Intermediate Math Skills
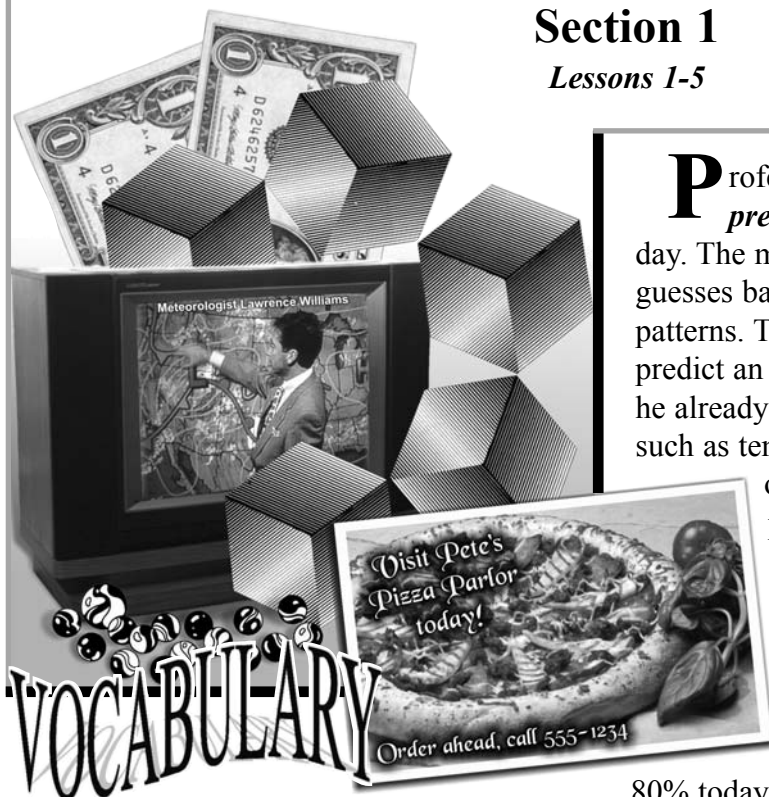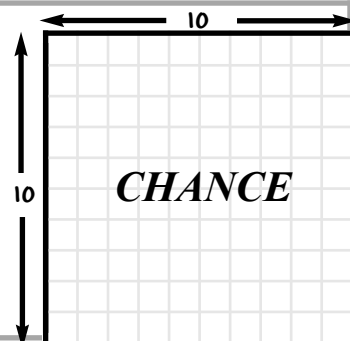
Chapter 1

Lesson 1

Predictions

CHANCE

Section 1
Lessons 1-5

Professor K listens to the weather *predictions* before he goes to work each day. The meteorologist makes estimations or guesses based on prior occurrences in weather patterns. The weatherman believes that he can predict an *outcome* (estimate) based on what he already knows, in this case weather data such as temperatures. Looking at data (a record of previous occurrences) and then predicting an outcome is known in mathematics as *probability*. Sometimes this is referred to as *chance*.

In meteorology (forecasting the weather), the weatherman might say that the chance of rain is 80% today. That means that rain *occurred* 80% or 80 times out of 100 in the past when the weather patterns were the same as today.

Professor K's children play various games that include number cubes, cards and/or spinners. These devices *effect* or *cause* an outcome that ultimately determines a winner. These types of devices are good for games because the probability of a given outcome is never certain, only possible.

In this lesson, Professor K will begin another part of your journey through the land of mathematics to the portion called *probability*. Probability has a language similar to other parts of mathematics, and yet different. Professor K encourages you to study the definitions, vocabulary and examples to familiarize yourself with the terminology of *probability*.

Look at **Example Set 1** as Professor K explains *sets*, *sample space*, outcomes, *events*, *subsets* and *experiments*.

VOCABULARY

Prediction: the telling of an event in advance of it happening; foretelling future events

Outcome: result of an experiment

Set: collection of objects

Sample space: the set containing all possible outcomes

Event: a subset of the sample space

Subset: a set whose members are members of an equal or larger set.

Experiment: something that produces results that can be seen and recorded

Example Set 1

Professor K once taught a class that consisted of 3 boys and 4 girls. The students' names were Rafael, Michael, Jeffrey, Tina, Nicole, Tammy and Marcy. Determine the following from the students in Professor K's class:

    a) the sample space
    b) the outcomes if the "experiment" is all the boys in the class.
    c) the outcomes if the "experiment" is all the girls in the class.
    d) the outcomes if the "experiment" is all the students whose name contains the letter y.

a) sample space:
   {Rafael, Michael, Jeffrey, Tina, Nicole, Tammy and Marcy}

a) Professor K writes the names of all the students in the class within braces. This *set* makes up the *sample space*.

b) boys in the class:
   {Rafael, Michael, Jeffrey}

b) Professor K knows that the mathematical statement applied to the sample space is like applying heat to a test tube in a chemistry experiment. Both produce observable results. Professor K places the names of all the boys in the class in set symbols {curly brackets}. This is considered an *event*.

c) girls in the class:
   {Tina, Nicole, Tammy, Marcy}

c) Professor K places the event of all the girl's names within set symbols.

d) students whose names contain the letter *y*:
   {Jeffrey, Marcy, Tammy}

d) Professor K places all the students in the event of names containing the letter *y* in set symbols.

Example Set 2

Professor K visited an automobile dealer and noticed that there were many cars of various types and colors. Professor K considered all the colors of cars on a certain row at the dealership. In this row Professor K saw three white vehicles (w,w,w), two red (r,r), four blue (B,B,B,B) and one black (b) vehicle. Making a math problem from his visit to the automobile dealership, Professor K asked the following questions about:

    a) the sample space
    b) the outcomes if the "experiment" is all the red vehicles in the row
    c) the outcomes if the "experiment" is all the black vehicles in the row
    d) the outcomes if the "experiment" is all the white and blue vehicles in the row

a) sample space:
   {w, w, w, r, r, B, B, B, B, b}

a) Professor K writes the colors of the vehicles in the row within braces. This set makes up the sample space.

b) red vehicles in the row:
{r, r}

b) Remember, Professor K knows that the mathematical statement applied to the sample space is like applying heat to a test tube in a chemistry experiment. Both produce observable results. Professor K places the elements of all the red vehicles in the row in set symbols. This is considered an event.

c) black vehicles in the row:
{b}

c) Professor K places the event of all black vehicles within set symbols.

d) white and blue vehicles in the row:
{w, w, w, B, B, B, B}

d) Professor K places all the vehicles in the event of all the white and blue vehicles in the row in set symbols.

Show Professor K your understanding of *probability* by working the activities for this lesson.

LIFE PRINCIPLE

*"Learning increases
the probability of success."*
—Anonymous