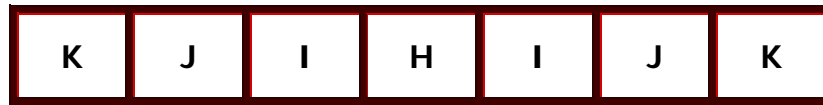


A Fair Hopper

NAME _____

This game is played on the following game board. Study the game and answer Question 1.



To begin each turn, place a chip on the home (H) square. Each turn consists of tossing a coin three times. For each toss, if the coin lands *heads*, move the chip — or the “hopper,” — to the right. If the coin lands *tails*, move the hopper to the left.

After three tosses, player A scores a point if the chip is on either I square. Player B scores a point if the chip lands on the H, J, or K squares. A game consists of ten turns.

1. Predict who will win. Does the game appear to be fair? Why?

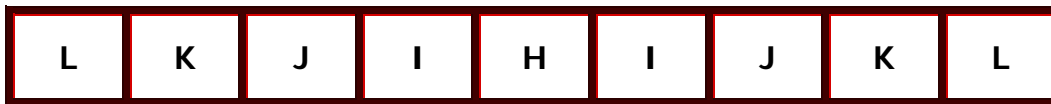
Play the game. Record the results for each turn in a chart for each player.

TURN	PLAYER A	PLAYER B
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

2. On the basis of the data, does the game seem fair?

- Use a tree diagram to list all possible outcomes. How many outcomes are possible? For each branch of the tree diagram, decide on which square the hopper lands. Use your analysis to determine the fairness of the game. Write a brief report of your results.
- If “hopper” is not a fair game, how could you change it to make it fair?

Suppose that a coin is tossed four times and a longer board is used (add a square labeled L at each end). Player A scores a point if the hopper lands on I or L, and player B scores a point if the hopper lands on H, J, or K.



- Predict the winner. Explain your reasoning.

Play the game. Record and study the results.

TURN	PLAYER A	PLAYER B
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

6. Does the game appear to be fair?

7. Use a tree diagram to analyze the outcomes. Are you surprised?

8. What do you think will happen if a longer board is used and the coin is tossed five times?

9. Make up a different game that is based on the “hopper” idea. Analyze your game to determine if it is fair. Present your game to other students, and analyze it for fairness.