The FUTURES Channel

MOVIE GUIDE

MOVIE NUMBER 2003

Growing Bugs

The Movie:

Most farmers know that good bugs will get rid of bad bugs, but where do you get the good bugs? Featured: Jan Dietrick, General Manager, Rincon-Vitova Insectaries, Inc. *(Movie length 1:19)*

Background:

There are more species of insects on Earth than all other animal species combined. Without them plants would not be pollinated, dead plant and animal matter would not be recycled into the soil, and many species of birds, freshwater fish and other animals would have nothing to eat. So while we may often think of insects as pests, they are in fact essential, though unseen, participants in many aspects of our daily lives.

Still, some insects do compete with us for food, and that competition generally takes place in the fields and orchards of our farms. What we see as next year's produce crop, they see as a conveniently laid out feast of plants, fruits and vegetables. One solution to this problem is pesticides, but we are learning that what is poison for insects is generally poisonous in some way for many other species (including ourselves!). A better solution is to learn everything we can about the anatomy, physiology, and habits of insects, and the ways that they interact with other insects, plants and animals.

Curriculum Connections:

Decimals, Measurement (area) — 1

A farmer wants to use an insect called the green lacewing to get rid of aphids. He finds that he can purchase lacewing eggs at the rate of $4.78 per thousand, and that the supplier recommends that he use 1,000 eggs per 200 square feet. If he wants to cover an area which is 100 feet by 150 feet, what will it cost him?

Percents — 2

There are about 91,000 species of insects in the United States, and about 1.5 million discovered so far in the world. What percent of the total number of insect species is found in the U.S.?

Ratios — 3

A ½ inch grasshopper can jump up to 40 feet. If a 6-foot tall man could jump that far compared to his own height, how far could he jump?

Multiplication, Measurement (time) — 4

The queen of a termite colony can lay 6,000 eggs a day. If she does this every day for a lifespan of 15 years, how many eggs is that?

Measurement (area) 5

The gypsy moth is considered a serious pest because, in the caterpillar phase of its life, it can eat a great deal of leaves—as much as one square foot per day per caterpillar.

Gypsy moths have completely defoliated (eaten all foliage from) large areas of forest in the Northwestern region of the United States.

Gypsy moths are currently spreading at the rate of around 16,000 square miles a year. How many acres per day is this?

Measurement (volume) 6

A honeybee makes around 160 trips to gather enough nectar to produce one teaspoon of honey. How many trips are required to produce a gallon of honey?

Measurement (speed) 7

Cockroaches can run a foot per second.

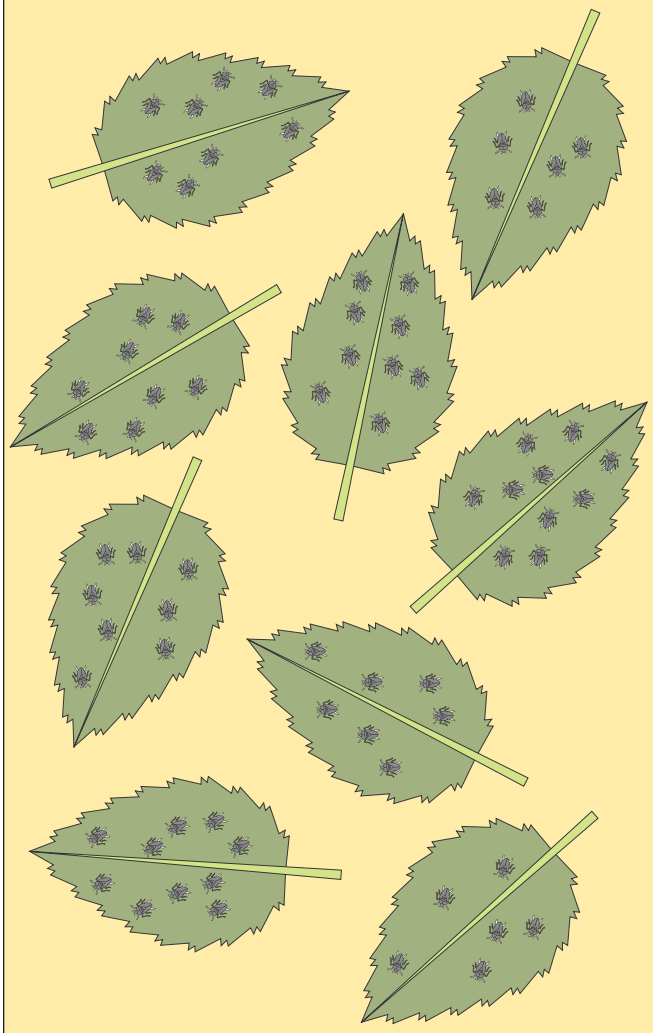
Monarch butterflies can travel 265 miles in 8 hours.

Which is faster?

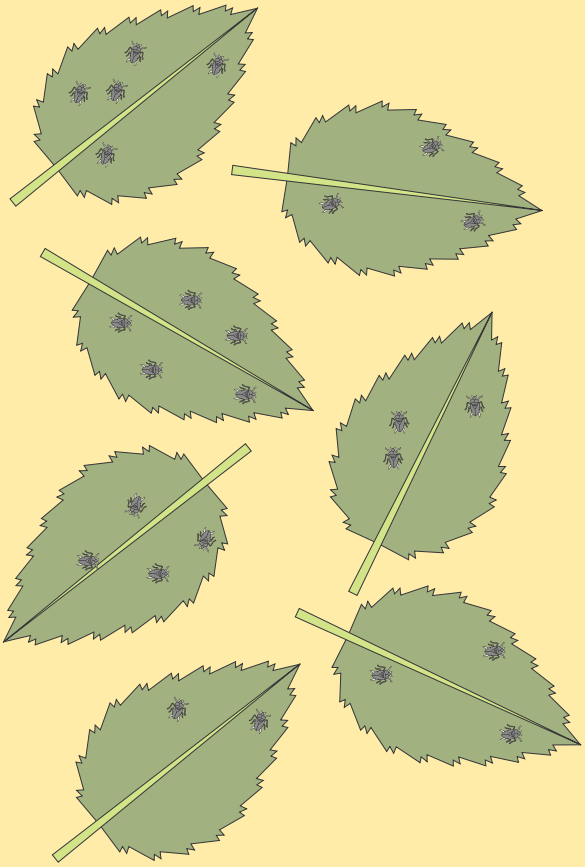
Statistics 8

Aphids eat garden and crop plants, and ladybugs eat aphids. Suppose a farmer wanted to find out if the ladybugs he released into one of his fields were effective. These are images of leaves that he gathered from that field and another field where he did not use ladybugs. Use statistics to describe exactly how effective the ladybugs are. If the farmer released 5,000 ladybugs into the field to achieve this result, how many could he have released to eliminate all of the aphids?

Field without ladybugs



Field with ladybugs



Measurement, ratios

Use the information and the images provided to estimate the total wing area of each of these insects, then compare that to the weight of the insect and the rate of motion of the wings. What ratios can you create that show how these facts are related?

Monarch butterfly

Scale: 1:1

Weight: 550 mg

Wing beats per second: 10

Dragonfly

Scale: 1:1

Weight: 530 mg

Wing beats per second: 25

Honeybee

Scale: 6:1

Weight: 80 mg

Wing beats per second: 190

Geometry (polygons), ratios

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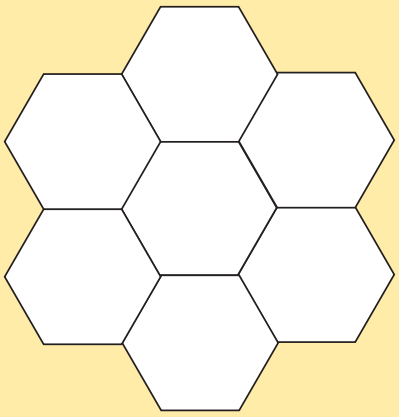
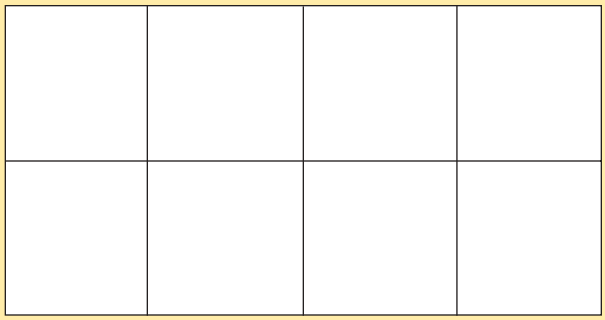
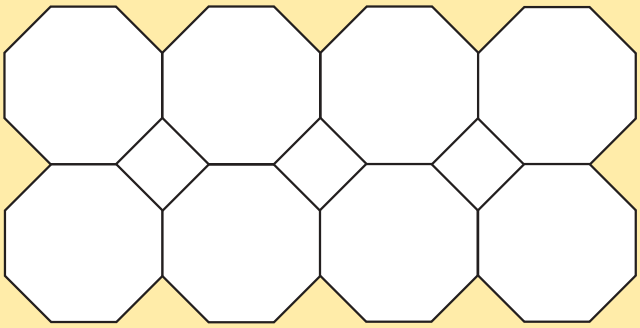
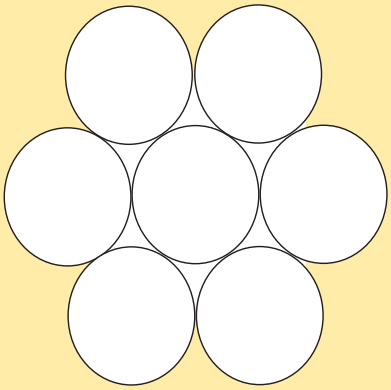
Bees make the honeycombs with hexagons. Is this the best shape? Compare these four possible shapes for honeycombs. Imagine that the "lines" in the shape are actually wax. Which shape encloses the greatest amount of area for the least amount of wax?









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