10 Pest Control — It All Adds Up

Word problems

Materials: worksheet pages 10-3—10-5 ● pencils ● calculators (if desired)ial 10)

Answer Key

1. 1/7 x 4/5 = **4/35 kg**
2. 150 x 4/35 = 120/9 = **13 1/3 kg**
3. alfalfa weevil – 320,000 x 1/20 = **16,000 acres** ; potato leafhopper – 320,000 x 1/5 = **64,000 acres**
4. 1 ÷ .005 = **200 weevils**
5. 200 x 150 = **30,000 weevils**
6. 450,000 x 1/2 = **225,000 bats**
7. 4/5 - 1/2 = **3/10 is non-beetle pests**
8. $30 x 3000 = **$90,000**
9. 5 million x 2/5 = 2 million acres x $20 = **$40,000,000**
10. **Nocturnal moths** are the insects selected most often by Indiana bats.
11. Order of the Indiana bat's preference:
    1) **Nocturnal moths**
    2) **Small beetles**
    3) **Flies**
    4) **Leafhoppers and other Homopterans**
12. 4034 ÷ 11.2 = **360 bats**

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Name _____

10 Pest Control & Hibernation— It All Adds Up

Solve the following problems about bats' eating habits and hibernation. Show your work.

	Work Area
1. If 1/7 of a single Indiana bat's diet is from the order Homoptera, how many kilograms of Homopterans would an Indiana bat eat in year if it ate 4/5kg of insects? _____ kilograms	
2. How many kilograms of Homopterans would a colony of 150 Indiana bats eat in a year? _____ kilograms	
3. Homopterans include the alfalfa pests like the potato leafhopper and the alfalfa weevil. There are about 320,000 acres of alfalfa in Indiana. Approximately 1/20 is treated for the alfalfa weevil and 1/5 is treated for the potato leafhopper. How many acres in Indiana are treated for each alfalfa pest? alfalfa weevil: potato leafhopper: _____ acres _____ acres	
4. An alfalfa weevil weighs approximately 0.005 g. If a female Indiana bat eats a gram of alfalfa weevils in one evening, how many weevils did she eat? _____ weevils	
5. How many weevils does her colony of 150 individuals eat? _____ weevils	

Name _____

6. Half of all the Indiana bats hibernate in Indiana. Currently the population is estimated at 450,000 bats nationwide. How many bats hibernate in caves in Indiana? _____ bats	
7. Agricultural pests make up 4/5 of the big brown bat's diet. About ½ of the big brown bat's diet is made up of leaf beetles, June beetles, Japanese beetles, and other beetle pests). What proportion of the big brown bat's diet is made up of pest insects that are not beetles? _____ non-beetle pests	
8. A colony of 150 big brown bats eat enough cucumber beetles each summer to prevent 33 million rootworm larvae from being born. Roughly 3,000 acres of cucumbers, squash, melons, and pumpkins in the state of Indiana are treated to control cucumber beetles at a cost of $30 per acre on average. How much would farmers in the state of Indiana save if big brown bat colonies protected their crops? _____ savings	
9. Indiana farmers treat approximately 2/5 of the corn grown in the state for rootworms at a cost of approximately $20 per acre. Indiana farmers typically plant about 5 million acres of corn. How much would they save if big brown bat colonies protected their crops? _____ savings	

Name _____

10. Bats are one of the few predators of night flying insects. The larvae of nocturnal moths like cutworm, tobacco hornworm, and tomato hornworm are crop pests and make up between 28.5 % and 34 % of the Indiana bat's diet. Flies and their relatives make up between 15 % and 28% of their diet. The diet of Indiana bats consists of between 4.5% and 15 % leafhoppers and other Homopterans. Small beetles like the alfalfa weevil and the Asiatic oak weevil make up between 16 % and 32% of the Indiana bat's diet. Which insect group is selected the most often in the diet of the Indiana bat?

_____

11. Rank the insects described above in the order of the bat's preference from most to least eaten.

1) _____

2) _____

3) _____

4) _____

12. Indiana farmers planted 4034 acres of tobacco in 2002. If an Indiana bat forages over approximately 11.2 acres per bat in midsummer when thehornworm emerge as adults, how many bats would be needed to help control hornworm in Indiana's tobacco fields.

_____ bats