Insect Field Guide

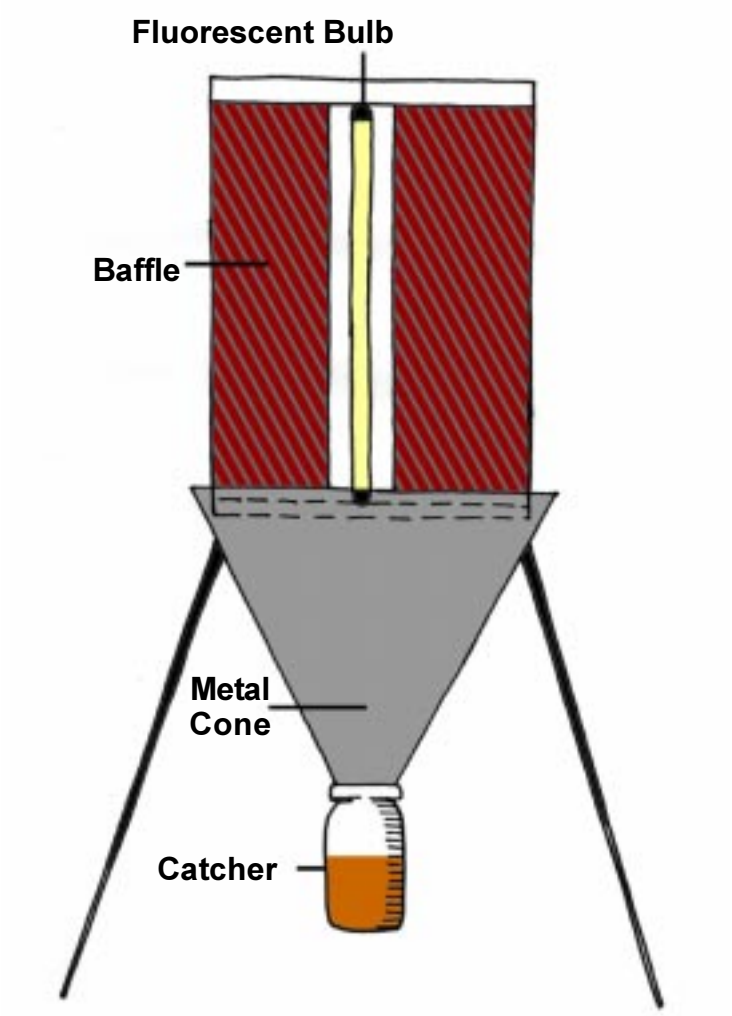





Insect Monitoring Tools

Wing Trap

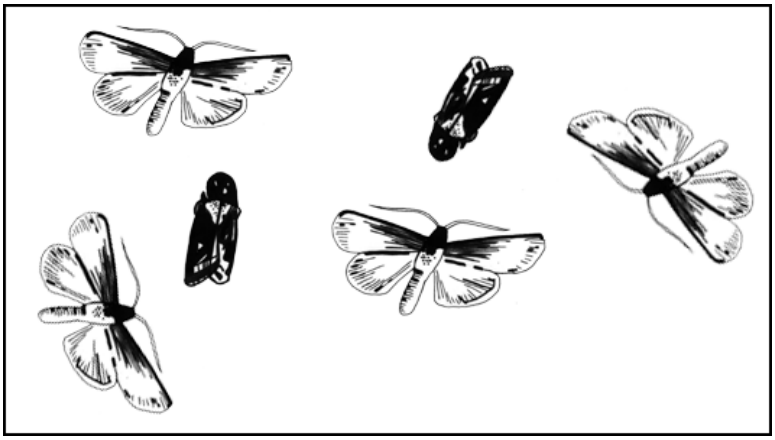
Light Trap



Count the number of moths flying into a phero-mone trap in a one week period.

Day 1

How many moths? 6



Day 2

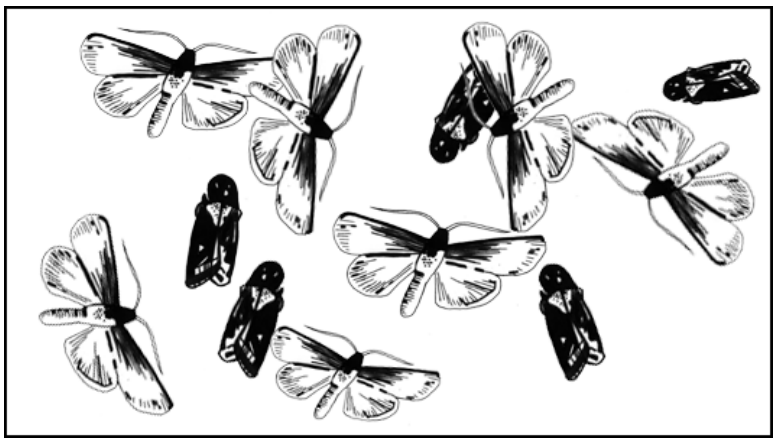
How many moths? 8

How many came last night? 8 - 6 = 2

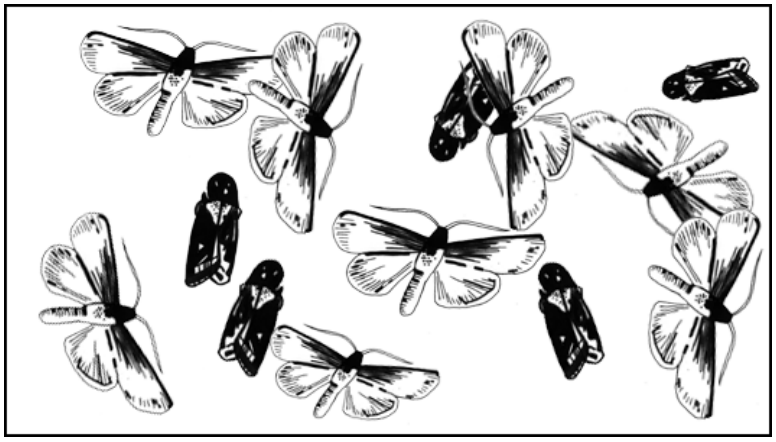
Day 3

How many moths? 12

How many came last night? 12-8=4



Day 4



How many moths? 13

How many came last night? 13-12=1

Day 5

How many moths? 17

How many came last night? 17-13=4

Day 6

How many moths? 17

How many came last night? 0

Day 7

How many moths? 24

How many came last night? 24-17=7

Which day did the most arrive? Day 7

How many moths have their wings folded? 9

How many moths have their wings spread? 15

GROWING DEGREE DAYS

The formula for determining GDD is:

$$\frac{\text{Maximum Daily Temperature} + \text{Minimum Daily Temperature}}{2} - 50$$

- If the temperature is below 50 degrees F, 50 degrees is **substituted** as the minimum temperature in the above formula. This is because 50 degrees is the base temperature below which black cutworms, like corn plants, do not grow.
- If the temperature is above 86 degree F, 86 is **substituted** for the maximum temperature in the above formula. The growth rate (how fast growth occurs) of black cutworms, like corn, will increase up to 86 degrees, but over that, the growth rate will stay constant instead of increasing. (There are different maximum and minimum temperatures for different species of plants and insects.)

For example, to calculate the GDD for a Saturday when the maximum and minimum temperatures were 73 and 53 degrees respectively, you use the formula: (73 + 53) / 2 minus 50 = 13 GDD.

If on Sunday, the temperatures were 73 and 48, the calculation would be: (73 + 50) / 2 minus 50 = 11.5 GDD. In this example, 50 degrees were substituted for 48, because growth stops below 50 degrees.

Black cutworm development as related to Growing Degree Days is indicated in the following chart. The "instar" stages indicate the size of the larvae. Black cutworms hatch as very small larvae and continue to grow larger as they eat. The tiny larvae don't do as much damage—they eat holes in the corn leaves. The largest larvae don't do much damage either—they're about to pupate. The most serious damage to crops is done in the middle instar stages.

Stage	Black Cutworm Activity	Degree Days
Egg hatch		90
1st-3rd instar	Light leaf feeding	91-311
4th instar	Initial cutting	312
5th instar	Cutting	365
6th instar	Cutting slows	431
Pupa-adult	No more cutting	641

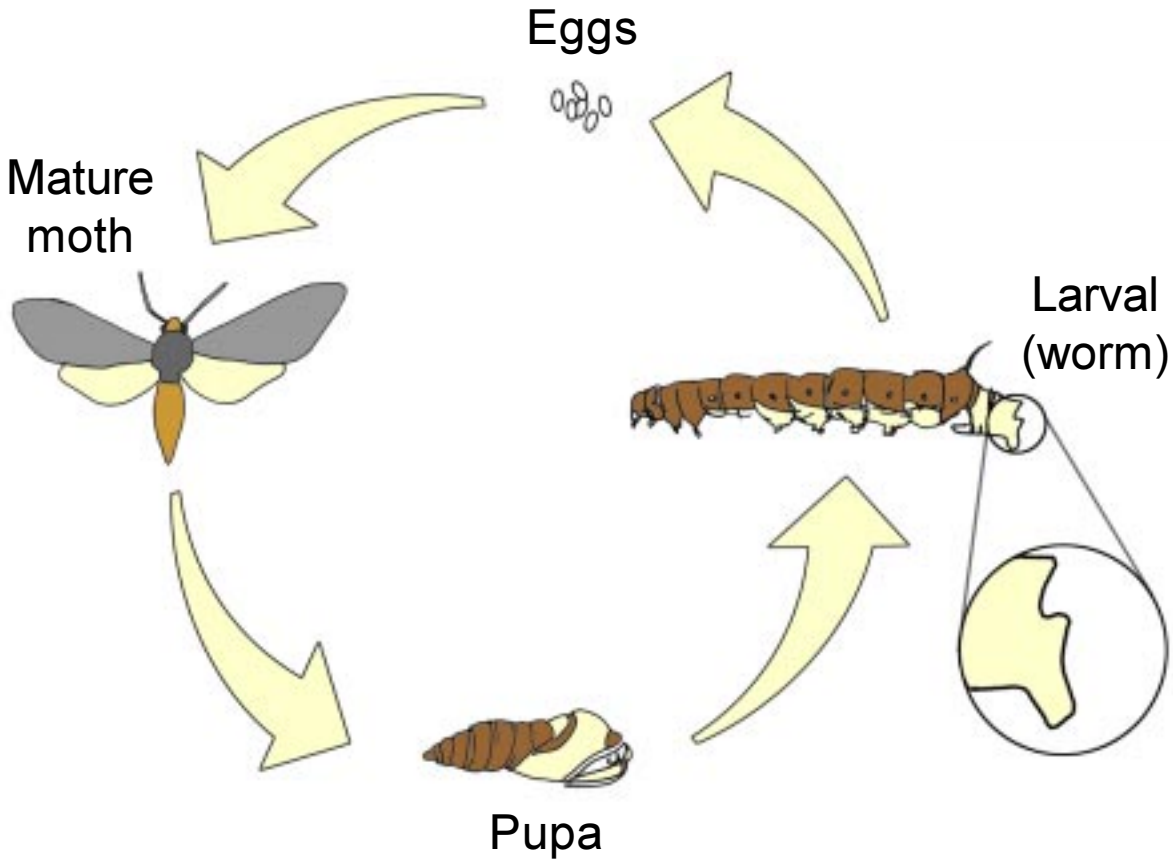
Calculate the GDD for each of these days, and use the chart to answer the questions at the end:

Date	Minimum Temperature	Maximum Temperature	Formula	Degree Days
April 15	46	62	*50 + 62 / 2 - 50*	*6*
April 16	47	67		*8.5*
April 17	44	66		8
April 18	40	62		6
April 19	45	66		8
April 20	50	69		9.5
April 21	48	68		9
April 22	47	68		9
April 23	50	71		10.5
April 24	52	72		12
April 25	51	73		12
April 26	53	73		13
April 27	52	68		10
April 28	54	70		12
April 29	55	74		14.5
April 30	53	72		12.5
May 1	58	76		17
May 2	60	76		18
May 3	61	77		19
May 4	56	72		14
May 5	58	72		15
May 6	61	75		18
May 7	63	76		18.5
May 8	64	76		20
May 9	65	74		19.5
May 10	68	78		23
May 11	65	79		22
May 12	63	76		19.5
May 13	63	73		18
May 14	60	72		16
May 15	62	74		18

QUESTIONS

1. How many Growing Degree Days accumulated from April 15 to May 5?
   (Answer: 243.5)
2. Approximately what day will the black cutworm eggs hatch?
   (Answer: April 25)
3. Approximately what day will initial cutting begin?
   (Answer: *May 9)*
4. Approximately what day will the cutting slow down?
   (Answer: May 15)
5. During what time period will the greatest damage be done if nothing is done to stop it?
   (Answer: Approximately May 9-May 15)

Metamorphosis



You can tell how old the larva is — and how much he eats by the size of his head

Larval instar	Head capsule width
4	
5	
6	
7	

GIVE ME AN "I", GIVE ME A "P", GIVE ME AN "M"

"I" Stands for "Integrated" Integrated = Combined

1. Think of some words that mean the same thing as "integrated": _____
(Answers: together, united, mixed, joint, blended, fused, rolled into one, combined)

2. List some examples of things that are "integrated" _____
(Answers: a basketball team is a combined (integrated) group of individual players, a chocolate milkshake is a combined (integrated) product of chocolate syrup with ice cream, a suit is a combined (integrated) set of clothing)

"P" Stands for "Pest" Pest = Problem

1. Think of some words that mean the same thing as "pest"_____
(Answers: nuisance, bother, pain in the neck, problem)

2. List some examples of "pests" _____
(Answer: little brother, bully in school, mosquitoes, weeds in the garden)

"M" Stands for "Management" Management = Decision

1. Think of some words that mean the same thing as "manage":_____
(Answers: control, direct, mastermind, regulate, handle, run, call the signals, boss)

2. List some examples of "managing" _____
(Answers: a quarterback calls (manages) a play, a company president makes a (management) decision, a parent controls (manages) a conflict)

IPM means COMBINING many different ways to solve a PROBLEM. Sometimes the DECISION is easy to make, and sometimes it is very difficult.

1. Think of some examples where you thought of many solutions to solve a single problem.

_____

2. Discuss some solutions that farmers could use when they have a pest in their fields. (The AgEd worksheet for older students has specific examples. Younger children can use their imaginations.)

_____

3. Would combining several of these solutions be better than using only one solution?_____
Why? _____

4. Could farmers use one solution for one pest, and another solution for a different pest?
_____

5. Do you think farmers would like someone (for example, a crop consultant) to help make the decisions?
_____ Why?_____