Entomology Lab

The blow fly life cycle has six parts: the egg, three larval stages, the pupa, and adult.

130 hours

22 hours

At 70 degrees F, each stage in a blow fly's life takes a known amount of time to complete...
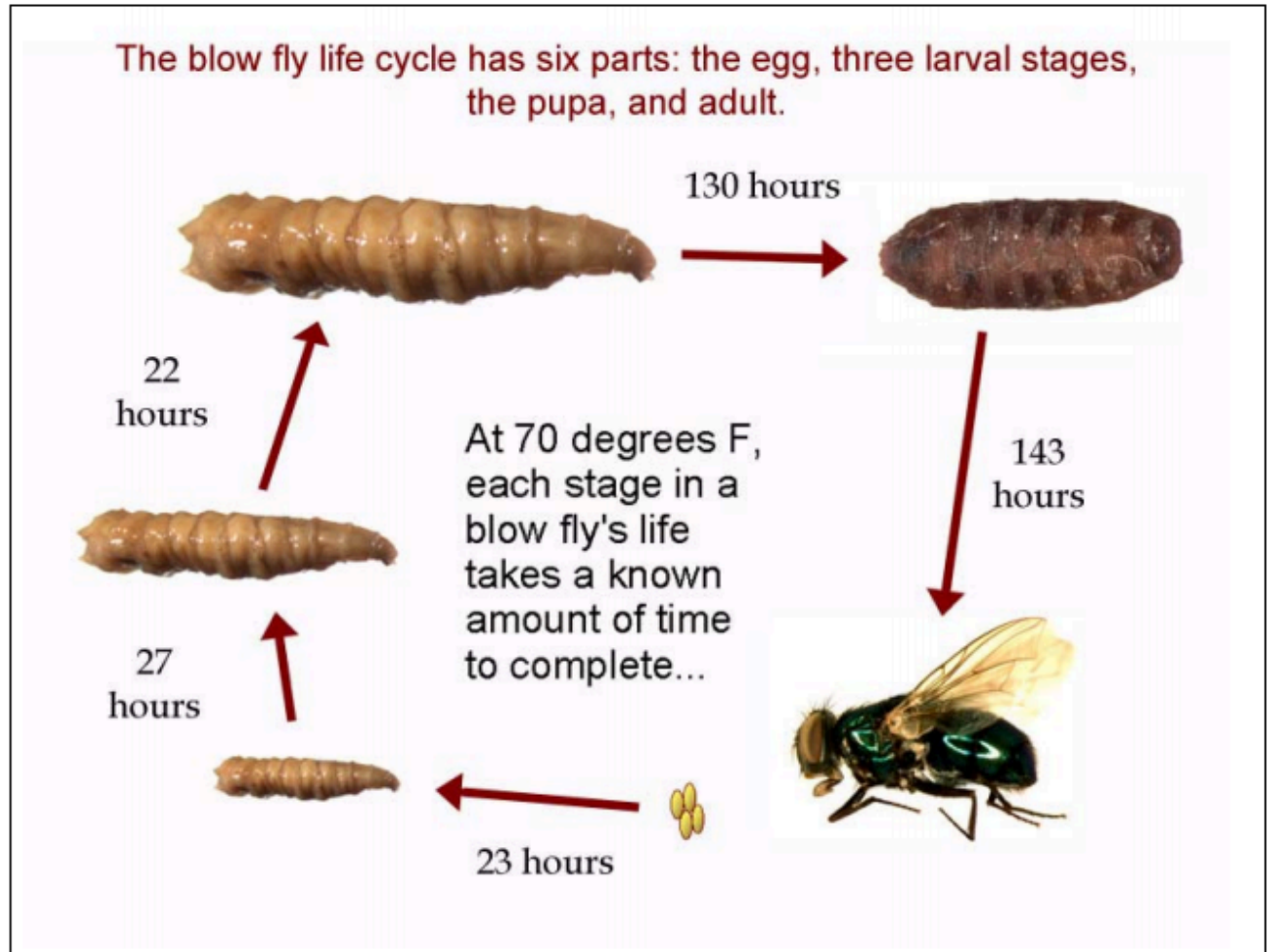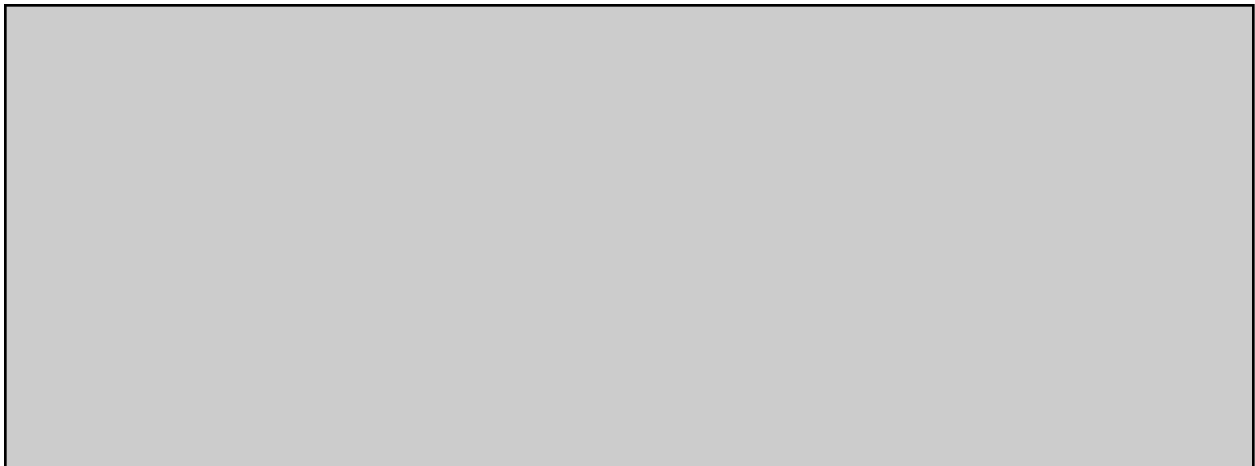
143 hours

27 hours

23 hours

1. What kind of information is provided on the Blow Fly Life Cycle?

2. Calculate the heat/thermal energy (accumulated degree hour) required for each stage of the Green Bottle

Table 1: ADH of the Green Bottle Fly

FROM	TO	TEMPERATURE	HOURS	ADH (Accumulated Degree Hour)
Egg	First instar	70° F	23	70x23= 1610 ADH
		70° F	27	
		70° F	22	
		70° F	130	
		70° F	143	

3. Using the above Table 1 as the reference, calculate and fill in the blank areas.

    a. How many hours does it take for a green bottle fly egg to become an adult fly?
    _____ hours
    Convert these hours to _____ days and_____ hours

    b. For a maggot at the beginning of the second instar stage, how many hours does it take to reach the third instar if the ambient temperature is at 77° F?
    _____hours

    c. If you are rearing a Green Bottle Fly pupa, at what temperature do you need to keep the pupa to have the adult fly merge in about 7 days?
    _____ °F

    d. Determine whether each of the following is a constant or a variable in the experiment:

Table 2: Constants and Variables

	Constant	**Variable**
Life cycle stages		
Temperature		
Time between the life cycle stage		
ADH		

4. Describe in your own words how insect life cycles can be used in estimating the time of death.

Now let's put that to use.

Open this link:
https://www.nlm.nih.gov/exhibition/visibleproofs/education/entomology/ii_a_213a_b.pdf

Review the "Preliminary Local Climatological Data" from WSO Bridgeport CT (link above) and review the following questions:

1. Review the data sheet and list three top categories of information that may affect entomological factors?

2. Review the wind and precipitation data. Would these two factors affect entomological behaviors highly, moderately, or not much? Explain your analysis.

3. Complete the following table based on the climatological data sheet and the fact that Dr. Krinsky started to rare some collected specimen at 5 PM on September 22*:

Table 1: ADH calculation for period between September 7-22, 1986

Date (September)	Average Temperature	Hours	Daily ambient thermal energy	ADH
22	56°F	17	952	952
21	62°F	24	1488	2440
20	62°F	24	1488	3928
19	65°F	24	1560	

18	58°F			
17				
16				
15				
14				
13				
12				
11				
10				
9				
8				
7				

*17 hours is calculated from midnight until 5 PM when Dr. Krinsky collected the insect specimen from the carpet.

4. Dr. Krinsky used various entomological references in calculating the ADH to count back to the earliest possible time of ovipostion by adult black blow fly. One of the references used states that at a constant 80° F, it takes between 10-12 days from the oviposition to emergence of the adult fly.

a. Calculate the ADH at constant 80° F and fill in row A in Table 2 below.
b. Calculate the thermal heat provided at Dr. Krinsky's laboratory for the 25 flies emerged at 4 PM on September 27. Fill in row B in Table 2.
c. Subtract B from A and record them on row C.
d. Use the values from row C and Table 1 above to identify corresponding dates in row D.

Table 2: Calculations

Row	Life cycle duration	10 days	11 days	12 days
A	ADH value at 80° F			
B	ADH from Laboratory			
C	subtract B from A (remaining ADH value)			
D	approximate date of the oviposition based on Table 1			

5. When do you estimate the earliest possible date when the first adult blow flies deposited eggs on the victim's body?