

## Activity 8. Flight of the hummingbird

### 1. Read with attention the following text:

One summer morning, Ana looked out of her bedroom window and saw a beautiful garden, filled with flowers, butterflies and sunshine. Then she saw something unexpected, a hummingbird was positioned above a red flower, she was astounded by the beauty of this small bird, and noted how close by it had built its nest. Every day she would watch in wonder as the hummingbird flew to and from its nest to feed the two small chicks born there. Ana wondered how they were able to flap their wings so fast, she saw how the chicks left the nest and were able to fly after a few weeks, finally leaving the nest, it was a wonderful experience, sometime later, the rains started and the garden was converted into a whole new world on the ground, where brightly colored mushrooms grew and Ana was amazed at the wonder of nature, she decided to share the observations that she had during her summer vacation with her life science class when she returned to school.

### 2. Do the following:

- a. Explain what food provides the energy that the hummingbird uses to fly.  
The hummingbirds feed on the flower's nectar, and eating insects and spiders that are also found in the flowers and in the air complements their diet.
- b. Identify the molecule present in the food.  
Food: nectar  
Nectar molecules: they are made up mainly of water and a lot of carbohydrates like glucose, fructose and sucrose, as well as some amino acids, proteins, fats and minerals.
- c. Explain the digestion process that transforms the food from the time that the hummingbird feeds on the flower's nectar until it is converted into the energy necessary to fly.  
The hummingbird feeds on the nectar of flowers, the nectar passes into its digestive system where the molecules are digested into smaller parts that are absorbed into the blood, the blood transports nutrients that are mainly carbohydrates like glucose to all the cells. When the glucose enters the cells, first glycolysis occurs in the cytoplasm, converting into two molecules of pyruvate and generating 2 molecules of ATP. Acetyl CoA is formed and initiates the Krebs cycle, which occurs in the mitochondrial matrix, this cycle produces another 2 molecules of ATP and the pyruvate is converted into citric acid, releasing CO<sub>2</sub> then the process continues in the internal membrane of the mitochondria where transport of electrons occurs that generates 34 ATP and releases water. Thus we find that for each glucose molecule that reaches the cell, 38 ATP molecules of energy are obtained.
- d. Using a diagram, represent the process that energy follows from: the sun, how it passes through photosynthesis, its transformation into nectar, the hummingbird feeding off the flower's nectar and how the energy passes from the nectar to cellular respiration in the hummingbird's cells to generate energy for movement and to fly.

