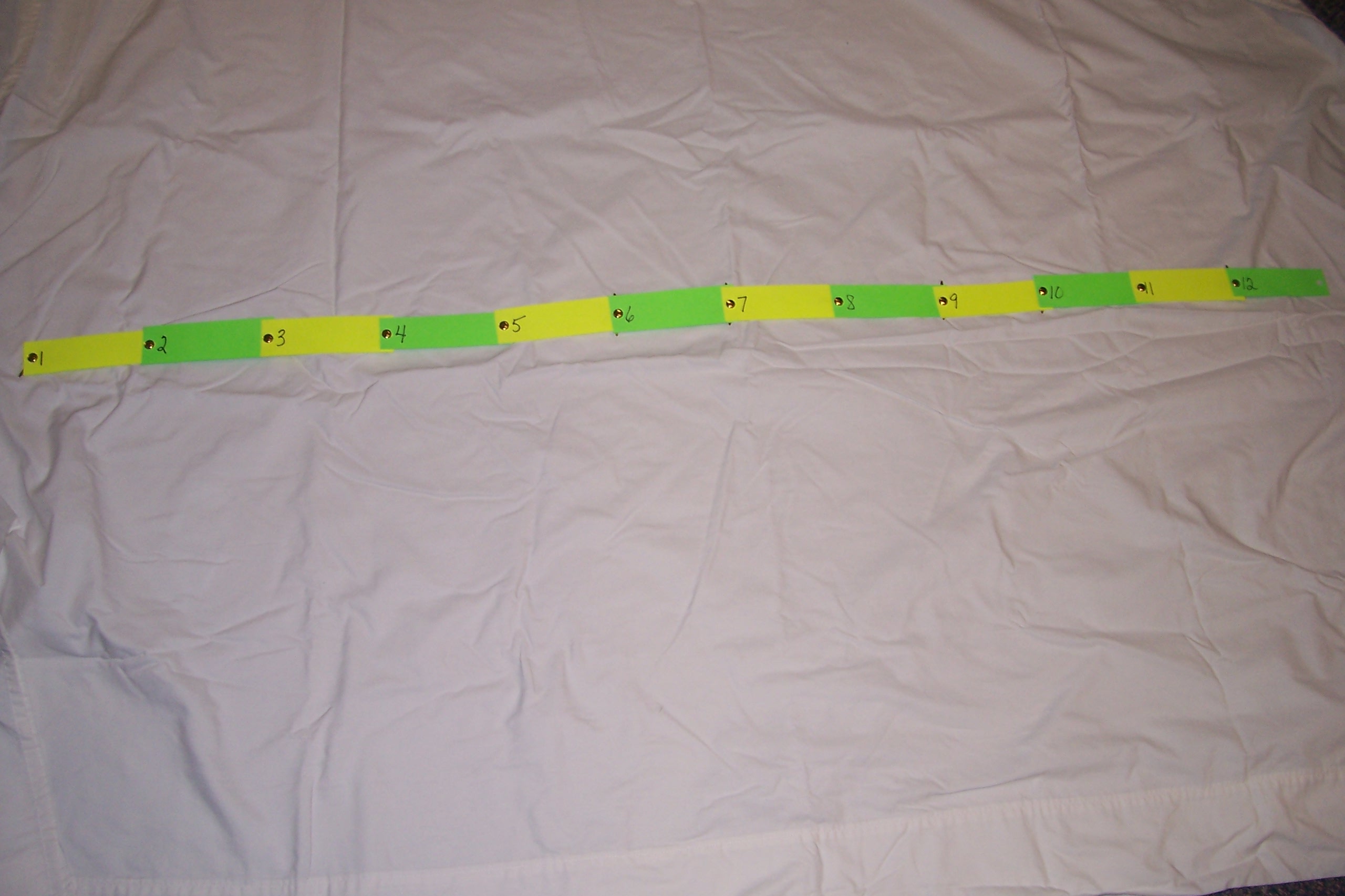
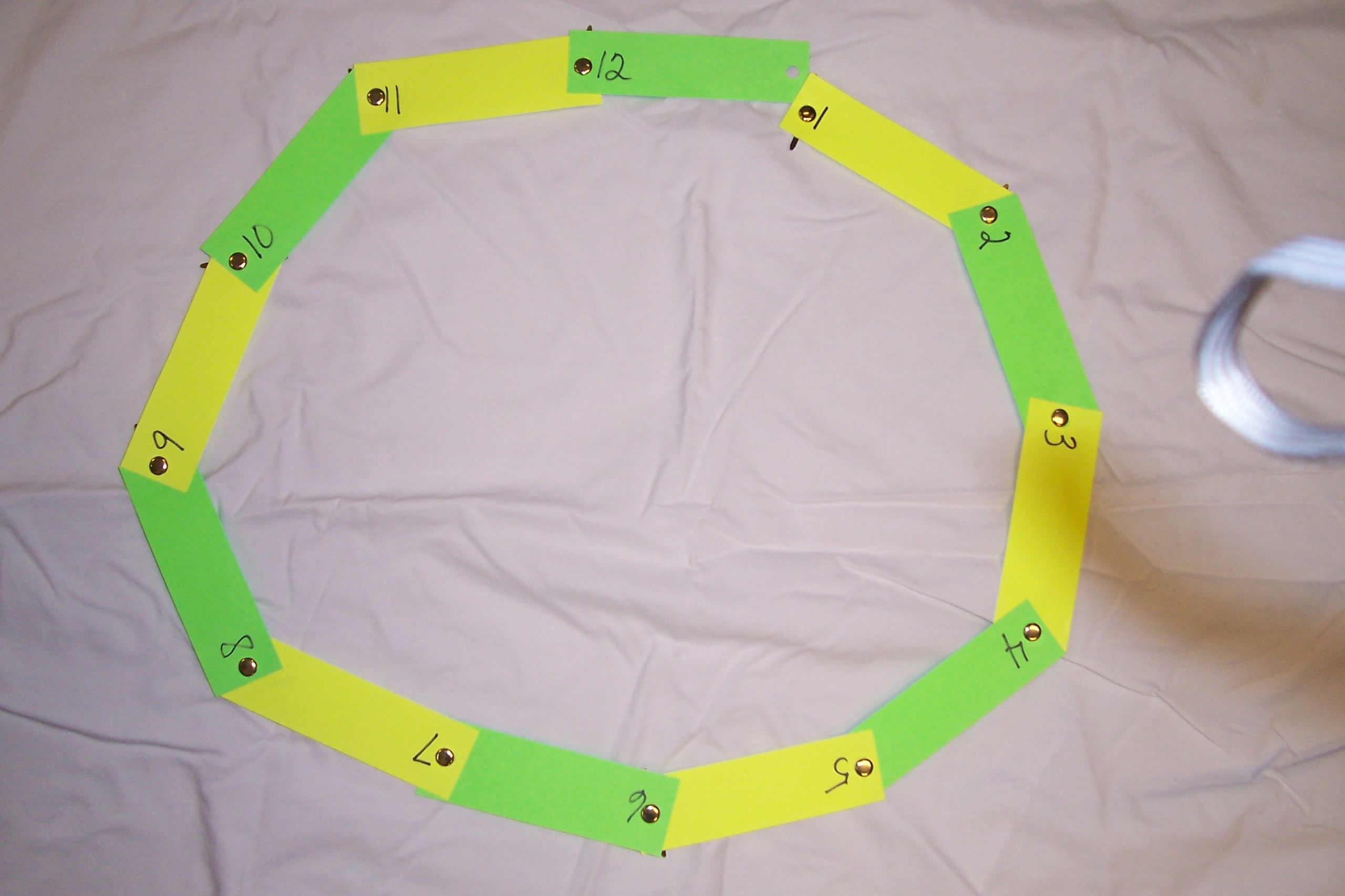
**Overview:** *The overview statement is intended to provide a summary of major themes in this unit.*

In this unit, students are introduced to the clock and telling time in intervals of hours and half-hours, using both the analog and digital clocks. Students will learn that there are 24 hours in a day and that the clock displays up to twelve hours at a time. Students will be able to identify the hour hand and the minute hand on the analog clock. They will also be able to match time displayed on the analog clock with the same time displayed on a digital clock.

**Teacher Notes:** *The information in this component provides additional insights which will help the educator in the planning process for the unit.*

* When implementing this unit, be sure to incorporate the Enduring Understandings and Essential Questions as the foundation for your instruction, as appropriate.
* Students should engage in well-chosen, purposeful, problem-based tasks. A good mathematics problem can be defined as any task or activity for which the students have no prescribed or memorized rules or methods, nor is there a perception by students that there is a specific correct solution method (Hiebert et al., 1997). A good mathematics problem will have multiple entry points and require students to make sense of the mathematics. It should also foster the development of efficient computations strategies as well as require justifications or explanations for answers and methods.
* It is introduce the clock using a one-to-twelve number line made of cards connected by brads. After exploring the number line itself, the student can curve it around so that the ‘12’ card attaches to the ‘1’ card at the top of the circle to form a clock face.



* It is also helpful to have a large clock made of number cards on the floor so students can ‘step’ their way around the clock when counting by hours.
* Students need to understand that time has measurable attributes similar to that used when measuring length. In time, the attributes used are seconds, minutes, and hours, although only half-hours (30 minutes) and hours are addressed in Grade 1. The student needs to make sense of the attributes in order to accurately use them. Unlike length, time cannot be seen and can be difficult for students to comprehend.
* Students need to make comparisons based on the attribute, use models of measuring units, and then use measuring instruments themselves.
* Estimation involving standard units helps develop a familiarity with the units involved.
* In first grade students tell and write time in-hours and half hours using analog and digital clocks. In second grade the expectation is that students will tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
* Introducing the term ‘half past’ may be confusing for students since the coin ‘half dollar’ represents 50 cents. Therefore, it requires careful and clear explanation to students. It is important to show that the clock can be divided into two equal 30-minute sections, or halves just as a dollar equals two half dollars. It vital to help students see that half past’ is the same as ‘30 minutes after’’.
* In addition to reading time to nearest 30 minutes, students need to understand how many minutes are in an hour.
* Students need to develop an understanding of the function of the hour and minute hands on an analog clock. They should also understand that the duration of time is directly related to the numbers and hands on a clock.
* Time-related vocabulary such as: season, century, past, present, future, second, minute, hour, day, week, month, year, half past, evening, morning, etc. can be an obstacle for young children when learning about time.
* On an analog clock, the minute hand indicates the number of minutes before or after an hour; the hour hand indicates broad, approximate times to the nearest hour.
* On an analog clock, when we look at the minute hand, the focus is on the distance that is has gone around the clock or the distance yet to go for the hand to get back to the top. When we look at the hour hand, we focus on where it is pointing.
* An analog clock is like a number line because, until the next hour is reached, the minutes up to that point refer to the previous hour.

**Enduring Understandings:** *Enduring understandings**go beyond discrete facts or skills. They focus on larger concepts, principles, or processes. They are transferable and apply to new situations within or beyond the subject.*

* Time has distinct attributes that can be measured.
* Standard units of measure enable people to interpret results or data.
* All measurements have some degree of uncertainty.
* The choice of measurement tools depends on the measurable attribute and the degree of precision desired.
* Being able to tell time is a critical life skill.
* Time can be measured and have value.
* Time is often an integral part of our daily lives.

**Essential Questions:** *A question is essential when it stimulates multi-layered inquiry, provokes deep thought and lively discussion, requires students to consider alternatives and justify their reasoning, encourages re-thinking of big ideas, makes meaningful connections with prior learning, and provides students with opportunities to apply problem-solving skills to authentic situations.*

* What types of problems are solved with measurement?
* What are tools of measurement for time and how are they used?
* What is the purpose of standard units of measurement?
* How do units within a system relate to each other?
* When is an estimate more appropriate than an actual measurement?
* What strategies help estimate measurements?
* Why is it important to tell time?
* What is measured when we are telling time?
* What is the difference between length of time and time of day?
* How do I determine the duration of time intervals in hours and minutes?
* How do I make an estimate for a length of time for a determined event and know if the estimate is reasonable?
* How do I determine how much time has passed between events?

**Content Emphasis by Cluster in Grade 1:** *According to the Partnership for the Assessment of Readiness for College and Careers (PARCC), some clusters require greater emphasis than others. The table below shows PARCC’s relative emphasis for each cluster. Prioritization does not imply neglect or exclusion of material. Clear priorities are intended to ensure that the relative importance of content is properly attended to. Note that the prioritization is in terms of cluster headings.*

**Key:**

* ***Major Clusters***
* ***Supporting Clusters***
* ***Additional Clusters***

Operations and Algebraic Thinking

* Represent and solve problems involving addition and subtraction.
* Understand and apply properties of operations and the relationship between addition and subtraction.
* Add and subtract within 20.
* Work with addition and subtraction equations.

Number and Operations in Base Ten

* Extend the counting sequence.
* Understand place value.
* Use place value understanding and properties of operations to add and subtract.

Measurement and Data

* Measure lengths indirectly and by iterating length units.
* ***Tell time and write time***
* Represent and interpret data.

Geometry

* Reason with shapes and their attributes.

**Focus Standards:** *(Listed as Examples of Opportunities for In-Depth Focus in the PARCC Content Framework documents for Grades 3-8)*

*According to the Partnership for the Assessment of Readiness for College and Careers (PARCC), this component highlights some individual standards that play an important role in the content of this unit. Educators from the State of Maryland have identified the following Standards as Focus Standards. Should PARCC release this information for Prekindergarten through Grade 2, this section would be updated to align with their list. Educators may choose to give the indicated mathematics an especially in-depth treatment, as measured for example by the number of days; the quality of classroom activities for exploration and reasoning, the amount of student practice, and the rigor of expectations for depth of understanding or mastery of skills.*

* **1.MD.A.2** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size units that span it with no gaps or overlaps. *Limit to context where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*
* **1.MD.B.3** Tell and write time in hours and half-hours using analog and digital clocks.

**Possible Student Outcomes:** *The following list provides outcomes that describe the knowledge and skills that students should understand and be able to do when the unit is completed. The outcomes are often components of more broadly-worded standards and sometimes address knowledge and skills necessarily related to the standards. The lists of outcomes are not exhaustive, and the outcomes should not supplant the standards themselves. Rather, they are designed to help teachers delve deeply into the standards and augment as necessary, providing added focus and clarity for lesson planning purposes. This list is not intended to imply any particular scope or sequence.*

The student will:

* Actively use concrete and/or virtual manipulatives, such as analog and digital clocks, interactive white board, etc. to represent time and solve problems.
* Count time in hour and half-hour units.
* Record or identify time in written form to match that shown on an analog or digital clock.
* Determine elapsed time for given events.

**Progressions for Common Core State Standards in Mathematics:** *For an in-depth discussion of the overarching, “big picture” perspective on student learning of content related to this unit, see:*

*Time is not addressed in any of the Progressions for the Common Core State Standards.*

**Vertical Alignment:** *Vertical curriculum alignment provides two pieces of information: (1) a description of prior learning that should support the learning of the concepts in this unit, and (2) a description of how the concepts studied in this unit will support the learning of additional mathematics.*

* **Key Advances from Previous Grades:**
* In Kindergarten, students work to develop reliable counting skills that are applied when working with time.
* In Kindergarten, students describe and compare measureable attributes of objects.
* **Additional Mathematics:**
  + In grade 2, students tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
  + In grade 3, students tell and write time to the nearest minute and measure time intervals in minutes. They also solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
  + In grade 4, students use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals.
  + In grade 5, students convert units within a given measurement system.

**Possible Organization of Unit Standards:** *This table identifies additional grade-level standards within a given cluster that support the over-arching unit standards from within the same cluster. The table also provides instructional connections to grade-level standards from outside the cluster.*

|  |  |  |
| --- | --- | --- |
| **Over-Arching**  **Standards** | **Supporting Standards**  **within the Cluster** | **Instructional Connections outside the Cluster** |
| **1.MD.B.3** Tell and write time in hours and half-hours using analog and digital clocks. |  | * **1.MD.A.2** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size units that span it with no gaps or overlaps. *Limit to context where the object being measured is spanned by a whole number of length units with no gaps or overlaps.* |

**Connections to the Standards for Mathematical Practice:** *This section provides examples of learning experiences for this unit that support the development of the proficiencies described in the Standards for Mathematical Practice. These proficiencies correspond to those developed through the Literacy Standards. The statements provided offer a few examples of connections between the Standards for Mathematical Practice and the Content Standards of this unit. The list is not exhaustive and will hopefully prompt further reflection and discussion.*

***In this unit, educators should consider implementing learning experiences which provide opportunities for students to:***

1. **Make sense of problems and persevere in solving them.**
   1. Determine what the problem is asking for:
   2. Determine whether concrete or virtual models, pictures, mental mathematics, or equations are the best tools for solving the problem.
   3. Check the solution with the problem to verify that it does answer the question asked.
2. **Reason abstractly and quantitatively**
   1. Compare the
   2. Use
3. **Construct Viable Arguments and critique the reasoning of others.**
   1. Compare the clock and times used by others with yours.
   2. Examine the steps taken that produce an incorrect response and provide a viable argument as to why the process produced an incorrect response.
   3. Use
4. **Model with Mathematics**
   1. Construct visual models using concrete or virtual manipulatives, pictures, or number lines to justify thinking and display the solution
5. **Use appropriate tools strategically**
   1. Use analog clocks, digital clocks, number lines, etc., as appropriate.
6. **Attend to precision**
   1. Use mathematics vocabulary such as minute, hour, time, analog clock, digital clock, etc. properly when discussing problems.
   2. Demonstrate understanding of the mathematical processes required to solve a problem by carefully showing all of the steps in the solving process.
   3. Correctly write and read times.
   4. Use <, =, and > appropriately to compare expressions.
7. **Look for and make use of structure.**
8. Use the patterns such as skip-counting by 5’s to determine time intervals.
9. Use the relationships between minutes and hours to make sense of a problem.
10. **Look for and express regularity in reasoning**
    1. Use the patterns illustrated on an analog clock to see the progression of minutes and/or hours.
    2. Use the relationships between minutes and hours to make sense of telling time.

**Content Standards with Essential Skills and Knowledge Statements and Clarifications:** *The Content Standards and Essential Skills and Knowledge statements shown in this section come directly from the Maryland State Common Core Curriculum Frameworks. Clarifications were added as needed. Educators should be cautioned against perceiving this as a checklist. All information added is intended to help the reader gain a better understanding of the standards.*

| **Standard** | **Essential Skills and Knowledge** | **Clarification** |
| --- | --- | --- |
| **1.MD.B.3**  Tell and write time in hours and half-hours using analog and digital clocks. | **Essential Skills and Knowledge**   * **Ability to apply knowledge of fractional wholes and halves to tell time** * **Ability to equate a number line to 12 with the face of a clock** * **Ability to match time on a digital clock with that on an analog clock** | * Using the clock, ‘map out’ the day on the clock face labeling the times of major events of the day (getting up, catching the bus, beginning of school, lunch, recess, dinner, bath, bedtime, etc.). Help students see that it takes two trips around the clock to complete a 24-hour day. So within one day, the hour hand goes around the clock two times and it only moves in one direction. (Time NEVER moves backwards.) * There are sixty minutes in one hour. * When the hour hand is pointing exactly at a number, the time is exactly on the hour. * When the hour hand is exactly halfway between two numbers, the minute hand is on the 6 and it is half past the hour or 30 minutes after the hour. * The half hour is written as with “30” after the colon. * The idea of 30 being ‘halfway’ is difficult for students to understand. Students could use a number line from 0 to 60 and fold it in half to see that 30 is halfway between 0 minutes and 60 minutes. * Start with a number line made of index cards and connected with brads. Write each hour on the cards in order. Stretch out the number line and ask students to share what they notice about it. FF15FDF3 * Then curve the number line around until the ‘12’ card reaches the top and is next to the 1 card, making a circle, or a clock face. Now allow students to share what they notice about it and guess what it could be.   F2550F26 |

**Evidence of Student Learning:** *The Partnership for the Assessment of Readiness for College and Careers (PARCC) has awarded the Dana Center a grant to develop the information for this component. This information will be provided at a later date. The Dana Center, located at the University of Texas in Austin, encourages high academic standards in mathematics by working in partnership with local, state, and national education entities.  Educators at the Center collaborate with their partners to help school systems nurture students' intellectual passions.  The Center advocates for every student leaving school prepared for success in postsecondary education and in the contemporary workplace.*

**Fluency Expectations and Examples of Culminating Standards:** *This section highlights individual standards that set expectations for fluency, or that otherwise represent culminating masteries. These standards highlight the need to provide sufficient supports and opportunities for practice to help students meet these expectations. Fluency is not meant to come at the expense of understanding, but is an outcome of a progression of learning and sufficient thoughtful practice. It is important to provide the conceptual building blocks that develop understanding in tandem with skill along the way to fluency; the roots of this conceptual understanding often extend one or more grades earlier in the standards than the grade when fluency is finally expected.*

* Add and subtract within 10.

**Common Misconceptions:** *This list includes general misunderstandings and issues that frequently hinder student mastery of concepts regarding the content of this unit.*

* Confusing the hour and minute hands on the analog clock.
* Not knowing which attribute to measure.
* Estimating in the wrong units.
* Errors in converting minutes to hours.
* Incorrect positioning of the hour hand.
* Confusing terms such as ‘a half hour’ with money vocabulary of half dollar and thinking it means 50 minutes of the hour instead of 30 minutes of the hour.

**Interdisciplinary Connections:** *Interdisciplinary connections fall into a number of related categories:*

* *Literacy standards within the Maryland Common Core State Curriculum*
* *Science, Technology, Engineering, and Mathematics standards*
* *Instructional connections to mathematics that will be established by local school systems, and will reflect their specific grade-level coursework in other content areas, such as English language arts, reading, science, social studies, world languages, physical education, and fine arts, among others.*

|  |  |  |
| --- | --- | --- |
| **Available Model Lesson Plan(s)** | | |
| The lesson plan(s) have been written with specific standards in mind.  Each model lesson plan is only a MODEL – one way the lesson could be developed.  We have NOT included any references to the timing associated with delivering this model.  Each teacher will need to make decisions related to the timing of the lesson plan based on the learning needs of students in the class. The model lesson plans are designed to generate evidence of student understanding.  This chart indicates one or more lesson plans which have been developed for this unit. Lesson plans are being written and posted on the Curriculum Management System as they are completed. Please check back periodically for additional postings. | | |
| **Standards Addressed** | **Title** | **Description/Suggested Use** |
| 1.MD.B.3 | Tell and Write Time | Students will tell and write time to the hour and half hour using analog and digital clocks. |

|  |  |  |
| --- | --- | --- |
| **Available Lesson Seeds** | | |
| The lesson seed(s) have been written with specific standards in mind.  These suggested activity/activities are not intended to be prescriptive, exhaustive, or sequential; they simply demonstrate how specific content can be used to help students learn the skills described in the standards. Seeds are designed to give teachers ideas for developing their own activities in order to generate evidence of student understanding.  This chart indicates one or more lesson seeds which have been developed for this unit. Lesson seeds are being written and posted on the Curriculum Management System as they are completed. Please check back periodically for additional postings. | | |
| **Standards Addressed** | **Title** | **Description/Suggested Use** |
| 1.MD.B.3 | Tell Time | Students play a concentration game matching a digital clock on one card to an analog clock on another. |
| 1.MD.B.3 | Solving Problems about Time | Students use picture cards to solve problems about time. |
| 1.MD.B.3 | Matching Times to the Story | Students show different times on an analog clock to match the times in The Grouchy Ladybug. |

**Sample Assessment Items:** *The items included in this component will be aligned to the standards in the unit and will include:*

* + *Items purchased from vendors*
  + *PARCC prototype items*
  + *PARCC public released items*
  + *Maryland Public release items*
  + *Formative Assessment*

**Interventions/Enrichments:** *(Standard-specific modules that focus on student interventions/enrichments and on professional development for teachers will be included later, as available from the vendor(s) producing the modules.)*

**Vocabulary/Terminology/Concepts:** *This section of the Unit Plan is divided into two parts. Part I contains vocabulary and terminology from standards that comprise the cluster which is the focus of this unit plan. Part II contains vocabulary and terminology from standards outside of the focus cluster. These “outside standards” provide important instructional connections to the focus cluster.*

***Part I – Focus Cluster:***

*There is no specific vocabulary listed in the Content Framework that addresses time.*

***Part II – Instructional Connections outside the Focus Cluster***

***Counting On:*** an addition counting strategy in which a student starts with one set of objects and counts up to solve the problem. Example: Bobby has two counters and Susie has three. How many do they have all together?

2 3 4 5

***Counting On from the Larger Number:*** an addition counting strategy in which a student starts with the largest set of objects and counts up to solve the problem. Example: Bobby has two counters and Susie has three. How many do they have all together?

3 4 5

1 2 3 4 5 6 7 8 9 10

***Counting Up:*** a subtraction counting strategy in which a student counts up from one part to the whole in order to find the missing part. Example: 9 – 6 = ? The student would count starting at 6, saying “7, 8, 9” determining that, by counting up three numbers, the missing part of the number sentence is ‘3’.

**Resources:**

**Free Resources:**

* <http://wps.ablongman.com/ab_vandewalle_math_6/0,12312,3547876-,00.html> Reproducible blackline masters
* <http://lrt.ednet.ns.ca/PD/BLM_Ess11/table_of_contents.htm> mathematics blackline masters
* <http://yourtherapysource.com/freestuff.html> Simple activities to encourage physical activity in the classroom
* <http://www.mathsolutions.com/index.cfm?page=wp9&crid=56> Free lesson plan ideas for different grade levels
* <http://sci.tamucc.edu/~eyoung/literature.html> links to mathematics-related children’s literature
* <http://www.nctm.org/> National Council of Teachers of Mathematics
* [www.k-5mathteachingresources.com](http://www.k-5mathteachingresources.com) Extensive collection of free resources, math games, and hands-on math activities aligned with the Common Core State Standards for Mathematics
* <http://elementarymath.cmswiki.wikispaces.net/Standards+for+Mathematical+Practice> Common Core Mathematical Practices in Spanish
* <http://mathwire.com/> Mathematics games, activities, and resources for different grade levels
* <http://www.pbs.org/teachers/math/> interactive online and offline lesson plans to engage students. Database is searchable by grade level and content
* <http://www.k8accesscenter.org/training_resources/MathWebResources.asp> valuable resource including a large annotated list of free web-based math tools and activities.
* <http://www.cast.org/udl/index.html> Universal Design for Learning
* <http://engageny.org/wp-content/uploads/2012/05/Shifts-for-Students-and-Parents.pdf> Information for parents and students about the Shifts associated with the CCSS.
* <http://havefunteaching.com/> Various resources, including tools such as sets of Common Core Standards posters.
* <http://michellef.essdack.org/links> Numerous mathematics links.

**Math Related Literature:**

**References:**

* ------. 2000. *Principles and Standards for School Mathematics.* Reston, VA: National Council of Teachers of Mathematics.
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* Burns, M. (2007 ) *About Teaching Mathematics: A K-8 Resource*. Sausalito, CA: Math Solutions Publications.
* North Carolina Department of Public Instruction. Web. February 2012. North Carolina Department of Public Instruction. Web. February 2012 <http://www.ncpublicschools.org/acre/standards/common-core-tools/#unmath>
* Van de Walle, J. A., Lovin, J. H. (2006). *Teaching Student-Centered mathematics, Grades K-3.* Boston, MASS: Pearson Education, Inc.