

CAREER MATH

Teaching Real-world Math Skills and Concepts

Hope Martin

Correlates to the Common Core
Standards for Mathematics

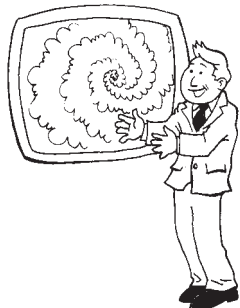
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 GOOD YEAR BOOKS

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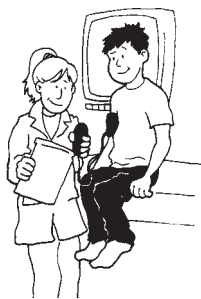
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Alignment to the CCSS

<i>Activities</i>	<i>Number and Operation</i>	<i>Algebra</i>	<i>Geometry</i>	<i>Measurement</i>	<i>Data & Probability</i>	<i>Problem Solving</i>	<i>Reasoning & Proof</i>	<i>Communication</i>	<i>Connections</i>	<i>Representation</i>
Math and Meteorology										
Keeping Track of Highs and Lows	●				●	●		●	●	
Continental Hot Spots	●	●		●		●		●	●	●
Let's Climb a Mountain	●				●	●		●	●	
The Heat Index	●	●			●	●		●	●	
Winter's Temperatures and Wind Chill		●			●	●		●	●	
The Science of Lightning	●					●	●	●	●	●
Average Rainfall around the World	●				●	●		●	●	
The Geometry of Hurricanes	●		●	●		●	●	●	●	
Math and Medicine										
Understanding & Reading Growth Charts	●			●	●	●		●	●	●
Reading the Blood Pressure Charts	●	●			●	●		●	●	●
Prescribing Medication	●			●						
Diabetes and Diet	●			●		●	●	●	●	
Average Weight for Boys and Girls	●			●		●		●	●	●
Designing a Doctor's Office	●		●	●	●	●	●	●	●	●
Math and Food Preparation										
Baking Raisin Muffins	●			●	●	●		●	●	
Using the Baker's Percentage	●	●		●		●		●	●	●
Percentages in a Side of Beef	●					●		●	●	
Edible Portion and Serving Size	●			●		●		●	●	
How Much Food to Order?	●			●		●		●	●	
Pattie's Pizza Parlor	●	●	●	●		●	●	●	●	
Math at the Zoo										
Lion Cub Math	●	●			●	●		●	●	
Polar Bear Growth vs. Human Growth	●	●		●	●	●	●	●	●	●
The Leaping Gazelle	●			●	●	●		●	●	
The Logic in Animal Species		●				●	●	●	●	●
The Remarkable Leaping Frog	●			●	●	●		●	●	
Feeding Gorillas at the Zoo	●			●	●	●		●	●	
Animal Enclosures	●	●	●	●		●		●	●	
Math and Personal Fitness										
Finding Your Heart Rate	●			●	●	●		●	●	
Our Basal Metabolism Rate	●	●		●		●		●	●	
Estimated Energy Requirements	●	●		●	●	●	●	●	●	
Walking for Your Health	●	●	●	●		●		●	●	
How Many Calories in a Cookie?	●			●	●	●		●	●	
Reading Product Labels	●			●	●	●		●	●	
The USDA's New Pyramid	●			●	●	●	●	●	●	●

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Introduction

What is the underlying philosophy of *Career Math*?

Children enter school believing that mathematics is relevant and important. They do not believe mathematics is an isolated subject with rules and procedures to be memorized but see math as a useful and efficient way to quantify and understand their world (NRC, 2001). By using math applications, *Career Math* makes important connections between *school math* and *real math*.

This book is for students in grades 5 through 8. The lessons can be used in a variety of ways—as replacement lessons, as supplementary materials in a regular classroom setting, or as parents' home schooling lessons. Each activity in *Career Math* teaches children vital mathematics skills and concepts using real-world applications.

In its introduction, The Common Core State Standards for Mathematics asserts, “These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.” (CCSS, p. 5) The document defines two interconnected components—the Standards for Mathematical Practice and the Standard for Mathematical Content.

The Standards for Mathematical Practice describe ways in which students should approach mathematical problems as they move through their elementary, middle and high school years. There should be a connection between what students need to know and the way they go about the process of learning it. The Mathematical Practices answer the question, “What do good problem solvers do?”

The Standards for Mathematical Content has balanced this combination of procedure and understanding. Students who lack understanding may rely on rote procedures to and without a firm understanding of what they are doing and why they are doing it, students may be less likely to consider similar problems, represent problems logically, give good reason for their conclusions, and be apply the mathematics to real-world situations. They will be unable to use technology correctly, to step back for an overview to reevaluate their thinking, or move away from a known procedure to find a shortcut. In short, a lack of understanding effectively hinders a student's mathematical progress.

The four main objectives of *Career Math* are to:

- Make connections between “school math” and their applications—how are these skills needed in the “real world”?
- Share the expertise of professionals, the people who use math every day, to help teachers answer the question, “When am I ever going to use this?”
- Use the Common Core State Standards and Mathematical Practices as a guide to focus on the important skills and concepts taught at these grade levels, and
- Make ready-to-use, motivating math activities available to help them answer the often-heard question, “When are we ever going to use this?”

What does this book contain?

There are five careers highlighted in *Career Math*: meteorology, medicine, food preparation, animal care/zoology, and personal fitness. Each chapter contains an introduction that briefly describes the career and some of the mathematics skills needed to work in the field.

Each of the activities is preceded by a Teacher's Page that identifies:

- **Math Skills:** The skills and concepts contained in the lesson
- **Materials Needed:** The student activity sheets and other materials that are needed for the lesson to run smoothly (**Note:** Some activities ask you to make transparencies of the activity sheets or background information sheets so that you can go over information with the class as a whole.)
- **Background Information and Suggested Teaching Strategies:** Background information about the activity.
- **Communicating through Journaling:** To encourage students to communicate mathematically, at least one journal question is included. You can use these questions as part of the assessment process. You can also use traditional assessment, such as tests, quizzes, and the accuracy of work on the student activity sheets.
- **Possible Extension Activities:** Provides suggestions for extension activities to facilitate differentiation of instruction. The entire class can participate in these activities or you can use them with students who might benefit from continued investigations.

- **Activity Answers:** Answers to questions asked of students on the activity sheets

At the ends of some of the chapters there are collections of puzzles. These puzzles review vocabulary and encourage students to use problem-solving strategies. There is also a list of related books and Web sites that you can use to supplement the math activities, supply additional practice for students, or make connections between math and literature.

You can teach the activities in *Career Math* in any order—choose them for the skills and concepts that best meet the scope and sequence of your mathematics program.

Children hear that “math is everywhere,” and *Career Math* can be used to show them that this is true—math is, in fact, everywhere!

Math and Meteorology

A meteorologist is a scientist who uses scientific principles to explain, understand, observe, and forecast the Earth's atmospheric phenomena and weather. While we're used to seeing meteorologists on TV forecasting and predicting the weather, not all meteorologists specialize in this field. Some meteorologists specialize in air pollution, changes in the global climate, and/or numerical analysis and forecasting.

The mathematics of meteorology is varied and sometimes quite complicated. Meteorologists collect data and use this data to make weather predictions; apply formulas to calculate heat indexes, dew point, and wind chill factors; and record weather phenomena, including record temperatures, rainfalls, and so on.

The mathematics of meteorology is algebra, data collection, organization and analysis, graphing, computation and percentages, and a great deal of problem solving.



Keeping Track of Highs and Lows

Math Skills

- Collecting data
- Assigning units to graph coordinates
- Graphing

Materials Needed

- Weather reports for a ten-day period
- Colored pencils
- “Data Collection Sheet” (p. 5) for each student
- “Data Graphing Sheet” (p. 6) for each student

Background Information and Suggested Teaching Strategies

This lesson takes place over a ten-day period of time, but students can enter their data on the data table and on the graph daily. Because some students have difficulty with assignments that span an extended period of time, daily recordings narrow the duration of the activity.

On the line graph, a different-colored pencil should be used to record the high and low temperature for each day. Students can connect the coordinates because the temperature fluctuates between highs and lows. Students will also design a bar graph to compare the highs and lows.

You can ask students to analyze the graphs using the following types of questions:

1. Was the difference between the high and low temperature consistent?
2. What was the average difference between the high and low temperatures during this ten-day period?
3. Do you think the data we obtained now would be the same at other times of the year (at different seasons)?
4. Did all of the highs occur during the same time of day? Did all of the lows appear during the same time of day? Why do you think this occurred?

Communicating through Journaling

You designed two different graphs to represent the data you collected. Which graph do you think better pictured the data? Explain your answer.

Possible Extension Ideas

Students can enter the data into a computer spreadsheet and use the computer to design different types of graphs (such as bar graphs). Students can experiment with a variety of different graphs. Ask them which of these graphs are appropriate and which are not.

Name _____ Date _____

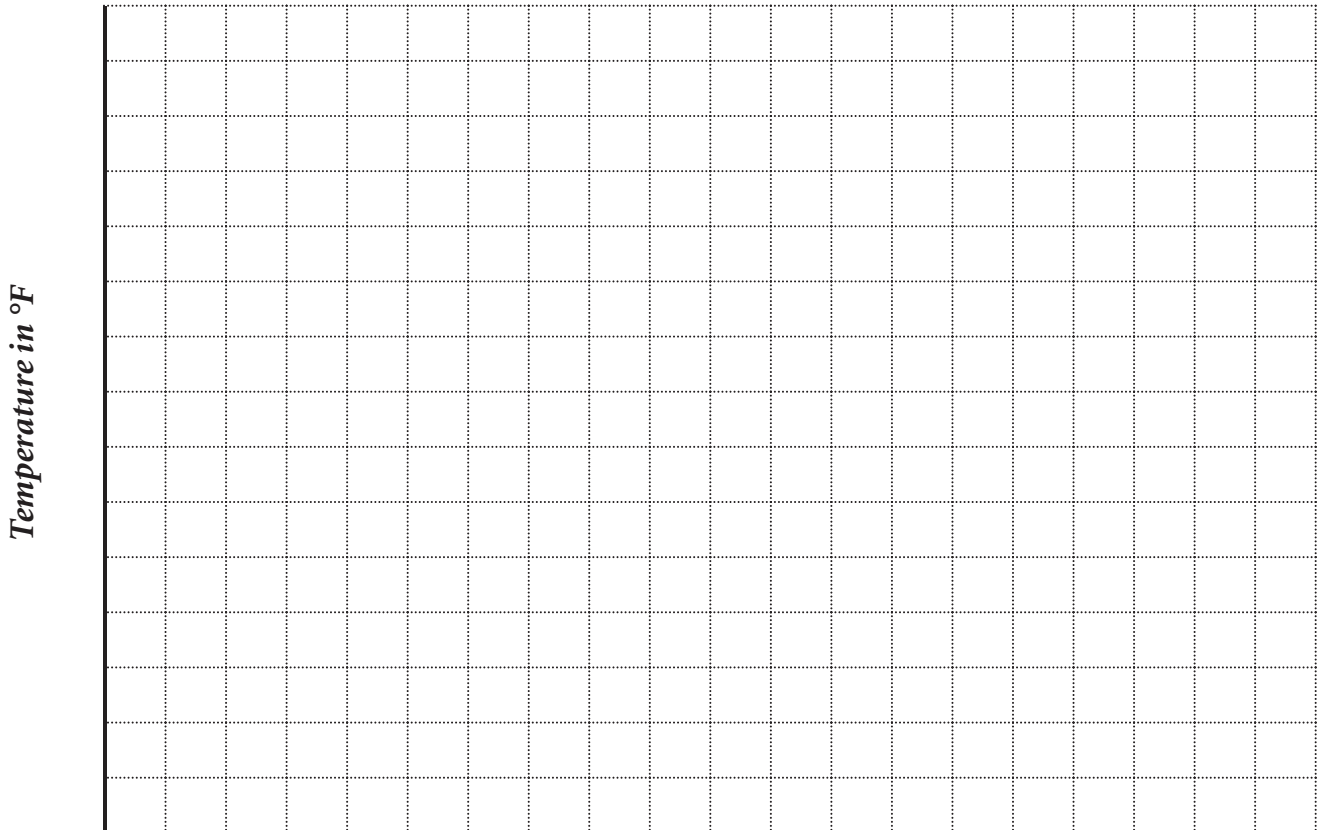
Data Collection Sheet

Directions: Use the table below to record the high and low temperatures for your city for ten days. Then design a line graph to show the range of daily temperatures in your area.



Date																				
Temp																				
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L

Title _____



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