

Lesson Plan 4

Population Change

CRITICAL OUTCOMES

CO #4: Collect, analyze, organize and critically evaluate information.

CO #5: Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation.

CO #7: Demonstrate an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation.

LEARNING OUTCOMES

LO #1: The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

LO #2: The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

LO #3: The learner will be able to demonstrate and understanding of the interrelationships between science and technology, society and the environment.

Process Skills:

Recording and interpreting information

Predicting and raising questions about a situation

Reporting

Utilisation of resources, impact of man on the environment and ethics

ASSESSMENT STANDARDS

Collects data, recording observations

Evaluates data and communicates findings, relates observations and responses to the focus question

Recalls meaningful information

Interprets information

Understands the impact of science and technology: suggests ways to minimize negative effects on the environment



TEACHING THE LESSON

Review vocabulary words, population and community found in Grade Five Lessons Population Change section on page 35.



ACTIVITY 1 - cheetah challenge with graphing

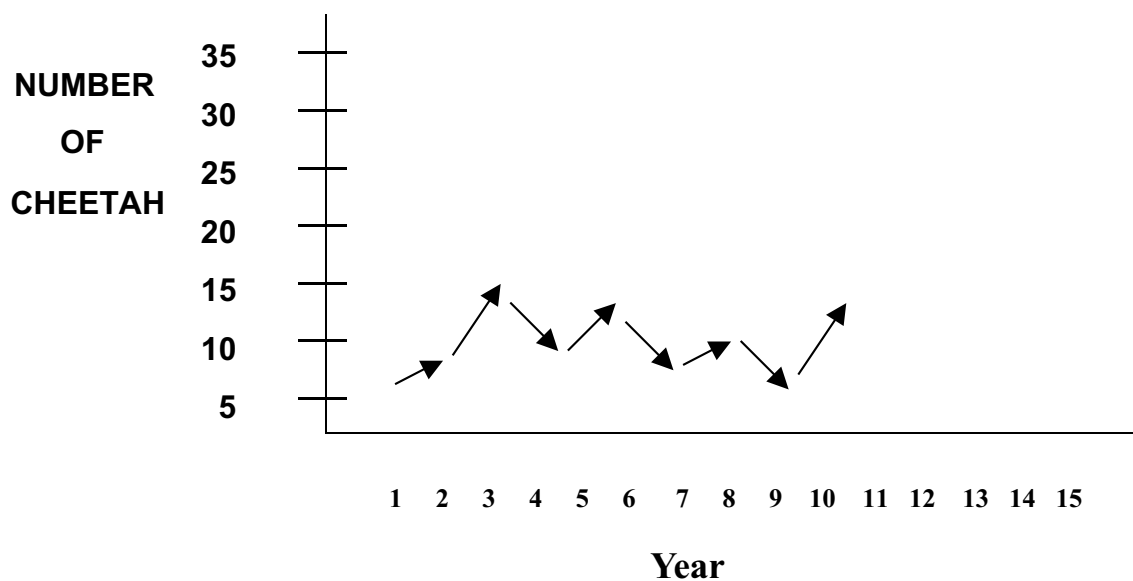
Procedure:

1. Ask the students to count off in fours. Have all the "ones" go to one side of the activity area and the rest to the other side.
2. The "ones" become cheetahs. Ask the students what a cheetah or any animal needs to survive - food, water, shelter & space. For the purpose of this activity, assume that the cheetahs have enough water in which to drink. The "ones" need to find food, shelter, & space. If a cheetah (the "ones") want to find food they clamp their paws over their stomachs. If the cheetah is looking for shelter, it puts its paws over its head. If it is looking for space, it crosses its paws across its chest (like hugging itself). A cheetah can choose to look for one of its needs during each round and can change what it is looking for in the next round, if it survives. The cheetah cannot change its sign when it sees what is available during that round.
3. The twos, threes, and fours are food, shelter and space - components of a habitat. Each student is allowed to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the cheetah show what they are looking for; that is, hands on stomach for food, etc.
4. The activity starts with all players lined up on each side of the activity area (cheetah on one side, habitat components on the other side) and with their backs facing the students along the other side of the area.
5. Begin the first round by asking the students to make their signs - each cheetah deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to put their hands in place. (The two lines of students normally will display a lot of variety in signs. As the activity proceeds, sometimes the students will confer with each other and all will make the same sign. That's okay, and you may encourage it. For example, all students in the habitat might decide to be shelter. This could represent a drought year with no food or water.)
Note: Switching symbols in the middle of a round can be avoided by telling the students if they are caught cheating they will not participate.
6. When the students are ready, say: "Cheetah Challenge!" Each cheetah and each habitat component turn to face the opposite group, continuing to hold their sign clearly.
7. When the cheetahs see the habitat component they need, they run to it. Each cheetah must hold the sign of what it is looking for until getting to the habitat component student with the same sign. Each cheetah that reaches its necessary habitat component takes the "food", "shelter", or "space" back to the cheetah side of the activity area.
8. "Capturing" a habitat component represents the cheetah successfully meeting its needs and successfully reproducing as a result. Any cheetah that fails to find its food, shelter, or space dies and becomes part of the habitat.

Note: When more than one cheetah reaches a habitat component, the student who arrives first survives. Habitat components stay in place until a cheetah chooses them. If no cheetah needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. That habitat component can, however, change which component it is from round to round.



9. Record the number of cheetah at the beginning of the activity and at the end of each round. Continue the activity for approximately 15 rounds. If possible, have a student or two assist you in recording the numbers.
10. After each round, ask the students to observe what is happening to the cheetah population? Why did it increase?
11. Repeat the round several times and encourage students to confer with one another or you can simply have the habitat components be all shelter to represent a drought.
12. At the end of 15 rounds, use an overhead projector, flip chart or chalkboard, post the data recorded during the activity. The number of cheetah at the beginning of the activity and at the end of each round represents the number of cheetah in a series of years. That is, the beginning of the activity is year one; each round is an additional year. Cheetah can be posted by fives for convenience. For example:



Draw the line graph for students or have them create their own graphs using the data. Provide them with the years and numbers of cheetah.

The students will see this visual reminder of what they experienced during the activity: the cheetah population fluctuated over a period of years. This process is natural as long as the factors that limit the population do not become excessive, to the point where animals cannot successfully reproduce.





ACTIVITY 2 - cheetah challenge incorporating farmer

This is a continuation of activity 1: Use the data from that lesson or rerun the learners through the exercise and continue with the following steps.

13. Once you have completed a few rounds and observed the changes in the cheetah population, it is time to introduce the trapper / farmer. The trapper starts in his home, which is a designated area off to the side of the activity area. The trapper must skip or hop. This reduces the possibility of violent collisions between cheetah and trapper. Trappers can only tag a cheetah when they are going towards the habitat and are between the habitat and cheetah lines. Once a cheetah is tagged, the trapper escorts the cheetah back to the trapper's home. The caught cheetah is now another trapper. If a trapper fails to tag a cheetah during a round, the trapper becomes habitat.
14. After a few rounds with the trapper, ask the students what happened to the cheetah population. Did it increase? Decrease? Why?
15. Have the students add this data onto their graphs from lesson five.
16. The students will again see this visual reminder of what they experienced during the activity: the cheetah population fluctuated over a period of years. This process is natural as long as the factors that limit the population do not become excessive, to the point where animals cannot successfully reproduce.

Ask the students to summarize some of the things they learned from this activity in a paragraph, you can give them the following questions as a guideline:

Would the trapper be a natural factor? *No farmers / trappers tend to remove too much from a system resulting in an imbalance.*

The wildlife populations will tend to peak, decline and rebuild; peak decline and rebuild as long as there is good habitat and sufficient numbers of animals to reproduce successfully. How might the trapper affect this trend? *The trapper will disturb this trend by removing too much so that reproduction will not be successful enough to rebuild the population.*

What is realistic and unrealistic about this simulation? *Cheetah that don't survive DO become recycled as nutrients but it is not instantaneous. Cheetah need ALL habitat components to survive. Poor habitat usually results in a weakened individual that succumbs to disease, etc. not instant death.*

What do animals need to survive? *-food, water, space, shelter'*

How do these components influence carrying capacity? *if any of these components are absent or there is an insufficient amount it will decrease the number of animals that can live successfully in that habitat.*

What are some of the "limiting factors" that affect the survival of animals? *food, disease, water, space, shelter, increase in predation etc.*



How do factors limiting carrying capacity affect health, numbers and distribution of animals? *animals will be unhealthy, numbers will decrease, animals will move to other areas which could offer better chances of survival.*

How do these factors affect competition within species? *competition will increase if there is insufficient food, water, space or shelter.*

Are wildlife populations static, or do they tend to fluctuate as part of an overall “balance” or ecological systems involved in the process of constant change? *- wildlife populations tend to change all the time in response to changes in the environment, such as varying food availability, water availability etc.*

How does the trapper affect this “balance” of nature? *-trappers can disturb this by taking too much out of the system.*



ASSESSMENT

Checklist for Graph:

Assessment Statements	Yes	No
Graph has a heading		
Both Axis are labelled		
Axis labels are correct (number of cheetahs vs years)		
Axis are divided into relevant intervals		
Data is plotted accurately		
The data for with and without trapper is easily distinguishable		
The graph is neat and legible		

Rubric for paragraph:

1	2	3	4
The learner was unable to explain the data.	The learner showed some understanding of the processes behind the data.	Learner showed an understanding of the effect of man on the system as well as the concept of “balance of nature”. The learner was able to predict what caused fluctuations in the graphed population.	The learner exceeded expectations, showing a deeper understanding of the graphed data.





BACKGROUND – threats to survival

The cheetah is facing many threats to its survival, including the high death rate of cubs, loss of habitat, a reduction in its prey base, conflict with livestock farming and a reduced ability to survive in parks and reserves due to the presence of larger predators.

The cheetah's ideal habitat is open grassland and they occupy quite large territories. Man wants this land for livestock farming, leading to an obvious conflict resulting in the cheetahs' survival being in doubt as an increasing amount of land is converted for human use. Further more, as a predator, it is seen as a threat to livestock and is generally trapped and shot by farmers under the perception that the cheetah is having an excessive economic impact. In some instances large corporate companies eliminate the wild herbivores to make space for livestock. This removes the cheetah's natural prey, resulting in starvation for many.

Did you know?

The cheetahs ideal habitat is open grassland

If the farmer employs effective livestock management practices, they suffer little or no livestock loss to cheetah due to their hunting behaviour. The cheetah is not generally a livestock predator due to the fact that it relies on speed and does not have the weight for an ambush attack. Livestock does not run, therefore the cheetah is not stimulated to chase and kill. However, if desperate, the cheetah has been known to go for the easier kill, such as goats and sheep. This is generally when the cheetah is old, ill, injured or has no other alternative prey available. The problem has been a lack of education, farmers do not understand the nature of the cheetah and have been blaming it for livestock kills due to the fact that it is a day hunter and therefore always seen.

In the past, our solution to conservation issues has been to put animals in a protected area such as game parks and nature reserves. This however is not an ideal situation for a cheetah due to the presence of larger predators such as lion, leopard, hyena etc. These predators will kill cheetah adults and cubs as they are seen as competition, they will also steal their kills. If a cheetah loses too many kills they will starve to death. As a result of losing too many cubs as well as an increase in loss of kills, cheetah numbers are decreasing in game parks and nature reserves. This means that most of our cheetahs live outside of protected areas, mostly on livestock farms, where the farmer is the threat. Through education, it is possible to bring about a sharing of land between farmers and cheetahs and thereby ensure the survival of this species.

