Title: What Do We Have In Common? (Comparing Bivalves to Humans)

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Implemented: St. Andrews Middle School, Columbia SC

Overview: This is an easy dissection for middle school students. Students will dissect and observe mussels (or other bivalves) and compare the body system to humans.

Suggested grade level(s): 7th grade science

Concepts covered: This lesson covers the differences between human body systems and other animal systems. It also is a good primer to other dissections or can stand alone if no other dissections will be done in the classroom.

Standards: The human organism has systems for digestion, respiration, circulation, excretion, movement, control, and coordination, and protection from disease. These systems interact with one another.

   i. Compare and contrast the human body organs and systems to other animals.

Length of lesson: ~70 minutes

Materials required:

Dissection procedure sheet
Human body systems comparison worksheet
Mussels or Clams (one per 2-4 students)
   • Grocery store (cheapest route), call your local grocery stores ahead of time, many will order them for you if they have none in stock. In South Carolina ~50 mussels cost ~$10
   • Biological supply house or order online www.eatmussels.com, www.gortonsfreshseafood.com
Dissection trays
Rulers
Scalpels (teacher only, teachers should cut open the mussels before or individually)
   -Note opening bivalves takes a bit of practice, make sure you find the major muscles and cut through them.
Probe
Lesson Format

**Phase I. Engage**

1. Discuss the body functions that are important for living things. (Student should have previously learned about the major systems, the circulatory, digestive, and respiratory systems in the human should have been taught.) Review the systems.
2. Ask the students, “Do all animals have the same systems?” This is a good time to talk about the different types of animals (e.g. vertebrates versus invertebrates, mammals versus other classes of animals). You can ask them if bivalves have a digestive system. They don’t have a mouth like we do, do they? But don’t all animals need food because they don’t create their own food like plants?
3. Tell them today we are going to do a simple dissection to compare bivalves (see teacher information below) with humans.

Bivalves- A mollusk that has a shell consisting of two hinged valves such as oysters, mussels, clams

**Phase II. Explore**

Part A: External Observations
1. Pair students in groups of two or three, pass out the dissection trays with the probes.
2. Give each student an unopened bivalve.
3. Have the student observe the outside of shell and write down two quantitative and two qualitative observations about the bivalve. You may need to refresh their memory about the difference between the two types of observation. (Hint: quaNtitative has a n for NUMBERS).
4. Have the students share their observations.

Part B: Internal Observations
1. Carefully explain that now we can open up the animal. Have students hypothesize what the animal looks like inside.
2. Once the mussel is open students must not destroy the internal areas, they must spend time looking for some of the major parts.
3. Open up each group’s animal.
4. Give the students ~10 minutes to observe the bivalve and search for some of the parts
5. Go over some of the major parts with the students. Then give them time to fill out the FIRST chart on their worksheet.

**Phase III. Explain**

1. Students will now try to explain the differences and similarities between the bivalve and human body systems. You may want to refer them to their text to review human and other animals’ body systems.
2. Students should then complete the charts on the body systems and the comparisons, the SECOND chart.
**Phase IV. Elaborate**

This may be a good dissection to do before moving on to more complex organisms such as frogs or worms. However, if no dissections are usually done at this level this is a perfect introduction to dissection.

**Phase V. Evaluate**

Use the following rubric to assess the student’s work for this lesson.

Students should be assessed on how well they compared human body systems with that of the bivalves.

<table>
<thead>
<tr>
<th>Points Earned</th>
<th>Digestive system</th>
<th>Respiratory system</th>
<th>Circulatory system</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Missing or confused on one section (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on one section (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on one section (compare, contrast, parts or what the system does)</td>
</tr>
<tr>
<td>3</td>
<td>Student has compared/contrast humans &amp; bivalves and has located and labeled the parts of the system and what they do.</td>
<td>Missing or confused on two sections (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on two sections (compare, contrast, parts or what the system does)</td>
</tr>
<tr>
<td>1</td>
<td>Missing or confused on two sections (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on three or more sections (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on three or more sections (compare, contrast, parts or what the system does)</td>
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<td>0</td>
<td>Missing or confused on three or more sections (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on three or more sections (compare, contrast, parts or what the system does)</td>
<td>Missing or confused on three or more sections (compare, contrast, parts or what the system does)</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Total Points</th>
<th>15-13=A</th>
<th>12-10=B</th>
<th>9-7=C</th>
<th>6-4=D</th>
<th>3-0=F</th>
</tr>
</thead>
</table>

This lesson plan is part of the 2006 GK-12 Institute
Some mollusks belong to the class Bivalvia. They typically have two-part shells, with both parts being more or less symmetrical. The class has 30,000 species, including scallops, clams, oysters and mussels. Other names for the class include Bivalva, Pelecypoda, and Lamellibranchia.

Bivalves are exclusively aquatic; they include both marine and freshwater forms. Bivalves are filter feeders and feed by siphoning and filtering small particles from water. Some bivalves are epifaunal: that is, they attach themselves to surfaces in the water, by means of a byssus (byssal threads) or organic cementation. Others are infaunal: they bury themselves in sand or other sediments. These forms typically have a strong digging foot. Some bivalves can swim.

Bivalves are filter feeding mollusks that feed using their gills. They have an open circulatory system that covers the organs with blood. Nephridia remove the excreted waste.