

NAME _____

DATE _____

Anatomy and Physiology of Casper Fish

In this activity, you will view either the external anatomy of a zebra fish or the internal anatomy of a Casper fish by inducing torpor in the fish. After viewing the specimen at a cold temperature, you will slowly bring the temperature back to normal range, recording the activity of the fish as you do so.

Materials

Casper fish or zebra fish
2 cups, 9 oz.
plastic holding tank
petri dish
plastic pipet
dip net (shared)
hand lens
dissecting stereomicroscope (optional)
timer
thermometer

At a central station:

chopped ice
room-temperature water

Procedure

1. Read the following instructions completely before beginning the activity. If any of the procedures are unclear, ask your teacher for clarification.
2. If your teacher has not already done so, fill the plastic holding tank three-quarters full with water from the fish tank. Using a dip net, obtain either a zebra fish or a Casper fish, depending on what your group has been assigned. Take the tank back to your workstation.
3. Fill one 9-oz. cup with ice. Make sure the ice does not extend above the lip of the cup. Add room-temperature water up to the bottom of the lip of the cup. Fill the other cup with room-temperature water until it reaches the bottom of the lip of the cup. Take both cups back to your workstation.
4. Using the pipet, fill the bottom half of the petri dish one-quarter of the way with the water from the holding tank.
5. Using a dip net, carefully remove the fish from the holding tank and transfer it into the petri dish. Using a pipet, remove water from the petri dish until the dorsal fin of the fish is touching the surface of the water and the belly is touching the bottom of the petri dish. Place the top on the petri dish so the fish cannot escape.
6. Determine each team member's job. One member of your team will monitor the time and record the movement data. A second person will count and record the number of times the fish moves its tail every 30 seconds. A third team member will monitor the temperature and record it every 30 seconds. If there is a fourth member of your team, that person can act as the data recorder.

7. Prepare the timer and the data sheets, and make sure everyone is ready before you continue. Remove the lid of the petri dish and take an initial temperature reading. Record the initial temperature (Time = 0.0) in the "Cool Down" data table.
8. Place the bottom part of the petri dish into the cup containing ice and water. The dish should fit snugly into the lip of the cup. If the ice and water do not touch the bottom of the petri dish, remove the dish and add water to the cup. Your goal is to cool the water to 9–10°C.
9. When the timer starts, begin recording the data. Record the number of times the fish moves its tail during each 30-second increment. Also, record the temperature at the end of every 30-second increment.

Note: Do not put ice directly into the petri dish with the fish.



Ice Cup Setup

10. It should take 5 to 6 minutes for the water to cool to 9–10°C. (Do not let the water drop below 9°C, as this could harm the fish.) At this point, the fish should be in a torpor state and floating on its side. You should be able to see evidence of respiration every few seconds as the fish opens and closes its mouth and operculum.
11. Quickly remove the petri dish from the cup and place it under a dissecting stereomicroscope. If you do not have a stereomicroscope, use a hand lens. You have approximately 4 minutes to make observations under the microscope before the water warms and the fish becomes active. Move quickly so everyone in your team has a chance to observe the fish.

Note: Observe the heart rate of the fish. The heart is clearly visible in the Casper fish, and can be seen on the underside of the zebra fish, just behind the gills. Also, note the fish's rate of respiration-related movement. The fish will open and close its mouth and operculum to facilitate gas exchange.

If you are working with a Casper fish, draw and label the internal anatomical structures on the appropriate outline on the Illustration Sheet. If you are working with a zebra fish, draw and label the external anatomical structures on the corresponding outline on the Illustration Sheet.

12. After 4 minutes of observation, move the petri dish onto the cup containing only room-temperature water. Reset the timer, and once again record movement and temperature every 30 seconds for 6 minutes. This time, use the "Warm Up" data table.
13. After 6 minutes, remove the petri dish and float it in the holding tank for 10 minutes. Then, return the fish to the holding tank. Use this time to make additional observations of the fish using a hand lens, and finish your illustration on the Illustration Sheet.
14. Return the fish to the main tank, and then rinse all the materials you used. Compare notes with your lab partners to obtain any data or details that you might have missed.