

Virtual Beetle Dissection Activity

Beetle Dissection

Instructions: Open the virtual beetle dissection. Dissect and inspect the male and female *Mecynorrhina torquata* beetles. While exploring, answer the following questions. If an answer is not available in the dissection tool, check the beetle story or the terms list for the information you need.

Dissection Observations

1. Record your observations of the following tissues and structures using the virtual dissection.
 - a) flight muscles
 - b) leg muscles
 - c) brain
 - d) eyes
 - e) heart
 - f) digestive tract
 - g) testes
 - h) eggs
 - i) penis
 - j) legs
 - k) wings
 - l) elytra
 - m) spiracles
 - n) air sacs
 - o) fat body
2. The form of an organism's parts (what they look and feel like, how they're shaped) often directly determines the function of that part. Choose three of the parts observed above and explain how the form of the body parts relate to their function.

3. Which external structures are different between the male and female beetles? How are they different?
4. Which internal structures are different between the male and female beetles? How are they different?
5. Propose a reason why these internal and external structures are different between males and females.
6. In many animals, females prefer males with certain traits. Might any of the traits you observe on the male beetle be related to female preference?

Exoskeletal System

7. Look at the beetle's elytra and wings. Which parts are used for flying? Which are used for protection?
8. The beetle has hairs in many places on the outside of its body. What are these hairs used for?
9. True or False: The elytra cover the wings, which attach to the abdomen.
10. Where are the soft parts and the hard parts of the beetle's exoskeleton?
Why do they have both soft and hard parts?

Sensory Systems

11. What are compound eyes?
12. What is a ganglion? How many do beetles have?

13. Examine the beetle brain. What are three main regions of the brain? What do they do? What sensory organs do they receive information from?

Respiratory System

14. What are the parts of the beetle respiratory system?
15. Why are there tracheae and air sacs throughout the flight muscles and leg muscles?
16. How is oxygen transport different in beetles and humans?
17. Propose a reason why these beetles have so many air sacs and why they are different sizes.

Muscular System

18. How do beetles use muscles to move their legs?
19. How do beetles use muscles to move their wings up and down?
20. The dorso-longitudinal muscles do not attach to the wings, yet when the muscles contract, they depress the wings. How does this work?

Circulatory System

21. Blood is called hemolymph in insects. Do you see any hemolymph in the virtual beetle dissection? Use an outside reference to discuss how insect blood and human blood differ.
22. Some organs are used for many functions. What are the roles of fat body in the beetle body?

Digestive System

23. Examine the beetle's mouthparts closely. What kind of food might the beetle eat using these mouthparts?
24. Use an outside reference to discuss how the digestive tract of the beetles differs from the human digestive tract.
25. What is the function of Malpighian tubules? What human organ are they most similar to?
26. *Putting it all together:* Choose a body system. Explain how each of its parts work together as a system in the beetle. How and why is this system different in humans? What would happen to the beetle if this system was removed?