SOUTH CAROLINA SUPPORT SYSTEMS INSTRUCTIONAL GUIDE	
Content Area	**First Grade Mathematics**
Recommended Days of Instruction	**Second Nine Weeks**

Standards/Indicators Addressed:

Standard 1-2: The student will demonstrate through the mathematical processes a sense of quantity and numerical relationships; the relationship among related basic facts; and the connections among numeric, oral, and written-word forms of whole numbers.

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value. (B4) yearlong

Standard 1-5: The student will demonstrate through the mathematical processes a sense of the value of combinations of coins and the measurement of length, weight, time, and temperature.

1-5.1 Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarters totaling less than a dollar. (C3)
1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins. (B2)
1-5.3 Represent money by using the cent and dollar notations. (A2)
1-5.4 Use whole-inch units to measure the length of an object. (C3)
1-5.5 Generate common referents for whole inches. (B6)
1-5.6 Use common referents to make estimates in whole inches. (C3)
1-5.7 Use nonstandard units to measure the weight of objects. (C3)
1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3) yearlong
1-5.9 Illustrate past and future dates on a calendar. (A2) yearlong
1-5.10 Represent dates in standard form (June 1, 2007, for example) and numeric form (6-1-2007, for example). (A2) yearlong
1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3) yearlong

* These indicators are covered in the following 3 Modules for this Nine Weeks Period.
Teaching time should be adjusted to allow for sufficient learning experiences in each of the modules.

Module 2-1 Year Long Indicators			
Indicator	**Recommended Resources**	**Suggested Instructional Strategies**	**Assessment Guidelines**
Module 2-1 Lesson A: Time to the Half Hour 1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3)	NCTM's Online Illuminations http://illuminations.nctm.org NCTM's Navigations Series SC Mathematics Support Document Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John Van de Walle NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources	See Instructional Planning Guide Module 2-1 Introductory Lesson A See Instructional Planning Guide Module 2-2, Lesson A Additional Instructional Strategies	See Instructional Planning Guide Module 2-1 Lesson A Assessment
Module 2-1 Lesson B: Dates on a Calendar 1-5.9 Illustrate past and future dates on a calendar. (A2) 1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6-1-2008). (A2)		See Instructional Planning Guide Module 2-1 Introductory Lesson B See Instructional Planning Guide Module 2-1, Lesson B Additional Instructional Strategies	See Instructional Planning Guide Module 2-1 Lesson B Assessment

Module 2-1 Lesson C: Reading a Thermometer 1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3)		See Instructional Planning Guide Module 2-1 Introductory Lesson C See Instructional Planning Guide Module 2-1, Lesson C Additional Instructional Strategies	See Instructional Planning Guide Module 2-1 Lesson C Assessment
Module 2-1 Lesson D: Numbers to 99 1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value. (B4)		See Instructional Planning Guide Module 2-1 Introductory Lesson D See Instructional Planning Guide Module 2-1, Lesson D Additional Instructional Strategies	See Instructional Planning Guide Module 2-1 Lesson D Assessment

Module 2-2 Length and Weight			
Indicator	**Recommended Resources**	**Suggested Instructional Strategies**	**Assessment Guidelines**
Module 2-2 Lesson A: Measurement Grab Bag 1-5.4 Use whole-inch units to measure the length of an object (C3) 1-5.5 Generate common referents for whole inches (B6) 1-5.6 Use common referents to make estimates in whole inches (C3)	NCTM's Online Illuminations http://illuminations.nctm.org NCTM's Navigations Series SC Mathematics Support Document Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John Van de Walle NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources Sizing Up Measurement K-2, Vicki Bachman	See Instructional Planning Guide Module 2-2 Introductory Lesson A See Instructional Planning Guide Module 2-2, Lesson A Additional Instructional Strategies	See Instructional Planning Guide Module 2-2 Lesson A Assessment
Module 2-2 Lesson B: Balance the Scale 1-5.7 Use nonstandard units to measure the weight of objects (C3)		See Instructional Planning Guide Module 2-2 Introductory Lesson B See Instructional Planning Guide Module 2-2, Lesson B Additional Instructional Strategies	See Instructional Planning Guide Module 2-2 Lesson B Assessment

Module 2-3 Money			
Indicator	**Recommended Resources**	**Suggested Instructional Strategies**	**Assessment Guidelines**
Module 2-3 Lesson A: Representing Coins in Combinations 1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins. (B2)	NCTM's Online Illuminations http://illuminations.nctm.org/ NCTM's Navigations Series SC Mathematics Support Document Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John Van de Walle NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources	See Instructional Planning Guide Module 2-3 Introductory Lesson A See Instructional Planning Guide Module 2-3, Lesson A Additional Instructional Strategies	See Instructional Planning Guide Module 2-3 Lesson A Assessment
Module 2-3 Lesson B: Counting Coins and Recording Values 1-5.1 Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarters totaling less than a dollar. (C3) 1-5.3 Represent money by using cent and dollar		See Instructional Planning Guide Module 2-3 Introductory Lesson B See Instructional Planning Guide Module 2-3, Lesson B Additional Instructional Strategies	See Instructional Planning Guide Module 2-3 Lesson B Assessment

notations (A2)			

MODULE

2-1

Year Long Indicators

This module addresses the following indicators:

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value.
1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3)
1-5.9 Illustrate past and future dates on a calendar. (A2)
1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6-1-2008, for example). (A2)
1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature.

All of these are yearlong indicators.

This module contains 4 lessons. These indicators were first introduced in Modules throughout the First Nine Weeks. These lessons are **INTRODUCTORY ONLY.** Lessons in S³ begin to build the conceptual foundation students need. **ADDITIONAL LESSONS will be required** to fully develop the concepts.

I. Planning the Module

The first bullet under the Continuum of Knowledge represents students' prior knowledge and/or skills related to this standard. It is recommended that students are pre-assessed on this prior knowledge.

Continuum of Knowledge

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value.

- In kindergarten, students analyzed the magnitude of digits through 99 on the basis of their place value (K-2.6) and represented the place value of each digit in a two-digit whole number (K-2.7)
- In first grade, students analyze the magnitude of digits through 999 on the basis of their place value (1-2.9).
- In second grade, students will analyze the magnitude of digits through 9,999 on the basis of their place value.

1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3)

- In kindergarten, students use analog and digital clocks to tell time to the hour. (K-5.6)
- In first grade, students use analog and digital clocks to tell and record time to the half hour. (1-5.8)
- In second grade, students use analog and digital clocks to tell and record time to the nearest quarter hour and to the nearest five-minute interval. (2-5.7)

1-5.9 Illustrate past and future dates on a calendar. (A2)

- In kindergarten, students use a calendar to identify dates, days of the week, and months of the year (K-5.7).
- In first grade, students illustrate past and future dates on a calendar (1-5.9).

1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6-1-2008, for example). (A2)

- In kindergarten, students use a calendar to identify dates, days of the week, and months of the year (K-5.7).
- In first grade, represent dates in standard form (June 1, 2007, for example) and numeric form (6-1-2007, for example) (1-5.10).

1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3)

- In kindergarten, students identify digital and standard thermometers as devices used to measure temperature (K-5.4). Students understand which measure-length, weight, time, or temperature-is appropriate for a given situation (K-5.5).
- In first grade, students use Celsius and Fahrenheit thermometers to measure temperature (1-5.11).

- In second grade, students use appropriate tools to measure temperature on Celsius and Fahrenheit thermometers (2-5.3).

Key Concepts/ Key Terms

***These are vocabulary terms that are reasonable for students to know and be able to use. Terms without the * are additional terms for teacher awareness, knowledge and use in conversation with students.**

*Analog
*Digital
*Hour
Half hour
*Calendar
*Date
*Days of the week
*Months of the year
*Past
*Present
*Future
*Celsius
*Fahrenheit
*Thermometer
*Temperature
*Degrees
*Scale
*Measure
*Magnitude
*Place value

II. Teaching the Lesson(s)

Teacher Notes: Mathematics learning builds over the course of time. This is especially true with concepts such as number sense and measurement. As a result some topics are best acquired through repeated exposure in small on-going intervals of time. Therefore, while an introductory lesson has been provided for the concepts addressed in Module 1-1, First Nine Weeks, it is important to point out that students will need on-going formal and informal experiences throughout the year to ensure the automaticity and flexibility that is demonstrated with mathematical understanding.

First grade students should continue to use concrete and pictorial materials to build understanding on the concepts addressed in Module 1-1, First Nine Weeks, for these year-long indicators. Please refer to this Module and provide learning experiences that builds on prior learning to meet the indicators

1. Teaching Lesson 2-1A Time to the Half Hour

1-5.8 Use analog and digital clocks to tell and record time to the half hour.

For this indicator, it is **essential** for students to:

- Tell time to the hour
- Understand that 30 minutes is a half hour
- Record time to the half hour in multiple ways
- Identify location of the minute hand at the half hour
- Identify location of the hour hand at the half hour
- Understand the difference between analog and digital clocks
- Understand that the little hand indicates broad, approximate time (nearest hour)
- Understand that the big hand indicates time (minutes) before or after an hour

For this indicator, it is **not essential** for students to:

- Tell time to the quarter hour or to the nearest five minutes

a. Indicators with Taxonomy

1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3)
Cognitive Process Dimension: Apply
Knowledge Dimension: Procedural Knowledge

b. Introductory Lesson

Adapted from Hands-On Standards Grades 1-2, Learning Resources, 2006, Pages 126-127.

- ***Materials Needed:***

- Large demonstration clock
- Analog clock

As this is an indicator that will be addressed throughout the year, this should be a consistent part of the daily routine. You may choose to do this during morning calendar activities to allow all students an opportunity to demonstrate time to the half hour. As the year progresses, use time to the half hour opportunities and have various students answer questions about time for scheduled activities and events as they occur on the hour/half hour.

In whole group, review the hour and minute hands on the large demonstration analog clock. Point out the hour hand and discuss that it is the shorter hand and tells you the hour. Count by 1's around the clock. Point out the minute hand and discuss that it is the longer hand and tells you the minutes. Count by 5's around the clock. Rotate the minute hand halfway around the clock. Ask the children, where is the hour hand when the minute hand is on the 6? Ask the children, what time does the clock show now? Ask the children, what does 9:30 look like? Using various times, have individual students come and demonstrate the given time. Introduce the digital clock. Have students read the time on the digital clock. Have students demonstrate the time on the analog clock that a student reads from the digital clock. Then, students should record the time in proper form next to the display clock. This may be a part of the calendar with a white board/marker.

c. Misconceptions/Common Errors

- Students often confuse 12:30 or half past 12 as 6 o'clock.
- Children may be unsure of why the long hand points to the number 6 to show 30 minutes. Explain that 30 minutes is half of an hour and the long hand is halfway around the clock. Reinforce this by counting by 5's from the top of the hour. You may additionally point out that the hour hand is also halfway between the hours when the minutes hand is pointing at the 6 – halfway around the clock.

d. Additional Instructional Strategies/Differentiation

Children need time to practice the skill of moving the hands on clocks and writing the time. Many opportunities should be given to the children to practice the skills with hands on materials.

Give each child a clock and clock recording sheet. Ask them to show 8:00 on the clock. Tell the children to turn the minutes hand clockwise slowly around the clock face to make a complete circle. Demonstrate with the large clock so all the children can see the hands moving and model their clock movements after your movements. Ask the children, what time does the clock say now? Have the children draw the clock hands on the recording sheet and write the time beneath the clock. Demonstrate as needed. Ask the children to show you 10:00 on their clocks. Demonstrate with the large clock so all the children can see and model their clock movements if needed. Ask the children, what they think the clock will look like at 10:30? Have the children move the hand clockwise on their clocks to show 10:30. Demonstrate with the large clock so all the children can see and model their clock movements if needed. Ask the children, does the clock look like you though it would? Have the children draw the hands on the recording sheet and write the time beneath the clock. Repeat the activity with other times to the hour and half hour.

Have student demonstrate times using a large analog and digital clock.

Children are usually taught first to read the time to the hour, then the half and quarter hours and then to the 5- and 1-minute intervals. In the early stages of this sequence, children are shown clocks set exactly to the hour or half hour. Many children who can read a clock at 7;00 or 2:30 have no idea what time it is at 6:58 or 2:33. Digital clocks permit students to read times easily but do not relate times very well.

The following suggestions can help students understand and read analog clocks.

- Begin with a one-handed clock. A clock with only an hour hand can be read with reasonably accuracy. Use lots of approximate language: "It's about 7 o'clock." It's a little past 9 o'clock." "It's half way between 2 o'clock and 3 o'clock."

- Discuss what happens to the big hand as the little hand goes from one hour to the next. If the hour hand is pointing exactly at 12, the hour hand is pointing exactly at a number. If the hour hand is a little past or before an hour (10 to 15 minutes), about where would the minute hand be?
- Use two real clocks, one with only an hour hand and one with two hands. Cover the two-handed clock. Periodically during the day, direct attention to the one-handed clock. Discuss the time in approximate language. Have students predict where the minute hand should be. Uncover the other clock and check. (Van De Walle 2006)

e. Technology

Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding.

http://www.apples4theteacher.com/java/telling-time/ This website gives children a time and they drag the hands to indicate the correct time.

http://www.arcytech.org/java/clock/telling_time.html This website gives information on telling time and then has an interactive practice for students.

http://www.netrover.com/~jjrose/time/Time.html Interactive clock that allows us students to practice moving the hands of the clock to indicate the time given.

http://www.apples4theteacher.com/clocks.html This website allows students to manipulate an analog clock to match the time on the digital clock.

http://www.kidsnumbers.com/tick-tock-clock-game.php This website allows students to match analog clocks to the corresponding digital clock by reading the time.

http://www.worsleyschool.net/socialarts/telling/time.html This website allows students to drag the hands of the clock to indicate the given time.

f. Assessing the Lesson

"When done well, assessment that helps teachers make decisions about the content or form of instruction (often called formative assessment) can also be used to judge students' attainment (summative assessment)." PSSM page 24 Therefore, for the purposes of this work no distinction will be made between formative and summative assessment. Instead, emphasis will be placed on assessment techniques/strategies that may be used to gather information about student understanding that will support instructional decisions both during individual lessons and at the end of a major concept/module.

Formative assessment is embedded within the lesson through questioning and observation. Teachers should observe students as they read analog and digital clocks out loud and record the time. This information should determine how much additional instructional time should be given to this indicator. However, other formative assessment strategies should also be used.

2. Teaching Lesson 2-1B Dates on a Calendar

1-5.9 Illustrate past and future dates on a calendar. (A2)

For this indicator, it is **essential** for students to:

- Understand the structure of a calendar
- Recall the days of the week and the months of the year
- Locate a past or future dates on a calendar
- Record dates using standard and numeric form
- Understand terms such yesterday, tomorrow, one week ago, etc…

For this indicator, it is **not essential** for students to:

- understand elapsed time on a calendar

1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6- 1- 2008) (A2)

For this indicator, it is **essential** for students to:

- recall the days of the week and the months of the year
- know their numbers
- be able to count
- distinguish between standard and numeric form.

For this indicator, it is **not essential** for students to:

- None noted

a. Indicators with Taxonomy

1-5.9 Illustrate past and future dates on a calendar. (A2)
Cognitive Process Dimension: Understand
Knowledge Dimension: Factual Knowledge

1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6- 1- 2008) (A2)
Cognitive Process Dimension: Understand
Knowledge Dimension: Factual Knowledge

b. Introductory Lesson

Adapted from Everyday Mathematics First Grade, McGraw Hill, 2009, Pages 53-54.

Materials Needed

- Calendar
- Chart paper/board

This is a year-long indicator, which means that it should be addressed daily throughout the year. You may choose to do this during morning calendar activities. Repeated exposure will help students understand the concept of past/future dates, and recording the time in standard and numeric form.

At the beginning of the year, ask students to give examples for why it might be important to keep track of the date. Record their responses for some uses of calendars such as helping keep track of time, appointments and special days like birthdays and holidays. Point to and discuss the parts of the calendar such as the months and days of the week. Record on the chart paper or board the children's answers to the following questions. What is the name of this month? What day of the week is today? What number tells the year? What number tells the day? Tell the children you are going to put all that information together to write today's date. Write the date in standard form using a sentence starting with "Today is". For example, "Today is Tuesday, August 18, 2009". Also record the date in numeric form using a sentence such as "Today's date is 8/18/09."

After you have written today's date in both forms, ask the children to use the calendar to tell you yesterday's date. Record the date on the chart/board using a sentence starting with "Yesterday was". Ask the children to tell you what tomorrow's

date will be and record that on the chart/board using a sentence starting with "Tomorrow will be". After modeling, allow students to take turns recording the dates daily throughout the year.

As the children become familiar with the concept of past and future dates, use the calendar to answer questions such as: What will the date be one week from today? What was the date one week ago? What was the last Monday's date? What will be the date on Friday?

c. Misconceptions/Common Errors

No typical student misconceptions noted at this time.

d. Additional Instructional Strategies/Differentiation

Put students in pairs. Read out a date. Student A writes the date using standard notation. Student B writes it out using numeric notation. Each pair turns and shares their answer with another pair. On the next problem, student A and B exchange roles.

e. Technology

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http://www.fi.edu/time/Journey/JustInTime/calendar/calendar1.html This online activity allows students to use a calendar to determine appropriate answers to given questions for additional practice.

http://www.sparklebox.co.uk/share/res/res166-170/sz166.html This is a downloadable calendar for SMART board users that has the format that matches the lesson "Yesterday was _____, Today is _____, Tomorrow will be _____, " format.

f. Assessing the Lesson

"When done well, assessment that helps teachers make decisions about the content or form of instruction (often called formative assessment) can also be used to judge students' attainment (summative assessment)." PSSM page 24 Therefore, for the purposes of this work no distinction will be made between formative and summative assessment. Instead, emphasis will be placed on assessment techniques/strategies that may be used to gather information about student understanding that will support instructional decisions both during individual lessons and at the end of a major concept/module.

Formative assessment is embedded within the lesson through questioning and observation. However, other formative assessment strategies should also be used.

3. Teaching Lesson 2-1C- Reading a Thermometer

1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3)

For this indicator, it is **essential** for students to:

- Understand the meaning of temperature
- Understand that Celsius and Fahrenheit are used to measure temperature as opposed to length, weight, etc.
- Measure temperature using thermometers that progress by increments of one.
- Read thermometers from pictorial and concrete models
- Make connection between pictorial models and the actual thermometer
- Understand the Celsius and Fahrenheit are two ways to measure the same temperature

For this indicator, it is **not essential** for students to:

- Measure temperature using thermometers that progress increments of more than one.

a. Indicators with Taxonomy

1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3)
Cognitive Process Dimension: Apply
Knowledge Dimension: Procedural Knowledge

b. Introductory Lesson

Materials Needed

- Fahrenheit and Celsius thermometer measured in increments of one

As this is an indicator in the year long module, this should be a daily activity throughout the year. As you begin the year, review the thermometer as a device that measures temperature. Discuss and brainstorm situations where a thermometer might be useful. Chart student input. Ask what the thermometer might look like if we placed it in chocolate milk. What might happen if we place the thermometer in ice water? Boiling water? Then point students' attention to the numbers on the thermometer. Point to the zero at the bottom and show how the numbers increase as you go up the thermometer. Tell students that you will have a classroom thermometer placed outside the window of the room. Each morning, a student will retrieve the thermometer and read the temperature for each day. Each day should allow for a different student so that all students have opportunities to participate several times throughout the year. Once students understand how to measure temperature using the Fahrenheit scale, you will introduce the Celsius scale.

c. Misconceptions/Common Errors

No typical student misconceptions noted at this time.

d. Additional Instructional Strategies/Differentiation

- Tell students that the thermometer's numbers are represented by a number line that has been turned.

- Sufficient and varied hands-on experiences with pictorial and concrete models of Celsius and Fahrenheit thermometers will be necessary for conceptual understanding.

e. Technology

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conceptual understanding. Real life situations/representations are critical for conceptual understanding.

http://www.beaconlearningcenter.com/WebLessons/BeAScientist/default.htm estimate temperature using a Celsius thermometer

http://www.beaconlearningcenter.com/WebLessons/HotStuff/default.htm estimate temperature using a Fahrenheit thermometer

http://www.ies.co.jp/math/java/geo/therm/therm.html compare temperatures between two days

f. Assessing the Lesson

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Show thermometers at various temperatures and ask students to read the temperature. Student responses should determine needs for future instruction.

4. Teaching Lesson 2-1D Numbers through 99

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value. (B4)

For this indicator, it is **essential** for students to:

- Understand place value
- Understand that each place value ten times greater than the position to the right.
- Model place value relationships i.e. what does ten times one place look like, what does ten times the hundreds place look like, etc…
- Expand numbers in order to analyze place value

For this indicator, it is **not essential** for students to:
None noted

a. *Indicators with Taxonomy*

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value.
Cognitive Dimension: Analyze
Knowledge Dimension: Conceptual

b. Introductory Lesson
(adapted from: http://www.nsa.gov/academia/_files/collected_learning/elementary/arithmetic/expand_place_value.pdf)

Materials Needed
- Sticky Notes
- Number cards with assorted values 1-999 (approximately 10 per pair of students)
- Base ten blocks
- Place Value Mat (or paper divided into 3 columns with headings "Hundreds, Tens, Ones" created by students)

Suggested Literature Connections
- *How Much, How Many, How Far, How Heavy, How Long, How Tall is 1,000* by Helen Nolan
- *The Big Wide Mouthed Frog* by Ana Larranaga

As this is an indicator to be taught year long by increasing the rigor as the year progresses, begin by using numbers with 2 digits or less. As the year progresses and students increase their number sense, increase to three digit numbers and extend the activities. Expanded form should also be introduced when students have a developed a conceptual understanding of place value.

Give each pair of students ten number cards and ask them to sort them. Elicit students' knowledge of number sense by having students group the numbers into two categories of their choice. While students are sorting, circulate around the room to observe students grouping strategies. After 3-5 minutes the class will have a short discussion to share grouping strategies.

Allow students to use a "Place Value Mat" and base ten blocks to build models of their numbers up to 99. Then ask students to use the sticky notes to write the "tens" on one, and the "ones" on a separate sticky note. Then have them represent the number by

places in the appropriate spaces on the Place Value Mat. As numbers are posted, guide students to explain why they put their numbers into a particular column.

c. Misconceptions/Common Errors

- As students write large numbers in expanded form to represent the magnitude of the digits, they should translate between number and expanded form. Some students can write the expanded form of a number but have difficulty writing the standard form of a number when given the expanded form. A common error is for students to forget to use zero to represent the value of a particular place. For example: students may write 300506 for 300 + 50 + 6. This can be avoided through the use of a Place Value Chart with marked columns.

d. Additional Instructional Strategies/Differentiation

- With large number it is difficult to model because physical models are not commonly available. One idea that should be extended is the idea that each place value position is ten times greater than the position to the right.

e. Technology

Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding.

http://www.ictgames.com/dinoplacevalue.html place value practice for 10's, and 1's

http://www.nsa.gov/academia/_files/collected_learning/elementary/arithmetic/expand_place_value.pdf This website offers numerous lesson ideas for teachers to expand upon place value to increase student understanding through 999.

f. Assessing the Lesson

"When done well, assessment that helps teachers make decisions about the content or form of instruction (often called formative assessment) can also be used to judge students' attainment (summative assessment)." PSSM page 24 Therefore, for the purposes of this work no distinction will be made between formative and summative assessment. Instead, emphasis will be placed on assessment techniques/strategies that may be used to gather information about student understanding that will support instructional decisions both during individual lessons and at the end of a major concept/module.

Throughout the lesson, teachers should monitor that students are able to determine proper tens and ones for their given numbers, and that they can represent with the base ten blocks. Students that have difficulty should be given more opportunities to practice with lower numbers before moving on to numbers with hundreds place value.

III. Assessing the Module

At the end of this module summative assessment is necessary to determine student understanding of the connections among and between the indicators addressed in this module.

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place values.

The objective of this indicator is to analyze which is in the "analyze conceptual" knowledge cell of the Revised Taxonomy. To analyze means to determine relevant features and relationships. The learning progression to **analyze** requires students to understand place value and be able to locate the correct place value. Students represent the place value using concrete and/or pictorial models and generalize the connections (1-1.7) between place value and the multiple of ten. They write numbers in expanded form to examine the magnitude of the number. Students then use their observations to generate statements. Students explain and justify their answers (1-1.3) and use appropriate forms of mathematical communication (1-1.6) to share their answers with their classmates and teacher.

1-5.8 Use analog and digital clocks to tell and record time to the half hour.

The objective of this indicator is to apply, which is in the "apply procedural" cell of the Revised Taxonomy table. Procedural knowledge is knowledge of specific steps; therefore, students should use a specific

set of steps to record and tell time to the half hour. The learning progression to apply requires students to recognize if the clock is digital or analog. Students analyze patterns (1-1.4) by reasoning where the positions of the hands are on a given clock. They also demonstrate their understanding by using concrete and models to represent time. They explain and justify their answer (1-1.3) to their classmates and their teacher. As students explore time, they explain how recording and telling time with a digital clock is different from using an analog clock. After applying procedures to determine the time, student use a variety of forms of mathematical communication (1-1.6) (written and oral) to record and tell time.

1-5.9 Illustrate past and future dates on a calendar.

The objective of this indicator is to illustrate which is in the "understand factual" knowledge of the Revised Taxonomy. To understand is to construct meaning and to illustrate is to find specific examples of a concept; therefore, construct an understanding of the methods needed to locate past and future dates. The learning progression to **illustrate** requires students to recall dates, days of the week, and months of the year on a calendar. They analyze patterns on the calendar to determine the month, day and year. Students locate dates on the calendar based on a given description such as yesterday or one week from now. They explain and justify their answers to their classmates and their teacher (1-1.3).

1-5.10 Represent dates in standard form (June 1, 2007, for example) and numeric form (6-1-2007, for example).

The objective of this indicator is to represent which is in the "understand factual" knowledge cell of the Revised Taxonomy. To represent means to translate from one form to another and the factual knowledge component is the format in which standard and numeric dates are written. The learning progression to **represent** requires students to recall the days of the week and months of the year and the corresponding number for each month. Students also understand the format for standard and numeric form and how to convert the month, day and year to numeric form when required. Given a verbal description and/or written description of a date, students represent dates in standard form and numeric form. Students also translate from standard to numeric form. They explain and justify their answers (1-1.3) to their classmates and their teacher.

1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature.

The objective of this indicator is to use which is in the "apply procedural" cell of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps; therefore, students should use a specific set of steps to measure temperature using Celsius and Fahrenheit. The learning progression to **use** requires students to understand the attribute (temperature) being measured. Student count by increments of one to determine the temperature indicated on a pictorial or concrete model and explain and justify how their found their answer (1-1.3). They also mark a given temperature on a blank thermometer to demonstrate understanding and explain their reasoning.

Checklist (can be completed while observing a small group of children, while observing children in centers or with each child individually). A child should be able to consistently perform all the items on the checklist.

- Able to show/read time to hour.
- Able to show/read time to half hour.
- Able to write digital time to the hour.
- Able to write digital time to half hour.
- Able to orally state the date in standard form.
- Able to orally state the date in numeric form.
- Able to name a date in the past using the calendar.
- Able to name a date in the future using the calendar.
- Able to read a thermometer in Fahrenheit and Celsius degrees to increments of 1 degree.
    - Able to represent numbers in the proper place value with base ten blocks and a place value mat.

MODULE

2-2

Length and Weight

This module addresses the following indicators:

1-5.4 Use whole-inch units to measure the length of an object. (C3)
1-5.5 Generate common referents for whole inches. (B6)
1-5.6 Use common referents to make estimates in whole inches. (C3)
1-5.7 Use nonstandard units to measure the weight of objects. (C3)

This module contains __2__ lessons. These lessons are **INTRODUCTORY ONLY**. Lessons in S3 begin to build the conceptual foundation students need. **ADDITIONAL LESSONS will be required** to fully develop the concepts.

I. Planning the Module

The first bullet under the Continuum of Knowledge represents students' prior knowledge and/or skills related to this standard. It is recommended that students are pre-assessed on this prior knowledge.

- **Continuum of Knowledge**

1-5.4 Use whole-inch units to measure the length of an object. (C3)
- In kindergarten, students use nonstandard units to explore the measurement concepts of length and weight. (K-5.3)
- In first grade, students use whole-inch units to measure the length of an object.
- (1-5.4)
- In second grade, students use appropriate tools to measure objects to the nearest whole unit: measuring length in centimeters, feet, and yards; measuring liquid volume in cups, quarts, and gallons; measuring weight in ounces and pounds; and measuring temperature on Celsius and Fahrenheit thermometers. (2-5.3)

1-5.5 Generate common referents for whole inches. (B6)
- In kindergarten, students use nonstandard units to explore the measurement concepts of length and weight. (K-5.3)
- In first grade, students generate common referents for whole inches. (1-5.3)
- In second grade, students generate common referents to make estimates in feet, yards, and centimeters. (2-5.4)

1-5.6 Use common referents to make estimates in whole inches. (C3)
- In kindergarten, students use nonstandard units to explore the measurement concepts of length and weight. (K-5.3)
- In first grade, students use common referents to make estimates in whole inches. (1-5.6).
- In second grade, students use common referents to make estimates in feet, yards, and centimeters. (2-5.5)

1-5.7 Use nonstandard units to measure the weight of objects. (C3)
- In kindergarten, students use nonstandard units to explore the measurement concepts of length and weight. (K-5.3)
- In first grade, students use nonstandard units to measure the weight of objects. (1-5.7)
- In second grade, students use appropriate tools to measure objects to the nearest whole unit: measuring length in centimeters, feet and yards; measuring liquid volume in cups, quarts, and gallons; measuring weight in ounces and pounds; and measuring temperature on Celsius and Fahrenheit thermometers. (2-5.3)

- **Key Concepts/Key Terms**

  *These are vocabulary terms that are reasonable for students to know and be able to use. Terms without the * are additional terms for teacher awareness, knowledge and use in conversation with students.

  *Measure
  *Measurement
  *Length
  *Inch
  *Ruler
  *Unit
  *Measurement
  *Referents
  *Benchmarks
  *Weight
  *Nonstandard
  *Units
  *Scale

II. Teaching the Lesson(s)

1-5.4 Use whole-inch units to measure the length of an object. (C3)

For this indicator, it is **essential** for students to:
- recognize and identify whole inch units on a ruler
- identify and use appropriate tools such as rulers and yardsticks to measure objects to the nearest whole inch
- recognize "non-important" space at the beginning of measuring devices and that some measuring devices begin at 0
- understand that objects are measured in units and do not have to line up with the zero to determine how many units (whole inches) in length an object is

For this indicator, it is **not essential** for students to:
- measure in units greater than whole inch units
- measure in units less than whole inch units (fractional parts of a unit)

1-5.5 Generate common referents for whole inches. (B6)

For this indicator, it is **essential** for students to:
- Understand standard and nonstandard measurements
- Understand inches
- Measure to the nearest whole inch
- Develop a familiarity with inches

For this indicator, it is **not essential** for students to:
- Use common referents to make estimates

1-5.6 Use common referents to make estimates in whole inches. (C3)

For this indicator, it is **essential** for students to:
- Understand standard and nonstandard measurements
- Understand inches
- Measure to the nearest whole inch
- Make estimates using common referents
- Understand that they measurement with the common referent is not exact

For this indicator, it is **not essential** for students to:
- None noted

1. Teaching Lesson 2-2A- Measuring Length – Whole Inches

a. Indicators with Taxonomy

1-5.4 Use whole-inch units to measure the length of an object. (C3)
Cognitive Process Dimension: Apply
Knowledge Dimension: Procedural Knowledge

1-5.5 Generate common referents for whole inches. (B6)
Cognitive Process Dimension: Understand
Knowledge Dimension: Create

1-5.6 Use common referents to make estimates in whole inches. (C3)
Cognitive Process Dimension: Apply
Knowledge Dimension: Procedural Knowledge

b. Introductory Lesson

Materials Needed
- Objects to measure (at least on object per pair)
- Large "grab bag" to hold objects
- Color tiles (measuring 1in x1 in)
- Paper/pencil

Teacher Note: This lesson may be broken into two days.

Have children work in pairs. Tell them that you have some objects in the bag and that you are going to come around and let each pair pull out an object to measure for length. Once each group has their object, ask the class to offer ideas of how they might measure the length of their objects. You may want to chart their ideas. Show students the color tiles and tell them that since these color tiles are all the same size and shape that

they can be used to measure length. Have the pairs estimate about how many color tiles it will take to measure their objects. Allow time for each pair of students to discuss and come to a consensus. Their estimates and discussions will help you to assess their spatial and number sense. Once the estimates have been made for each group, hand out baggies of color tiles to each pair. Direct students to line up the squares next to their object to measure the length. Then have them record their actual measurements. Hold a discussion comparing their estimates to the actual measurement. After the discussion, ask students to recall a tool that is used to measure length (ruler). Hand out inch rulers and have students measure. Ask them to compare their inch ruler measurement to their colored tile measurement. Ask why the numbers might be the same for each of the measurements. Discuss the concept that the colored tile measures about the same length as an inch. (You may decide to divide the lesson over two days with the second day beginning here.) As a class, chart other items that that measure about an inch. If it is not offered by a student, point out that from the knuckle joint to the fingertip joint on the index finger is about an inch.) Spend time allowing students to explore measurement using these common referents to estimate and rulers to find an exact measurement.

c. Misconceptions/Common Errors

- Students may think that all objects measured with a ruler must be lined up at the end of the measuring device (non-important space)
- Students may think that objects always have to be lined up at the zero to measure objects in whole inch units
- Students might think that a common referent is equivalent to the actual measurement.
- Students may believe that their common referent is an exact representation for inches.
- Student may overlap their common referent instead of placing them end to end with no gaps.

d. Additional Instructional Strategies/Differentiation

- Sufficient and varied experiences with customary rulers and yardsticks marked in whole inch units will be necessary for conceptual understanding.
- Precut narrow strips of construction paper 5 cm. long and about 2 cm wide. Use two different colors of paper. Discuss how the strips could be used to measure by laying them end

to end. Provide long strips of tagboard about 3cm wide. Without explicit guided direction, have students make their own ruler by pasting the units onto the tagboard. Have a list of a few things to measure. Students use their new rulers to measure the things on the list. Discuss the results. It is very likely that there will be discrepancies due to rulers that were not made properly or to a failure to understand how a ruler works. Resource: Make Your Own Ruler Activity 20.7 (Van de Walle 2007 page 381)

- The same activity can be done using larger units such as tracings of students' footprints pasted onto strips of adding machine tape. Older children can use a standard unit (inch, foot, centimeter) to make marks on the strips and color in the spaces with alternating colors.
- Give students a model of an inch, and have them search for things that measure about the same as the inch. Have them make a list of things that are about an inch, a little more and a little less than an inch. Encourage them to also find personal references on their bodies for an inch. This will develop a familiarity with an inch and develop a personal referent or benchmark for an inch.

- Allow students to determine their own personal benchmark for an inch and then share with the class. Then a common benchmark for the class can be determined. Once common benchmarks are established, they can then estimate length to the nearest inch.

- Estimation helps students focus on the attributes being measured and the measuring process. Allow students to use their common referents to make estimates and then use their referents to compare their estimates to the actual measurement.
- To provide on-going practice in using common referents, have something to measure daily as they enter the classroom. They can make estimates, record their estimate and then compare their estimate to the actual.
- Broken Ruler Activity- Have students measure objects using rulers that do not begin with 0. You can create "broken rulers" by photocopying blackline rulers and cutting them into smaller pieces.

e. Technology

Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding.

f. Assessing the Lesson

Formative assessment is embedded within the lesson through questioning and observation. However, other formative assessment strategies should be employed.

Have students show and explain how to use a ruler to measure objects. Also, use one of the additional instructional strategies as an assessment tool to gauge where students are with this concept. Have students categorize objects in a box according to ones that are 1 in long, 2in long, etc. They need to demonstrate their understanding for you.

3. Teaching Lesson 2-2B- Weight Using Nonstandard Units

1-5.7 Use nonstandard units to measure the weight of objects. (C3)

For this indicator, it is **essential** for students to:
- Understand that nonstandard units are an approximate not exact
- Understand the concept of weight

For this indicator, it is **not essential** for students to:
- Measure in standard units or fractional parts of units.

a. Indicators with Taxonomy

1-5.7 Use nonstandard units to measure the weight of objects. (C3)
Cognitive Process Dimension: Apply.
Knowledge Dimension: Procedural Knowledge

b. Introductory Lesson

Adapted from Sizing Up Measurement, Vicki Bachman, Math Solutions Publishing. 2007

Materials Needed

- Pan balance scales, 1 per group of 3 or 4 students
- Cubes, tiles, teddy bear counters, about 20 of one type per group
- Sets of 6 different lightweight objects such as a toy car, box of crayons, rock, marker, key, small toy, placed in small bags, 1 per group

Suggested Literature Connection: Just a Little Bit, by Ann Tompert (1993) **Optional**: Begin the lesson by reading the book, Just a Little Bit if you have it. The book depicts what happens when an elephant and a mouse try to play on a seesaw. Ask the class, "What happened when all of the animals joined in the fun?"

Review the pan balance scale. Students should be familiar with this device since they explored with them in kindergarten. Show the nonstandard units. Explain that the scale is going to be used to determine the weight of the objects in the bag. Place a small object to be measured on the scale. Ask students to predict about how many of one of the nonstandard units it might take to balance out the scale. Then, demonstrate by placing the nonstandard units on the scale until the scale is balanced. Make the connection that since it took x amount of units to balance the scale, then the object weighs that amount. Then, pass out the materials and allow students a few minutes to explore. Ask them to predict which object they think is the heaviest and which is the lightest. Then, have the groups measure each item and record it on a sheet similar to the example below. As you circulate the room, ask students to talk about why they are placing nonstandard units on one side and the objects to be measured on the other side. When everyone is done, conduct a whole class discussion. Have each group share their heaviest and lightest objects along with their measurements. Discuss their findings, especially if there are discrepancies in data from one group to another.

Object	Weight 
	
	
	

c. Misconceptions/Common Errors

Make sure students understand that the nonstandard unit must be made up of like objects. It would not be suitable to measure an object using unifix cubes and teddy bear counters.

d. Additional Instructional Strategies/Differentiation

- Informal or nonstandard units make it easier to focus directly on the attribute (weight) being measured. Informal units provide a good rational for the need for standard units.
- The emphasis here is actually weighing objects using nonstandard units. Measuring with nonstandard units means using the same size/mass objects with a balance scale.
- For advanced learners, this activity can be adjusted by giving a variety of nonstandard units and asking the student to predict whether they will use more or less of a nonstandard unit that is heavier or lighter.

e. Technology

Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding.

f. Assessing the Lesson

Formative assessment is embedded within the lesson through questioning and observation. Also, use their data collection as an assessment tool to determine where their thinking is for this concept. Have one-on-one conversations with your students to determine whether or not they have any misconceptions of measuring with non-standard units, as noted in the misconceptions piece. However, other formative assessment strategies should be employed.

III. Assessing the Module

At the end of this module summative assessment is necessary to determine student understanding of the connections among and between the indicators addressed in this module.

To assess the indicators in this module, create a checklist that includes the indicators from the module and administer through oral interview and performance assessment throughout the school year, noting the students' progress.

1-5.4 Use whole-inch units to measure the length of an object.

The objective of this indicator is to use which is in the "apply procedural" knowledge cell of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps; therefore, students should use a specific set of steps to measure the length of an object. The learning progression to **use** requires students to understand the meaning of a whole inch unit of measurement. Student estimate the length based on their knowledge of the length of an inch and exchange their ideas with their classmates and their teacher (1-1.2). Students select an appropriate measuring tools based on the length of the object and explain and justify their selection (1-1.3). Students apply a learned procedure to determine the measurement to the whole inch.

1-5.5 Generate common referents for whole inches.

The objective of this indicator is to create which is in the "create conceptual" cell of the Revised Taxonomy. Conceptual knowledge is not bound by specific examples; therefore, students should explore a variety of common referents for whole inches. The learning progression to **generate** requires students to understand the concept of whole inches. Students approximate the length of objects compared to an exact inch. Students locate objects and exchange their ideas with their classmates and their teachers (1-1.2). As students examine a variety of objects, they generalize the mathematical concept of an inch (1-1.5) and generalize connections between mathematics and the

environment (1-1.7). Students verify that their common referent is reasonable using an appropriate problem strategy (1-1.1) such as comparing to other referent, measuring using a ruler, etc…

1-5.6 Use common referents to make estimates in whole inches.

The objective of this indicator is to apply which is in the "apply procedural" cell of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps; therefore, students should use a specific set of steps to measure the length of an object using their common referent. The learning progression to **apply** requires students to estimate the length of an object without the use of their common referent. They explain and justify their reasoning (1-1.3) when making these estimates. Student use their common referents to measure for whole inches. Students explain and justify (1-1.3) why their estimation and measurement may be different (1-1.3) and use a variety of forms of mathematical communication to share their reasoning. (1-1.6)

1-5.7 Use nonstandard units to measure the weight of objects.

The objective of this indicator is to apply which is in the "apply procedural" cell of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps; therefore, students should use a specific set of steps to measure the weight of objects using nonstandard units. The learning progression to **apply** requires students to understand the attribute being measured. Students make estimation about the weight of the object in terms of the nonstandard unit. They explain and justify their answer (1-1.3) to their classmates and their teacher. Students use the nonstandard units to measure the object and explain and justify (1-1.3) why their estimate and measurement may be different.

MODULE

2-3

Money

This module addresses the following indicators:

1-5.1 Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarter, totaling less than a dollar.
1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins.
1-5.3 Represent money by using the cent and dollar notations.

This module contains __2__ lessons. These lessons are **INTRODUCTORY ONLY**. Lessons in S3 begin to build the conceptual foundation students need. **ADDITIONAL LESSONS will be required** to fully develop the concepts.

I. Planning the Module

The first bullet under the Continuum of Knowledge represents students prior knowledge and/or skills related to this standard. It is recommended that students are pre-assessed on this prior knowledge.

- **Continuum of Knowledge**

  1-5.1 Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarter, totaling less than a dollar.

  - In kindergarten, students identify a penny, a nickel, a dime, a quarter, and a dollar and the value of each. (K- 5.1)
  - In first grade, students use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarters totaling less than a dollar. (1-5.1)
  - In second grade, students use a counting procedure to determine the value of a collection of coins and bills with a value not to exceed $20.00. (2-5.1)

  1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins.

  - In kindergarten, students identify a penny, a nickel, a dime, a quarter, and a dollar and the value of each (K-5.1).
  - In first grade, students represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins (1-5.2).
  - In second grade, use a counting procedure to determine the value of a collection of coins and bills (2-5.1). Students will also use coins to make change up to one dollar (2-5.3)

  1-5.3 Represent money by using the cent and dollar notations.

  - In kindergarten, this indicator is not addressed.
  - In first grade, students represent money by using the cent and dollar notation. (1-5.3)

- **Key Concepts/ Key Terms**

  *These are vocabulary terms that are reasonable for students to know and be able to use. Terms without the * are additional terms for teacher awareness, knowledge and use in conversation with students.

  *penny
  *nickel
  *dime
  *quarter
  *half dollar
  *cents
  *value
  *coins
  *change
  *dollar
  *equal

II. Teaching the Lesson(s)

1, Teaching Lesson 2-3A- Coin Combinations

1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins. (B2)

For this indicator, it is **essential** for students to:
- recognize and identify the value of a penny, nickel, dime, quarter, and half-dollar from concrete and pictorial models
- know how to represent money using the cent and dollar notation
- know how to count by 1's, 5's, 10's , and 25's to 100
- know how different combinations can be used to represent these coins
  (Ex. 2 dimes and 1 nickel equals a quarter, 5 pennies equals a nickel.)

For this indicator, it is **not essential** for students to:
- know how to count beyond 100
- know how to represent amounts greater than a dollar

a. Indicators with Taxonomy

1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins. (B2)

Cognitive Process Dimension: Understand
Knowledge Dimension: Conceptual Knowledge

b. Introductory Lesson

Materials Needed

- Coins
- Chart paper
- Chart markers

As a coin is introduced, create a name collection box for it. Explain to students that the coins can be represented in many different ways, or using many different names. As the penny is introduced, ask students to offer different names for it. Ex. penny, one cent. As other coins are introduced, the list should include more names. Ex. dime, ten cents, two nickels, 10 pennies. Throughout the activity, probe children and challenge them to think of other names for the coin.

c. Misconceptions/Common Errors

- Students have a tendency to confuse the values of nickels and quarters.
- Students may believe that smaller coins have less value than larger coins. For example, a student might think dimes would be worth less than a nickel because a dime is smaller in size.
- Students who have not yet developed a sense of number may have difficulty skip counting and changing from one increment to another.

- Students may have difficulty realizing that coins can be combined to make up the same value as another coin, especially nickels and dimes. Some students may think that since the nickel is larger in size that it has a greater value.

d. Additional Instructional Strategies/Differentiation

- The focus of the indicator is for student to develop an understanding of how to represent coins using a variety of combinations. Students should experiment to build their knowledge and understanding of the value of coins.
- Provide students will many opportunities to represent a nickel, dime, quarter, a half-dollar, and dollar using real coins and/or models of real coins

- Touch points may be used for counting coins (TouchMath program)
- Games and activities may be used to provide students with opportunities to practice representing coins. For example, prepare a set of cards with a money value written on each card (5c, 10c, 25c, etc.) Give students a container filled with coins. Have one student choose a card. The other student picks coins out of the container that will equal the amount shown on the card. Students can draw representations of the coins they chose. Resource: About Teaching Mathematics by Marilyn Burns p.371.

e. Technology

Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding.

f. Assessing the Lesson

During student observation, ask students to show different ways to represent coin values. Also ask them to explain how they know.

2. ***Teaching Lesson 2-3B- Counting Money***

1-5.1 Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarter, totaling less than a dollar. (C3)

For this indicator, it is **essential** for students to:

- recognize and identify the value of a penny, nickel, dime, and quarter.
- use a counting procedure to determine the value of a collection of coins
- know how to represent money using the cent notation
- know how to count by 1's, 5's, 10's , and 25's to 100

For this indicator, it is **not essential** for students to:

- know how to count beyond 100

1-5.3 Represent money by using the cent and dollar notations. (A2)
Cognitive Process Dimension: Remember
Knowledge Dimension: Conceptual Knowledge

For this indicator, it is **essential** for students to:
- know how to represent money using the cent and dollar notation
- write cent/dollar given pictorial models
- write cent/dollar notation given concrete models

For this indicator, it is **not essential** for students to:
- None noted

a. Indicators with Taxonomy

1-5.1 Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarter, totaling less than a dollar. (C3)

Cognitive Process Dimension: Apply
Knowledge Dimension: Procedural Knowledge

1-5.3 Represent money by using the cent and dollar notations. (A2)
Cognitive Process Dimension: Remember
Knowledge Dimension: Conceptual Knowledge

b. Introductory Lesson

Activity adapted from *Teaching Student- Centered Mathematics: Grades K-3 Volume One*. Boston, MA: Pearson Education, Inc. Lovin, LouAnn , Van de Walle, John (2006).

Explain to your students that they will start counting by one number and at your signal they will shift to count by a different number. Begin by displaying enlarged pictures of a nickel and a penny so all students can see. Under each coin, write its value using proper notation. Point to the nickel and have students begin to count by 5's. After three or more counts, raise your hand to indicate a pause in the counting. Record the ending value on the board. Then lower your hand and point to the penny. Students continue the count from where they left off, but now counting by ones.

This lesson will be repeated and extended as new coin values are added. It is important to note that you should begin with the coin of greatest value and move to the lesser valued coin. To challenge students, try three changing between three coins, still in descending order.

c. Misconceptions/Common Errors

- Students who have not yet developed a sense of number may have difficulty skip counting and changing from one increment to another.
- Students use the dollar and cents notations together.

d. Additional Instructional Strategies/Differentiation

- Provide students will many opportunities to count combinations of coins and dollars using real/and or models of coins and bills and write the values of these combinations using the correct cents and dollar notations.
- Money grab- As coin values are introduced, give students a collection of those coins. Have them work in pairs and grab a small handful of coins, arrange the coins from greatest to least, and count their collection. The student with the greatest coin value wins the round.
- Pocket Problems- Give students visual scenarios where they see a "pocket" holding a set amount of coins. Tell them that a certain item costs a specific amount (under $1.00) and ask them if there is enough money in the pocket to purchase the item.

e. Technology

Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding.

f. Assessing the Lesson

During teacher observation, ask individual students to count a collection of coins. Watch to see if they group like coins together to begin their counting procedure and if they are able to count using multiple intervals.

III. Assessing the Module

1-5.1 Use a counting procedure to determine the value of a collection pennies, nickels, dimes, and quarter, totaling less than a dollar.

The objective of this indicator is to use which is in the "apply procedural" knowledge cell of the Revised Taxonomy. Procedural knowledge is knowledge of specific steps; therefore, students should use a specific set of steps when determining the value of a collection of pennies, nickels, dimes, and quarters. The learning progression to **use** requires students to identify coins and their value. Students analyze patterns (1-1.4) to decide how to sort the coins and use their knowledge of skip counting to find the value of each set of coins. As student sort and calculate, they explain and justify their processes (1-1.3) and exchange their ideas (1-1.2) with their classmates and their teacher. Student use appropriate cent notation to represent their total.

1-5.2 Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins.

The objective of this indicator is to represent which is in the "understand conceptual" knowledge cell of the Revised Taxonomy. To represent is to change from one form to another, to understand is to construct meaning and conceptual knowledge is not bound by specific examples; therefore, students build conceptual knowledge and meaning by represent coins in a variety of ways. The learning progression to **represent** requires students to identify coins and their value using concrete and pictorial models. Students analyze patterns (1-1.4) and use their knowledge of skip counting to decide which combinations of coins may be used to represent a nickel, dime, quarter, half-dollar and one dollar bill. As students sort and calculate, they explain and justify their processes (1-1.3) and exchange their ideas (1-1.2) with their classmates and their teacher. Student use appropriate cent notation to represent their total.

1-5.3 Represent money by using the cent and dollar notations.

The objective of this indicator is to represent which is in the "understand factual" cell of the Revised Taxonomy. To understand is construct meaning and factual knowledge is knowledge of details, elements and terminology; therefore, students should construct meaning of cent/dollar notation by applying it in a variety of problems. The learning progression to represent requires students to identify coins and recall the value of each. Students will analyze a collection of coins and bills and determine the value of each collection. They explain and justify their answers (1-1.3) as their exchange their answer (1-1.2) with their classmates and their teachers. As students analyze a variety of problems, they generalize and use the mathematical concepts (1-1.5) of cent/dollar notation to represent money.

This module would be best assessed through a one on one performance assessment interviews. The following checklist is one suggestion of recording data from the interviews.

For the performance assessment, have readily available:
Authentic coins, dollar bill, and paper/pencil or slate/marker

Indicator: Represent a nickel, a dime, a quarter, a half-dollar, and a dollar in combinations of coins.		
Task: Display the following coins. Ask students to provide possible coin combinations that equal the value of the coin.	Rating:	Comments:
Nickel		
Dime		
Quarter		
Half-dollar		
Dollar		
Indicators being Assessed: Use a counting procedure to determine the value of a collection of pennies, nickels, dimes, and quarters totaling less than a dollar. Represent money by using the cent a dollar notations		
Task: Provide students with collections of coins as follows. Ask them to find the value of the collection and write the value on the paper/slate.	Rating:	Comments:
Give only dimes and pennies		
Give only nickels and pennies		
Give nickels and dimes		
Give nickels, dimes, and pennies		
Give quarters and nickels		
Give quarters, nickels, dimes, and pennies		