ST Math
Summer Immersion

Kindergarten | Module 4

Topic: Making 10

Module 4 Resources

Students will use different models to compose 10 when one addend is given. Students will solve problems involving making combinations of 10. Students will decompose numbers less than or equal to 10 into different pairs of addends. Students solve word problems involving making 10.

Module 4 at a Glance

Printed Resources

- **Bookmarks**
  - Problem Solving Process Bookmark
  - Problem Solving Facilitation Bookmark
- **K-2 Table Games Directions**
  - Addition Connect Four
  - Three Cards Make Ten
  - *Tic-Tac-Ten (optional)*
  - *Number Path Race (optional)*
  - *Addition War (optional)*
  - *Pyramid Make Ten (optional)*
  - *Number Kicker (optional)*
  - *Make Ten Concentration (optional)*
  - JiJi Sudoku (Day 5)
- **Game Mats**
  - Bouncing Shoes Game Mat
  - Creature Cards
- **Problem Solving Journal** (pages 22–28)
  - My Thinking Path
  - Problem of the Day
  - Exit Tickets
  - ST Math Puzzle Reflections
- **Design Challenge Booklet** (pages 15–16)

Optional Printed Resources

- Accomplishments Log
- ST Math Activity Pages
- Pre/Post Quizzes

Immersion Slide Deck (slides 53–66)

- The Immersion Slide Deck is intended to be projected to the class in a whole group setting.

Supplies for Table Games (per group)

- Addition Connect Four - 2 paper clips, 2 different color chips (20 of each color), 1 copy of the Addition Connect Four Game Mat
- Three Cards Make Ten - 1 deck of cards with face cards removed.

My Thinking Path

- Daily reflection time for students on equal groups and representing numbers with repeated addition.

ST Math Puzzle Talks

- Bouncing Shoes
- Bouncing Shoes to 10
- Bouncing Shoes with Numbers

Problem Solving

Day 1:

- **Problem Solving Slide Deck** - JiJi is making a bracelet. JiJi made a bracelet with 10 beads. How many more beads does JiJi need?
- **Problem Solving Journal** - Students solve a similar bracelet bead problem.

Day 2:

- **Problem Solving Slide Deck** - Octopus was thinking about all the ways to make 8. Help Octopus make 8.
- **Problem Solving Journal** - Students show all the ways to make 7.

Day 3:

- **Problem Solving Slide Deck** -Pie Monster wants to eat 10 pies. The pies are either cherry pies or apple pies. How many pies are strawberry? How many pies are apple?
- **Problem Solving Journal** - Students solve a problem with cupcakes showing how to make 8.

Day 4:

- **Problem Solving Slide Deck** - JiJi went to the zoo and saw these two animals in one of the exhibits. JiJi looked down and saw 10 feet. How many giraffes and how many monkeys did JiJi see?
- **Problem Solving Journal** - Students solve a problem to make 10.

Instructional Stations

On Days 1–4, each student will visit two stations a day for 20 minutes each. On Day 5, students do not rotate. They can either be assigned to a station or allowed to choose which one to go to. Consider assigning students who need additional support to Station 1 to work with the teacher on concepts they are struggling with.

Station 1: Small Group Instruction

- Days 1 & 2: Engage students in a math conversation about math concepts using a rich problem.
- Days 3 & 4: Engage students in a math conversation about math concepts using a rich problem.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
- Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Addition Connect Four or Three Cards Make Ten.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Days 1-4: Students will continue to make changes to their games, finalize their rules, and directions.

Day 5: Design Challenge (whole group)

- Have the students test their games with the other students, get feedback, and then see what additional improvements they need to do to improve their games.
- As students are playing games, monitor student gameplay and use facilitation questions to help support their thinking about games and about math.

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Kindergarten | Module 4 | Day 1

My Thinking Path (5-10 minutes)

- Have students write in the topic, “Making 10.”
- Have students begin working on the first two boxes.
- Discuss their ideas and allow students to add to their paper any additional thoughts they have.
- Have students complete the Pre-Quiz (optional).

Puzzle Talk: Bouncing Shoes (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with Bouncing Shoes Game Mat, centimeter cubes, Creature Cards, and whiteboards/dry-erase markers.

Notice and Wonder

- Display the first puzzle in Level 1. Ask “What do you notice? What do you wonder?” Allow a few students to share out.
- Ask students: ”How do you think we fill these shoes?”

Predict and Justify

- Have students think-pair-share about what they would like to try, what will happen when they try it, and why they think it will work.
- Have students share out. Try one of the students’ ideas. Ask the students to think about if they agree/disagree with the strategy and why. How does it relate to their strategy?
- Count together to prove that the creature they have chosen matches the number of shoes shown (e.g., I see 1, 2, 3 feet on Robot and 1, 2, 3 shoes.)

Test and Observe

- Watch the feedback together, and discuss what they saw.

Analyze and Learn

- Ask students to think about how what they saw happen compares to what they thought would happen. What did they learn from the feedback?

Connect and Extend

- Display the first puzzle in Level 2. Give students the Bouncing Shoes Game Mat, centimeter cubes, and JiJi Creatures Cards.
- Compare these puzzles to puzzles in Level 1. As they use their game mat to solve the problem, ask students: “What is different about this puzzle and the ones we solved in Level 1? How do you think we solve this puzzle?”
- Select a volunteer and discuss their strategy for solving the problem. Do the students agree or disagree, why? Does anyone else have a different strategy? Compare the strategies and decide on one to test.
- Have students write an equation to represent their solution.
- Ask students: “Is there more than one solution to this puzzle? Why? How do you know you have found all of the possible solutions?” Record all of the solutions for each puzzle.
- Repeat with additional puzzles in Level 2 and some puzzles in Level 3.

How does the student:

- model the problem on the Bouncing Shoes Game Mat using math tools?
- find all of the possible creature combinations to fill the shoes?

How does the student: (continued)

- explain why all of the possible solutions have been found?
- discuss and chart the math concepts and vocabulary evident in the puzzles?
- represent the puzzle with numbers and symbols?
- write equations to represent the problem and solution?
- discuss what the numbers in their equation represent in the puzzle?

Problem Solving (20-25 minutes)

Engage students in problem solving discussions. Read and discuss the problem, share student work, compare strategies, and make connections.

Problem Solving Slide Deck (slides 56–57)

- JiJi is making a bracelet. JiJi made a bracelet with 10 beads. How many more beads does JiJi need?

Problem Solving Journal (page 23, top)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students solve a similar bracelet bead problem.

Instructional Stations (40 minutes)

Students will visit two stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Use the Creature Cards to ask questions about how many shoes different combinations of creatures would need and which creatures could wear a certain number of shoes. For example:
  - I have 10 shoes. Which creatures could wear the shoes?
  - Pick two creatures, and tell how many shoes those two creatures would wear.
  - Write equations for the problems, and discuss what the numbers in the equations represent.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
- Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Addition Connect Four or Three Cards Make Ten.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Have students continue to build their games.
- Once they have finished building their games, they will play each other's games to test them out. Have students complete page 14 in the Design Challenge Booklet.
- After they test their games, students can make any changes to their games they see are needed. The goal is to have them done so other students can play their games on Day 5 to test them out.
- If students are done, have them turn to page 16 in their Design Challenge Booklet and create a poster about their game.

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Kindergarten | Module 4 | Day 2

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about making 10.

Puzzle Talk: Bouncing Shoes to 10 (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with Bouncing Shoes Game Mat, whiteboards, and dry-erase markers.

Notice and Wonder

- Display the first puzzle in Level 1. Ask "What do you notice? What do you wonder?" Allow a few students to share out.

Predict and Justify

- Have students predict how to solve this puzzle and use their game mat, paper/whiteboard to show their prediction. Have students share their prediction and the reason they think it will work with a neighbor.
- Have students share out. Discuss different solutions to the puzzle. Write the different strategies on chart paper. Ask students: "Why is there more than one solution? Can all of them be correct? How could we prove that these solutions are correct?"

Test and Observe

- Select one of the students' ideas to try. Watch the feedback together, and discuss what they saw.

Analyze and Learn

- Discuss why it was correct or incorrect. What did they learn from the feedback and is it different than what they thought would happen? Ask students: "Did we learn something that can help us prove that these other solutions are correct?" Discuss other possible solutions. Students can prove it on their mat or by making an equation.
- Pull up other puzzles in Level 1 and 2. Have students write equations to represent their answers on their game mat or whiteboards, and discuss what the numbers in the equations represent.
- Share and prove the solutions as a whole class.
- Ask students: "If you could add one more creature to this puzzle, which creature would it be and why?" Have them think and then group share.
- Share students' answers, and prove that the total number of shoes can be filled using the new creature as part of an equation.

Connect and Extend

- Record the number sentences the students have discovered. Ask students if there are any additional equations that would equal the total number of shoes and how they know if they have found all of the possible equations.
- Ask students to describe what is occurring in the puzzles. What are they learning? Do they notice any relationships or patterns?
- Write the math concepts/words/skills that students discuss.
- Repeat with additional puzzles in Level 2 and a few puzzles from Level 3.

How does the student:

- model the problem on the Bouncing Shoes Game Mat?
- represent the puzzle with numbers and symbols?
- write equations to represent the problem and solution?
- discuss what the numbers in their equation represent in the puzzle?
- prove that their number sentence equals the total number of shoes?

Problem Solving (20-25 minutes)

Engage students in problem solving discussions. Read and discuss the problem, share student work, compare strategies, and make connections.

Problem Solving Slide Deck (slide 60)

- Octopus was thinking about all the ways to make 8. Help Octopus make 8.

Problem Solving Journal (page 23, bottom)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students show all the ways to make 7.

Instructional Stations (40 minutes)

Students will visit two stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Use the Creature Cards to ask questions about how many shoes different combinations of creatures would need and which creatures could wear a certain number of shoes. For example:
  - I have 10 shoes. Which creatures could wear the shoes?
  - Pick two creatures, and tell how many shoes those two creatures would wear.
  - Write equations for the problems, and discuss what the numbers in the equations represent.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
- Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Addition Connect Four or Three Cards Make Ten.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Have students continue to build their games.
- Once they have finished building their games, they will play each other's games to test them out. Have students complete page 14 in the Design Challenge Booklet.
- After they test their games, students can make any changes to their games they see are needed. The goal is to have them done so other students can play their games on Day 5 to test them out.
- If students are done, have them turn to page 16 in their Design Challenge Booklet and create a poster about their game.

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Kindergarten | Module 4 | Day 3

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about making 10.

Puzzle Talk: Bouncing Shoes to 10 (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with Bouncing Shoes Game Mat, Creature Cards, centimeter cubes, and whiteboards/dry-erase markers.

Notice and Wonder

- Give students Bouncing Shoes Game Mats and/or Creature Cards.
- Display the first puzzle in Level 1. Ask: “What do you notice? What do you wonder?” Allow a few students to share out the things they notice. Ask: “How is this like the puzzle from yesterday?”

Predict and Justify

- Have students use their Bouncing Shoes Game Mat or Creature Cards to make and prove their predictions to the puzzles you project.
- Have students discuss their predictions and strategies with a neighbor. How are they the same? How are they different? If they are different, can they both be correct?
- Have students share out. Try one of the students’ ideas. Ask the students to think about if they agree or disagree and why. How does it relate to what they had?

Test and Observe

- Watch the feedback together, and discuss what they saw

Analyze and Learn

- Ask students to think about how what they saw happen compares to what they thought would happen. What did they learn from the feedback?
- Discuss different solutions to the puzzle. Ask students: "Why is there more than one solution? How could we prove that all of these solutions are correct?”

Connect and Extend

- Have students write equations to represent their answers and discuss what the numbers in the equations represent.
- Repeat with additional puzzles in Level 1.
- Display the first puzzle in Level 2. Ask students to find both solutions and represent those solutions on their game mats or with the Creature Cards. Share and prove the solutions as a whole class.
- Ask students: “If you could add one more creature to this puzzle, which creature would it be and why?” Have them think and then group share.
- Share students’ answers, and prove that the total number of shoes can be filled using the new creature as part of an equation.
- Record the number sentences the students have discovered. Ask students if there are any additional number sentences that would equal the total number of shoes and how they know if they have found all of the possible number sentences.
- Ask students to describe what is occurring in the puzzles. What are they learning? Do they notice any relationships or patterns?
- Write the math concepts/words/skills that students discuss.
- Repeat with additional puzzles in Level 2 and a few puzzles from Level 3.

How does the student:

- model the problem on the Bouncing Shoes Game Mat?
- represent the puzzle with numbers and symbols?
- write equations to represent the problem and solution?
- discuss what the numbers in their equation represent in the puzzle?
- prove that their number sentence equals the total number of shoes?

Problem Solving (20-25 minutes)

Engage students in problem solving discussions. Read and discuss the problem, share student work, compare strategies, and make connections.

Problem Solving Slide Deck (slide 63)

- Pie Monster wants to eat 10 pies. The pies are either cherry pies or apple pies. How many pies are strawberry? How many pies are apple?

Problem Solving Journal (page 24, top)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students solve a problem with cupcakes showing how to make 8.

Instructional Stations (40 minutes)

Students will visit two stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Have students get out a number of two-color counters or other manipulatives. Explore different combinations. For example:
- Put your counters in two different piles. Write an equation to represent combining your two piles.
- Discuss the different equations and write equations to show that two different expressions are equal.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
- Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Addition Connect Four or Three Cards Make Ten.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Have students continue to build their games.
- Once they have finished building their games, they will play the games as a group to test them out. Have students complete page 14 in the Design Challenge Booklet.
- After they test their games, students can make any changes to their games they see are needed. The goal is to have them done so other students can play their games on Day 5 to test them out.
- If students are done, have them turn to page 16 in their Design Challenge Booklet and create a poster about their game.

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My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about making 10.

Puzzle Talk: Bouncing Shoes with Numbers (20-25 minutes)

- ¤ Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- ¤ Provide students with Bouncing Shoes Game Mat, Creature Cards, centimeter cubes, and whiteboards/dry-erase markers.

Notice and Wonder

- Give students a Bouncing Shoes Game Mat, centimeter cubes, and Creature Cards.
- Display the first puzzle in Level 2. Ask: “What do you notice that is different about this puzzle from the ones we did yesterday? What do you notice that is the same?” Allow a few students to share out the things they notice.
- Ask students: “How do we know how many shoes we need to fill?"
- Have students use their Bouncing Shoes Game Mat or Creature Cards to make and prove their predictions to the puzzles you project.

Predict and Justify

- Have students discuss their predictions and strategies with a neighbor. How are they the same? How are they different? If they are different, can they both be correct?
- Have students share out. During the share out, check students’ understanding of the number shown and how they will prove they have filled that many shoes.

Test and Observe

- Try one of the students’ ideas. Ask the students to think about if they agree or disagree and why. How does it relate to what they had?
- Watch the feedback together and discuss what they saw.

Analyze and Learn

- Ask students to think about how what they saw happen compares to what they thought would happen. What did they learn from the feedback?
- Discuss different solutions to the puzzle. Engage the students in a conversation about the different thinking and solution strategies that have been presented. Ask students: "Why is there more than one solution? How could we prove that all of these solutions are correct?”
- Have students write equations to represent their answers and discuss what the numbers in the equations represent.

Connect and Extend

- Discuss other possible solutions if they had the missing Creature Cards to use. Ask students: “If you could add 2 more creatures to use to solve this puzzle, which two creatures would you add and why?”
- Allow a couple volunteers to share their thinking and their solution. Repeat with additional puzzles in Level 2.
- Display the first puzzle from Level 3 and have students solve the puzzle. After you have shared solutions, ask questions such as, “If you added (one, two) shoes, how many shoes would you have and how would this change your solution?”
- Display the next puzzle in Level 3. Ask students: “Can you find a solution using 3 creatures? What would the equation for this look like?” Share students’ solutions and prove the 3 numbers equal the total number of shoes. You may ask them to write their solution on their whiteboard or game mat using an equation. Share students' equations.
- Repeat with additional puzzles in Level 3.

How does the student:

- model the problem on the Bouncing Shoes Game Mat?
- represent the puzzle with numbers and symbols?
- write equations to represent the problem and solution?
- discuss what the numbers in their equation represent in the puzzle?
- prove their answer is correct?

Problem Solving (20-25 minutes)

Engage students in problem solving discussions. Read and discuss the problem, share student work, compare strategies, and make connections.

Problem Solving Slide Deck (slide 66)

- JiJi went to the zoo and saw these two animals in one of the exhibits. JiJi looked down and saw 10 feet. How many giraffes and how many monkeys did JiJi see?

Problem Solving Journal (page 24, bottom)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students solve a problem to make 10.

Instructional Stations (40 minutes)

Students will visit two stations today (20 minutes in each station).

Station 1: Small Group Instruction

- Have students get out a number of two-color counters or other manipulatives. Explore different combinations. For example:
- Put your counters in two different piles. Write an equation to represent combining your two piles.
- Discuss the different equations and write equations to show that two different expressions are equal.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
- Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Addition Connect Four or Three Cards Make Ten.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Have students continue to build their games.
- Once they have finished building their games, they will play the games as a group to test them out. Have students complete page 14 in the Design Challenge Booklet.
- After they test their games, students can make any changes to their games they see are needed. The goal is to have them done so other students can play their games on Day 5 to test them out.
- If students are done, have them turn to page 16 in their Design Challenge Booklet and create a poster about their game.

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Design Challenge (30-40 minutes)

- Have the students test their games with the other students, get feedback, and then see what additional work they need to do to improve their games.
- Divide the students into groups so there is one person in each group from each team. Rotate the games that the students created through the groups.
- Give students 10-15 minutes to play the game.
- When students are done playing the game, ask them to rate the game using the Game Tester Report. You may want to have some students share their thoughts.
- Rotate the games so the each group gets a new game. Have students play that game and then complete a feedback sheet.
- As students are playing games, monitor student gameplay and use facilitation questions to help support their thinking about games and about math.
- Have students complete the Review Game page for their game, page 15 in Game Design Station Booklet.

Whole Group Games (15-20 minutes)

During this time you will introduce JiJi Sudoku. Students will play this game in the next module in Station 3.

- Introduce JiJi Sudoku using the simple picture game boards.
- Allow students to work together to solve the picture puzzles.
- If there's time, explain that Sudoku is usually played with numbers. Share one or two of the additional numeric Sudoku puzzles.

Optional Activity Page (15-20 minutes) - whole group

ST Math Activity Page

- Project the game *Bouncing Shoes*.
- Play a few puzzles to help students understand the game.
- Have students turn to the Activity Page: *Bouncing Shoes*.
- Ask students what they notice about the content on the page. What do they wonder? Where do they want to start on the page?
- Give them time to complete the page.
- Discuss the page, and have students share their thinking.
- Take the time to compare strategies and have students share their work.
- Make connections to the game.

Focused Instructional Time (20 minutes)

Focused Instructional Time

- During this station time, students do not rotate. They can either be assigned to a station or allowed to choose which one to go to.
- This is an excellent opportunity to pull students who need additional support to Station 1: Small Group Instruction, where they can work with the teacher on concepts they are struggling with. Use the Intervention Planner to help target this time with students.

Station 1: Small Group Instruction

- Identify specific students for intervention or extension.
- Choose the ST Math puzzle or problem solving question that the students struggled with.
- You may choose to use the Intervention Planner to help you plan your instruction.

Station 2: ST Math Puzzle

- Have students sign in and play ST Math puzzles.
- Remind students to use manipulatives and/or paper and pencil to help them solve problems. They can ask themselves the questions that are on the Problem Solving Process Poster.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Allow students to choose one of the games they have learned.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Have students continue to build their games.
- Once they have finished building their games, they will play the games as a group to test them out. Have students complete page 15 in the Design Challenge Booklet.
- After they test their games, students can make any changes to their games they see are needed. The goal is to have them done so other students can play their games on Day 5 to test them out.

Closing (10 minutes)

Thinking and Reflecting Time

- Have students complete the Post-Quiz (optional).
- Have students review their Puzzle Reflection, Exit Tickets, and Problem Solving work.
- Engage students in discussions about what they have learned in this module, what they have questions about, and what they would like to learn more about.