

Game Play

After the initial setup, the game consists of four turns (or seasons). Each turn has the following four steps:

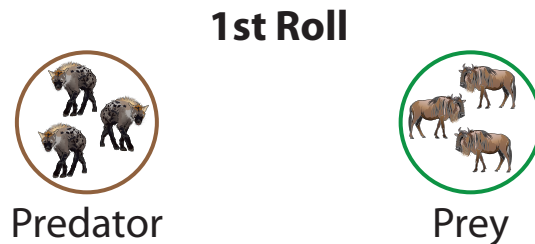
- 1.** Wildebeest Migration
- 2.** Draw Event Cards
- 3.** Hyenas Hunt
- 4.** Lions Hunt
 - End of Turn

How to Roll the Dice in a Hunt

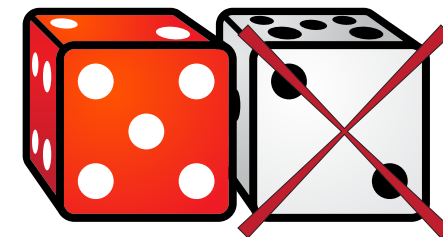
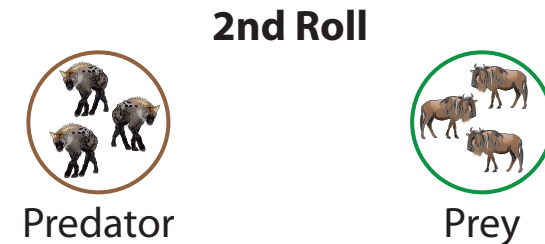
- 1.** The red dice represent the predators and the white dice represent the wildebeest.
- 2.** The number of dice that are rolled in a given hunt will vary with the type of token involved in the hunt. Each agent involved in a hunt should collect the correct number of dice for predator and prey based on the following:
 - Herd token (for wildebeest only) = 3 dice
 - Small Group token (wildebeest, hyena, lions) = 2 dice
 - Individual token (wildebeest, hyena, lions) = 1 die
- 3.** Both predator and prey agents involved in the hunt now roll their dice.
- 4.** Line up the rolled dice for the prey from highest value to lowest value next to the predator's dice, also lined up from highest to lowest. (See examples.)
- 5.** Determine the results of the dice roll.
 - a.** Compare the highest predator die to the highest prey die. If one is higher than the other, remove the lower die and keep the higher die. If they are equal in value, keep both.
 - b.** Compare any remaining pairs of dice. For each comparison, the lower die is removed from play, and the winning, higher die, is kept. If the dice tie, keep both dice.
 - c.** If there are any predator or prey dice that were not initially part of a predator-prey pair of dice, those dice remain in play.
- 6.** After the results of the dice roll have been determined, if both agents still have dice remaining, roll all remaining dice again and repeat steps 4 and 5.
- 7.** Keep rolling until one person runs out of dice. The agent who runs out of dice first loses the hunt. The other agent wins.

How to Roll the Dice in a Hunt

Example Hunt 1 - Small group predator vs. small group wildebeest



When lined up in order, the first prey dice is higher than the first predator. The second predator is higher than the second prey. One dice from each is eliminated.

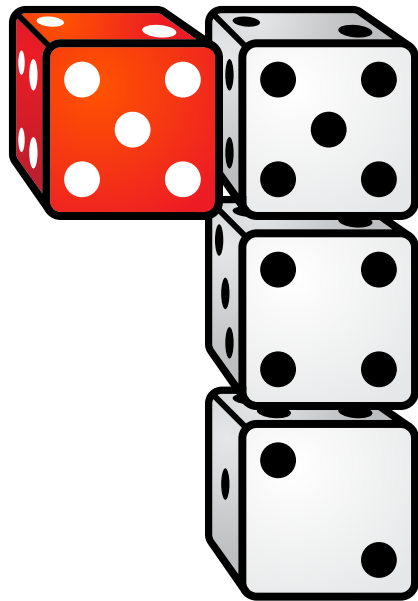
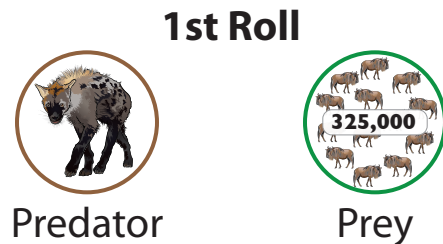


↑
Predator wins

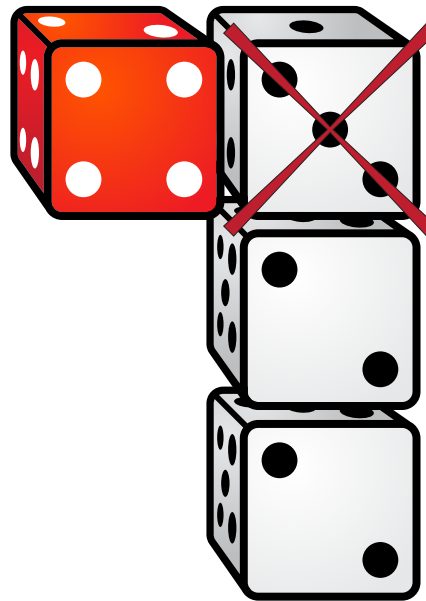
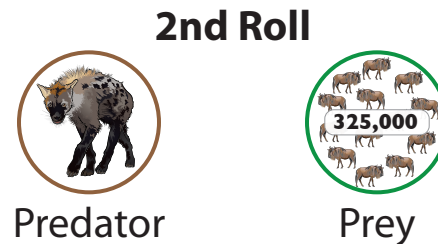
The predator's dice is higher than the prey's. The predator wins.

How to Roll the Dice in a Hunt

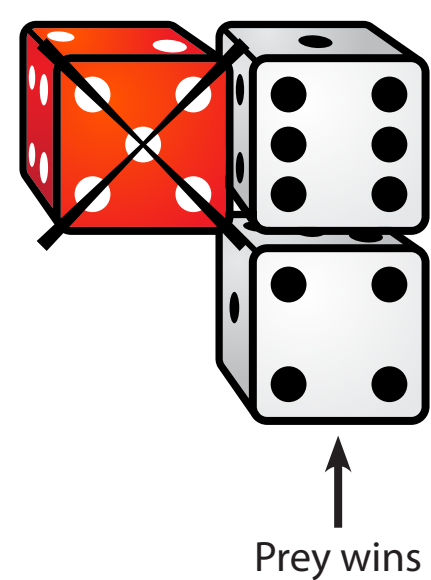
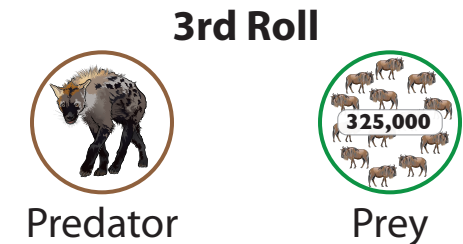
Example Hunt 2 - Individual predator vs. herd of wildebeest



The two highest dice are tied. Since the predator only has one dice, all die are rolled again.



The predator's die is higher than the prey's highest. One predator's die is eliminated.



The predator's die is lower than the prey's and removed, leaving no predator dice remaining.

Name: _____

Date: _____

Unit B.1, Lesson 7 - Data Analysis

Part 1

1. Analyze your data.

a) Use your data to complete the table below.

Group Size	Number of Interactions	Number of Successful Interactions	% of Time Successful
Individual			
Small Group			
Herd (Skip for lion or hyena)			

Hint: To calculate % success, divide the number of successful interactions by the number of interactions.

b) What does it mean for your agent to be successful?

c) How did group size contribute to success?

d) How did the success of individuals during these interactions help the whole group?

2. Develop algorithms to help explain patterns in data.

a) Write an if/then statement based on each of the rows in your data table.

For example:

Group Size	Number of Interactions	Number of Successful Interactions	% of Time Successful
Individual	7	2	$2/7 \times 100 = 29\%$

Group Size	Algorithm in Words
Individual	<i>If the wildebeest are alone and they interact with a predator, they are successful 29% of the time.</i> OR <i>If the wildebeest are alone and they interact with a predator, they are unsuccessful 71% of the time.</i>

Group Size	Algorithm in Words
Individual	
Small Group	
Herd (Skip for lion or hyena)	

b) Write a NUMERIC if/then statement based on each of the rows in your data table.

For example:

Group Size	Number of Interactions	Number of Successful Interactions	% of Time Successful
Individual	7	2	29%

Group Size	Algorithm in Words
Individual	<i>If wildebeest (1) + predator then wildebeest = -0(.29)</i> OR <i>If wildebeest (1) + predator then wildebeest = -1(.71)</i>

Group Size	Numeric Algorithm
Individual	
Small Group	

Herd (Skip for lion or hyena)	
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3. Talk to your group members. How do their algorithms compare to yours? How do the algorithms for all three agents help you identify a pattern?

4. Our game was designed to model interactions in the Serengeti system. How well did our design of the game support that goal? What recommendations would you make to revise the game system?
5. The data we collected predicts the behavior of the agents in the model. Our model made assumptions about the system that limit the value of our predictions. All models have limitations. In what ways do you think our model is limited? How do those limits affect the kinds of conclusions we can make? Use the example below to help you identify one assumption and limit.

Prediction	Assumption	Limit
Group behavior increases chances of survival for predators or prey.	We drew a line around the park and assumed that the agents outside the park boundaries did not impact our model.	There might be a lot more lions or hyena living outside the park that can travel in and interact with the wildebeest, we would not capture these interactions so the number of interactions might be lower.