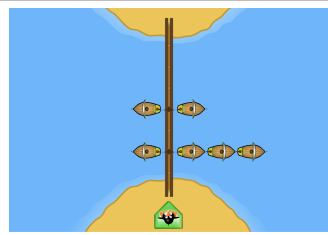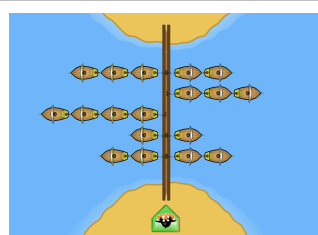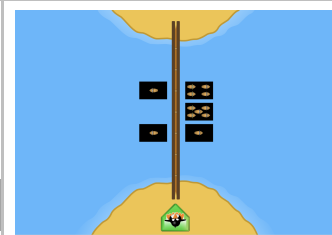# PUZZLE TALK

Standards	1.OA.D.7: Understand the meaning of the equal sign and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2. 2.OA.B.2: Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers. 2.OA.C.3: Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
Game Description	Boats are shown on either side of a bridge. Students must arrange the boats so there will be an equal number of boats on each side. The boats pull the bridge open to allow JiJi to cross. Too many boats on one side will exert more force on that side of the bridge than the other side, pulling the unopened bridge to the side with the most boats.
Suggested Puzzles	Level 1 Level 3 Level 6
Materials	Centimeter cubes or other manipulative to represent the boats blank paper or whiteboards and markers
Directions	● Show a puzzle from Level 1 and ask students to make sense of the puzzle. ● Show puzzles from Level 2 and have students describe how the boats move after they clicked on JiJi. ● Show a puzzle from Level 3. Have students represent the puzzle on paper or with manipulatives, solve, and explain their reasoning. Share a few solutions. ● Have students write the expression for the boats on each side of the bridge and compare the two expressions. (e.g., 2 +3 +1 and 4 +2 are equal; 2 +3 +1 = 4 +2) ● Show a puzzle from Level 6 and have students solve. Compare Level 6 to Levels 1-3. Have students write solution equations.
Sample Questions	● What do you have to do to get JiJi across? What do you need to do to make the bridge open? ● How do you know the bridge will open if you choose this? ● How can you show what you were thinking on your board/paper? ● Why will/won't that work? ● Explain why you agree/disagree with _____'s solution.
What to look for	How does the student: ● think about the boats they need to move? (Do they try to equal out each row? Do they understand that they only need to make sure there are an equal number of boats on each side?) ● write the equations? (Do they understand that the expressions on each side need to have the same total, but not necessarily the same numbers?)

PUZZLE TALK

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<td>Extensions</td>
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- Write inequalities for the puzzle before it is solved.
- Have students make up their own puzzles. Ask what they know about the total number of boats they need to show in their puzzle and explain. (must be an even number, both sides end up with the same total in order to pull the bridge apart)
- Have students show multiple solutions for a specific number of boats (e.g., 10 boats).

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