

Rich Mathematical Task – Kindergarten – *Picking Apples*

Task Overview/Description/Purpose:
<ul style="list-style-type: none"> In this task students will explore the part-whole relationship for numbers up to five in order to facilitate the development of fluency with addition and subtraction. Using a set of counters in two different colors, students will explore and represent ways to decompose five.

Standards Alignment: Strand – Number and Number Sense
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<p>Primary SOL: K.4 The student will</p> <ul style="list-style-type: none"> a) recognize and describe with fluency part-whole relationships for numbers up to 5 b) investigate and describe part-whole relationships for numbers up to 10. <p>Related SOL: K.6, 1.7 a,b; 2.5b</p>

<p>Learning Intentions:</p> <ul style="list-style-type: none"> Content – I am learning to compose and decompose numbers up to five using concrete models. Language – I am learning to use the language of mathematics to describe my understanding of part-whole relationships. Social – I am learning to describe my thinking and listen as classmates share their mathematical thinking.

<p>Success Criteria (Evidence of Student Learning):</p> <ul style="list-style-type: none"> I can compose and decompose numbers up to five using concrete models. I can describe with fluency part-whole relationships for numbers up to five using multiple representations. I can use the language of part-whole relationships when sharing my solutions. I can describe my thinking and listen as my classmates share their mathematical ideas.
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Mathematics Process Goals	
Problem Solving	Students will apply their understanding of the composition of numbers to five as they investigate part-whole relationships.
Communication and Reasoning	Students will represent, describe, and justify their mathematical thinking through their representations and labeling of ways to decompose the number five.
Connections and Representations	Students will represent ways to decompose the number five using concrete models and pictures. Through these representations, students will make connections to the patterns that exist in decomposing any number.

Task Pre-Planning

Approximate Length/Time Frame: 45 minutes
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Grouping of Students: Students begin the task independently. As the task progresses, students share ideas with a partner. Students will communicate findings by sharing models and representations during a whole group reflection.
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<p>Materials and Technology:</p> <ul style="list-style-type: none"> color tiles, bears, cubes (two colors) copy of the task sheet for each student writing tools (marker, crayon, pencil) document camera, if available (for sharing) 	<p>Vocabulary: (<i>mathematical vocabulary specific to grade level of the task</i>)</p> <ul style="list-style-type: none"> part, whole compose, decompose strategy, fluency combine, join, separate
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Task Pre-Planning

Anticipate Responses: See Planning for Mathematical Discourse Chart (Columns 1-3)

Task Implementation (Before)

Task Launch:

- *Prior to launching the task, the teacher should wrap a combination of five green and red apples with foil and place them in a bag.*
- During the whole group launch ensure students understand the task vocabulary by sharing pictures of apples, like the one included in this task. Explain that as people choose apples at the store, or in an orchard, they often collect them in a bag. Allow students to share their experiences with choosing different apples.
 - Read the task aloud to students.
 - Explain to students that their task is to figure out what combination of red and green apples Tom might have in his bag. Encourage students to use counters and to show their thinking in pictures, numbers, and words.
 - Tell students they will explore different combinations on their own before sharing with a partner.
- Before sending students off to start the task, share your bag of five foil wrapped apples. Tell students that some are green and some are red, just like in Tom’s bag. Encourage students to think of as many possible combinations as they can. Tell them you will share your apples at the end of the task.

Task Implementation (During)

Directions for Supporting Implementation of the Task

- Monitor – Teacher will listen and observe students as they work on task and ask assessing or advancing questions (see potential ideas on the Planning for Mathematical Discourse Chart).
- Select – Teacher will decide which strategies or thinking that will be highlighted (after student task implementation) in order to advance mathematical ideas and support student learning.
- Sequence – Teacher will decide the order in which student ideas will be highlighted (following the student task implementation).
- Connect – Teacher will consider ways to facilitate connections between different student responses.

*The teacher should listen and take notes while students are working and sharing ideas, as some kindergartners may not be fully able to express their mathematical thinking fully in a picture or with numbers.

Suggestions For Additional Student Support

May include, among others:

- Create an anchor chart to display task vocabulary.
- Provide a five-frame (see sample included) to students who may not be able to count five objects.
- Increase or decrease the number of apples.
- Provide the recording sheet (see sample included) for students to represent different part-whole combinations.
- Use [VDOE Vocabulary Word Wall Cards](#) for *addition*, *join*, and *part-whole*.
- Use two-color counters (i.e., red/yellow) which supports maintaining the whole (five) constant.
- Provide a part-part-whole chart (see example included).

Task Implementation (After)

Connecting Student Responses (From Anticipating Student Response Chart) and Closure of the Task:

- Based on the actual student responses, sequence and select particular students to present their mathematical work during class discussion.

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Task Implementation (After)

- Connect different students' responses and connect the responses to the key mathematical ideas to bring closure to the task.
- Consider ways to ensure that each student will have an equitable opportunity to share his/her thinking during task discussion.
- During the whole group reflection, model for students how you would listen and evaluate each classmate's response by asking questions such as:
 - Does the model show some red apples?
 - Does the model show some green apples?
 - How many apples are there altogether?
 - After modeling, consider having partners share their part-whole relationships using similar questions.
- As students share during whole group, record each combination in such a way that students will begin to see the patterns. Begin by recording 1 and 4, 2 and 3, and then connect to symbols and record equations, as appropriate for each group of students.
- Students may find it exciting to see the combination of apples you wrapped and put in your bag; however, you do not want to give students the impression that *your apple representation* is "the only way or the right way." Consider the best way to reveal the apples in your bag.
- Close the lesson by returning to the success criteria. Have students reflect on their progress toward the criteria.

Teacher Reflection About Student Learning:

- Use the rich mathematical task rubric to evaluate students' progress toward the process goals.
- Based on student responses, the teacher may repeat the task using different contexts and different numbers of objects up to 10. Listed below are several potential ideas:
 - 7 balloons—some blue and some red;
 - 6 crayons—some pink and some yellow;
 - 8 pennies—some with heads up and some with tails up;
 - 9 eggs—some plain and some fancy (using Patricia Polacco's book *Plain and Fancy*).
- Another way to engage students in exploring and developing fluency with part-whole relationships is to ask them to show you a given number of fingers (held up like Indian feathers). For example, *show me 6 with two hands*. A student might show 2 on one hand and 4 on the other. You can then say "*show me another way.*"
- When recording student combinations, it is important to record them in a way that reveals the patterns associated with decomposing numbers – this will allow students to see that as one number increases, the other number decreases by the same amount.

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Mathematical Task: Picking Apples

Content Standard(s): K.4ab

Teacher Completes Prior to Task Implementation			Teacher Completes During Task Implementation	
Anticipated Student Response/Strategy <i>Provide examples of possible correct student responses along with examples of student errors/misconceptions</i>	Assessing Questions – Teacher Stays to Hear Response <i>Teacher questioning that allows student to explain and clarify thinking</i>	Advancing Questions – Teacher Poses Question and Walks Away <i>Teacher questioning that moves thinking forward</i>	List of Students Providing Response <i>Who? Which students used this strategy?</i>	Discussion Order - sequencing student responses <ul style="list-style-type: none"> ● <i>Based on the actual student responses, sequence and select particular students to present their mathematical work during class discussion</i> ● <i>Consider ways to ensure that each student will have an equitable opportunity to share his/her thinking during task discussion</i>
Anticipated Student Response: Student uses a random combination of red and green apples (not equal to 5).	How many apples did Tom have in his bag? How many do you have? Can you count them?	Does your combination of red and green apples equal 5?	Student F	
Anticipated Student Response: Student struggles to count to 5.	Provide student a five frame. How many boxes do you see? How can you use the five frame to count 5 apples?	Do you have 5 apples?	Student E	
Anticipated Student Response: Student chooses 5 random colors to make 5, or student makes all apples the same color.	Tell me which counters represent red apples and which represent green apples.	How many different colors did Tom have in his bag?	Student C	
Anticipated Student Response: Student correctly decomposes 5 into two sets.	If you put the 3 red and 2 green apples together, how many would there be?	Is there another combination that makes 5?	Students A, B, D	

Name _____

Date _____

Picking Apples

Tom put 5 apples in a bag. Some of the apples were red, and some were green.

- How many red apples could be in the bag?
- How many green apples could be in the bag?

Show what Tom's bag of apples might look like. Could it look a different way?



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Rich Mathematical Task Rubric

	Advanced	Proficient	Developing	Emerging
Mathematical Understanding	<p>Proficient Plus:</p> <ul style="list-style-type: none"> • Uses relationships among mathematical concepts 	<ul style="list-style-type: none"> • Demonstrates an understanding of concepts and skills associated with task • Applies mathematical concepts and skills which lead to a valid and correct solution 	<ul style="list-style-type: none"> • Demonstrates a partial understanding of concepts and skills associated with task • Applies mathematical concepts and skills which lead to an incomplete or incorrect solution 	<ul style="list-style-type: none"> • Demonstrates little or no understanding of concepts and skills associated with task • Applies limited mathematical concepts and skills in an attempt to find a solution or provides no solution
Problem Solving	<p>Proficient Plus:</p> <ul style="list-style-type: none"> • Problem solving strategy is efficient 	<ul style="list-style-type: none"> • Problem solving strategy displays an understanding of the underlying mathematical concept • Produces a solution relevant to the problem and confirms the reasonableness of the solution 	<ul style="list-style-type: none"> • Chooses a problem solving strategy that does not display an understanding of the underlying mathematical concept • Produces a solution relevant to the problem but does not confirm the reasonableness of the solution 	<ul style="list-style-type: none"> • A problem solving strategy is not evident or is not complete • Does not produce a solution that is relevant to the problem
Communication and Reasoning	<p>Proficient Plus:</p> <ul style="list-style-type: none"> • Reasoning is organized and coherent • Consistent use of precise mathematical language and accurate use of symbolic notation 	<ul style="list-style-type: none"> • Communicates thinking process • Demonstrates reasoning and/or justifies solution steps • Supports arguments and claims with evidence • Uses mathematical language to express ideas with precision 	<ul style="list-style-type: none"> • Reasoning or justification of solution steps is limited or contains misconceptions • Provides limited or inconsistent evidence to support arguments and claims • Uses limited mathematical language to partially communicate thinking with some imprecision 	<ul style="list-style-type: none"> • Provides little to no correct reasoning or justification • Does not provide evidence to support arguments and claims • Uses little or no mathematical language to communicate thinking
Representations and Connections	<p>Proficient Plus:</p> <ul style="list-style-type: none"> • Uses representations to analyze relationships and extend thinking • Uses mathematical connections to extend the solution to other mathematics or to deepen understanding 	<ul style="list-style-type: none"> • Uses a representation or multiple representations, with accurate labels, to explore and model the problem • Makes a mathematical connection that is relevant to the context of the problem 	<ul style="list-style-type: none"> • Uses an incomplete or limited representation to model the problem • Makes a partial mathematical connection or the connection is not relevant to the context of the problem 	<ul style="list-style-type: none"> • Uses no representation or uses a representation that does not model the problem • Makes no mathematical connections

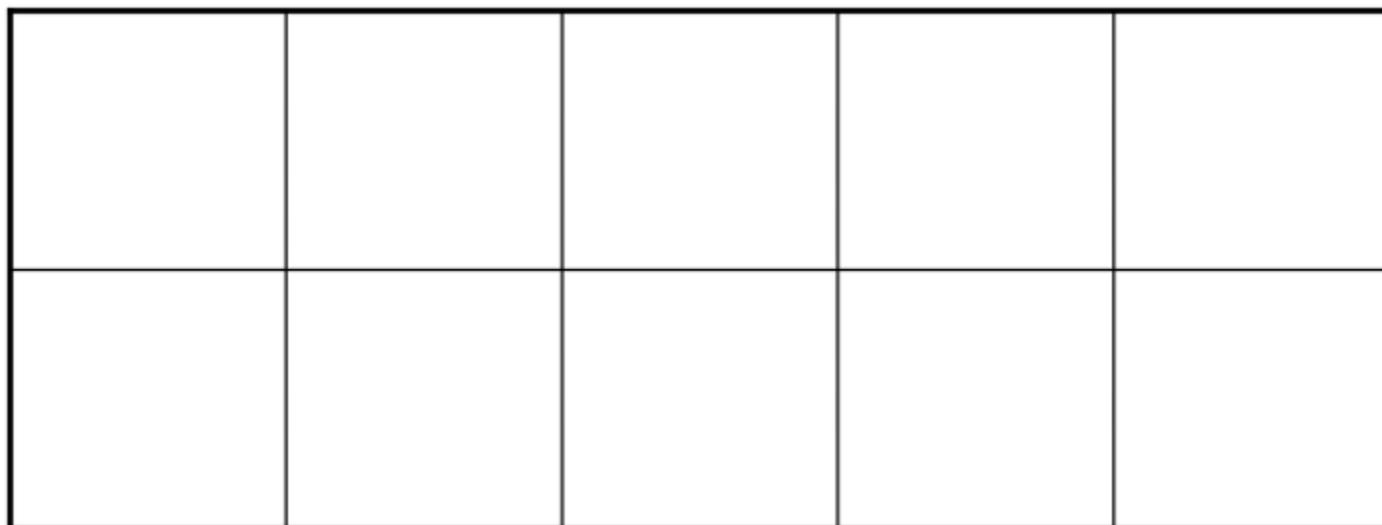
Task Supporting Documents

For students who may not be familiar with red and green apples, use pictures, like the one below, to introduce the idea.

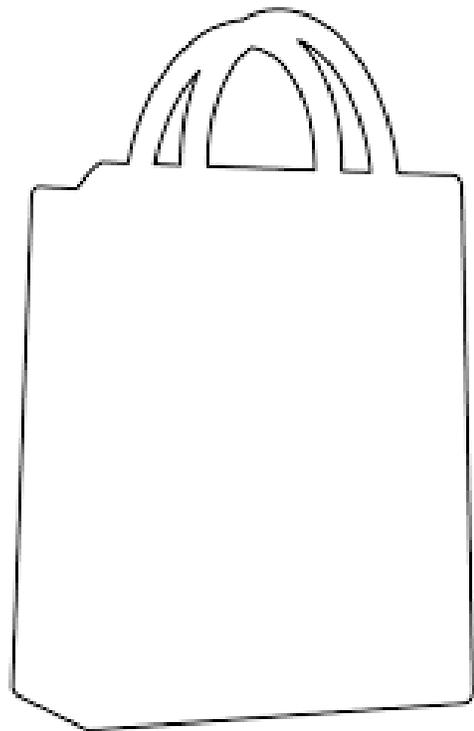
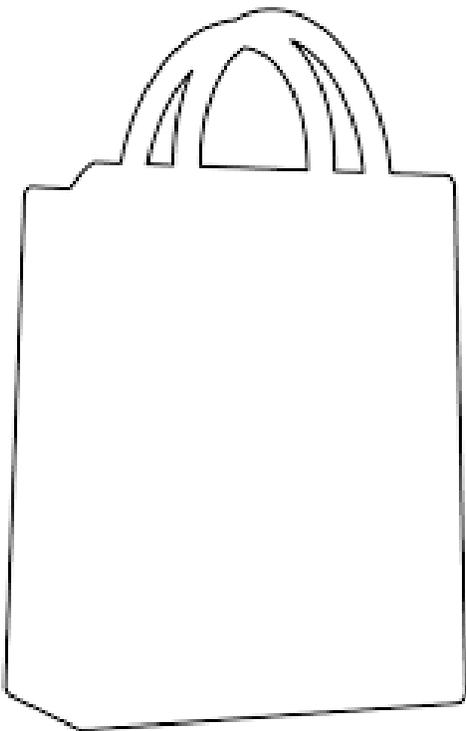
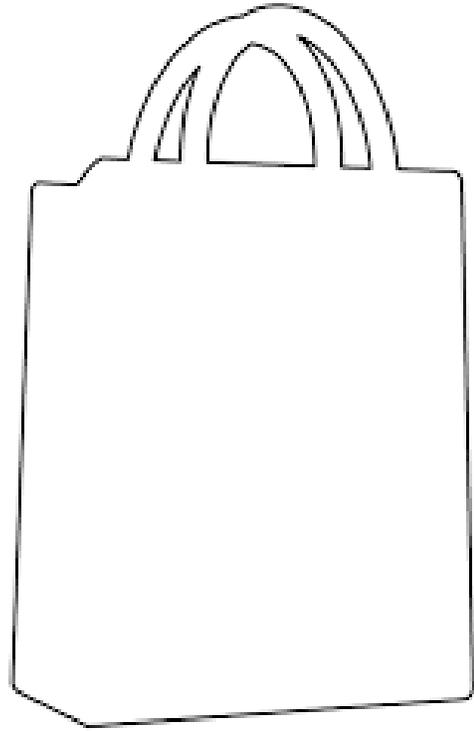
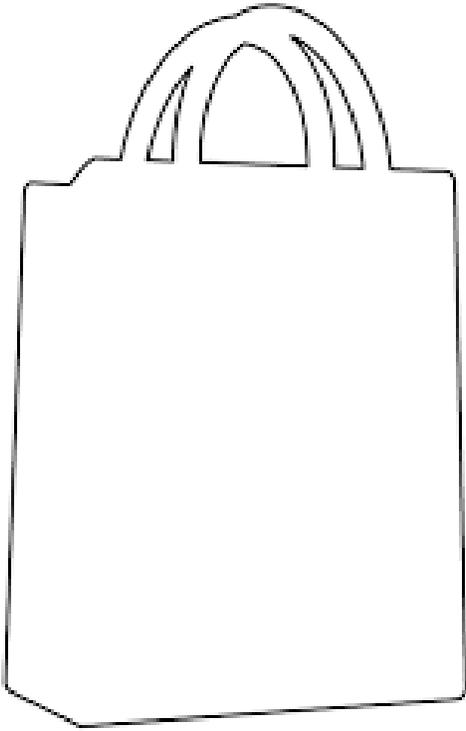


Possible Graphic Organizers

It may be helpful for students to have access to a five or ten frame to organize thinking.



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