AFT Innovation Fund Lesson Plan

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**Unit Title:** Strategies for understanding place value

**Subject:** Math **Grade Level:** 1

**Lesson #** 2 **Lesson Title:** The similarities between tens frames and tens/ones blocks when used to add a two-digit number and a one-digit number

**Common Core State Standard: 1.NBT.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two- digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

**Standards for Mathematical Practices Identified for this Lesson:**

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

**Reason abstractly and quantitatively.**

**Construct viable arguments and critique the reasoning of others.**

**Model with mathematics.**

**Use appropriate tools strategically.**

**Attend to precision.**

**Lesson Objectives: I CAN Statement(s):**

1. I CAN explain how ten frames and ten/ones blocks are alike and how they can be used

in similar ways to add a 2-digit number and a 1-digit number.

1. I CAN use ones to make groups of ten.
2. I CAN write down and explain the steps that I followed as I used the concrete models or drawings to show how I added.
3. I CAN use concrete models or drawings to show a strategy based on place value to add a 2-digit number and a 1-digit number.

**Essential Questions:**

1. How can I use tens frames and tens/ones blocks in similar ways to add a two-digit number and a one-digit number?
2. How can I make new groups of ten to find the sum?
3. How does a digit’s position affect its value?

**Time Needed:** 1 one hundred minute lesson, or 2 fifty minute consecutive lessons

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| **Materials Required:**   * Paper copies of ten frames * Paper copies of tens blocks * Paper copies of ones blocks * whiteboard, math journal or scratch paper * pencil * chalkboard, easel or document camera (Elmo) * scissors * Suggested story problems (Appendix A) * Exit Slip (Appendix B) * Homework (Appendix C) * Key Vocabulary Checklist (Appendix D) | **Vocabulary:**   * tens * ones * ten frame * counters * making ten * 2-digit * 1-digit * story problem * multiple of 10 * place value * group of ten * tens blocks * ones blocks * equal * amount * rows * columns |

**Bloom’s Taxonomy Level(s) of Objective(s)** (Check appropriate box)

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| Cognitive Domain | | | |
|  | Evaluation | X | Application |
| X | Synthesis |  | Comprehension |
| X | Analysis |  | Knowledge |

**Introduction: “**Today we will use what we know about adding with ten frames to find how we can add with tens and ones blocks. We will discover how tens frames and counters are like tens and ones blocks.” T. refers to first of two posters labeled “Today I CAN” and has S.s read I CAN statement along with her. T. asks S.s to predict what the concrete models for this lesson will be. Since ten frames were mentioned at the beginning of the introduction, S.s should be able to determine the concrete model with ease. Next, T. directs S.s to the Mathematical Practices chart on which the practices to be of particular importance for this lesson have been identified using highlighter tape. T. and S.s also read these together. (Reading I CAN statements and Mathematical Practices have become routine for the S.s by this time in the year, as it begins every math lesson every day. S.s have come to understand the meaning of the terminology because math vocabulary is used in discussion and writing daily.)

**Lesson Outline:**

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1. T. presents Ss with blank copies of a ten frame and a tens block, naming them as they are presented. T. asks, “What do you notice about the tens frame and the tens block? What is the same about them and what is different? Talk it over with your partner and be ready to share your thoughts.” Conversations and share out should involve noticing they both represent 10 ones or 1 ten, but their format is different.

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1. T. directs S.s to draw circles on the ten frames to make 11. (ten circles on one frame, one on the other). T. models with the Elmo.
2. T. places one ten block and one ones block next to the ten frames. T. asks, “What amount do these blocks equal?” How can we use tens and ones blocks like we use ten frames and counters?” Conversations between partners should result in the S.s recognizing the tens block and the full ten frames represent the same amount, and the tens frame containing one circle equals the same amount as the ones block. They should also determine that the ten frames represents 10 in two rows of 5, while the tens block represents 10 in one vertical row. T. circulates to hear S.s’ ideas and to insure talk is on-topic.

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1. T. directs S.s to share their thinking with the class, agreeing or disagreeing with classmates and explaining why.
2. T. asks, “Many of you think that the completed ten frame represents an amount that equals the tens block, and the tens frame with only one circle represents the same amount as the one’s block. How can we prove it? Talk to your partner again.”
3. After deliberating with their partners, S.s may answer “Take the ten frame apart.” or “Cut the blocks on the tens block apart.” or “Count the circles on both ten frames and then count the blocks on the tens block and the ones block to see if the tens frames and the tens blocks are equal”.
4. T. suggests, “Let’s try your ideas.”
5. T. directs half the class to work with partners to cut the complete ten frame apart to make it look more like a tens block. If necessary, T. models cutting the tens block into two pieces or tens pieces, placing then atop each other to form a vertical column, then cutting out the one remaining circle in the other ten frame and placing it alongside. T. directs the other half of the class to work with partners to cut the tens blocks apart and put the blocks into two ten frames, one with ten frames full, one with one frame full. (See Figure 1).

**Figure 1**

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**Cut ten frame apart horizontally and reassemble vertically to make a tens block, or cut tens block apart horizontally and reassemble horizontally to make a tens frame with 2 rows of 5 blocks.**

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1. When reorganization of the models is complete, T. asks the S.s to explain what they learned about how tens frames and tens and ones blocks are the same, and how they can prove it. Partners should share out that tens frames and tens and ones blocks can represent the same amounts, that both are representations of place value, that both represent multiples of tens and groups of ones, etc.
2. T. states “Now we are going to use what we’ve learned about tens frames and tens and ones blocks to add 2-digit numbers and 1-digit numbers.” T. places a copy of a story problem on the Elmo and reads aloud with the class, “Fred swam 12 lengths of the pool on Friday and 8 more lengths of the pool on Saturday. How many lengths did he swim on both days combined?” T. asks partners to work together to represent the story problem with ten frames and then with tens/ones blocks. If necessary, T. models at the Elmo. T. asks S.s to write an equation which matches their pictorials representations in their math journals or on whiteboards. These equations may include:

2 ten(s) + 0 one(s) = 20

20\_ + 0 = 20

1. + 8 = 20

T. then asks partners to write a sentence explaining their math reasoning. T. models a sentence a set of partners dictates if necessary. Repeat step 10 until T. observes the S.s are ready for guided practice. (See Appendix A for some suggested story problems).

**Guided Practice:** T. directs partners to work together to create and solve real life situation story problems together, one partner using tens frames and the other using tens and ones blocks, and then compare their efforts and check for accuracy in their math journals. When partners are finished, T. calls sets of partners to come to the Elmo to show and explain their work. Repeat the process, this time switching the partners’ use of manipulatives, so each partner has an opportunity to work with both representations. Repeat the process as needed.

**Independent Practice/Tiered Formative Assessment:** T. offers each student an exit slip and explains that tens frames should be used to solve the first problem, and tens and ones blocks should be used for the second. T. and students read story problems aloud together, but provide their answers individually as a formative assessment. See appendix B. S.s who have successfully completed their exit slip and require more challenge may try one of the challenge questions in Appendix A while their classmates complete their exit slips. A challenge question could be printed on the back of the exit slip.

**Answer Key for Suggested Story Problems: Practice: 1. 23 cars, 2. 11 frogs, 3. 13 girls, 4. 20 butterflies, 5. 13 pennies Challenge: 7. Yes, they needed 24, but they picked 28. 8. 23 marbles, 9. 3 points.**

**Answer Key for Exit Slip: 1. 14 people, 1 ten + 4 ones = 14, 10 + 4 = 14, 6 + 8 = 14 2. 31 cookies, 3 tens + 1 one = 31, 30 + 1 = 31, 24 + 7 = 31**

**Answer Key for Homework: 1. 17 carrots, 1 ten + 7 ones = 17, 10 + 7 = 17, 12 + 5 = 17 2. 15 books, 1 ten + 5 ones = 15, 10 + 5 = 15, 8 + 7 = 15.**

**Learning Center:**

1. S.s write or dictate their own story problems, alone or with a partner, which involve 2-digit numbers added to 1-digit numbers using ten frames and tens/ones blocks.
2. S.s draw a pictorial representation of an addition problem involving tens frames or tens/ones blocks used to add a 2-digit and a 1-digit number, then present it to their partner to write the corresponding equations.

**Additional resources:**

1. The following websites can be accessed for further practice:

<http://www.ixl.com/promo?partner=google&phrase=sitelink_common-core-strand-practice&gclid=COXJupWK9bMCFayPPAodzTAAGA>

<https://www-k6.thinkcentral.com/ePC/start.do>

<http://nrich.maths.org/frontpage>

<http://www.mathlanding.org/>

<http://www.coolmath-games.com/>

1. Math Expressions Differentiated Instruction Cards
2. Intervention Level – Number Flash, Activity Card 4-13

On Level – Make a New Ten, Activity Card 4-13

Challenge – Faster than a Calculator, Activity Card 4-13

Intervention Level – Tens and Ones, Activity Card 4-15

On Level – Add to Totals, Activity Card 4-15

Challenge – Nines Pattern, Activity Card 4-15

**Technology Integration:** Document Camera, websites listed above as learning center activities

**Assessments:**

1. **Products:** Exit slip – Rubric 1 point for each drawing, one point for each corresponding equation. Challenge question for diagnostic purposes and to inform further instruction.
2. **Observations:** T. will observe how students determine the equality of the first ten frame/tens and ones block. T. will also observe S.s examining similarities between the two types of manipulatives. When partners are engaged in modeling and guided practice phases of the lesson, T. will observe the ease or difficulty of the S. problem solving in order to make mid-lesson clarifications to insure understanding.
3. **Conversations:** Conversations will include teacher/student during modeling, partner conversations, teacher/partner, and partner share out. T. will be attuned to S. use of key vocabulary, on-topic engagement, partner explanations and peer/self evaluation of work products.

**Suggestions of modifying up or down for other grade levels within grade band:**

**Adaptation for Kindergarten:**

Teachers can adapt this lesson for kindergarteners by using ten frames to add two 1- digit numbers, some that would necessitate making ten. This knowledge is a prerequisite for understanding place value in first grade.

**Adaptations for Second Grade:**

Teaches can adapt this lesson for second grade by using ten frames and tens and ones blocks to add 3-digit numbers and 1- or 2-digit numbers, some which require regrouping, some which don’t.

**If applicable – Accommodations for ELL or Exceptional Needs Students:** Partner groupings should be planned by the teacher to include heterogeneous abilities so peer collaboration is maximized.

**Homework:** See Appendix C.

**Research to support instructional strategies:**

Houghton Mifflin Math Expressions, Houghton-Mifflin Harcourt Publishing Co., 2009

Teaching Student-Centered Mathematics, Grades K-3, Vol. 1, by John A. Van de Walle and LouAnn H. Lovin, Pearson, New York, 2006

The Young Child and Mathematics by Juanita V. Copley, National Association for the Education of Young Children, Washington D.C., 2000

Do the Math by Marilyn Burns, Scholastic, New York, 2008

It Makes Sense: Using Ten Frames to Build Number Sense K-2 by Melissa Conklin, Math Solutions, Sausilito, 2010

Good Questions for Math Teaching by Peter Sullivan and Pat Lilburn, Math Solutions, Sausilito, 2010

**Related Websites:**

<http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_nbt_2011_04_073.pdf>

<http://www.hmheducation.com/on-core-mathematics/pdf/MATH_OC_TE_G1.pdf>

<http://www.readtennessee.org/math/teachers/k-3_common_core_math_standards/first_grade/number_operations_in_base_ten/1nbt4.aspx>

<http://ccss1.watchknowlearn.org/Category.aspx?CategoryID=8857>

<http://www.youtube.com/watch?v=Jq1C_sIm8Q4>

<https://ccgps.org/1.NBT_RKQ1.html>

<http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/wiki/fa0f5/1NBT4.html>

<http://www.myboe.org/cognoti/content/file/resources/documents/ca/ca84285e/ca84285ee449bdeffe2d16973bfd38683dba696d/downloadedfile_4767250468492220493_NYCDOEG1MathNinasNumbers_Final.pdf>

<https://grade1commoncoremath.wikispaces.hcpss.org/1.NBT.4>

<http://www.parcconline.org/>

<http://www.achievethecore.org/>

<http://www.coedu.usf.edu/main/departments/sped/mathvids/understanding/understanding.html>

<http://www.nctm.org/profile/changes_confirm.aspx>

<http://mathsolutions.com/>

**Appendix A: Suggested story problems**

Practice Questions:

1. Hector washed 9 cars at the school car wash. His brother washed 14. How many cars did they wash together?
2. In the pond, 6 frogs sat on a log. Five more frogs hopped up to join them. How many frogs were on the log then?
3. Eight girls jumped rope together at recess. Five friends asked to play too. Altogether, how many girls jumped rope?
4. Eleven butterflies landed in a field of flowers. Next, nine more butterflies flew down. How many were in the field?
5. Brooke had 4 pennies in her pocket. She earned 9 more for washing the dishes. Brooke now has how many pennies?
6. On open house night 26 parents came to Mrs. Smith’s room. Mr. Jones had 9 parents arrive. How many parents came to open house?

Challenge Questions:

1. Farmer John picked 19 strawberries from his garden. His wife picked 9 more. They needed 24 strawberries to make a pie. Did they have enough? How do you know?
2. Tamara and her sister both had 10 marbles. Then Tamara found 3 more. How many marbles do the girls have now?
3. The red team had 12 points so far in the basketball throwing contest during gym. They needed 15 points to win. How many more points do they need?

**Appendix B: Exit slip**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Draw and complete ten frames to solve the problem. Write the equations on the lines below.** | **Draw tens and ones blocks to solve the problem. Write the equations on the lines below.** |
| 1. Jose invited 6 friends to his birthday party. Then he decided to invite his 8 cousins. How many people did Jose invite to his party?   \_\_\_\_\_\_\_\_tens + \_\_\_\_\_\_\_\_ones = \_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_ | 1. Tiffany baked 24 cookies for the bake sale at school. Her mom baked 7 more. How many cookies did they bake for the sale.?   \_\_\_\_\_\_\_\_tens + \_\_\_\_\_\_\_\_ones = \_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_ |

**Appendix C: Homework**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Draw and complete ten frames to solve the problem. Write the equations on the lines below.** | **Draw tens and ones blocks to solve the problem. Write the equations on the lines below.** |
| 1. Twelve carrots were growing in Judy’s garden. Then 5 more carrots popped up. How many carrots does Judy have in her garden now?   \_\_\_\_\_\_\_\_tens + \_\_\_\_\_\_\_\_ones = \_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_ | 1. Ned took 8 books home from the library. His brother, Tim, brought home 7 books. How many books did they bring home altogether?   \_\_\_\_\_\_\_\_tens + \_\_\_\_\_\_\_\_ones = \_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_+\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_ |

**Appendix D: Math Vocabulary Checklist**

**Anecdotal Record of Math Vocabulary used by Students With Lesson #1 (Can be used for individual, group or class record)**

**Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Lesson\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Class \_\_\_\_\_ Group\_\_\_\_\_\_ Student\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Key Vocabulary Word** | **Tally** |
| **tens** |  |
| **ones** |  |
| **making ten** |  |
| **2-digit** |  |
| **1-digit** |  |
| **story problem** |  |
| **multiples of 10** |  |
| **place value** |  |
| **group of ten** |  |
| **tens blocks** |  |
| **ones blocks** |  |
| **equal** |  |
| **amount** |  |
| **rows** |  |
| **columns** |  |