Sec: _____ Name: _____

Experiment: Feathers and Flight
(B. Science 10-V-6ϕ)

Purpose: To become familiar with different types of feathers and their structure.

Materials: large quill feather (8-12 cm long)
balance dissecting microscope

Methods:

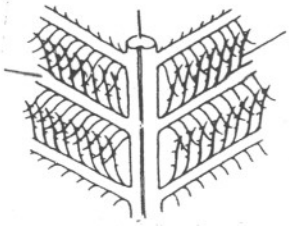
1. Examine a quill feather and determine where the phrase "light as a feather" originates. To determine actual weight, place the feather on a balance and weight it to the nearest tenth of a gram. Record mass.
2. How would the weight of a single down feather compare to the weight of the single quill feather?
3. Suggest a reason for feathers being as light as they are.
4. Examine the "**quill**" end of the quill feather and note the presence of a **small opening**. Speculate on the function of this opening.
5. Without breaking the quill, determine its stiffness. How is this degree of stiffness a value to the bird?
6. Examine the expanded portion of the feather known as the **vane**. The axis of the feather is known as the **rachis**. Attached to the rachis and composing the vane are divisions called **barbs**. Run your fingers down the feather to separate the barbs from each other. Using the dissecting microscope, examine an individual barb and locate still smaller projections These are subdivisions of barbs, called **barbules**. Examine the barbules for still smaller projections which are known as **hooks**. Label the parts of the feather printed in bold. (Draw a sketch of the microscope observations).
7. Suggest a function for the hooks.
8. Take the large quill feather and separate the barbs from each other. This gives the feathers a very ragged appearance. In several repeated short strokes, pass the feather rapidly through the air. Note the resistance to air.
9. Using your fingers, smooth the barbs back to normal position. Repeat the motions describe above. What differences may be noted in air resistance.
10. Explain how the structure of a feather contributes to air resistance.
11. After a bird has taken a water or dust "bath," in what activity does it engage to prepare its feathers for flight?
12. What is being accomplished?
13. Account for the overlap of the flight feathers in a bird's wing.
14. Compare the structures of a contour body feather with that of a quill feather. What differences can be noted?
15. Which type of feather do you think would be found in greatest abundance on a bird's body? why?
16. On what parts of a bird's body would you expect to find the greatest number of flight feathers?
17. Explain the use of the word "contour" for a type of feather.
18. Examine a portion of a colored feather under a microscope. How does the distribution of pigment appear compared to what you expected?
19. How does light absorption and reflection affect the coloration of a bird's feathers?
20. What is the function of the small amount of "down" at the base of the shaft?
21. What is molting?

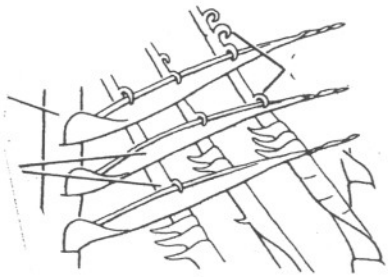
Sec: _____ Name: _____

Results:

1. mass: _____
2. down compared: _____
3. reason: _____
4. function: _____
5. stiffness: _____
7. function: _____
8. resistance: _____
9. differences: _____
10. structure: _____
11. activity: _____
12. accomplished: _____
13. overlap: _____
14. compare: _____
15. greatest: _____
16. part: _____
17. explain: _____
18. appear: _____
19. light: _____
20. "down": _____
21. molting: _____

6.





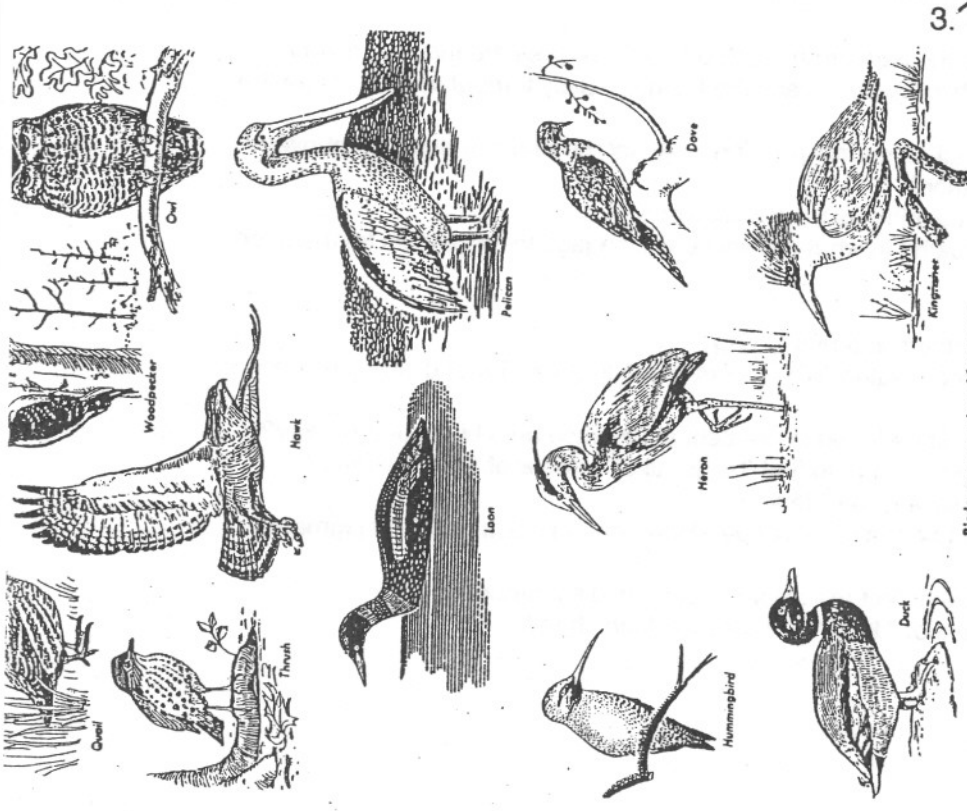
Conclusions:

1. List the different plumages of birds and the molting that follows each.

plumage	molt
a. natal down	-
b.	- post juvenile molt
c.	-
d.	-

2. After Job has gone through difficult times who does he turn to to answer tough questions (Job 12: 4-10)? What is the answer?

3.



Birds representing 12 orders

CLASSIFICATION AND ADAPTATIONS OF COMMON BIRDS. A wide variety of birds, belonging to 12 different orders, are shown in Fig. 75-3. These birds illustrate many different adaptations of beaks and feet for varied uses. Examine each of the birds closely, then list each one in the table provided, place it into its proper order (see the Classification Table in the Appendix of MODERN BIOLOGY, or a bird book) and list adaptations of the beak and feet.

NAME OF BIRD	ORDER	ADAPTATIONS OF BEAK	ADAPTATIONS OF FEET
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			