ST Math
Summer Immersion

Grade 1 | Module 2

Topic: Solving problems with addition and subtraction

Module 2 Resources

Students develop their understanding of addition and subtraction situations within 100 to solve problems. Students use strategies involving situations of adding to, taking from, putting together, taking apart, and comparing unknowns in different positions. Students will find missing addends, decompose numbers to make adding easier, and practice adding one-digit and two-digit whole numbers. Students will represent situations with equations.

Module 2 at a Glance

Printed Resources

- **Bookmarks**
  - Problem Solving Process Bookmark
  - Problem Solving Facilitation Bookmark
- **K-2 Table Games Directions**
  - Addition War
  - Pyramid Make Ten
  - *Number Kicker (optional)*
  - *Make Ten Concentration (optional)*
  - Tic-Tac-Ten (Day 5)
  - Number Line Race (Day 5)
- **Game Mat**
  - Pie Monster Game Mat 02
- **Problem Solving Journal** (pages 8–14)
  - My Thinking Path
  - Problem of the Day
  - Exit Tickets
  - ST Math Puzzle Reflections
- **Design Challenge Booklet** (pages 7–13)

Optional Printed Resources

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

Immersion Slide Deck (slides 20–38)

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

Literature Connection (optional)

- *What Do You Do with an Idea?* by Kobi Yamada

Teacher Resources

- Teacher Planner

Supplies for Table Games (per group)

- **Addition War** -1 deck of cards with face cards removed
- **Pyramid Make Ten** - 1 deck of cards with face cards removed

My Thinking Path

- This module, students reflect on solving problems with addition and subtraction.

ST Math Puzzle Talks

- Pie Monster Addition
- Pie Monster Subtraction

Problem Solving

Day 1:

- **Problem Solving Slide Deck** - JiJi was baking pies. JiJi made some apple, cherry, and strawberry pies. How many pies do you think JiJi made? JiJi made 16 pies. How many of each kind did JiJi make?
  Problem Solving Journal - Students will complete the Pie Monster equations.

Day 2:

- **Problem Solving Slide Deck** - JiJi has some marbles. Paco gave JiJi 8 more marbles. Now JiJi has 14 marbles. How many marbles did JiJi have at first?
- **Problem Solving Journal** - Students will complete Number Bond problems.

Day 3:

- **Problem Solving Slide Deck** - JiJi made cupcakes for the class party. How many cupcakes did JiJi make? There are 15 students in JiJi's class. If all the students got one cupcake, how many are left?
- **Problem Solving Journal** - Students will determine how many of each type of pie they have if there are 17 pies.

Day 4:

- **Problem Solving Slide Deck** - Helix was showing his friend, Moby, his new pencils. Helix has a box of 16 pencils. He gave some to his friend, Moby. Now Helix has 9 pencils in his box. How many did he give to Moby?
- **Problem Solving Journal** - Students will solve an open ended problem using 19 cars.

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 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: Give students problems similar to the Problem of the Day and puzzle problems. Have students solve the problems.
- Days 3 & 4: Give students problems with different situations. Discuss the journal questions.

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 War or Pyramid 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 & 2: Students write or draw their ideas for a math game on page 7 of their Design Challenge Station Booklet.
- Days 3 & 4: Students start to plan their game. Have students complete page 8 in their Design Challenge Station Booklet.

Day 5: Design Challenge (whole group)

- Optional Literature Connection
  - Read the book *What Do You Do with an Idea?* by Kobi Yamada
- Discuss with students the ideas they came up with.
- Discuss information needed to play a game and understanding how to win.
- Talk to students about a game like Tic-Tac-Toe or one of the Table Games they played in the Table Games station. Have the students explain the directions for playing the game.

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Grade 1 | Module 2 | Day 1

My Thinking Path (5-10 minutes)

- Remind students of the My Thinking Path page to students (page 8). Have them write in the topic, “Solving problems by adding and subtracting."
- Have students begin working on completing the page.
- Discuss their ideas, and allow students to add to their paper any additional thoughts they have.
- From now on, each of Days 1-4 begins with time for students to reflect on their learning and prepare for the day. On Day 4, they complete the second My Thinking Path page.
- Have students complete the Pre-Quiz (optional).

Puzzle Talk: Pie Monster Addition (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the guiding questions in each step of the Problem Solving Process.
- Provide students with Pie Monster Game Mat 02 and whiteboards/dry erase markers.

Notice and Wonder

- Show a puzzle from Level 1. Ask students: “What do you notice? What do you wonder?” Allow students to share.

Predict and Justify

- Have students make a prediction and model it on their Pie Monster Game Mat. Ask them to describe their strategy. Have students share their predictions of how many pies to choose, what they think will happen, and why.

Test and Observe

- Try one of the students’ ideas. (As you try students’ strategies, be sure to try strategies that work and those that don’t.)
- Watch the feedback together for a few correct and incorrect solutions, and discuss what you saw.

Analyze and Learn

- Ask students to think about how what they saw happen compares to their prediction.

Connect and Extend

- Display a puzzle from Level 1 and discuss what is unknown in the puzzle.
- Work together to represent the puzzle with an equation and include a variable (e.g., 4 + 5 = ?).
- Have students solve for the missing variable. To uncover learning, ask: "What do each of the numbers represent (pies on the conveyor belt, pies in the Monster's Belly, etc.)? What are we trying to solve for?"
- Continue with additional puzzles in Level 1.

Level 2

- Project a puzzle from Level 2, and ask students: "What do you notice that is similar/different from the puzzles in Level 1? What are we trying to solve?"
- Have students share their strategies and try a few out, repeating the Problem Solving Process.
- Challenge students to write an equation to represent the Pie Monster puzzle.

How does the student:

- solve the puzzles? Are they thinking flexibly about addition and subtraction? Do they struggle with specific problem types, such as result unknown, change unknown, start unknown?
- write an equation to represent the problem? (This is a great opportunity to connect the visual to the symbolic and reinforce the meaning of equality as "same as.")
- understand the relationship between addition and subtraction? Do they see them as opposites?

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 23–25)

- JiJi was baking pies. JiJi made some apple, cherry, and strawberry pies. How many pies do you think JiJi made? JiJi made 16 pies. How many of each kind did JiJi make?

Problem Solving Journal (page 9, top)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students will complete the Pie Monster equations.

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

- Give students problems similar to the Problem of the Day and puzzle problems. Have students solve the problems.
- For example, Torrence has 19 stamps. Laura had 6 stamps. She got some more stamps at the store. Now she has the same number of stamps as Torrence. How many stamps did she get at the store?
- Discuss what they know in the problem and what they need to know to solve the 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 War or Pyramid 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 complete page 7 in their Design Challenge Station Booklet.
- Students will think about all that they have learned about games and what they know about math. They will write or draw their ideas for games.
- After writing/drawing their ideas, have students share them with their team.
- The team will discuss the idea they want to use for their game.

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Grade 1 | Module 2 | Day 2

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems with addition and subtraction.

Puzzle Talk: Pie Monster Addition (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the guiding questions in each step of the Problem Solving Process.
- Provide students with the Pie Monster Game Mat 02 and whiteboards/dry erase markers.

Notice and Wonder

- Show a puzzle from Level 3. Ask students: "What do you notice that is similar/different from the puzzles we did yesterday?" Allow students to share.

Predict and Justify

- Have students make a prediction and model it on their game mat. They should model the puzzle and show their thinking about how to correctly solve it. Have students share their predictions and solution strategies. Have them discuss with their neighbor what they think will happen and why.
- Have students share out. Ask the students to think about if they agree/disagree with the strategy and why. How does it relate to their strategy?

Test and Observe

- Try one of the students' ideas. (As you try students' strategies, be sure to try strategies that work and those that don't. Analyze the feedback in both correct and incorrect solutions.)

Analyze and Learn

- Ask students to think about how what they saw happen compares to their prediction. Project another puzzle from Level 3.

Connect and Extend

- Have students write an equation to show how they solved the puzzle. Discuss equations that are true and equations that are false.
- Project a new puzzle from Level 4. Talk with students about what is known and unknown in the puzzle. Work together to write an equation with a ? to represent the unknown.
- Have students solve the puzzle and share their strategies and solutions.
- As the position of the unknown changes throughout the puzzles, talk with students about how their strategies change as the position of the unknown changes.
- Continue with additional puzzles in Level 4.
- Select different students to share, look for different types of strategies, and discuss as a class.

How does the student:

- solve the puzzles? (Are they thinking flexibly about addition and subtraction? Do they struggle with specific problem types, such as result unknown, change unknown, start unknown?)
- write an equation to represent the problem? (This is a great opportunity to connect the visual to the symbolic and reinforce the meaning of equality as "same as.")
- understand the relationship between addition and subtraction? Do they see them as opposites?

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 28–29)

- JiJi has some marbles. Paco gave JiJi 8 more marbles. Now JiJi has 14 marbles. How many marbles did JiJi have at first?

Problem Solving Journal (page 9, bottom)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students will complete Number Bond problems.

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

- Give students problems similar to the Problem of the Day and puzzle problems. Have students solve the problems.
- For example, Torrence has 19 stamps. Laura had 6 stamps. She got some more stamps at the store. Now she has the same number of stamps as Torrence. How many stamps did she get at the store?
- Discuss what they know in the problem and what they need to know to solve the 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 War or Pyramid 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 complete page 7 in their Design Challenge Station Booklet.
- Students will think about all that they have learned about games and what they know about math. They will write or draw their ideas for games.
- After writing/drawing their ideas, have students share them with their team.
- The team will discuss the idea they want to use for their game.

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Grade 1 | Module 2 | Day 3

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems with addition and subtraction.

Puzzle Talk: Pie Monster Subtraction (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the guiding questions in each step of the Problem Solving Process.
- Provide students with Pie Monster Game Mat 02 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: "What number are you going to choose on the Pie Monster and why?" Have students talk with a neighbor.

Predict and Justify

- Ask students: "Did you and your neighbor select the same number? If not, can you convince your neighbor that your number is the best one to choose?"
- Have students share out to the whole group. Did anyone convince their neighbor? If so, what was it that convinced them?

Test and Observe

- Select one of the students to solve the problem and describe what happens when they try their prediction.

Analyze and Learn

- Ask students to explain what they learned from the feedback. Is that the only answer to the problem? How do they know?
- Solve additional puzzles in Level 1.

Connect and Extend

- Select one of the puzzles, and work together to write an equation.
- Display the first puzzle in Level 2. Ask students: "How is this puzzle different from the ones we just solved? What is the unknown in this puzzle?"
- Have students model the puzzle on their game mat and solve it. Remind them to show their thinking. Have students turn and talk to a neighbor to share their prediction, associated strategy, and thinking.
- Ask students to write an equation that represents their model and solution. Share students' strategies, equations, and solutions. Model how to write an equation with a ? to represent that the change is unknown. For example, 5 – ? = 1.
- Repeat with additional puzzles in Level 2.
- Display the first puzzle in Level 3. Ask students: "Now what is unknown in the puzzle? How could we represent that with an equation?" Model how to write an equation with a ? to represent that the start is unknown. For example, ? – 2 = 4.
- Repeat with a few more puzzles in Level 3. Remind students that the unknown can be found if we know the other parts of the equation.

How does the student:

- use a drawing to help solve the puzzles?
- share different strategies to solve the puzzle?
- write equations to represent the puzzle and solution?
- discuss the action in the puzzle when it is solved?
- discuss what is known and unknown 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 32–33)

- JiJi made cupcakes for the class party. How many cupcakes did JiJi make? There are 15 students in JiJi's class. If all the students got one cupcake, how many are left?

Problem Solving Journal (page 10, top)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students will determine how many of each type of pie they have if there are 17 pies.

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

- Give students problems similar to the Problem of the Day and puzzle problems. Have students solve the problems.
- For example, Amber had 17 pieces of gum. She ate 4 of her pieces of gum and gave her brother 4 pieces. How many pieces of gum does Amber have now?
- Discuss what they know in the problem and what they need to know to solve the 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 War or Pyramid 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 complete page 8 in their Design Challenge Station Booklet.
- They will work with their team to determine what game they are going to make and write about it.
- Prior to this station, you may want to talk to the students about how they can work together to pick one idea.

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Grade 1 | Module 2 | Day 4

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems with addition and subtraction. They should complete the My Thinking Path reflection page.

Puzzle Talk: Pie Monster Subtraction (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the guiding questions in each step of the Problem Solving Process.
- Provide students with copies of the Pie Monster Game Mat 02 and whiteboards/dry erase markers.

Notice and Wonder

- Show a puzzle from Level 3. Ask "What do you notice is the same/different from the puzzles we did yesterday? What do you wonder?" Allow a few students to share out.
- Ask students to think of their strategy for solving the puzzle and predict what will happen when they try it.

Predict and Justify

- Have students think-pair-share their strategy and why they think their strategy can be used to solve this puzzle.
- 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 own strategy?

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?
- Be sure to try strategies that work and those that don't. Analyze the feedback in both correct and incorrect solutions.

Connect and Extend

- Ask students: "What would this puzzle look like with numbers and symbols?" Students can use their Pie Monster Game Mat to illustrate this.
- Have students write equations to represent their solutions to the puzzles. Discuss how the equations represent the puzzle, and look for different ways students wrote equations (addition, subtraction, etc.)
- You may choose to pull up some puzzles from Level 4, repeating the Problem Solving Process and asking students to write equations to represent them.

How does the student:

- solve the puzzles? (Are they thinking flexibly about addition and subtraction? Do they struggle with specific problem types, such as result unknown, change unknown, start unknown?)
- write an equation to represent the problem? (Great opportunity to connect the visual to the symbolic and reinforce the meaning of equality as "same as.")
- represent the puzzle? (Do they use tools? An equation with a variable?)

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 36–38)

- Helix was showing his friend, Moby, his new pencils. Helix has a box of 16 pencils. He gave some to his friend, Moby. Now Helix has 9 pencils in his box. How many did he give to Moby?

Problem Solving Journal (page 10, bottom)

- Students will complete the Problem of the Day independently. Provide guidance as needed.
- Students will solve an open ended problem using 19 cars.

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

- Give students problems similar to the Problem of the Day and puzzle problems. Have students solve the problems.
- For example, Amber had 17 pieces of gum. She ate 4 of her pieces of gum and gave her brother 4 pieces. How many pieces of gum does Amber have now?
- Discuss what they know in the problem and what they need to know to solve the 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 War or Pyramid 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 complete page 8 in their Design Challenge Station Booklet.
- They will work with their team to determine what game they are going to make and write about it.
- Prior to this station, you may want to talk to the students about how they can work together to pick one idea.

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Grade 1 | Module 2 | Day 5

Design Challenge (30-40 minutes)

Design Challenge

- Read the book *What Do You Do with an Idea?* by Kobi Yamada. (optional literature connection)
  - Discuss the story.
  - What was this book about?
  - Why do you think the idea followed the boy around?
  - Why did the boy think about giving up his idea?
  - Why did he decide not to give up on his idea?
  - What are some things that you learned from this book?
- Have students share the ideas they came up with for their game. Ask them to share some things they think are important in creating a math game. How will they make these things part of their games. (Write the big ideas on chart paper.)
- Discuss with students the ideas they came up with in the Design Challenge. Point to the IMAGINE part of the poster. Explain that a big part of the design process is imagining what you could make to complete the task. Now that they have imagined some of the things they want to make, it is important to think about how those ideas might work in a game.
- Ask students to explain what information they need to play a game. Answer should include things such as rules, number of people, understanding how to win. Inform students that directions and rules are really important. Let them know that the focus for today will be on the rules of the game.
- Discuss the game Tic-Tac-Toe. What are the rules of the game? Have the students write the rules in their booklets.
  - It is important to help students understand how to write rules that are clear and easy for the players to understand.
- Working in teams of two, have the students change one rule for Tic-Tac-Toe, write the new rule, and play the game using that rule.
- Discuss how game play was affected by their new rule. Reiterate the importance of having clear rules.
- Inform the students that writing rules is only part of what they need to plan for their game.
- They are going to be working on blueprints. Review pages 10–12 in the Design Challenge Station Booklet with the students. Explain that blueprints allow them to plan each part of their game so that it is easier to build. Let students know that they will be working on their blueprints, creating a sketch of their game, and writing their rules.
- Share with students that on page 13 of the Design Challenge Station Booklet they will begin assigning jobs to team members to build their game. As they make their blueprint, they can start to think about who will have the job of making the game board, who will make the game cards or game pieces, who will write out all the rules that the group decides on, etc., It is important that everyone in the group helps build the game. On page 13, students will write down their job and the things they will need.
- After reviewing the booklet with the students, give them time to begin their blueprints.

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

ST Math Activity Page

- Project the game *Pie Monster Addition.*
- Play a few puzzles to help students understand the game.
- Have students turn to the Activity Page: *Pie Monster Addition*.
- 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.

Whole Group Table Games (15-20 minutes)

During this time you will introduce Tic-Tac-Ten and Number Line Race. Students will play these games next module in Station 3.

- Introduce one of the games.
- After explaining the game and playing it with the whole group, give students time to play it on their own.
- After playing the game, have them discuss:
  - What math did they learn or use?
  - What strategies did they try to win the game?
- If time permits, repeat with the second 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 Teacher 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 Teacher Planner to help you plan your instruction.

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. 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.

Grade 1 | Module 2 | Day 5

Focused Instructional Time (20 minutes) continued

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

- Allow students to continue to work on their blueprints.
- Once students have completed their blueprints, they need to create their rules, directions, and assign the task of building the game to different members of their team.
- Remind students that they can record the jobs that need to be done on page 13 of the Design Challenge Station Booklet.

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 this module, what they have questions about, and what they would like to learn more about.