



Turkey Trouble

Objectives: Upon completion of this activity, you will

- Analyze data to identify possible patterns and relationships between a biotic or abiotic factor and a biological system (populations, communities and ecosystems).
- Predict the effects of a change in the community's populations on the community.
- Use data analysis to refine observations and measurements regarding the effect of population interactions on patterns of species distribution and abundance.

BACKGROUND: You are working for the Texas Parks and Wildlife Department as a wildlife biologist. In order to restore balance to the ecosystem found in the Texas Panhandle, a decision was made to transplant a population of Merriam turkeys to a wildlife preserve established by the state. In this activity, you will simulate the environmental changes that affect how the population of turkeys will change over time. During this simulation, you will track the changes that occur in the turkeys' environment as well as the changes in the population. You will also make observations about how biotic and abiotic factors can affect population size.

Procedure:

- 1) **Work in pairs. In your BILL, construct an appropriate data chart that reflects the data you will collect during each round. This chart should include information such as population size, event affecting population and the event's effect on the population.** Each player must keep track of the number they roll for each round and the change in their flock's population.
- 2) **Each group will begin with 100 turkeys.** To determine what events will affect your turkey population, roll the two dice simultaneously. Depending on the total points of the toss, use the chart to determine what you are to do. Notice that sometimes you will do something different if your population is a particular size.
- 3) Each group will roll the dice **at least 20 rounds (unless wiped out)**. Be sure to record information for your population after each round.
- 4) When the game is over, make a graph of your population as it changed over each of the rounds. **Annotate the graph appropriately to indicate the events that caused your population of turkeys to change.**
- 5) After you have constructed your graph, answer the questions below in your lab notebook:

Lab Questions

1. What pattern of population growth do you notice about your turkey population? Why?
2. Identify the biotic factors affecting your particular population. What are they? Identify the abiotic factors affecting your particular population. What are they?
3. Which set of factors (biotic or abiotic) have a more profound effect on your population's size and why?
4. How does this activity accurately model the growth and contraction of real populations in nature?
5. All populations of organisms have some effect on their ecosystem, whether positive or negative. Describe how the turkey population affects its local ecosystem, including any interactions it may have with other populations.
6. Describe the limitations this model has in showing the growth of real populations. How could this model be improved to more accurately portray what happens to real populations in nature?
7. In Texas, javelinas (wild pigs) are known to be a nuisance in many of the state's counties. The Texas Department of Parks and Wildlife has established designated javelina hunting seasons in order to control the population. For the following counties, the hunting seasons are as follows:
 - a. Bexar County (San Antonio): September 1-August 31
 - b. Hays County (San Marcos, 50 miles north): October 1-February 23

Why do you think the javelina hunting seasons are different lengths for each of these counties, even though they are only 50 miles apart? What factors do you think contribute to the determination of a hunting season's length, and how do they relate to population control?

GAME CHART

Dice Value	Event	Effect on Population
2	Housing Development	Rapid population growth occurs as people flee the state's large metropolitan areas in favor of the sleepy Panhandle. People need houses and places to shop, you know. So sorry, but your entire flock was just eliminated except for one pair that was taken to the local zoo. Unfortunately, both birds are males. Better take lots of pictures to show your kids. ☹
3	Prairie Fire due to lightning strike	A storm happens one night, causing a lightning strike that starts a widespread prairie fire. The fire destroys both habitat and food sources for the turkeys. Alas, only 10 birds survive (no matter how many you had to start the round with).
4	Mild Winter	Your flock just grew by 75 (no matter how many you had to start the round with).
5	Hunting Season	If your flock is less than 200 , you are safe since no hunters will drive to your area for so few birds. If your flock is over 200 , then hunters kill 70 of them. If your flock is exactly 200 , then the population remains unchanged.
6	Good Hatching Weather	The size of your flock triples.
7	Avian Flu Outbreak	If your flock is under 300 , you only lose 50 to the outbreak. If your flock is larger than 300 , you lose 100 of your birds. If your flock is exactly 300 , then your flock remains unchanged.
8	Abundant Food	Your flock will double if it is currently under 500 birds. It will grow by only 100 if it was larger than 500 to start the round.
9	Corn planted nearby	Your population will triple if it started the round under 99 . If your flock is 99 or over , the local farmers will be concerned the birds will eat too much corn and will convince the TPWD to open a hunting season. Then your population will fall by half.
10	Coyotes move in	If your flock is under 99 , only 20 fall prey to the coyotes since your birds are too scattered to provide a daily food supply for the coyotes. If your flock is 99 or more, then 50 will be eaten by the carnivorous animals.
11	Mild Summer	Your flock doubles.
12	Flash Flood	A heavy rainstorm falls across the Panhandle, causing massive flooding. All but 10 birds die.

References

Jefferson, J. (2009, September). 2009 hunting forecast. Retrieved from http://www.tpwmagazine.com/archive/2009/sep/ed_1/index.phtml

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TPWD: javelina season, south zone. (2008, August 8). Retrieved from <http://www.tpwd.state.tx.us/huntwild/hunt/season/javelina/south/>