

## 1: LESSON PLAN - Tic Tac Toe

<b>LEARNING AIMS</b>	<p>Students will:</p> <ul style="list-style-type: none"> <li>● Engage in cooperative play (W1-5)</li> <li>● Reflect on their own logical and spatial reasoning</li> <li>● Gain a basic understanding of game mechanics, rules, fundamental gameplay, strategies, winning, cooperative principles</li> <li>● Logical Reasoning: <b>Exploring</b> game mechanics and the three winning patterns (W1)</li> <li>● Spatial Reasoning: <b>Locating</b> pieces in order to know where to place and stack (W1)</li> </ul>
<b>MATERIALS</b>	<ul style="list-style-type: none"> <li>● Enough copies of <i>Tic Tac Toe</i> for your class</li> <li>● Whiteboard and marker</li> <li>● Condensed rules sheet -- Tic Tac Toe How to Play</li> </ul>
<b>SPECIAL CONSIDERATIONS</b>	<ul style="list-style-type: none"> <li>● Could introduce game through modelling the game (ELL learners)</li> <li>● Could have the instructions in picture formats (simplified instructions)</li> <li>● Tic Tac Toe is a quick game; one round takes a few minutes</li> <li>● Organize groups according to student needs: Play in pairs, so two on two. Encourage discussion and understanding of the game. Focus on the rules of the game.</li> </ul>
<b>LESSON ACTIVITIES</b>	<ol style="list-style-type: none"> <li>1. Introduce the game via prepared slideshow/online video.             <ol style="list-style-type: none"> <li>a. <b>Tic Tac Toe – How to play</b></li> <li>b. Engage prior knowledge of the game: Have you seen it? Heard of it? Played it? (If students have played Gobblet Gobblers: How is it similar/different to Gobblet Gobblers?)</li> <li>c. Brief explanation of the game and go over stacking (model the game with a few students who you feel will gain understanding quickly - higher level thinkers). Encourage students to play without the blockers for the first week.</li> </ol> <p style="margin-left: 40px;">Today when playing, I'll ask you to think hard about what location for your first piece is a good move and investigate the different patterns (horizontal, vertical, diagonal) you can use to win.</p> </li> <li>2. Divide students into their groups.             <ol style="list-style-type: none"> <li>a. Explore pieces, read rules that come with the game.</li> <li>b. Have students set up the game board and gather their pieces.</li> <li>c. One on one group engagement for questions and clarifications.</li> <li>d. Once students feel comfortable, they may start an official round.</li> </ol> </li> <li>3. Hand out the reflection sheet so students know what questions to think about. Encourage them to choose one round of the game and answer the questions.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Teacher circulates and prompts student discussion of strategies. Encourage students to ask each other the questions listed on the “How to Play” sheet.             <ol style="list-style-type: none"> <li>a. Why did you choose to do that?</li> <li>b. Could you have tried a different strategy?</li> <li>c. What are the benefits or risks of stacking?</li> </ol> </li> <li>5. At the end of the game time, encourage students to complete the reflection sheet.</li> </ol>
<p><b>QUESTIONS/ REFLECTIONS</b></p>	<p>Questions for students/prompts:</p> <p>Focus for Lesson 1:</p> <ul style="list-style-type: none"> <li>● (If your students have played Tic Tac Toe and Gobblet Gobblers) Were there Tic Tac Toe strategies you could use for this game? What about Gobblet Gobblers?</li> <li>● When the game started, did you move first or second?</li> <li>● How did you choose the first spot for your piece?</li> <li>● Did any of your first three moves involve stacking your piece on top of another piece that had already been played?</li> <li>● Which types of patterns (horizontal, vertical, diagonal, and multi-level versions) did you try and use to win your game?</li> <li>● Pick one of the patterns you used in your game, why did you choose to use that pattern?</li> </ul> <p>“For Next Time” Reflection Question:</p> <p>Which winning pattern do you think is the hardest to stop? Can you explain why?</p> <p>Other questions to consider:</p> <ul style="list-style-type: none"> <li>● Explain the similarities and differences you noticed between Tic Tac Toe and Tic Stac Toe. (If students have played Tic Tac Toe)</li> <li>● Explain the similarities and differences you noticed between Gobblet Gobblers and Tic Stac Toe. (If students have played Gobblet Gobblers)</li> <li>● During the middle of the game, how did you decide where to place a piece on the board? Use drawings and words.</li> <li>● Mathematicians who research game theory are interested in all the different moves that can be made in a game. Can you show all the opening moves for the three related games: Tic Tac Toe, Gobblet Gobblers, and Tic Stac Toe? Draw pictures, give a count and reason for the count.</li> <li>● What is an important strategy you figured out while playing Tic Stac Toe. Use drawings and words.</li> <li>● Is it better to be the first player or the second player? Why?</li> </ul>

	<ul style="list-style-type: none"><li>● Can you set up more than one way to win? 2 ways? 3 ways?</li><li>● What do you do when you are thinking offensively?</li><li>● What do you do when you are thinking defensively?</li><li>● How many moves in advance are you planning?</li></ul>
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## Reflection Sheet: Tic Tac Toe

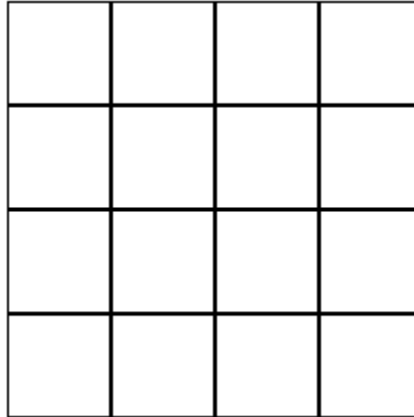
Your Name: \_\_\_\_\_

Team Members: \_\_\_\_\_

### 1) Locating Placement for First Move

a) When the game started, did you move first or second? Circle one:    FIRST    /    SECOND

b) Draw an “X” or “O” on the grid below where you placed your first piece:



c) Why did you choose that spot for your piece? Use the lines below to explain:

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d) Did any of your first three moves involve stacking your piece on top of another piece that had already been played? Circle One:    YES    /    NO

Why would stacking be a good move?

## 2) Investigating Winning Patterns

a) Which of the following types of patterns did you try and use to win your game? Circle all types you tried to use in your game:

1. Horizontal

2. Diagonal

3. Vertical

4. Horizontal (multiple levels)

5. Diagonal (multiple levels)

b) Pick one of the winning patterns from your game, how did you create that pattern? Why is it a winning pattern? Explain by drawing on the grid and using the lines below:

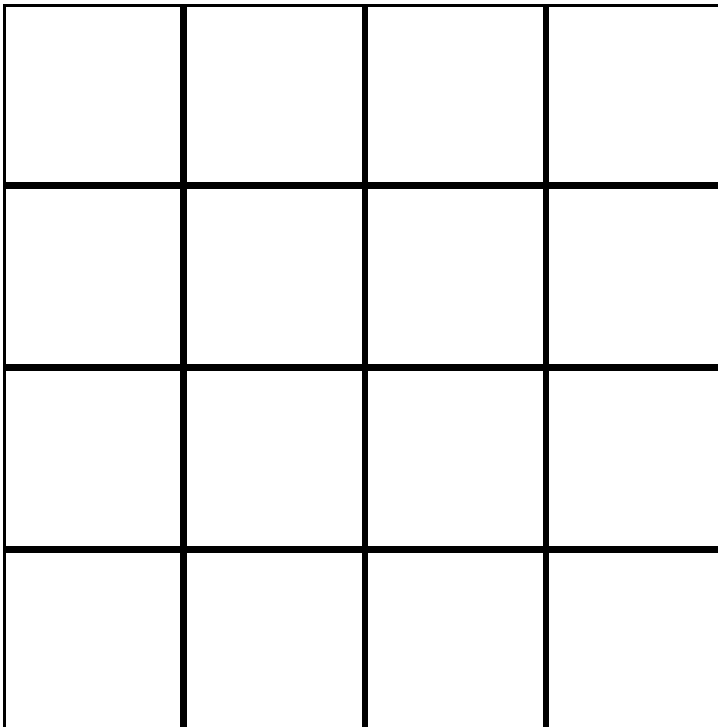
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Think about it for next time: Which winning pattern do you think is the hardest to stop? Can you explain why?