Health (6-8)#2
Toxic substances, some dietary habits, and personal behavior may be bad for one's health. Some effects show up right away, others may not show up for many years. Avoiding toxic substances, such as tobacco, and changing dietary habits to reduce the intake of such things as animal fat increases the chances of living longer.

7D Social Trade-Offs (9-12)#1
Benefits and costs of proposed choices include consequences that are long-term as well as short-term, and indirect as well as direct. The more remote the consequences of a personal or social decision, the harder it usually is to take them into account in considering alternatives. But benefits and costs may be difficult to estimate.

Introduction To Risk Analysis *(continued)*

8C Energy Sources and Use (9-12)#3
Nuclear reactions release energy without the combustion products of burning fuels, but the radioactivity of fuels and by-products poses other risks, which may last for thousands of years.

9A Numbers (6-8)#7
Computations (as on calculators) can give more digits than make sense or are useful.

9A Numbers (9-12)#1
Comparison of numbers of very different size can be made approximately by expressing them as nearest powers of 10.

9D Uncertainty (6-8)#6
Events can be described in terms of being more or less likely, impossible, or certain.

11D Scale (9-12)#1
Representing large numbers in terms of powers of 10 makes it easier to think about them and to compare things that are greatly different.

12B Computation and Estimation (6-8)#8
Decide what degree of precision is adequate and round off the result of calculator operations to enough significant figures to reasonably reflect those of the inputs.