



## CEMC at Home

Grade 4/5/6 - Monday, April 20, 2020

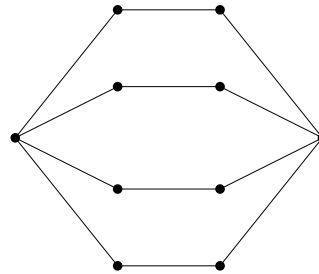
### Tag, and That's It!

In this activity, we will play a game of tag on a graph!

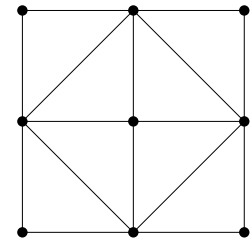
#### You Will Need:

- Two players
- A piece of paper and a pencil
- Two counters

*A different small object for each player.*



Board 1



Board 2

#### How to Play:

1. Choose one of the two game boards shown above (Board 1 or Board 2) for the game. Notice that each board consists of dots and line segments drawn between certain pairs of dots.

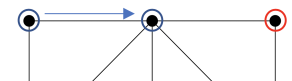
*Larger versions of these game boards are provided on the next page.*

2. Players alternate turns. Decide which player will go first (Player 1) and which player will go second (Player 2). Just like a game of tag, Player 1 is “it”, and Player 2 must avoid being caught by Player 1.

3. On the first turn, Player 1 puts their counter on any dot they wish. Next, Player 2 puts their counter on any *other* dot on the game board.

4. Next, Player 1 can move their counter from their current dot to another dot by following a single line segment on the game board. Player 1 can also choose to “pass”, and not move their counter at all. Player 2 then moves according to the same rules.

*For example, on Board 2, a player can move from the top left dot to the top middle dot on a single turn, but cannot move from the top left dot to the top right dot, because that means moving across two line segments.*



5. On all remaining turns, Player 1 and Player 2 take turns moving their counter following the rules outlined in 4. At all times, Player 1 is trying to catch Player 2, and Player 2 is trying to stay away from Player 1.

6. Player 1 can “catch” Player 2 by occupying the same dot as Player 2. If this happens, then Player 1 wins. If Player 1 is unable to catch Player 2 and gives up, then Player 2 wins.

#### Play this game a number of times using each of the game boards (Board 1 and Board 2).

Alternate who goes first and who goes second. As you play, think about the following questions:

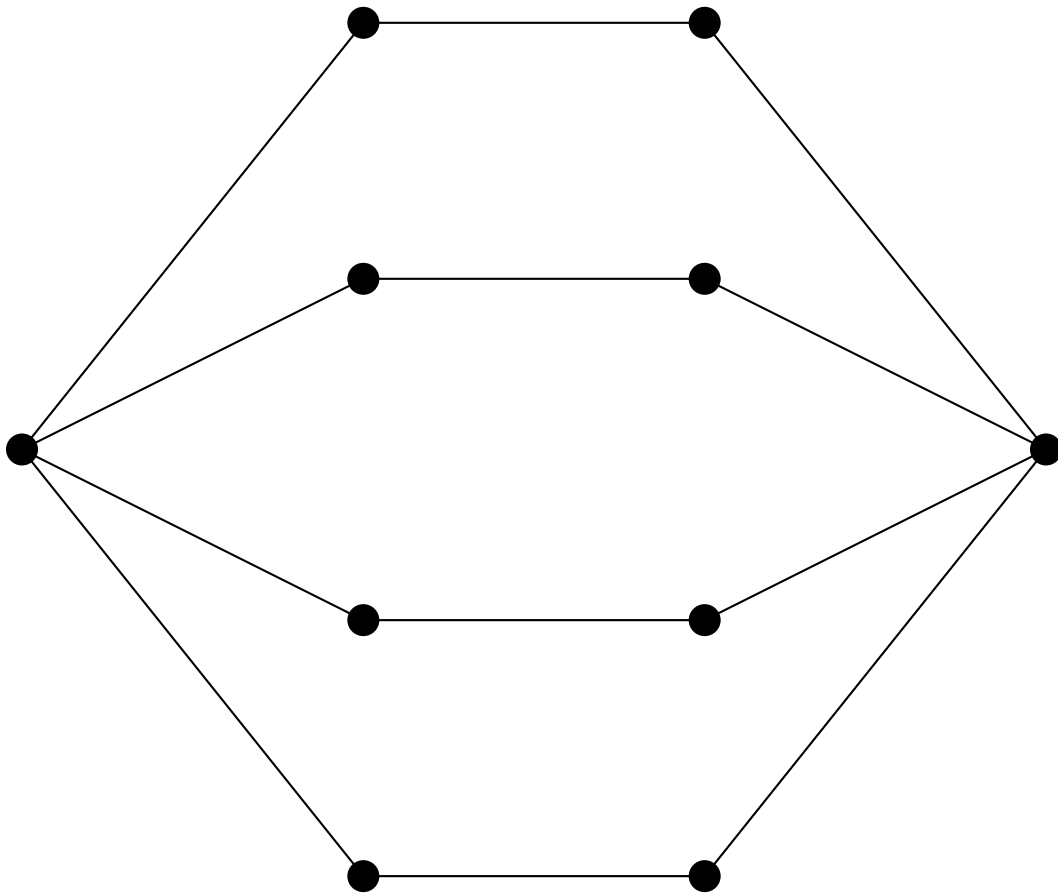
- Who seems to win most often: Player 1 or Player 2? For each of the game boards (Board 1 and Board 2), can you come up with a strategy that will allow you to win every time?
- The game boards for this game are called *graphs*. A graph is made up of dots (called *vertices*), along with lines (called *edges*) that connect certain pairs of vertices. Can you build a new game board (or graph) which gives Player 1 an advantage in the game? What about Player 2?

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#### More Info:

Check the CEMC at Home webpage on Monday, April 27 for a discussion of Tag, and That's It!

Board 1



Board 2

