

REAL WORLD of MATH

Applying Math and Technology in Today's Classroom

Grade 4

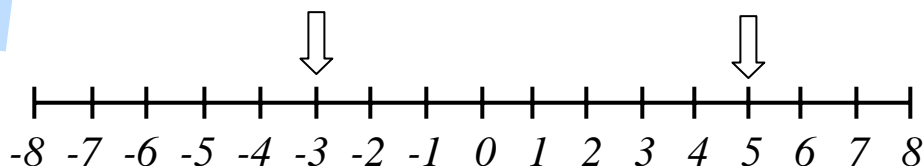
*The following
pages contain
sample activities
from the book.*

Changing Temperature



During the winter, the temperature sometimes drops below zero. During a cold winter night at Mount Rainier in Washington State the temperature dropped from 5°F to -3°F .

Use the number line below to help you determine the temperature change.



1. What is the change in temperature from 5°F to -3°F ? _____

Calculate the difference between these two temperatures.

2. 7°F to -5°F _____

3. 9°F to -19°F _____

4. 11°F to -6°F _____

A careless friend tries to convince you that you can calculate the temperature change for problem #4 by subtracting $11 - 6$. As a result, his answer is a 5° temperature change. You look at the number line and realize that 5° cannot possibly be correct.

What is the correct answer? After you calculate the temperature change, explain why your careless friend's method of solving this problem is wrong.

Changing Temperature

NCTM Standards Correlation

CONTENT STANDARDS	PROCESS STANDARDS
<input checked="" type="checkbox"/> Number & Operations	<input type="checkbox"/> Problem Solving
<input type="checkbox"/> Algebra	<input type="checkbox"/> Reasoning & Proof
<input type="checkbox"/> Geometry	<input checked="" type="checkbox"/> Communication
<input type="checkbox"/> Measurement	<input type="checkbox"/> Connections
<input type="checkbox"/> Data Analysis & Probability	<input type="checkbox"/> Representation

Number and Operations

Instructional programs should enable students to understand numbers, ways to represent numbers, relationships among numbers, and number systems.

- In grades 3–5 all students should explore numbers less than 0 by extending the number line and through familiar applications.

Instructional programs should enable students to compute fluently and make reasonable estimates

- In grades 3–5 all students should develop fluency in adding, subtracting, multiplying, and dividing whole numbers.

Communication

Instructional programs should enable students to analyze and evaluate the mathematical thinking and strategies of others.

Teaching Tips

This activity requires students to calculate differences between positive and negative numbers using a number line.

Prior to working with negative numbers, students should recognize that the word *difference* indicates subtraction. For example, the difference between 6 and 4 is $6-4=2$. However, when working with positive and negative numbers, this is not true. Students should first be instructed to visualize the number line to answer the questions. For example, between 9 degrees and zero are nine “spaces” on the number line and between 0 and -19 are nineteen more spaces. After gaining this understanding, teachers should help students understand that adding the 9 and the 19 gives the difference between the temperatures.

Some students may be able to construct this knowledge by completing the activity, whereas other students may need more direct instruction and practice with the number line before beginning.

Answers

1. During a cold winter night at Mount Rainier in Washington state the temperature dropped from 5° F to -3° F.

There was an 8° -temperature change.

2. 12° difference
3. 28° difference
4. 17° difference

What is the correct answer? After you calculate the temperature change, explain why your careless friend's method of solving this problem is wrong.

Students should state that the correct answer is 17° and that their careless friend's answer is wrong because there are 11° between 11 and 0 and 6 more between 0 and -6 . Therefore, the numbers should be added instead of subtracted as the negative sign with the number -6 does not represent a subtraction problem.

Technology Connection

Required Hardware: Microphone (optional)

The *Changing Temperatures PowerPoint Activity* is intended to provide a differentiated form of the original activity. The presentation includes text box objects in which students type responses. Students with poor typing skills or those who would benefit from the option may record their responses to questions in the *Normal View* (when the presentation is not being viewed) for slide 7.

In addition, students should access the **Ballpoint Pen** annotation tool from the pen icon in the bottom left-hand corner of the presentation to mark the number line as directed in slides 3 and 4. This visualization of negative numbers should provide representational understanding of the difference between positive and negative number. Slide 4 may be duplicated (**Insert** menu \rightarrow **Duplicate Slide**) to modify the positive and negative numbers to provide additional practice/reinforcement as desired.



Tech Know-How

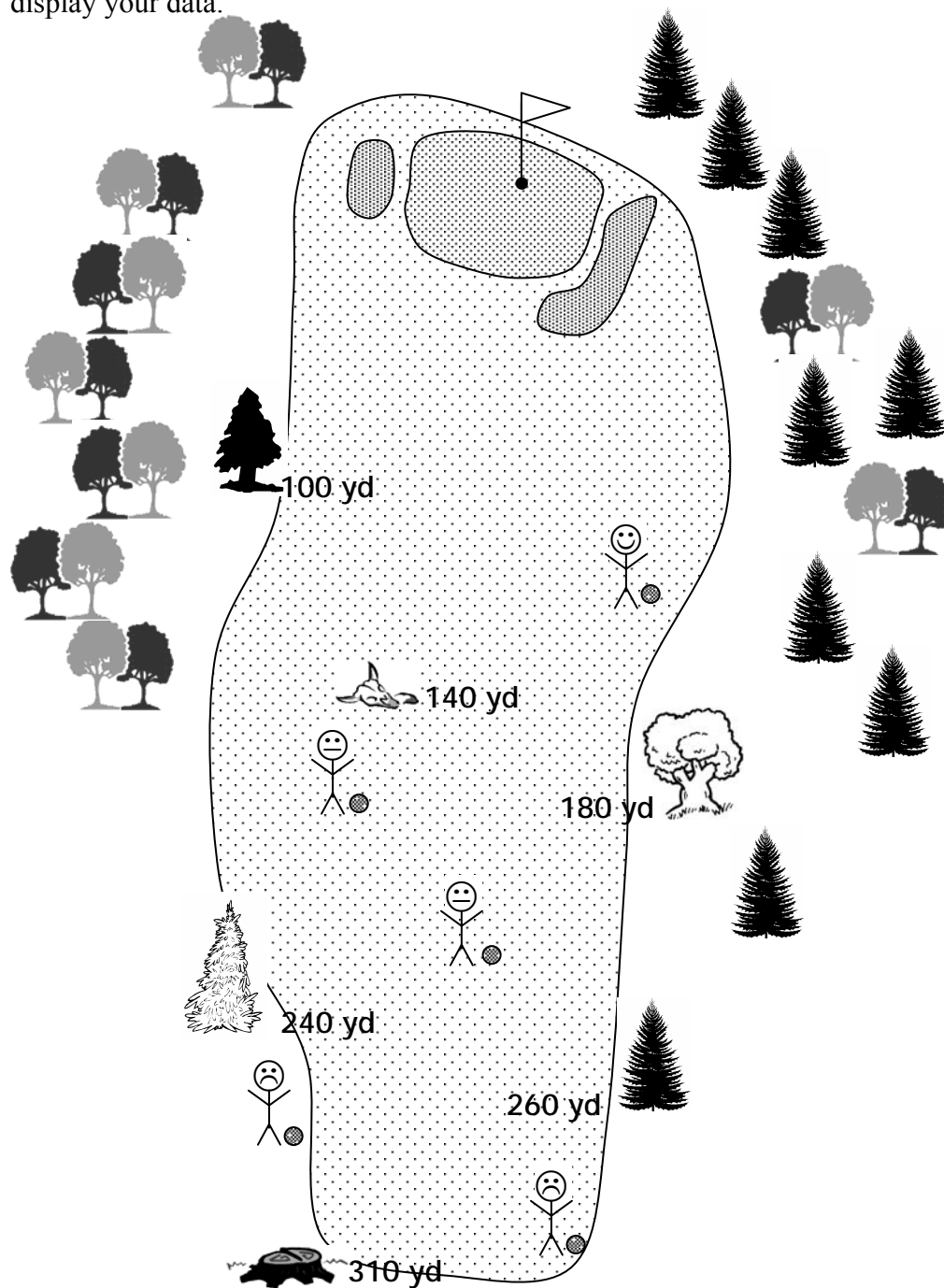
Directions for *Using Annotation Tools in Microsoft PowerPoint* presentation are available in the **Technology Connection Tutorials** folder on the CD.

Directions for *Recording Sound in Microsoft PowerPoint* are available in the **Technology Connection Tutorials** folder on the CD.

Distance from the Hole

It is important for golfers to know exactly how far their golf balls are from the hole to choose the correct club. A miscalculation can be terrible. The wrong club may cause the ball to go too far or too short. To make the correct club choice, some golfers use a model or a map of each hole. The map includes the distance to the hole from certain points along the fairway. This way they can more easily make their calculations.

Examine the golf hole below. The known distances correctly marked on the map. Use these measurements to estimate the distance each golf ball is from the hole. Construct a table to display your data.



Distance from the Hole

NCTM Standards Correlation

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Geometry

Instructional programs should enable students to use visualizations, spatial reasoning, and geometric modeling to solve problems.

- In grades 3–5 all students should use geometric models to solve problems in other areas of mathematics, such as number and measurement.

Data Analysis and Probability

Instructional programs should enable students to formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

- In grades 3–5 all students should represent data using tables and graphs such as line plot, bar graphs, and line graphs.

Reasoning and Proof

Instructional programs should enable students to select and use various types of reasoning and methods of proof.

Teaching Tips

Additional Material: ruler (metric)

This activity requires students to estimate the distances of different golfers from a hole on the golf course using known distances as guides.

When constructing tables to display data, students may need to number or name each player for easier identification. Teachers should encourage students to label the golfers on the activity sheet with the corresponding label from the table.

To help students estimate, teachers may give students the rule that 1 centimeter = approximately 20 yards. If using a ruler to measure, students should measure the distance from the bottom of the flagpole to the golf ball.

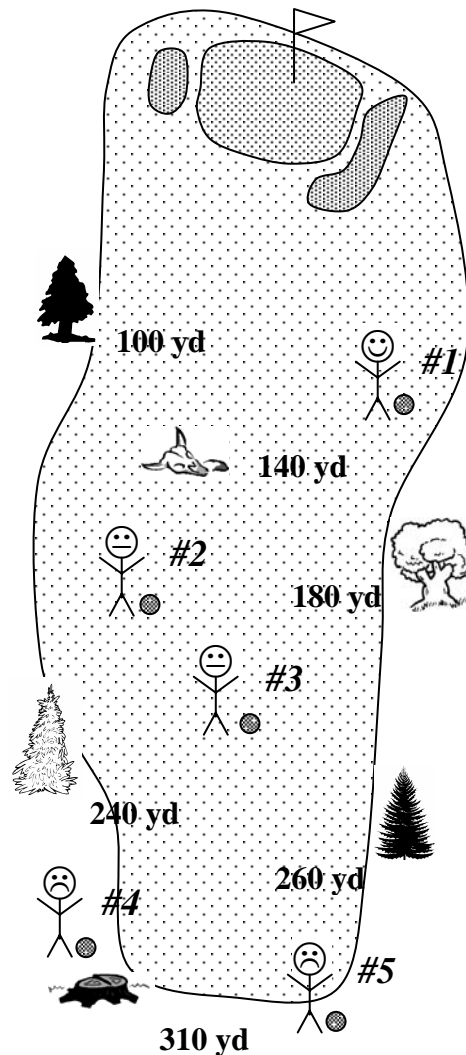
If students do not use a ruler or the centimeter rule, students may use the known distances to estimate. For example, the golfer closest to the hole is between 100 yards and 140 yards. There are a total of 60 yards between these two marks. Students may draw lines on the

picture to divide the space into six equal parts, each one representing 10 yards. Students may then use these marks and the golfer's ball to determine the approximate distance from the hole.

Answers

Examine the golf hole below. Notice the known distances correctly marked on the map. Use these known distances to estimate the distance each of the five players' golf balls is from the hole. Construct a table to display your data.

Golfer	Distance From Hole
#1 ☺	110–120 yd
#2 ☺	170–180 yd
#3 ☺	215–225 yd
#4 ☹	265–270 yd
#5 ☹	300–305 yd



Technology Connection

The *Distance to the Hole Word Activity* is intended to provide an extension activity involving the placement of golfers on a hole marked with yardage signs. This differs from the original activity as students work to determine the distance of the previously placed golfers. Teachers may select to use this technology connection activity as an engagement or an extension. Teachers may also opt to require the students to justify their placement orally or in writing.

Tech Know-How

Moving the cursor, as with any other object, entails a click-and-drag process. Encourage students to click on the golfer once, and then hover over it until a four-way arrow appears. This is important because when the two-way arrow appears, the golfer may be resized. To correct inadvertent resizing, open the **Edit** menu and select **Undo Resizing Object**.