INTRODUCING A NEW MATH SERIES from Robin Ward!

See inside for sample activities for grades 3-5
In a three-volume series by grade level, author Robin Ward provides easy-to-implement, literature-based activities that integrate standards-based content from science, social studies, and the arts with standards-based elementary mathematics content. Beginning with the rationale for and research to support interdisciplinary teaching, each book outlines a wealth of lessons that provide you with detailed instructions for implementing the activities and offers your students the benefits of integrated instruction. Each volume in the series offers literature summaries, NCTM and other national standards, assessment notes, and related websites and books, making it a perfect classroom companion for teaching in any K-8 classroom.

**Literature-Based Activities for Integrating Mathematics with Other Content Areas, Grades K-2**  

**Literature-Based Activities for Integrating Mathematics with Other Content Areas, Grades 3-5**  

**Literature-Based Activities for Integrating Mathematics with Other Content Areas, Grades 6-8**  

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Visit www.allynbaconmerrill.com to learn more!
Thank you for your interest in my newest mathematics series. I realize you have a wide-range of choices when selecting your professional development resources, and I appreciate that you have taken the time to test these sample activities from *Literature-Based Activities for Integrating Mathematics with Other Content Areas*.

Integrating children’s literature into the teaching and learning of mathematics, science, social studies, and the arts is more than just reading a book to students. By exploring picture books and reading works of fiction, nonfiction, and poetry, you help students to engage in worthwhile and stimulating mathematical activities that encourage them to communicate their ideas verbally or through drawing or writing. In short, mathematics can be viewed as “a vehicle for thinking, a medium for creating, and a language for communicating” (Kleiman, 1991, p.48). In addition, using children’s literature requires students to listen and comprehend — two vital skills needed for academic success. Thus, the goal of integrating children’s literature across the content areas is to improve the overall literacy of your students.

I hope that you agree with this philosophy and goal, and find them reflected on the pages you are about to read. Feel free to use these activities any time or any place they fit into your curriculum. I’m sure you’ll love them!

Best wishes.

Robin

Robin A. Ward

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Robin Ward has masterfully taken the guesswork and time out of creating exciting and engaging lessons to teach math across the content areas by integrating children’s literature for the classroom teacher. In her new series, *Literature-Based Activities for Integrating Mathematics with Other Content Areas*, Robin facilitates content integration by presenting easy-to-implement, literature-based activities that integrate standards-based content from science, social studies, and the arts with standards-based math content. Divided into three grade-band volumes, K-2, 3-5, and 6-8, each book provides a wealth of grade-specific, classroom-tested activities that every teacher needs!!
Each chapter opens with a brief overview that pinpoints the connection between mathematics and the specific content area (whether it be science, social studies, or the visual arts).

In addition, a list of concepts and skills featured in the literature-based activities are noted for the teacher.
The chapter matrix found after the overview lists each piece of children’s literature used in that chapter’s integrated activities, and offers teachers other relevant cross-curricular concepts and skills.

### Matrix of Mathematics and Science Activities

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<tr>
<th>BOOK TITLE</th>
<th>MATHEMATICAL CONCEPTS AND SKILLS</th>
<th>SCIENCE CONCEPTS AND SKILLS</th>
<th>SOCIAL STUDIES CONCEPTS AND SKILLS</th>
<th>VISUAL ARTS CONCEPTS AND SKILLS</th>
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<td>“Zebra Question” (a poem in <em>A Light in the Attic</em>); <em>My Light</em></td>
<td>number line, positive and negative numbers, integers, addition of positive and negative numbers</td>
<td>electricity, light, positive and negative charges</td>
<td>alternate sources of power, exploration of a biographical piece</td>
<td>artists’ renditions of light and electricity, positive and negative images</td>
</tr>
<tr>
<td>“The Planet of Mars” (a poem in <em>Where the Sidewalk Ends</em>); <em>The Planets in Our Solar System</em></td>
<td>fractions, decimals, measurement, ratio, size and scale, estimation</td>
<td>relative size of the planets, planets in the solar system</td>
<td>exploration of a biographical piece</td>
<td>artists’ renditions of the night sky, space, or solar system</td>
</tr>
<tr>
<td>Wild Fibonacci: <em>Nature’s Secret Code Revealed</em></td>
<td>patterns, pattern recognition, prediction</td>
<td>characteristics of organisms, scientific inquiry</td>
<td>exploration of a biographical piece, patterns in population growth</td>
<td>golden mean in architecture, artists who have used the golden mean</td>
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<tr>
<td>“Strange Wind” (a poem in <em>A Light in the Attic</em>); <em>Let’s Fly a Kite</em></td>
<td>line symmetry attributes of quadrilaterals (kites)</td>
<td>wind, aerodynamics of flight</td>
<td>cultural history of kites, exploration of a biographical piece, fallout and implications of historic hurricanes and tornadoes</td>
<td>artists’ renditions of windy scenes</td>
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<tr>
<td>“Me and My Giant” (a poem in <em>Where the Sidewalk Ends</em>); <em>Beanstalk: The Measure of a Giant</em></td>
<td>measurement, ratio, proportional reasoning, data collection and interpretation, line graphs, estimation</td>
<td>life cycles of organisms, scientific inquiry</td>
<td>mapping of grasslands, jungles, rain forests; exploration of a biographical piece on Johnny Appleseed</td>
<td>van Gogh’s renditions of trees</td>
</tr>
<tr>
<td>If You Hopped Like a Frog</td>
<td>measurement, size and scale, ratio, proportional reasoning, estimation</td>
<td>characteristics of organisms</td>
<td>expanding populations’ and industry’s impact on animal habitats; interplay between geography, climate, and habitat</td>
<td>collage of animals</td>
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Students explore characteristics of static electricity, a real-life example of

electricity. Students share their predictions and observations. Begin a discussion about negative numbers by challenging students to think of real-life examples of negative numbers (e.g., below-zero temperatures, being in debt, below sea level, negative charges, below par in golf, etc.). Did students correctly compute problems involving positive and negative numbers?

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In addition, more than 100 citations of instructional resources to support the teacher are included.
The Appendix of each book features several assessment tools and rubrics to aid in evaluating student performance, skills, and abilities.

Observation Log

Name: __________________________________________________________
Activity: _________________________________________________________
Date: ____________________________________________________________

<table>
<thead>
<tr>
<th>Objectives or Goals</th>
<th>Observed Behavior</th>
<th>Comments</th>
</tr>
</thead>
</table>

Inventory of Student’s Mathematical Disposition

Name: _______________________________________________________________

<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confident in using mathematics</td>
<td></td>
</tr>
<tr>
<td>Flexible in doing mathematics</td>
<td></td>
</tr>
<tr>
<td>Perseveres at mathematical tasks</td>
<td></td>
</tr>
<tr>
<td>Shows curiosity in doing mathematics</td>
<td></td>
</tr>
<tr>
<td>Reflects on own thinking</td>
<td></td>
</tr>
<tr>
<td>Values applications of mathematics</td>
<td></td>
</tr>
<tr>
<td>Appreciates role of mathematics</td>
<td></td>
</tr>
</tbody>
</table>

(Derived from Stenmark, 1991, p. 34)

Group Assessment

Group members: ________________________________________________
Activity title: ________________________________________________

<table>
<thead>
<tr>
<th>Did your group...</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talk about the Task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finish the Task</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

What went well? ________________________________________________
_________________________________________________________________
_________________________________________________________________

What would you do differently? ________________________________
_________________________________________________________________
_________________________________________________________________

(Derived from Stenmark, 1991, p. 34)

Sample Writing Prompts

- In your own words, explain the meaning of . . .
- The most important thing I learned in math class today (or this week) is . . .
- The most important thing to understand about polygons is . . .
  (Note: change polygons to the concept explored)
- I discovered that . . .
- Explain your reasoning about . . .
- I know my solution is correct because . . .
- I feel confident about my solution because . . .
- I am still uncertain about . . .
- Describe any instances during which you became stuck and how you became “unstuck” while solving the problem.
- Describe a real-world experience/connection to the mathematical concept you learned about today.
- Write a letter to a classmate who did not attend class today so that he or she will understand what you learned about.
- Draw a picture or diagram showing how the concepts you learned about today are connected.

(Derived from Stenmark, 1991, p. 34)
Helpful Hints

• Read through the entire activity before class to assess whether you need to modify any steps for any reason or substitute materials.

• Capitalize on those teaching moments. Remember to use your judgement and pedagogical ingenuity to take tangents in the activities as deemed appropriate.

• Read each piece of literature in its entirety, then move onto implementing the activity with students. You’ll be familiar with the story and have questions ready to ask the students during the activity. Everyone will want to participate. Take the time to stop and allow students to ask questions about the literature.

• Keep each piece of children’s literature that you use in your classroom. You never know when students will want to view it again.

• Have fun!
Activities Featuring Measurement

by Robert E. Wells
Whitman, ISBN #0807579408

Alice Yazzie’s Year (2003)
by Ramona Maher
Tricycle Press, ISBN #1582460809

Overview of Books: Alice Yazzie’s Year details the eleventh year of a young Navajo girl’s life, month by month, through poetic verse and richly southwestern illustrations. Then, in How Do You Know What Time It Is?, explore a concise history of time, clocks, and calendars and learn how time was measured and recorded by early civilizations, when clocks were first invented, and how time is measured in present day.

Mathematical Concepts and Skills: measurement of time, estimation, prediction

Social Studies Concepts and Skills: comparing and contrasting different stories or accounts about events, Navajo people and culture

Overview of Activities: Students gain practice with predicting and estimating how many times they can complete a task in the span of one minute. Students then learn about the various ways to measure time, both past and present. Students explore facts about and report on the Navajo people and culture.

National Mathematics Standards (2000): Students in grades 3 through 5 should “select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles.” Students should “understand that measurements are approximations and understand how differences in units affect precision” (Measurement Standard) (p. 400).
National Social Studies Standards (1994):

Social studies programs for early grades should include experiences that provide for the study of culture and cultural diversity, so that the learner can “describe ways in which language, stories, folktales, music, and artistic creations serve as expressions of culture and influence behavior of people living in a particular culture” (p. 49). Social studies programs for early grades should also include experiences that provide for the study of the ways human beings view themselves in and over time, so that the learner can “demonstrate an understanding that different people may describe the same event or situation in diverse ways,” “read and construct simple timelines,” and “compare and contrast different stories or accounts about past events, people, places, or situations” (p. 51).

Materials:

- stopwatches (or watches with a second hand), Internet (or other resources)

Description of Activities:

1. Challenge students to predict the length of one minute. Students close their eyes so they cannot see a clock or watch and are not swayed by their classmates’ responses. Announce “Start!” Students raise their hand when they think one minute has elapsed. How accurate were their predictions of the length of one minute?

2. Students work in pairs and record how many times they estimate they can write their name, tie their shoe, and count to 99 by nines in one minute. Both students time each other and record their data. How accurate were their predictions?

3. Besides using a stopwatch, challenge students to list in their journals other ways people can keep track of time (observing the moon phases, observing the movement of stars, sundials, hourglass, pendulum clock, atomic clock, calendars, etc.). Read How Do You Know What Time It Is? and allow students to learn a brief history of how people from centuries ago kept track of the passage of time.

4. Students now focus on the passage of time in terms of calendar months, while exploring facts about the Navajo people. Record on the board the English and corresponding Navajo name for each of the months (as done in Alice Yazzie’s Year). Assist students in pronouncing the Navajo months’ names.
5. Begin a discussion by asking students what they know about the Navajo Nation, which currently is the largest tribe in North America (e.g., Where is the Navajo Nation located? What is another name for the Navajo? Who is the current (or past) leader of the Navajo Nation?, etc.). Refer to the Navajo Nation websites listed below for information about the Navajo Nation regarding its history, government, economy, geography, culture, etc. Also, reference the closing pages of Alice Yazzie’s Year for facts about the Navajo people.

6. Read all or select passages from Alice Yazzie’s Year. Perhaps select the current month, or fall months, for example. Share with students the corresponding illustration for each month, allowing them to visually experience the southwestern influence evident in the illustrations.

7. After reading specific passages detailing various months in Alice’s life, students write a short verse or paragraph describing what might occur in their lives during the same months. Students share their creative writing samples with the class and make comparisons between their lives and that of Alice. How is life on a Navajo reservation different from students’ life? The same?

8. Students work in small groups and research an aspect of the Navajo Nation, such as its history, government and leadership, economy, music, art, folktales and legends, etc. Students locate at least five facts about their topic. Students create a PowerPoint presentation or develop large posters or a collage, in the spirit of southwestern colors and style, and share their findings with the class.

**Assessment:**
- Did students make reasonable estimations for what can be done in the span of one minute?
- Did students compose a short verse or paragraph detailing occurrences in their lives?
- Did students participate in discussions about the similarities and differences between their lives and that of Alice’s?
- Did students gather at least five pertinent pieces of information about their topic and articulately present their topic to the class?

**Activity Extensions:**
- Students work in small pairs and are assigned a means of measuring time (e.g., shadow stick, water clocks, sundial, hourglass, pendulum clock, watch, atomic clock, quartz crystals, calendars, etc.). Students research their topic and present their findings to the class (including the inventors of the device, how the device works, etc.).
• Research various types of calendars (Gregorian, Julian, Solar, Chinese, Hebrew, etc.).

• Research the Y2K problem that faced the world’s computers in the late 1990s.

• Bring a world map to class. Point out the various time zones and demonstrate how to read time as you cross time zones.

• Read The Navajo Year, Walk through Many Seasons (Flood, 2006) and learn about the events, sights, and sounds that occur throughout the year on the Navajo Reservation.

• Read How the Stars Fell into the Sky (Oughton, 1992), a Navajo tale explaining why the night sky appears as it does.

• Report on current events in the Navajo Nation by selecting and reading a headline from the Navajo Nation newspaper, Navajo Times.

• Research and present facts about other Native American tribes.

Cross-Curricular Connections: Visual Arts

• Students create a southwestern illustration to accompany their creative writing samples.

• Explore the work of Navajo artists using the Navajo Artists websites listed below.

• Explore the artwork and crafts of Native Americans such as kachina dolls, turquoise jewelry, pottery, quilts, etc.

• Explore the geometry in Navajo and Native American quilts.

• Explore the “melting clocks” appearing in many of Salvador Dali’s works.

Science

• Read Arctic Lights, Arctic Nights (Miller, 2003) and enjoy a month-by-month description of Fairbanks, Alaska, which experiences some of the world’s most extreme temperatures and light variations.

• Make a sundial or place a sundial (or shadow stick) outside. Teach students how to read time using a sundial. Over the course of a few hours, allow students to make readings using the sundial to test its accuracy.

• Explore how early civilizations observed moon phases to keep track of time.
Related Children's Literature


Related Instructional Resources


Related Websites

Calendar Facts
http://webexhibits.org/calendars/timeline.html

Franklin Institute—TimeKeepers
http://sln.fi.edu/time/keepers/index.html

History of Time and Clocks
http://home.rochester.rr.com/kjmpage/clocktimeline.html
http://inventors.about.com/od/cstartinventions/a/clock.htm
http://www.which-clocks.com/history.html

NASA Kids—Sundials
http://kids.msfc.nasa.gov/earth/sundials/sundials.asp

Native American Tribes
http://www.nativeculturelinks.com/indians.html
http://www.nativeamericainc.com/

Navajo Artists
http://www.nativeartistsunited.org/artists.html

Navajo Nation
http://www.navajo.org/
http://www.lapahie.com/Navajo_Map_Lg.cfm

Navajo Times Newspaper
http://www.navajotimes.com/

Salvador Dali
http://www.salvadordalimuseum.org/home.html
http://www.artcyclopedia.com/artists/dali_salvador.html

Stopwatch
http://www.shodor.org/interactivate/activities/stopwatch/

Tell Time Anywhere in the World

Tell Time with Your Feet
http://www.math.csusb.edu/faculty/susan/timefeet.html

Virtual Manipulatives Library—Analog and Digital Clocks
http://nlvm.usu.edu/en/nav/frames_asid_316_g_2_t_4.html

Virtual Manipulatives Library—What Time Will It Be?
http://nlvm.usu.edu/en/nav/frames_asid_318_g_2_t_4.html
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Refreshingly unlike other books and resources! I was pleasantly surprised that [these books are] full of content and ideas that are easily implemented. Teachers need more books like this!

— Amanda Guinn,
Kindergarten Teacher,
Monroe County Community Schools,
Bloomington, IL

With all of the demands in our schedules these days, teachers need to be better at incorporating content within literacy [instruction]...these book do a great job of this.

— Tammy Brown,
Early Education Staff Developer,
Denver Public Schools

The math-visual arts connections are exciting! As I was reading [Robin’s] suggestions for activities, I wanted to collect a group of eight- to ten-year-old students and begin working and learning with them. [She has] incorporated excitement for students who need to have concrete examples of math as well as attracting kinesthetic learners through hands-on activities. Well done!

— Kris O’Clair,
Math and Science Intervention Coordinator,
Denver Public Schools

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