

It's About Time...Average Time!

Objectives

- Students measure elapsed time to answer questions about average time needed to complete tasks.
- Students collect, organize, analyze, and display relevant time research data.
- Students in grades K-2 sketch pictures of daily tasks and record the time each task takes.
- Students in grades 3-6 draw in sketchbooks and record the amount of elapsed time they draw each day.
- Students design color-coded bar graphs to show the results of their research and analyze their findings.

Multiple Intelligences

- Bodily-kinesthetic
- Interpersonal
- Logical-mathematical
- Naturalist

What Does It Mean?

- Mean:** a mathematical average
- Median:** the middle point in a series of values
- Mode:** the value that occurs the greatest number of times in a given series

National Standards

Visual Arts Standard #3

Chooses and evaluates a range of subject matter, symbols, and ideas

Mathematics Standards

Data Analysis and Probability

Formulate questions that can be answered with data and collect, organize, and display relevant data to answer them

Measurement

Understand measurable attributes of objects and the units, systems, and processes of measurement

Background Information

Some art takes very little time to create and other art takes hours, weeks, and sometimes years. Graffiti typically takes little time and little skill to generate and many believe it creates a visual blight within cities. Some communities in the United States have found solutions that contribute visual improvements and demonstrate that artwork, even graffiti, can take time. One example of this is The Philadelphia Mural Arts Program (MAP). This public art program works in partnership with community residents, grassroots organizations, government agencies, educational institutions, corporations, and philanthropic groups to design and create murals of enduring value while actively engaging youth in the process. Those who participate in these efforts come to a clearer understanding of just how much time it takes to create art while working as a team.

Resources

All I See by Cynthia Rylant and Peter Catalanotto
A young boy's friendship with a painter inspires the way he sees the world around him. For all ages.

Counting on Frank by Rod Clement
With the help of his dog, Frank, the narrator collects math-themed facts. Appealingly illustrated, for all ages.

Vocabulary List

Use this list to explore new vocabulary, create idea webs, or brainstorm related subjects.

- Art terms

Composition	Mural
Fine art	Sketch
Graffiti	Sketchbook
Mixed media	Visual effects
Multi media	
- Calculating

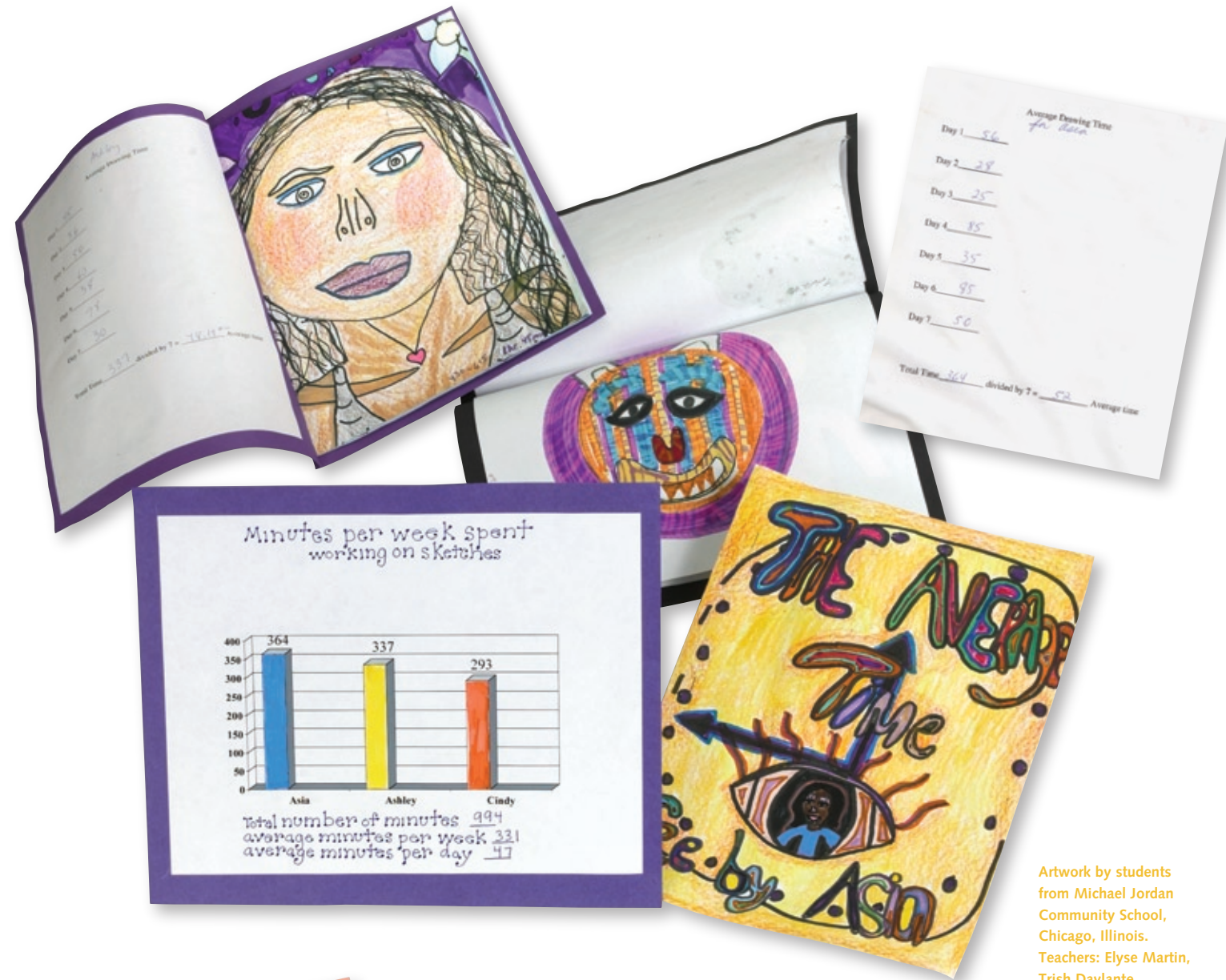
Approximate	Median
Average	Mode
Estimate	Rounding
Mean	Total
- Graphing

Bar graph	Statistic
Data	Table
Pictograph	
- Telling time

Century	Duration
Day	Elapsed time
Decade	Half hour
	Hour
	Half past
	Minute
	O'clock
	Second
	Year



Artwork by students from St. Theresa School, Hellertown, Pennsylvania.




Artwork by students from Michael Jordan Community School, Chicago, Illinois. Teachers: Elyse Martin, Trish Davlante



Artwork by students from St. Theresa School, Hellertown, Pennsylvania.



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	K-2	3-4	5-6
Suggested Preparation and Discussion	<p>Assemble a sample sketchbook. Display two clocks with movable hour and minute hands, and sample sketchbook.</p> <p>Show the clocks. Discuss how time is measured. How long is a second, minute, half hour, hour? Ask children to name activities that take different amounts of time to do, such as brushing teeth or traveling to school. Use clocks to show start and finish times for several typical activities.</p> <p>Ask students how long they think it will take them to carefully create similar sketchbooks (this is not a race). Record estimates. Set a clock at the start time. Create sketchbooks: Demonstrate how to sandwich seven sheets of copy paper inside folded drawing paper. Staple along spine. Set a second clock to show the finish time. Together calculate how long it took. Compare actual time to estimates.</p>	<p>Discuss the subject of graffiti. Have students share where they have seen graffiti. How long does it take to create graffiti? Explain that fine artists take time and practice drawing in sketchbooks to prepare for creating larger works such as mural paintings. Share examples of large outdoor murals such as those created by the Philadelphia Mural Arts Program.</p> <p>With students, create sketchbooks. Sandwich seven sheets of white paper inside folded drawing paper. Staple along spine.</p> <p>Ask students how long they think it will take them to create seven detailed drawings of the things they see around them (there is no rush)? What do they think will be the average time per drawing? Ask each student to record this estimate on the back cover of his/her sketchbook.</p> <p>Explain how to calculate an average. Tell students that, although each sketch will take a different amount of time, after they are finished they will be able to calculate the average time per sketch. Show how to calculate an average by asking how many days last week each student brought lunch or did some other similar, variable task. Tally the results; divide the total by the number of students in the class.</p> <p>Create a bar graph poster to illustrate how students will chart their drawing times.</p>	
Crayola® Supplies	<ul style="list-style-type: none"> • Colored Pencils • Crayons • Markers 		
Other Materials	<ul style="list-style-type: none"> • Calculators • Clock(s) • Copy paper • Staplers and staples • Stopwatch(es) (optional) • White drawing paper (12- x 18-inch) 		
Process: Session 1 20-30 min.	<p>Design cover</p> <ol style="list-style-type: none"> 1. Children write the word "TIME" on the covers of their sketchbooks. Decorate the covers with shapes and patterns around the letters. 2. Explain that each day students will complete a different task at home or school. Children draw a picture of each task in their sketchbooks and write how many minutes each task took. 	<p>Design cover</p> <ol style="list-style-type: none"> 1. Students draw decorative letters to create titles for their sketchbooks. Add interest by including increasingly more elaborate shapes, colors, and patterns. 2. Explain to students that they will create detailed drawings of objects they see. They are to record the time in minutes that it takes to do each daily drawing in small data blocks in one corner of each of seven pages: "START," "FINISH," and "ELAPSED TIME." Students calculate elapsed time daily or at the end of their research. 	
Process: Sessions 2 20-30 min.	<p>Collect data over 7 days</p> <ol style="list-style-type: none"> 3. Each day children measure how long it takes to do activities such as watch ice cream melt, walk around the entire school together, or draw a detailed self-portrait. They record an estimate before actually timing each task. Evaluate estimates. 	<p>Collect data over 7 days</p> <ol style="list-style-type: none"> 3. Review the assignment each day. Students share their sketches with classmates. Talk about how long it took to create each one. 	 <p>Czech Clock Photo by R. De Long</p>

	K-2	3-4	5-6
Process: Session 3 20-30 min.	<p>Sort and analyze data</p> <ol style="list-style-type: none"> 4. Students review their sketchbooks to find the tasks that took the most and least time. List all the tasks in order according to times. 5. Share sketchbook drawings and compare elapsed times for various students doing similar tasks. 6. Show students how to create bar graphs using their data. Encourage them to use a different color for each activity. 	<p>Sort, evaluate, and display data</p> <ol style="list-style-type: none"> 4. Students calculate the total time it took for each of them to create all seven drawings. 5. Students divide the sum by seven to find the average (arithmetic mean) time that drawings were made for one week. 6. Share drawings and findings. Compare and graph data, individually and as a class. Analyze findings. 7. Advanced students perform more sophisticated calculations with the data, such as comparing the range of time differences or calculating the percentage of total time each drawing took. Use class time data to calculate mean, median, and mode. 8. Challenge students to turn time calculated in minutes into fractional and decimal expressions of parts of an hour. Then calculate averages using these figures. 	
Assessment	<ul style="list-style-type: none"> • Review student sketchbooks to check for accurate recording of tasks and time measurements. 	<ul style="list-style-type: none"> • Students work in pairs to check each other's calculations with a calculator. • Compare and discuss bar graphs. 	
Extensions	<p>Create a time survey with children to find out how families enjoy time together and how much time they spend doing their favorite activities. Have children generate survey questions and record data at home. Create dioramas showing how each family spends time together. See Family Food Favorites on Crayola.com for creative inspiration.</p> <p>Younger children and those who need more practice make paper plate clocks that have moveable hands attached with brass paper fasteners. Children use them to solve relevant time story problems.</p>	<p>Investigate how things change over hours, days, and months. Document changes with drawings and mathematical data in layered tab books. See the How Time Flies Lesson Plan on Crayola.com for directions.</p> <p>Hold elapsed time showdowns! Students create clocks with moveable hands. One partner's clock is labeled "start time;" the other is "end time." Each clock can indicate a.m. or p.m. Partners stand back-to-back and record times on their clocks. Call out "showdown." Students turn to their partners and calculate the elapsed time between the clocks.</p>	<p>Students with strong mathematical backgrounds define and explain the terms <i>median</i> and <i>mode</i> to the class. Work together in small groups to have students determine the median and mode for the data collected on the sketchbook project. Discuss results.</p> <p>Challenge small groups of students to create elapsed-time game shows. Students identify problems related to calculating time, elapsed time, and average time as brainteasers for contestants. Hold a game show day.</p>
	<p>Children make a chart of their daily activities. Set the hands on a paper clock to indicate when they do these activities (wake up, go to school, eat lunch). Children draw pictures to illustrate the different activities.</p>		<p>Hold an obstacle course rally, much like a car rally. Students time each other in a series of challenges that they invent. Record individual data for each event. Total times to determine elapsed times for each student. Use data to calculate averages, means, modes, and medians for each event and the entire rally.</p>



Swiss Clock
Photo by R. De Long