Wolf Survival is Just a Roll Away…

National Science Content Standards:

Unifying Concepts and Processes
- Evolution and Equilibrium

Life Science
- Regulation and behavior

Vocabulary:
Limiting Factors
Mortality

Materials:
- 2 dice per group
- Score sheet
- Wolf information chart

Introduction: In this simulation, students will raise a pack of wolves under 2 different conditions; without human interference and with human interference. Students will use dice to determine what happens to the wolf pack over time.
This simulation may be played either before or after playing *WolfQuest.*

Objectives:

At the end of this activity, the student will:
1. Recognize that limiting factors - including predator/prey relationships affect wildlife populations.
2. Recognize that some fluctuations in wildlife populations are natural as ecological systems undergo constant change.
3. Understand how people can influence an ecosystem.

Procedure:

Background:
In the late 1990s, gray wolves were on the endangered species list. Great efforts were made to protect gray wolves: they moved to areas where they were protected, and hunters who shot wolves were heavily fined. Ranchers were compensated for livestock that wolves killed.

As the Gray wolf population grew, the wolves were removed from the endangered species list. Biologists continued to monitor the populations by tracking some wolves with radio transmitter collars. However, without the protection of the Endangered Species Act, will the wolves be able to survive?

Your team has just spotted a pack of gray wolves! Back at camp, you develop a model of this wolf pack's population and use it to determine what must be done to make sure this pack survives.

Procedure:

Set up:

1. Divide the class into groups of twos.
2. Distribute the wolf pack record table to record the data and the information sheet.
3. Hand out 2 dice per group.
4. Round 1 has been completed for you. Model round 2 if necessary with the class.

Game:

1. You start with 2 adult wolves and 3 pups to equal 5 total wolves
2. Each roll of the dice represents the passage of 1 year. Look at the dice and check the information sheet to see what happened to your pack during the year.
3. Fill in the information on the wolf record table and adjust the number of wolves according to what happened to your pack.
4. Repeat for 15 times to model 15 years of time.

**Every year add 3 wolves to your pack (due to reproduction and mature pups leaving the pack).

Discussion Questions:
Without human interference – what happened to your pack of wolves over the years?

With human interference – what happened to your pack of wolves over the years?

Under which condition, with or without human interference, did your pack do better? Why do you think that?

Wolf Pack Record Table – Without Human Interference

Year	Last year's total	Add 3 wolves	Total	What happened during the year?	Total for the year
1	**2**	**3**	= **5**	You roll the dice and get double 6's! This means you get another pup this year	**5 +1 = 6**
2	**6**	**3**	= **9**		
3		**3**	=		
4		**3**	=		
5		**3**	=		
6		**3**	=		
7		**3**	=		
8		**3**	=		
9		**3**	=		
10		**3**	=		
11		**3**	=		
12		**3**	=		
13		**3**	=		
14		**3**	=		
15		**3**	=		

Wolf Pack Record Table – With Human Interference

Year	Last year's total	Add 3 pups	Total	What happened during the year?	Total for the year
1	**2**	**3**	= **5**	Your dice add up to 9, this means you subtract 2 due to wolf death	**5 - 2 = 3**
2	**3**	**3**	= **6**		
3		**3**	=		
4		**3**	=		
5		**3**	=		
6		**3**	=		
7		**3**	=		
8		**3**	=		
9		**3**	=		
10		**3**	=		
11		**3**	=		
12		**3**	=		
13		**3**	=		
14		**3**	=		
15		**3**	=		

Wolf Survival is Just a Roll Away…

Information sheet

Game 1: Without Human Interference

If you Roll:	You:	What happened during the year:
Double 2, 3, 4, 5	Subtract 2	High pup mortality rate, 2 pups die
Double 1	Divide by 2	Disease kills half the pack
Double 6	Add 1	Extra pup this year!
Dice add up to 3	Subtract 1	One pup dies
Dice add up to 4 (not double 2)	Subtract 2	Two wolves die of natural causes
Dice add up to 5	Make no change	Pack lives well for the year
Dice add up to 6 (not double 3)	Make no change	Pack lives well for the year
Dice add up to 7	Make no change	Pack lives well for the year
Dice add up to 8 (not double 4)	Divide by 2	Food shortage kills half the pack
Dice adds up to 9	Make no change	Pack lives well for the year
Dice adds up to 10 (not double 5)	Make no change	Pack lives well for the year
Dice adds up to 11	Subtract 1	Wolf is attacked by another wolf pack and dies

Game 2: With Human Interference

If you Roll:	You:	What happened during the year:
Double 2, 3, 4, 5	Subtract 2	High pup mortality rate, 2 pups die
Double 1	Divide by 2	Disease kills half the pack
Double 6	Add 1	Extra pup this year!
Dice add up to 3	Subtract 1	One pup dies
Dice add up to 4 (not double 2)	Subtract 2	Two wolves die of natural causes
Dice add up to 5	Subtract 2	Hunter kills 2 wolves
Dice add up to 6 (not double 3)	Make no change	Pack lives well for the year
Dice add up to 7	Make no change	Pack lives well for the year
Dice add up to 8 (not double 4)	Divide by 2	Food shortage kills half the pack
Dice adds up to 9	Subtract 2	Human kills 2 wolves
Dice adds up to 10 (not double 5)	Subtract 1	Wolf is hit by a car and dies
Dice adds up to 11	Subtract 1	Wolf is attacked by another wolf pack and dies