▶ Grade 2 Topic 8: Work With Time and Money

Big Conceptual Idea: K-5 Progression on Measurement and Data (Measurement Part) (pp. 2-3)
Prior to instruction, view the Topic 8 Professional Development Video located in Pearson Realize online. Read the Teacher's Edition (TE): Cluster Overview/Math Background (pp. 435A-435E), the Topic Planner (pp.435I-435K), the Topic Performance Assessments (pp. 501-502A), and all 8 lessons.

Mathematical Background:	Topic Essential Question:
Read Cluster Overview (TE, pp. 435A-435E)	How can you solve problems about counting money or telling time to the nearest 5 minutes?
	Reference Answering the Topic Essential Question (TE, pp. 497-498) for key elements of answers to the Essential Question.

The lesson map for this topic is as follows:

8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	Assessment

5 A/D/E days used strategically throughout the topic.

Topic 8
Work With Time and Money

Number of lessons: **8**

A/D/E: 5 days

NVACS Focus:
MD.C

Total Days: ~13

2nd Grade Curriculum Pacing Framework: Balanced Calendar

Instructional note:
The big idea of Topic 8 is measurement. That is, objects have measurable attributes that can be quantified using specific units. Focus instruction on Nevada Academic Content Standards (NVACS, 2010) cluster 2.MD.C.
Standards listed in **bold** indicate a focus of the lesson.

> *2.MD.C Work with time and money.*
> *7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.*
> *8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?*

This work also supports the 2.NBT.A cluster. As indicated in the *Progression Documents*, the concept of *unit* is central to this work (CCSWT, 2012, p.3). Just as students understand ones, tens and hundreds as *units* and *units of units* (one hundred can be thought of as 1 hundred, 10 tens, or 100 ones), they will develop understanding of units in money (ones, fives, tens, twenty-fives, fifties, and hundreds) and time (minutes and hours). This provides teachers opportunity to **facilitate connections to students' schema around place value** from Topics 3-5. Students often find the units of time more difficult to understand as they refer to duration and are not tangible (Van de Walle, Karp, Lovin, & Bay-Williams, 2014, p.286).

Money. As students work in Topic 8, they will need to know the names and values of coins, which are conventions of our social system. This information is something that students must be told (Van de Walle, et al., 2014, p.289). However, students need an understanding of 5, 10 and 25 for these values to make sense. For example, students may be confused when we point to *one* nickel and say "This is five." if that student still needs to count objects by ones to determine "how much". When working on the values of coins, consider taking an approach that focuses on purchasing power (a quarter can buy the same thing that 25 pennies can buy). Through the study of the attributes of each coin (color, size, heads/tails sides, etc.) students will develop an understanding that a coin's value is not dependent on its size (Van de Walle, et al., 2014).

Coins are non-proportional representations. Reference the *Math and Science Project*: *Money Matters* and *Extension* activities included in the *Topic Opener* to support students in the study of coins and their attributes when launching the topic (TE p.435). Working with students to create an anchor chart or concept map provides students with a student-created resource for reference throughout the topic. As students identify connections and construct understandings have them add to this chart. For instance, students will develop connections to their place value understanding, use their mental math skills, and skip-count by 5s and 10s (NVACS, 2010, 2.NBT.A.2). Use questioning to help students connect money to the big mathematical idea of measurement. Although money does not explicitly appear in the NVACS for first grade, students use coins in the development of the 5-structure and 10-structure; as well as work with coins as a manipulative for skip counting. These experiences will support students' work with units in money.

Throughout lessons 8-1 to 8-5, students will have the opportunity to consider equivalent representations of a given monetary value. Add these equivalent representations to the class anchor chart or concept map. In lessons 8-1 to 8-4 children are encouraged to order and count coins and bills efficiently by starting with the greatest value and counting on. This leads into an appropriate strategy for creating an organized list (see lesson 8-5) used to find all the different ways to show the same amount of money. Refer to the *Prevent*

Misconceptions and *Error Intervention* notes included in your teacher's edition on the *Step 2 Develop: Visual Learning* pages for insight into possible misconceptions that may arise, and how to respond. As a consideration for long-term planning, students will benefit from learning opportunities throughout the school year to support their understanding of 2.MD.C.8.

Time. The concept of measuring time can be challenging for students as it is unlike other commonly measured attributes. Time is not visible or tangible, but rather, is the duration of an event. In first grade, (NVACS, 2010, 1.MD.B.3) students used analog and digital clocks to tell time to the hour and half-hour. In second grade, (NVACS, 2010, 2.MD.C.7) students learn to read analog and digital clocks in 5-minute intervals. Building on schema from first grade, teachers may consider having students time aspects of their daily lives as a fun and useful way to help students build an understanding of the units of time (minutes, hours). This real-world application can occur throughout the year. As with money, work with students to create an anchor chart or concept map to record understandings and connections. Use questioning to help students connect time to the big mathematical idea of measurement.

To help your students understand how to read analog clocks, consider these suggestions from *Teaching Student-Centered Mathematics*:

- Begin with using approximate language to describe the time on a one-handed clock (with the minute hand broken off). Encourage children to describe the time with phrases such as: "It's a little past 11 o'clock." "It's halfway between 12:00 and 1:00." "It's about 2 o'clock."
- Encourage students to consider what happens to the big hand as the little hand goes from hour to hour. If the minute hand is pointed at 12, where is the hour hand pointing? When the hour hand is about half way between numbers, where is the minute hand pointing? Focusing on this relationship will help students construct an understanding of the functions of the minute hand and hour hand.
- Use a one-handed clock and a two-handed clock. Cover the two-handed clock. Throughout the day, take a minute to discuss the time as shown on the one-handed clock in approximate language. Then, have children predict where the minute hand should be. Finally, reveal the two-handed clock and check for reasonableness of student predictions.
- Use counting by fives to help children learn to tell time in 5-minute intervals. Encourage children to move away from "the minute hand is pointing at the 4", towards "the minute hand is about 20 minutes after the hour." Continue to work towards encouraging students to first look at the hour hand for an approximation of the time, and then use the minute hand for precision.
- Encourage students to relate the time after the hour to the time before the hour to help with both telling time and number sense.   (Van de Walle, et al., 2014, p.287-288)

Math Practice 2: Reason abstractly and quantitatively
Focus opportunities for students to develop MP.2 behaviors. This is the focus of the *Math Practices and Problem Solving* lesson 8-5. Reference the Teacher's Edition (pp. F24-F24A) and the *Nevada Academic Content Standards for Mathematical Practice.*

Note: The purpose of the curriculum guides is for additional considerations. Therefore, not all components may have additional notes included in this guide.

Essential Academic Vocabulary	
Use these words consistently during instruction.	
New Academic Vocabulary: (First time explicitly taught)	**Review Academic Vocabulary**: (Vocabulary explicitly taught in prior grades or topics)
half-dollar tally marks greatest value quarter past least value half past dollar quarter to dollar sign a.m. dollar bills p.m.	*dime* *nickel* *penny* *quarter* *cents*

Additional terminology that students may need support with:

*Collaborative Team Conversations (CTC)

Consider using *one* of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for <u>evidence of mathematical understanding</u>:

Guiding questions: "Are students able to determine the value of a collection of coins and understand that different coins have different values?"
"Are students able to tell time to the nearest 5 minutes, and do they understand that numbers on an analog clock do not indicate numbers of minutes before or after an hour?"

Lesson	Evidence	Look for
8-4	*Solve & Share* (student work samples) *Money*	Focus CTC around the big idea: • Strategies and models to solve problem • understand that size of coin/bill does not indicate value
8-6	*Quick Check* (digital platform) *Time*	Focus CTC around data analysis and collection of student workspace (scratch paper). Printable version available under "Teacher Resources".

Learning Cycle Assessments (summative)	*Topic Assessments* SE pp. 497--502	Use *Scoring Guide* TE pp. 497-502

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Lesson 8-1: Solve Problems With Coins		
2.MD.C.8 2.NBT.A.2 MP.1 **MP.2** MP.3 MP.5	**Access Prior Learning**: In Topics 3-5, second grade students worked with place value and skip counting. **Developing the Big Idea:** In this lesson, students are *developing* understanding of coins as non-proportional units in which their size does not relate to their value. They count on to determine the value of a collection of coins already listed in order from greatest value to least using concrete objects and drawings.	**Possible 2-day Lesson** *Resources:* It is optimal to use real coins, but plastic coins are an alternative. Many teachers request families to send in a bag of coins for the child to use in math. **Day 1:** **Topic Opener:** Although money is not in the first grade standards, students do work with coins in Bridges Number Corner. Regardless, students will benefit from beginning the topic with the *Topic Opener* and a discussion of the *Topic Essential Question* (TE, p. 435). Follow with the *Math and Science Project: Money Matters* and *Extension* activity (TE, p.435). This project pairs well with the *Topic 8 Vocabulary Words Activity* (TE, pp.437-438) using the words, *cents, penny, nickel, dime, quarter,* and *half-dollar.* Also, consider having students include attributes of each coin on the graphic organizer (Teaching Tool 60) and post them as resources on the math focus wall. Introduce the remaining vocabulary words as they appear in instruction. Finally, use the *Review What You Know* (TE, p. 436) to help identify students who may need additional support. Consider offering support as indicated in the *Item Analysis for Diagnosis and Intervention chart* (TE, p.436) which connects missed items to corresponding lessons in the MDIS kit. Lastly, enlist the help of families by sending the *Home School Connection for Topic 8* (available on Pearson Realize Online) which encourages children to practice counting coins. **DAY 2** **Solve & Share:** Ensure that all students have access to coins. Child-watch for students who demonstrate understanding of coins and their values as they solve this two-step *Add To Result Unknown* word problem. Students may need support with how to draw coins in an efficient manner. ① ⑤ ⑩ ㉕ **Visual Learning:** As students discuss the *Visual Learning,* look for opportunities to add equivalent representations of coin values (a quarter is equivalent to 2 dimes and 1 nickel) to the vocabulary resources created in the *Topic Opener* above. Focus the conversation on efficient ways to count coins, beginning with the coin of greatest value. Also, highlight the importance of the cent sign in indicating the unit. This is a helpful connection to MP.6 Attend to Precision. *-continues on next page-*

		Independent Practice/Math Practices and Problem Solving:
		As previously indicated, students do NOT need to do all of the problems in their student edition. However, ALL students NEED to have opportunities to solve problems at varying DOK levels. The *Independent Practice* page offers problems that support procedural skill and fluency. The *Math Practices and Problem Solving* page offers problems that support application. The *Quick Check* items (marked with a pink check) offer both opportunities. Have students complete these items first and continue on to other items as appropriate.

Lesson 8-2: Continue to Solve Problems With Coins

2.MD.C.8 2.NBT.A.2 MP.3 MP.4 MP.5 MP.6	**Access Prior Learning**: In the prior lesson, second grade students counted on, to determine the value of coins already listed in order from greatest value to least. **Developing the Big Idea:** In this lesson, students are *developing* understanding of coins as non-proportional units in which their size does not relate to their value. They order and count on to determine the value of a collection of coins using concrete objects, drawings and mental math.	**Solve & Share:** Allow students to problem solve before introducing new vocabulary, *greatest value and least value*. Formatively assess students' understanding of these terms during problem solving, then, use the share to highlight these comparisons. Select students to use the graphic organizer "Picture the Word" (Teaching Tool 58) to create a shared resource defining *greatest value* and *least value*. This provides students with an opportunity to represent coins efficiently, as discussed in lesson 8-1 above. Add these graphic organizers to the focus wall. **Visual Learning:** When planning, prepare intentional responses to student misconceptions by reviewing *Prevent Misconceptions* and *Error Intervention* notes (TE, p.450). Use real coins if available. **Independent Practice/Math Practices and Problem Solving:** Continue to ensure that all students have access to concrete coins. Child-watch for students who struggle to order and count coins beginning with the coin of greatest value. Engage these students in small group instruction using the *Intervention Activity* (TE, p.453A) during *Assess and Differentiate*.

Lesson 8-3: Solve Problems With Dollar Bills

2.MD.C.8 2.NBT.A.2 **MP.2** MP.4 MP.6 MP.7	**Access Prior Learning**: In lesson 8-1 and 8-2, second grade students ordered and counted coins beginning with the coins of greatest value. **Developing the Big Idea:** In this lesson, students are *developing* understanding of bills as non-proportional units in which their size does not relate to their value. They make collections of coins with a value of 100 cents. They also order and count on to determine the value of a collection of bills.	*Resources:* Ensure that students are using concrete objects. Teaching Tools 32-33 offer printable bills. These are located in the *Teacher's Resource Masters Volume 2*. **Solve & Share:** Continue to ensure that all students are encouraged to use concrete coins in addition to drawings. Ask students to show two ways to build 100 cents with coins. Child-watch for students who demonstrate flexibility and efficiency. If students use 100 pennies, ask if there is a more efficient way to build 100 cents. Doing so supports students' understanding of units in money, connecting to their place value understanding. **Visual Learning:** Focus the discussion on making connections between counting coins and counting bills. This will support students when they respond to *Do You Understand? Show Me!* (TE, p.456). Also, highlight the importance of the dollar sign in indicating the unit. This is a helpful connection to MP.6 Attend to Precision. Students may need support with how to draw bills in an efficient manner. $1 $5 $10 $20 $100

Lesson 8-4: Continue To Solve Problems With Dollar Bills

2.MD.C.8 2.OA.A.1 MP.1 **MP.2** MP.4 MP.6	**Access Prior Learning**: In the prior lesson, students made collections of coins with a value of 100 cents. They also ordered and counted on to determine the value of a collection of bills. **Developing the Big Idea:** In this lesson, students are *developing* understanding of addition and subtraction word problems involving money (bills).	This lesson offers opportunities to connect to the purpose of the *Problem Solving Record Sheet* (Teaching Tool 1). Encourage students to identify what they know and what they need to find before solving. Continue to encourage all students to use concrete money manipulatives to support their pictorial representations. **Solve & Share:** This problem presents a *Put Together Total Unknown* problem with three addends. Child-watch for students who apply strategies such as skip counting or mental math (e.g., two $10 bills is $20). If students use less efficient strategies such as counting all or counting on, ask them if they can use skip counting or known facts to solve the problem more efficiently. All students should show their work with drawings, but some may need to model the problem using concrete bills. This is the case for students who demonstrate a misconception similar to Clay's Work in *Analyze Student Work* (TE, p.461). As noted in the Coherence section (TE, p.461A), also watch for and encourage students to keep track of their thinking with organized lists. This will connect to their use of organized lists in lesson 8-5. If students use these strategies, select them to share. *-continues on next page-*

		Independent Practice/Math Practices and Problem Solving: Item 9 presents an opportunity for students to explore money as non-proportional representations- the size does not affect the value. All U.S. bills have the same dimensions regardless of value. Also, the count of bills is irrelevant without considering the unit or value. Consider engaging students in a discussion around these ideas. *CTC: *Solve & Share* (student work samples)

Lesson 8-5: Math Practices And Problem Solving: Reasoning

2.MD.C.8 2.OA.A.1 MP.1 **MP.2** MP.3 MP.4 MP.8	**Access Prior Learning**: In Topic 7, second grade students focused on Math Practice 2: Reason Abstractly and Quantitatively. **Developing the Big Idea:** In this lesson, students are *developing* understanding of Math Practice 2: Reason Abstractly and Quantitatively through writing and solving word problems.	Students focused on MP2. Behaviors in Topic 7. Reference the *Math Practices and Problem Solving Handbook* for suggestions for developing, connecting and assessing MP.2 (TE, pp.F24-F24A). Also, consider having students self-reflect on their understanding of this math practice using the *Self-Assessment Tool* (Teaching Tool 65). Self-reflection engages students in metacognition and encourages a growth mindset in mathematics. MP. 2 Behaviors: • Identifies and understands the quantities in the problem. • Shows and explains how quantities are related (e.g., bar diagram, table). • Translates real-world contexts correctly to numbers, expressions, equations, or concrete or pictorial representations. • Connects numbers, expressions, equations, or concrete or pictorials representations back to real-world contexts. Solve & Share: During problem solving, child-watch for students who generalize their work with ordering coins and bills from greatest value to least value to complete the table in a systematic manner. Select and sequence the share to progress from less systematic to more systematic student solutions. Facilitate conversation that encourages students to connect peers' strategies and evaluate them for efficiency. Ask, "Which strategy would be most helpful in finding *all* the possible combinations to make a given value?"

Lesson 8-6: Tell Time To Five Minutes

2.MD.C.7 2.NBT.A.2 MP.2 MP.5 MP.6 MP.8	**Access Prior Learning**: In first grade (1.MD.B.3), students told time to the nearest hour and half-hour using analog and digital clocks. **Developing the Big Idea:** In this lesson, students are *developing* greater precision with telling time to the nearest 5 minutes. **Securing the Big Idea:** In this lesson, students are *securing* understanding of how to tell time using analog and digital clocks to the nearest hour and half-hour.	Possible 2-Day Lesson *Resources*: Teaching Tools 34-35 are available for printable analog and digital clocks. These are located in the *Teacher's Resource Masters, Volume 2.* If students demonstrate confusion around telling time with analog clocks, refer to the suggestions provided in the Instructional Note at the beginning of this document. Also, refer to the suggestion offered in the *Prevent Misconceptions* note (TE, p.474). This lesson offers students the opportunity to use skip counting by 5s up to 60 when telling time. Independent Practice/Math Practices and Problem Solving: The Item 9 instructional note (TE, pp.475-476) offers an opportunity to engage students in a conversation around 0 as a placeholder in place value (106 is not the same as 16), as well as in telling time. *CTC: *Quick Check* (digital platform)

Lesson 8-7: Tell Time Before And After The Hour

2.MD.C.7 2.NBT.A.2 MP.3 MP.4 MP.6 MP.8	**Access Prior Learning**: In first grade (1.G.A.3), students partitioned circles into halves and fourths, using the words: *halves, fourths, quarters, half of, fourth of,* and *quarter of.* In lesson 8-6, second grade students told time to the nearest 5 minutes.	To support students in understanding *quarter past, half past* and *quarter to,* intentionally use these phrases when referring to time throughout the school day and year. For example, "We will go to music at half past ten." Also, work with students to construct a vocabulary graphic organizer such as "Picture the Word" (Teaching Tool 58). As students draw a variety of analog and digital clocks that show the term, ask them to identify commonalities. It is also helpful for students to consider non-examples. Understanding of the unit of an hour is critical to connecting these terms to their meaning, and supports fraction development (Van de Walle et al., 2014, p.253). *-continues on next page-*

	Developing the Big Idea:	Visual Learning:
	In this lesson, students are *developing* understanding that time can be described in different ways, including before and after the hour using: *quarter past, half past* and *quarter to*.	Partitioning circles into halves and fourths can help students understand why 30 minutes can be referred to as *half past*, or 45 minutes can be referred to as a *quarter to*. Further support is offered in the *Intervention Activity*, "The Face of Time!" (TE, p.483A).Consider using Teaching Tools 34 and 35.

Lesson 8-8: A.M. And P.M.

2.MD.C.7 2.NBT.A.2 **MP.2** MP.6 MP.8	**Access Prior Learning**: In the prior lesson, second grade students described time in different ways, including before and after the hour using: *quarter past, half past* and *quarter to*. **Developing the Big Idea:** In this lesson, students are *developing* understanding of a.m. and p.m. They use reasoning to determine which is appropriate to describe the time of the event.	As stated in the *Coherence* note, students' work with a.m. and p.m. deepens their understanding of time as relevant to their daily lives (TE, pp.487-488).

References

Boaler, J. (n.d.). The Importance of Visual Mathematics – and Fingers: new evidence from brain science. Retrieved June 06, 2017, from https://www.youcubed.org/visual-math-network/visual-math-paper/

Common Core Standards Writing Team. (2012, June 23). *Progressions for the Common Core State Standards in Mathematics (draft). K-5 Geometric Measurement*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Council of Chief State School Officers. (2010). The Nevada Academic Content Standards. Retrieved from http://www.doe.nv.gov/uploadedFiles/nde.doe.nv.gov/content/Standards_Instructional_Support/Nevada_Academic_Standards/Math_Documents/mathstandards.pdf.

Van de Walle, J., Karp, K., Lovin, L., & Bay-Williams, J. (2014). *Teaching student-centered mathematics: Developmentally appropriate instruction for grades Pre-K-2* (2nd ed.). Boston, MA: Pearson.