Practice Task: Shoo-Fly

Adapted from "Fly on the Ceiling" Lesson:
http://www.uen.org/Lessonplan/preview.cgi?LPid=11237
Source:http://www.uen.org/Lessonplan/preview.cgi?LPid=11237 and www.coreknowledge.org
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The two games in this task require students to locate points on a coordinate grid and name ordered pairs.

STANDARDS FOR MATHEMATICAL CONTENT

Graph points on the coordinate plane to solve real-world and mathematical problems.

MCC5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).

MCC5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students need to know the difference between vertical and horizontal lines and how to locate and name points in the first quadrant of the coordinate plane.

COMMON MISCONCEPTIONS

- Students reverse the points when plotting them on a coordinate plane. They count up first on the *y*-axis and then count over on the *x*-axis. The location of every point in the plane has a specific place. Have students plot points where the numbers are reversed such as (4,

5) and (5, 4). Begin with students providing a verbal description of how to plot each point. Then, have them follow the verbal description and plot each point.
- When playing games with coordinates or looking at maps, students may think the order in plotting a coordinate point is not important. Have students plot points so that the position of the coordinates is switched. For example, have students plot (3, 4) and (4, 3) and discuss the order used to plot the points. Have students create directions for others to follow so that they become aware of the importance of direction and distance.

ESSENTIAL QUESTIONS

- How does the coordinate system work?
- How can the coordinate system help you better understand other map systems?
- How do coordinate grids help you organize information?

MATERIALS

- *The Fly on the Ceiling* by Julie Glass, or similar book
- "Fly Tic-Tac-Toe, Directions" student sheet
- "Fly Tic-Tac-Toe, Game board," student recording sheet
- "Shoo Fly" game board (laminated) for each student
- Markers (wet erase/dry erase)
- Flashlight

GROUPING

Partner task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Comments: Identifying points on a coordinate grid is important in understanding how the coordinate system works and in constructing simple line graphs to display data or to plot points. These skills further help us to examine algebraic functions and relationships. The skills developed in this lesson can be applied cross-curricular to reading latitude and longitude on a map and to plotting data points.

One way to introduce this task is to read the book *Fly on the Ceiling* by Julie Glass or a similar book about plotting points on in the first quadrant of a coordinate plane.

Another introductory activity is to ask students to look at the ceiling and ask them what they see. (In most schools, you will have a modified grid system on the ceiling from the ceiling tiles. If you do not have this, skip this.) If you have a metal frame supporting the ceiling tiles, use these to create a coordinate grid. You might want to label them just below the ceiling on the wall. (If no metal frame is visible, you may need to point out the grid that is created where the ceiling tiles meet.) Be sure to label the lines created by the grid and not the tiles themselves. Turn the lights out and pretend you found a fly. Using a flashlight, shine the light on an intersection in the ceiling grid. Ask students to identify the ordered pair. Continue on until the class has grasped the

concept. Then give the students flashlights and call out different ordered pairs for students to identify with the flashlight.

The game boards used for this task can be laminated and used with water-based, fine-tip markers (such as Vis-à-Vis® markers) so the game boards can be reused.

TASK:

Students will follow the directions below from the "Shoo Fly, Directions" student sheet.

Shoo Fly

Materials: 2 "Shoo Fly, Game Board" student recording sheets
2 water-based Vis-à-Vis® markers
"Shoo Fly, Directions" student sheet

Number of Players: 2

Objective: To "swat" all of the opponent's flies by calling out the coordinates that identify the location of the "fly families."

Directions:

(This game is similar to Battleship.)

- Each player has five fly families: one (1) family of two, two (2) families of three and two (2) families of four.
- Provide each player with a "Shoo Fly, Game Board" student recording sheet. Have them draw their fly families on the top grid using a water based Vis-à-Vis® marker. They can draw the families vertically or horizontally. Each family member must be placed where two lines intersect.
- On a turn, a player calls out the location of a point, (e.g. (3,2)). The opponent responds with "hit" if the point is located where one of the members of a fly family is hidden and "miss" if no fly is on that point. On the bottom grid the player records an "O" for a miss and an "X" for a hit on that point. (Recording on the bottom grid helps to prevent calling out the same location twice during a game.)
- The opponent will also mark a "hit" on his/her grid so s/he will know when all members of the fly family have been hit. When a player has hit all of the flies in a fly family, the opponent calls out "swatted" to signal all flies in a family have been hit.
- Play proceeds until one of the players has "swatted" all his/her opponent's fly families.
- The first player to locate and "swat" all of their opponent's fly families wins the game.

Students will follow the directions below from the "Fly Tic-Tac-Toe, Directions" student sheet.

Fly Tic-Tac-Toe

Materials: "Fly Tic-Tac-Toe, Directions" student sheet
"Fly Tic-Tac-Toe, Game board," student recording sheet
Pencil

Number of Players: 2

Objective: To mark four points in a row
Directions:

- Players choose to be the "X" or the "O" and choose who will go first.
- The first player chooses a point and describes it using an ordered pair of numbers to describe it, e.g., (2,3). Mark the point on the "Fly Tic-Tac-Toe" game board and record the correct ordered pair on the Player 1 list.

Remember:

- ◊ The first number of the ordered pair tells how far to go across, the second number tells how far to go up.
- ◊ Points are marked at intersections of a grid.
- ◊ The size of the grid is 4 x 4 with corners at (0,0), (0,4), (4,4), and (4,0).

- If a player states the wrong coordinates, their turn ends.
- Players take turns choosing and plotting points on the game board.
- To win, a player must get four coordinate points in an uninterrupted straight line —horizontally, vertically, or diagonally.

FORMATIVE ASSESSMENT QUESTIONS

- What is the coordinate for the horizontal axis?
- What is the coordinate for the vertical axis?
- Why do you need to plot your point where two lines intersect?
- How do you graph a point on the coordinate plane?
- How do you name a point on the coordinate plane?
- How do you use an ordered pair to identify a point on the coordinate plane?
- How do you use an ordered pair to locate a point on the coordinate plane?

DIFFERENTIATION

Extension

- Play a variation of the Fly Tic-Tac-Toe game by using a 5 x 5 grid and a die labeled with the numbers 0-5. Instead of choosing a point, students need to roll the die using the number rolled as the first coordinate (the *x* value) of the ordered pair. Students are able to choose (if possible) a point whose coordinates start with the rolled number. This limits the students' choice a little bit and focuses on the meaning of the coordinates of an ordered pair.
- Have students create a picture on a coordinate grid. List the ordered pairs of the points that need to be plotted to complete the mystery picture on a separate sheet of paper. Have a partner try to recreate the mystery picture following the coordinates given.

Intervention

- Ask students to plot coordinate points in order to create a mystery picture. Visual students will be able to see their mistakes when working in the context of a picture.

Name _____ Date _____

Shoo Fly

Directions

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Directions:
(This game is similar to Battleship.)

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- Provide each player with a "Shoo Fly, Game Board" student recording sheet. Have them draw their fly families on the top grid using a water based Vis-à-Vis® marker. They can draw the families vertically or horizontally. Each family member must be placed where two lines intersect.
- On a turn, a player calls out the location of a point, (e.g. (3,2)). The opponent responds with "hit" if the point is located where one of the members of a fly family is hidden and "miss" if no fly is on that point. On the bottom grid the player records an "O" for a miss and an "X" for a hit on that point. (Recording on the bottom grid helps to prevent calling out the same location twice during a game.)
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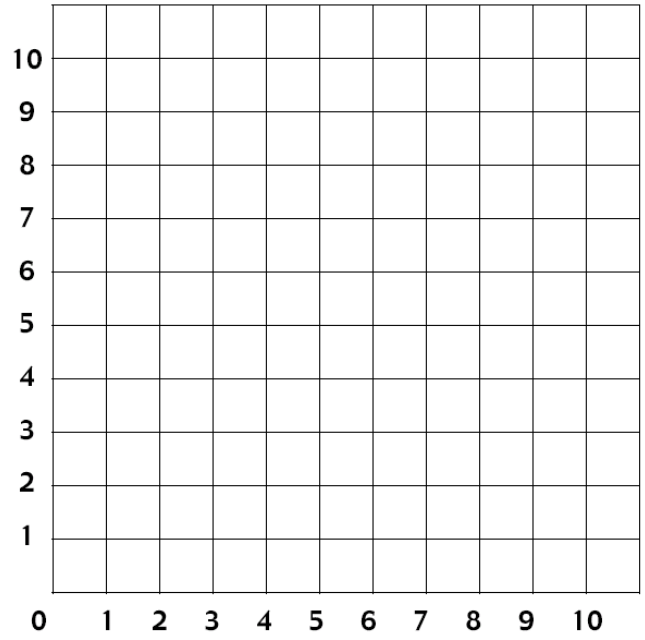
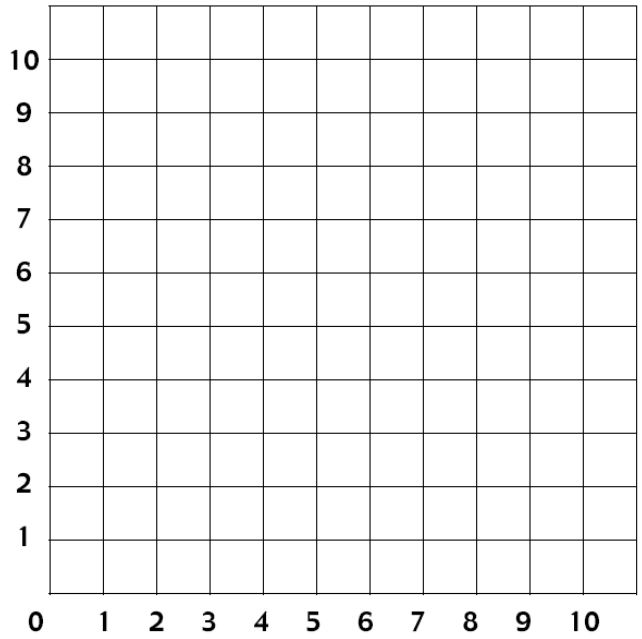
Name _____ Date _____

Shoo Fly

Game Board





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Fly Tic-Tac-Toe

Directions

Materials: "Fly Tic-Tac-Toe, Directions" student sheet
"Fly Tic-Tac-Toe, Game board," student recording sheet
Pencil

Number of Players: 2

Objective: To mark four points in a row

Directions:

- Players choose to be the "X" or the "O" and choose who will go first.
- The first player chooses a point and describes it using an ordered pair of numbers to describe it, e.g., (2,3). Mark the point on the "Fly Tic-Tac-Toe" game board and record the correct ordered pair on the Player 1 list.
- Remember:
  - ◊ The first number of the ordered pair tells how far to go across, the second number tells how far to go up.
  - ◊ Points are marked at intersections of a grid.
  - ◊ The size of the grid is 4 x 4 with corners at (0,0), (0,4), (4,4), and (4,0).
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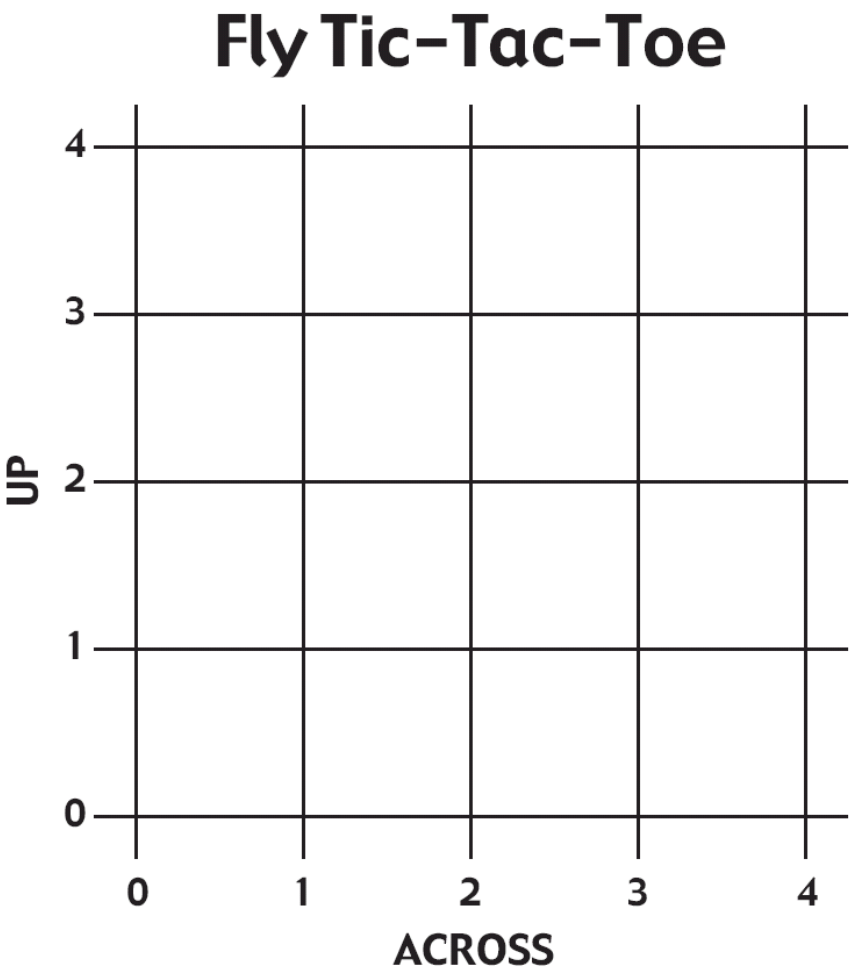
Fly Tic-Tac-Toe



Fly Tic-Tac-Toe Player 1
Recording Sheet

FLY COORDINATES Across	Up
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)

Fly Tic-Tac-Toe Player 2
Recording Sheet

FLY COORDINATES Across	Up
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)
(	)

Game Board