CCSS-Aligned Mathematical Task

Title: Jordan Saves Money
Grade 2

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Task

Jordan wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39.

Explain your thinking in two or more ways by using words, pictures, number sentences, and/or models.

1. How much money will he have to save for both?

2. Jordan gets $5 a week for his allowance. He plans to save his allowance every week. How many weeks does it take him to reach this goal?

3. Jordan remembers his sister's birthday is next month. He sets a goal of saving $16 for her gift. How much will Jordan have to save to be able to buy the school supplies, new shoes, and birthday present?

4. How many weeks does Jordan have to save his allowance to be able buy all three things?

Adapted from Illustrative Mathematics, 2 OA.A.1 Task: Saving Money

Rationale for Lesson

The purpose of this task is to have students engage in two-step word problems that involve addition and subtraction within 100 and unknowns in various positions.

Common Core State Standards for Content

2.OA.1

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart and comparing with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

2.NBT.2
Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.5
Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Common Core State Standards for Mathematical Practice

MP1: Make sense of problems and persevere in solving them. In grade two, students realize that doing mathematics involves reasoning about and solving problems. Students explain to themselves the meaning of a problem and look for ways to solve it. They may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" They make conjectures about the solution and plan out a problem-solving approach.

MP3: Construct viable arguments and critique the reasoning of others. Grade-two students may construct arguments using concrete referents, such as objects, pictures, math drawings, and actions. They practice their mathematical communication skills as they participate in mathematical discussions involving questions such as "How did you get that?" "Explain your thinking," and "Why is that true?" They not only explain their own thinking, but also listen to others' explanations. They decide if the explanations make sense and ask appropriate questions. Students critique the strategies and reasoning of their classmates. For example, to solve 74-18, students might use a variety of strategies and discuss and critique each other's reasoning and strategies.

MP4: Model with mathematics. The problem is using real life situation to model the math problem. In early grades, students experiment with representing problem situations in multiple ways, including writing numbers, using word (mathematical language), drawing pictures, using objects, acting out, making a chart or list, or creating equations. Students need opportunities to connect the different representations and explain the connections. Students model real---life mathematical situations with an equation and check to make sure that their equation accurately matches the problem context. They use concrete manipulatives or math drawings (or both) to explain the equation. They create an appropriate problem situation from an equation. For example, students create a story problem for the equation 43+__=82, such as "There were 43 mini-balls in the machine. Tom poured in some more mini-balls. There are 82 mini-balls in the machine now. How many balls did Tom pour in?" Students should be encouraged to answer questions, such as "What math drawing or diagram could you make and label to represent the problem?" or "What are some ways to represent the quantities?"

MP5: Use appropriate tools strategically. In second grade, students consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be better suited than others. For instance, grade-two students may decide to solve a problem by making a math drawing rather than writing an equation. Students may use tools such as snap cubes, place-value (base-ten) blocks, hundreds number boards, number lines, rulers, virtual manipulatives, diagrams, and concrete geometric shapes (e.g., Pattern blocks, three-dimensional solids). Students understand which tools are the most appropriate to use. For example, while measuring the length of the hallway, students are able to explain why a yardstick is more appropriate to use than a ruler. Students should be encouraged to answer questions such as, "Why was it helpful to use?"

MP6: Attend to precision. The students have to attend to precision when solving the problems because each part helps the student solve the next part correctly. As children begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and when they explain their own reasoning. Students communicate clearly, using grade---level---appropriate vocabulary accurately and precise explanations and reasoning to explain their process and solutions. For example, when measuring an object, students carefully line up the tool correctly to get an accurate measurement. During tasks involving number sense, students consider if their answers are reasonable and check their work to ensure the accuracy of solutions.

DOK Level:

Level 3 Strategic Thinking/ Reasoning

Enduring Understandings

- Problem can be solved by counting all, counting on from a quantity, or counting on from the largest set when solving for the whole
- Skip-counting or making an organized list is the same as adding the same number in a repeated form
- For complex problems, it is important for students to represent the problem situations with drawings and equations

Materials Needed

- Ten-frames, place value discs, tens rods, place value chart with tens and ones, number lines,
- Paper to draw pictures, graph paper, paper
- Crayons, pencils, erasers
- Any other manipulatives that your students are comfortable with using to solve word problems.
- A copy of *Jordan Saves Money* for each student

Literature Connection

- Pigs will be Pigs, Alexander Who Used to be Rich, The Penny Pot, Lemonade in Winter, The Kids' Money Book

Consider a read-aloud prior to the lesson.

Set-Up Phase

This lesson could be completed as one extended math lesson; however the suggested pace is to complete the lesson over 2 to 3 math lessons.

Tell/Read a story about saving money. Ask the students if they ever saved money or heard of someone that wanted to save money? Ask about reasons why someone would want to save money. How would they do it? Generate the vocabulary of allowance, save, donate, school supplies and others that you think your students would benefit from. If students are unfamiliar with the concept of an allowance, talk about making and saving money while doing chores for family, friends or neighbors. Use pictures to generate definitions if needed to support ELD students.

Give the students the problem titled, Jordan Saves Money. Read and discuss Part 1, as a whole group before breaking into small groups.

The following is a sample of how to use **'Talk Moves'** to check for understanding of the task:

- Have a student read the problem for Part 1. Ask another student to re-read the task. Ask for a volunteer to restate what the problem is asking. Ask for a volunteer to add-on to what the previous student stated.
- Underline/highlight the important information in Part 1. Ask if there are any remaining questions before breaking up into groups.
- Once the task has been reviewed have students work in strategic pairs, or table groups.
    - One suggestion is to group students based on their choice of manipulatives.

Repeat the same procedure for Parts 2, 3 and 4 over the designated days as you see fit and time allows.

Explore Phase

Allow the students 5 minutes of private think time before they begin working with their partner(s). Allow the students time to work and provide any manipulatives needed to solve the problem.

When it's time to work collaboratively, pair or group students strategically for language support to encourage constructive conversations.

Circulate around the classroom and pose questions to various groups as needed. Think about student solutions you want to share with the whole class in the Share/Discuss/Analyze step.

Possible Student Strategies	**Focusing Questions**	**Assessing Questions**	**Advancing Questions**
Students may draw pictures.	What do you know? What are you trying to find out?	How does the drawing match the problem?	
Students may count by fives using ten-frames, number lines.	How does this tool help you?	How might you record the work on paper?	What patterns do you see? How do you know whether or not this pattern always works?
Students may use number bonds.	Which friendly numbers are you making?	How are you choosing to break apart the numbers?	How might you show the number bonds on a number line?
Students may use place value discs or charts	How do the discs match the problem?	How can you show your work on paper?	
Students may use base-10 blocks.	How do the blocks help model the problem?		What do the base-10 blocks and number lines have in common?
Student is having difficulty organizing the information	How could you use a table to help you record what is happening in the problem?		
Student may use a table	How does the table match the problem?	How is the table and the number of weeks related?	

Differentiation/Support

Guidance from: Integrating the CA ELD Standards into K-12 Mathematics and Science Teaching and Learning: "Students use detailed evidence from their models to relate their strategy to a written method (MP.2) and to persuade others that their strategy is correct."

"For example, students work in pairs to solve addition and subtraction problems, using more than one strategy, and then explain to another pair of students why their strategies work, using accurate terms and vocabulary."

"When adding and subtracting within 20, students work in pairs or triads to connect their ideas, using language frames to combine clauses. For example, to explain how they solved 13 – 4 by decomposing a number to find the difference, students use teacher-provided language frames that support them in deepening their mathematical thinking and extending their use of math language (e.g., "We wanted to find the difference, so we ___. We started with _____, and then we ____. We knew that ____, so we ____. We decided to ____ because ____."). Using these frames, the students write an explanation such as: "We wanted to find the difference, so we started by decomposing the 4 to 3 + 1. Then we subtracted 13 – 3 to get 10. We knew that we needed to subtract 1 more, and then our final answer was 13 – 4 = 9."

Consider using the Standards for Mathematical Practices Look-Fors (attached) to keep a record of students' progress in the practice standards.

Consider using the Math Constructive Conversation Skills Poster (attached) to support student conversations.

Consider posting a math word wall, as students use the terms.

Share, Discuss, and Analyze Phase

As the students work in their groups, the teacher chooses 3 or 4 solution paths to share with the whole class.

The teacher may choose to:

- Anonymously share: show student work without identifying the author, and ask the students to explain the solution path.
- Build from concrete to symbolic: show drawings, then equations
- Show connections between solution paths:
    - Show base ten blocks, then show a number line drawing. Ask how they are similar and different.
    - Show counters, show an equation, compare/contrast.
    - Show a table and show ten frames, ask how skip counting is depicted in each.
    - Show an open number line. Discuss efficiency.

The teacher is the facilitator of the Share/Discuss/Analyze step and guides the sharing and the discussions of the students.

Include 'Talk Moves' strategies to increase discourse. Ask students to restate/rephrase and add-on to what other students are saying. Encourage the students to ask questions during this step to deepen their understanding of the solution path presented, such as:

- What questions do you have for this mathematician?
- I'm wondering how you decided to skip count by 5's?
- What is same about the solutions shared?
    - One similarity is…
    - Both solutions…
- What strategies make the most sense to you?
- What does it mean for a strategy to be "efficient"?
- What is a new strategy that you want to try next time?

Application

Can be used as an Exit Ticket, homework, or reflection in Math Journal.

Pose an opportunity to use someone else's strategy to solve a similar problem:

What is 49+16=____
Or
How might I show skip counting by 5, 7 times? How would I know when to stop?

Summary

This is the direct instruction portion of the lesson. It is a short summary of what you, as the teacher, want the students to take away.

When we solve multi-step word problems we need the answer from one part of the problem to be able to answer the other parts. Different parts can be built upon using the previous answers. There are several solution paths to show skip counting, and calculations, and to represent this type of thinking. Some strategies are more efficient and save time.

Quick-Write

Have students write in their math journal about what strategy they used to solve the problem and how it was similar or different than other strategies. How was one strategy more efficient than another?

Jordan Saves Money

Jordan wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39.
Explain your thinking in two ways by using words, pictures, number sentences, and/or models.

1. **How much money will he have to save for both?**

Jordan will have to save $_____ for both, because

_____

_____

_____

_____

_____

2. **Jordan gets $5 a week for his allowance. He plans to save his allowance every week. Jordan thinks it will take 10 weeks to reach his goal. His brother says it will take 11 weeks. Who is correct and why?**

_____ is correct, because_____

_____

_____

_____

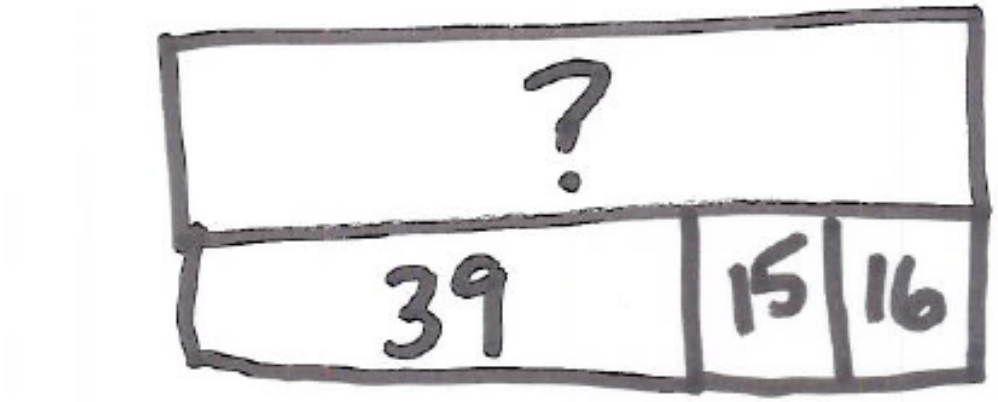
_____

_____

_____

_____

3. **Jordan remembers his sister's birthday is next month. He sets a goal of saving $16 for her gift. How much will Jordan have to save to be able to buy the school supplies, new shoes, and birthday present? Jordan uses a part-part-whole model.**



$\square = 39 + 15 + 16$

Jordan will have to save $_____ to buy all three things. Explain Jordan's thinking.

_____

_____

_____

_____

_____

4. How many weeks does Jordan have to save his allowance to be able buy all three things?

Jordan will now have to save his allowance for _____ weeks to

reach his goal, because

_____

_____

_____

_____

_____

_____

Teacher(s): **Mathematical Topic(s):** **Date:**

1. Makes sense of problems and perseveres in solving them

- ☐ Understands the meaning of the problem and looks for entry points to its solution
- ☐ Analyzes information (givens, constrains, relationships, goals)
- ☐ Designs a plan
- ☐ Monitors and evaluates the progress and changes course as necessary
- ☐ Checks their answers to problems and ask, "Does this make sense?"

Comments:

2. Reason abstractly and quantitatively

- ☐ Makes sense of quantities and relationships
- ☐ Represents a problem symbolically
- ☐ Considers the units involved
- ☐ Understands and uses properties of operations

Comments:

4. Model with mathematics.

- ☐ Apply reasoning to create a plan or analyze a real world problem
- ☐ Applies formulas/equations
- ☐ Makes assumptions and approximations to make a problem simpler
- ☐ Checks to see if an answer makes sense and changes a model when necessary

Comments:

8. Look for and express regularity in repeated reasoning

- ☐ Notices repeated calculations and looks for general methods and shortcuts
- ☐ Continually evaluates the reasonableness of their results while attending to details and makes generalizations based on findings
- ☐ Solves problems arising in everyday life

Comments:

3. Construct viable arguments and critique the reasoning of others

- ☐ Uses definitions and previously established causes/effects (results) in constructing arguments
- ☐ Makes conjectures and attempts to prove or disprove through examples and counterexamples
- ☐ Communicates and defends their mathematical reasoning using objects, drawings, diagrams, actions
- ☐ Listens or reads the arguments of others
- ☐ Decide if the arguments of others make sense
- ☐ Ask useful questions to clarify or improve the arguments

Comments:

5. Use appropriate tools strategically.

- ☐ Identifies relevant external math resources (digital content on a website) and uses them to pose or solve problems
- ☐ Makes sound decisions about the use of specific tools. Examples may include:
  - ☐ Calculator
  - ☐ Concrete models
  - ☐ Digital Technology
  - ☐ Pencil/paper
  - ☐ Ruler, compass, protractor
- ☐ Uses technological tools to explore and deepen understanding of concepts

Comments:

7. Look for and make use of structure.

- ☐ Looks for patterns or structure
- ☐ Recognize the significance in concepts and models and can apply strategies for solving related problems
- ☐ Looks for the big picture or overview

Comments:

6. Attend to precision.

☐ Communicates precisely using clear definitions
☐ States the meaning of symbols, calculates accurately and efficiently
☐ Provides carefully formulated explanations
☐ Labels accurately when measuring and graphing

Comments:

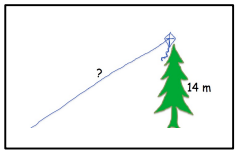
Math Constructive Conversation Skills Poster

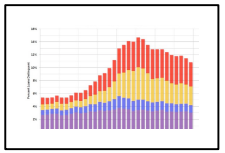
Clarify Problem and Ideas for Solving It

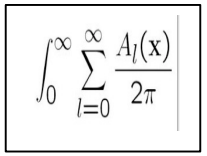
Prompt starters:
- What are we trying to do?
- What is the problem asking?
- How does the problem begin?
- What happens in the problem?
- What do we need to know?
- How can we break this down?
- What type of problem is this?
- What patterns do we notice?
- What's a possible plan for solving it?
- What is your estimate for the answer?
- Why are you doing that?
- Where did that number come from?

Response starters:
- In order to ___, we need to …
- In other words,
- More specifically, it is … because…
- Let's see, it is similar to the problem about … that we did because…
- It is important to ____because
- Let's stay focused on ….
- Let's get back to the idea of…
- In future problems like this one we need to remember to…

Generate & Try Multiple Methods & Representations





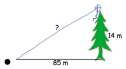


Prompt starters:
- How else can we show this?
- How can we draw or graph this?
- What symbols can we use?
- How can we explain this to others?
- How can we write what we are thinking/doing?
- How can we translate this into symbols?
- Let's back up and try a different way.
- Which method is most useful? Why?

Response starters:
- Maybe we can use…
- Another way to show this is…
- In math symbols we could write…
- We can draw it like this because it says…
- Let's try to… and see what happens.

Build Math Solutions, Ideas, & Understandings

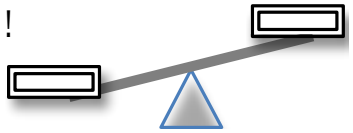
Explain & Support Reasoning

&& "rules" e.g.  erify

Prompt starters:
- Can you explain why you…?
- What does that mean?
- What are you doing?
- What math rule are you using?
- Can you give an example?
- How does the sample problem help us?
- What are examples of this problem from real life?
- Can you clarify where you…?
- How did you get this answer?

Response starters:
- If we ____, then we need to ___ because…
- A key mathematical principle is making sure that you…
- In real life this is similar to when you want to…
- An example from my life is
- One case that illustrates this is…
- In math, we always need to…
- Let me show you what I mean.
- We can't do that because it…

Negotiate Ideas



Prompt starters:
- can we add to the idea of…
- What do you think about this strategy for solving it?
- What else could support this idea?
- Do you agree?
- What contradicts this? What are other points of view?
- What did we learn from doing this problem? How will it help in life?
- Let's create a similar problem.

Response starters: How
- That reminds me of…
- I want to add on to your idea of…
- That idea connects to…
- I see it a different way,
- On the other hand, …
- That makes me think of…
- We can agree that…