**Toy Cars**

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| In this lesson, students solve a word problem using a strategy of choice and share the strategy to develop the concept of representing and solving problems involving addition and subtraction within 20. This lesson format may be used with any problem type appropriate for the grade. |

**NC Mathematics Standard(s):**

**Represent and solve problems.**

**NC.1.OA.1** Represent and solve addition and subtraction word problems, within 20, with unknowns in all positions, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving:

● Add to/Take from-Change Unknown

● Put together/Take Apart-Addend Unknown

● Compare-Difference Unknown

**Additional/Supporting Standard(s):**

**Understand and apply the properties of operations.**

**NC.1.OA.3** Apply the commutative and associative properties as strategies for solving addition problems.

**Analyze addition and subtraction equations within 20.**

**NC.1.OA.8** Determine the unknown whole number in an addition or subtraction equation involving three whole numbers.

**Use place value understanding and properties of operations.**

**1.NBT.4** Add, within 100, using concrete models or drawings and strategies based on place value, and properties of operations, explaining the reasoning used, in the following situations:

● A two-digit number and a one-digit number

● A two-digit number and a multiple of 10

**Standards for Mathematical Practice:**

1. Make sense of problems and persevere in solving them.

1. Construct viable arguments and critique the reasoning of others.
2. Model with mathematics.
3. Use appropriate tools strategically.
4. Attend to precision.

**Student Outcomes:**

* I can use addition and subtraction to solve problems within 20.
* I can determine the unknown whole number in an addition equation relating to three whole numbers (16+? =20).
* I can justify the reasonableness of my answer and explain my strategies.

**Materials:**

* Word problem on chart paper to use with whole group
* A class set of printed copies of the problem for students to glue in their math journals
* Paper or math journals for recording solutions
* Baskets of tools for each table or for groups of students to share. These should include various problem solving manipulatives such as two colored counters, snap cubes, beans, hundreds boards, or number lines

**Advance Preparation**:

* Review the significant ideas in Critical Area 1 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of addition and subtraction.
* Prepare baskets of materials, including only materials which have been introduced and used in previous lessons.
* Prepare a written copy of problem on chart paper.
* Prepare a class set of the problem for individuals.

**Directions:**

1. Gather students on the floor.
2. Show students the following problem on the chart paper, asking them to read aloud with you. Read again.

*Sasha had sixteen toy cars. He went to the toy store with his father. His father bought him some more cars. When Sasha got home, he counted his cars and then he had 20. How many cars did his father buy for him?*

1. Ask students to restate the problem in their own words. Students “unpack” the problem (give the information they know about the problem from reading it. See the guiding question suggestions in the “before the lesson” question section below).
2. Suggest several “possible” answers and ask students to explain the reasonableness of the solution, justifying their responses.
3. Send students to their work spaces to glue a personal copy of the problem in their journals or on a piece of paper.
4. Have students solve the problem with manipulatives, words, and/or pictures.
5. Students should add an equation to match their solution.
6. Record their solution strategies and equations in their journals.
7. While students work, the teacher observes and asks questions, recording student responses. (The teacher also decides which students will share their solution strategies when the whole group reconvenes.)
8. Bring the students back together as a group for sharing. It is important for the teacher to allow students to do most of the talking and questioning, with teacher offering support and clarification if needed.

**Questions to Pose:**

While students are in whole group:

* What do you know about this problem?
* Tell me in your own words.
* What are some ways you can show your mathematical thinking when you work on this problem?

As they work on the problem:

* Tell me about your thinking.
* What does this part of your solution show?
* Reread the problem again for me. What is the problem asking you to find?
* What tool did you decide to use for this problem? Why did you select it?
* What would happen if …?
* How can you show that solution on paper for others to see?
* How can you represent this problem in another way?

After solving (whole group):

* Who can restate what our problem was asking us to find?
* Tell the group how you solved it? What did you do first? Why? What did you do next? Why?
* What was your mathematical thinking for this problem?

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| Student adds the two known numbers and omits the unknown. | Ask the student to reread and “unpack” the problem, noting the problem structure. Use the student’s incorrect answer to discuss the reasonableness of the response. Student may need to work the problem with numbers 1-10. |

**Special Notes:**

Make notes as you observe students working to determine who will share with the group. Decide the sharing order for selected students beginning with a student who has a simple solution and progressing to students with more complex solution strategies. This allows students to visualize connections and relationships in solution strategies.

This problem is an example of the problem structure, Add To-Change Unknown. Teachers should be aware that some students may solve this problem using subtraction instead of addition. Allow a student with this strategy to share his reasoning and use the opportunity to explore the relationship between addition and subtraction.