**Flight Dynamics, Feathers, and Migration Unit Study Guide**

~ Be able to identify pictures/diagrams of the different types of feathers. Also, be able to match feather types to their functions.

~ What are the four forces involved in flight? Be able to label them on a diagram.

~ Be able to label the structures that make up an individual feather.

~ Familiarize yourself with the following flight characteristics/terms and their descriptions:

 V-Formation

 Flap-Bounding

 Flap-Gliding

 Soaring/Gliding

 Partial Migration

 Leap-Frog Migration

 Flyway

~ How much energy is saved by birds flying in a V-Formation?

~ What are “thermals”?

~ Be familiar with the way air travels over the wing surface and how the airfoil shape of a bird’s wing affects the speed of the air traveling over/under the wing and what that does to the air pressure.

~ Differentiate between “wing loading” and “aspect ratio”. Know the characteristics of the various aspect ratios seen in bird wings.

For Example: Wading birds like ducks have medium aspect ratios in the range of 12.5 making their wings good for speed and long-distance migrations, but poor for a quick take off and soaring/gliding flight.

~ What does the uropygial gland do for birds?

~ Which bird has one of the longest migration routes beginning in New Zealand and ending in the Alaskan tundra before traveling back to New Zealand over the open ocean?