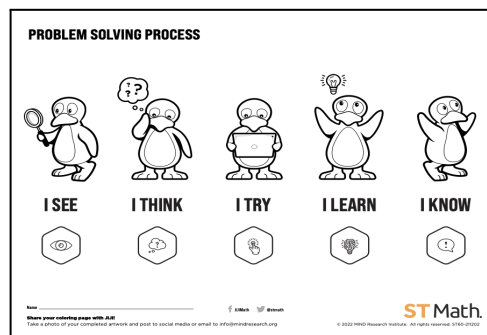


This is a guide to provide support for facilitating student thinking as teachers engage students in academic discourse around math concepts and strategies using ST Math puzzles. Read the [Puzzle Talks Overview](#) to learn more.

Grade Levels: Kindergarten - Grade 2
Objective: Learn the Problem Solving Process
Game: Attribute Transform
Game-in-a-Minute: [Link](#)



Teacher Prep

Purpose

- Today you are going to teach students the [Problem Solving Process](#). This process focuses on student thinking and developing problem-solving skills. It follows the [perception-action cycle](#) and can be used beyond ST Math to support students in problem-solving.
- As you engage students in the Puzzle Talk, spend time highlighting strategies, pointing out the feedback, and asking students [facilitation questions](#) to promote their thinking.
- Additional resources can be found at the [ST Math Help Site](#).

Description

- **Materials Needed:** Provide students with the Problem Solving Process Coloring Page [[English](#)] [[Spanish](#)] [[Portuguese](#)]
- **Puzzle Location:** [Click Here](#)
- **Duration:** 1- 2 days
- **Time:** may vary 15-25 minutes each session

Look Fors

How does the student:

- use the Problem Solving Process?
- persevere when they get stuck?
- solve the puzzles? (Are students visualizing the changes to the shape as it goes over each belt? Do they struggle to keep track of the changes?)
- compare the shape on the left to the shape in the ground?

Facilitation Suggestions (This is what a student-led discussion might look like.)

This could occur over 1-2 days

Notice and Wonder

- Display the first puzzle from Level 1.
 - Introduce and discuss the first Attribute Transform puzzle.
- Tell students you are going to teach them questions they can ask themselves to help them think through the puzzles.
 - The first question students can ask themselves is “What do I see?”
 - Encourage students to complete this sentence “I see ____.” (without suggesting a solution). Have several students share what they notice/see.
 - Have several students share what they see, **not** how they would solve it. For example, you might hear them say, “I see a blue square with lines through it.” or “I see Jiji on the grass.”
 - The second question students can ask themselves is “What can I click on?”
 - Show students that they can click the sky and the clickable elements will shimmer.
 - Other responses students might say as they are in the “Notice and Wonder” portion of the Problem Solving Process include:
 - I think Jiji needs to...
 - I wonder about...
 - This puzzle looks like one I have seen before because...
 - I think ___ on the screen is important because...
- Once students have an understanding of how to begin a puzzle, have them color the “I see” Jiji on their coloring page.

Predict and Justify

- Before you click and decide what to do next, the next question students should ask themselves is “What do I think is going to happen?”
 - Encourage students to complete this sentence “If I do____, I think ____ happen.”
- Have different students share their predictions and why they think theirs is the best prediction.
 - Students might complete one of these phrases, “My prediction is reasonable because...” or “I can support my prediction because...”.

- Ask students to name or describe the strategy they will use to test their prediction. For example, a student may predict that they have to somehow move the shape from one side to the other. In this case, they would name the strategy of matching. “My strategy is to change the color of the triangle on the left to match the color of the triangle on the right by selecting the block that has the matching color.”
 - Ask students to describe what they think will happen when you test their prediction and why.
 - They might say, “I think I should”
- Once students have an understanding of how to predict and justify what will happen in a puzzle, have them color the “I think” Jiji on their coloring page.

Test and Observe

- Test the strategy agreed upon by students.
 - Encourage students to observe and think about the results of testing their hypothesis.
 - Have students share their observations by saying “I/we tried ___ and (explain what they saw).” or “___ is what occurred when I tested my prediction.”
 - Discuss what happened in the animation.
 - After I clicked the green “Go Button”, what happened was...
- Once students have an understanding of how to test their predictions, have them color the “I try” Jiji on their coloring page.

Analyze and Learn

- Facilitate students in analyzing the feedback/results to gain an understanding of what worked and what didn't work.
 - If their strategy was correct, ask the students to demonstrate how the puzzle confirmed their answer.
 - They might say, “My answer was correct so now I can...”.
 - If their strategy was incorrect, ask the students to use the animation to describe why the answer was incorrect and what they think should happen.
 - They might say, “I need to change my strategy because...”.
- Facilitate a discussion about what students thought would happen and compare to what happened.
 - They might say, “This was (was not) what I thought would happen because...”
- Encourage students to complete this sentence “I learned _____.”

- How will you use what you learned?
- Be sure to use the playback features to pause, rewind, and fast forward the animation and discuss what they are learning from the feedback.
 - They might say, “Next time I will try...”
- Use the annotation tools to highlight the learning.
- Once students have an understanding of how to learn from the feedback, have them color the “I learn” Jiji on their coloring page.

Connect and Extend

- Continue to do Attribute Transform puzzles. Do one example of each (changing color, changing shape, and stretching).
- Help students use what they've learned to solve new puzzles.
- Discuss strategies and solutions (including incorrect ones). Explore different solutions and discuss what they thought would happen vs. what did happen.
 - Students may use phrases like:
 - This puzzle reminds me of....
 - The difference between ___ and ___ is ...
 - Another thing this makes me think of is....
 - Now I can...
- Have students create their own Attribute Transform puzzle and share it with a neighbor. Can their neighbor correctly solve it? Choose a few to share with the whole group. See who can make the most challenging one, the most unique one, the most surprising one, etc.
- Once students have an understanding of how to extend their learning from a puzzle, have them color the “I know” Jiji on their coloring page.