Suggested for grades 5-8

Short Grass Prairie Math Activities

1. A Black-footed Ferret family usually includes a mother and her two offspring. How many ferrets are in 4 ferret families? How many in 12 ferret families?

2. Each Black-footed Ferret family needs about 100 acres of prairie dog town to provide enough food and shelter.

Add or multiply to fill out the chart:

No. of families: 1	2	__	8	__
No. of acres: 100	__	400	__	10,000

3. You are a biologist. A prairie dog town near you has been infected with plague, a disease that occurs in nature and is fatal to prairie dogs. The disease has killed 95% of the prairie dogs in the town. From previous observation, you know that one acre of prairie supports about 5 prairie dogs. As the local expert, can you answer the following questions?

a. After the disease is gone, how many prairie dogs remain in a 10,000 acre colony that, when healthy, supports 5 prairie dogs per acre?

b. Considering that the surviving prairie dogs occupy 5 acres each, how many acres do the survivors occupy?

c. The healthy prairie dog town of 10,000 acres supported 100 Black-footed Ferret families (100 acres for 1 family). How many ferret families can be supported by the prairie dogs that survived the plague?

Challenge Question:

In addition to the natural disasters that affect Black-footed Ferret populations, the ferret is prey to other animals, such as the Coyote, Bobcat, Badger, and Great-horned Owl.

Using the equation: **(x/100) - 2p = s**

where: **x = no. of acres**
p = no. of predators
s = no. of surviving ferret families

a. How many ferret families are expected to survive on a 15,000 acre prairie dog town which is also home to a Coyote, a Bobcat, and a Great-horned Owl?

b. If plague reduces the prairie dog town to only 700 occupied acres, how many ferret families would be expected to survive?

c. How many acres of prairie dog town are needed for 25 ferret families to survive if the land is also home to 6 ferret predators?

Short Grass Prairie Math Activities - ANSWERS

1. 4 families x 3 ferrets in a family = 12 ferrets
   12 families x 3 ferrets in a family = 36 ferrets

2. 2 families need 200 acres
   400 acres supports 4 families
   8 families need 800 acres
   10,000 acres support 100 families

3a. Step 1: 10,000 acres x 5 prairie dogs per acre = 50,000 healthy prairie dogs
   Step 2: 50,000 healthy prairie dogs x 0.95 killed by disease = 47,500 dead prairie dogs
   Step 3: 50,000 healthy prairie dogs - 47,500 dead prairie dogs = 2,500 survivors

3b. 2,500 survivors / 5 prairie dogs per acre = 500 occupied acres

3c. 500 occupied acres / 100 acres per ferret family = 5 ferret families

Challenge Question:

a. p = 3
   x = 15,000
   $\left(\frac{15{,}000}{100}\right)$ - (2(3)) = 144 ferret families

b. p = 3
   x = 700
   $\left(\frac{700}{100}\right)$ - (2(3)) = 1 ferret family

c. p = 6
   s = 25
   $\frac{x}{100}$ - (2(6)) = 25

   $\frac{x}{100} = 37$

   x = 3700 acres

For further classroom discussion:
What would happen to the prairie dog population if another natural disaster occurred? Discuss direct threats to the ferret population (predators) and indirect threats (loss of prairie dog towns that provide food and shelter)

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