

9-12

Theories and applications in mathematics work influence each other. Sometimes a practical problem leads to the development of new mathematical theories; often mathematics developed for its own sake turns out to have

Mathematics is useful in business, industry, music, historical scholarship, politics, sports, medicine, agriculture, and the social and natural sciences.

Developments in science or technology often stimulate innovations in mathematics by presenting new kinds of problems to be solved.

Developments in mathematics often stimulate innovations in science and technology.

Mathematics provides a precise language to describe objects and events and the relationships among them. In addition, mathematics provides tools for solving problems, analyzing data, and making logical arguments.

The development of computer technology (which itself relies on mathematics) has generated new kinds of problems and methods of work in mathematics.

Mathematical modeling aids in technological design by simulating how a proposed system might behave.

Any mathematical model, graphic or algebraic, is limited in how well it can represent how the world works. The usefulness of a mathematical model for predicting may be limited by uncertainties in measurements, by neglect of some

A mathematical model uses rules and relationships to describe and predict objects and events in the real world.

Mathematics is the study of quantities and shapes, the patterns and relationships between quantities or shapes, and operations on either quantities or shapes. Some of these relationships involve natural phenomena, while others deal with

6-8

The mean, median, and mode tell different things about the middle of a data set.

A number line can be extended on the other side of zero to represent negative numbers. Negative numbers allow subtraction of a bigger number from a smaller number to make sense, and are often used when something can be

Numbers can be represented by using sequences of only two symbols (such as 1 and 0, on and off); computers work this way.

Computers have become invaluable in science, mathematics, and technology because they speed up and extend people's ability to collect, store, compile, and analyze data; prepare research reports; and share data and ideas with

Mathematics is helpful in almost every kind of human endeavor -- from laying bricks to prescribing medicine or drawing a face.

Symbolic equations can be used to summarize how the quantity of something changes over time or in response to other changes.

The graphic display of numbers may help to show patterns such as trends, varying rates of change, gaps, or clusters that are useful when making predictions about the phenomena being graphed.

3-5

Graphical display of quantities may make it possible to spot patterns that are not otherwise obvious, such as cycles and trends.

If 0 and 1 are located on a line, any other number can be depicted as a position on the line.

Mathematics is the study of quantity and shape and is useful for describing events and solving practical problems.

In some situations, "0" means none of something, but in others it may be just the label of some point on a scale, such as a number line.

K-2

Quantities and shapes can be used to describe objects and events in the world around us.

Patterns can be made by putting different shapes together or taking them apart. Patterns may show up in nature and in the things people make.

Numbers can be used to count things, place them in order, measure them, or name them.

Circles, squares, triangles, and other shapes can be found in nature and in things that people build.