Lesson Plan – Taxonomy and Classification

Summary
This lesson will introduce students to the classification of living things, how animals are grouped and why all living things have a scientific name.

Content Area
Life Science, Biology

Grade Level
K-2

Key Concept(s)
• Livings things are given a universal scientific name used for classification worldwide.
• Living things are put into groups according to shared body features and characteristics.
Objectives

Students will be able to:
• Understand why all living things have a universal scientific name used worldwide.
• How scientists sort and group living things.
• Identify features of animals and how features are used to group organisms.
• Understand that each animal has different structures that serve different functions.

Resources
Biology for Kids - Taxonomy
<table>
<thead>
<tr>
<th>National Science Education Standard or Ocean Literacy Essential Principle</th>
<th>Learning Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unifying Concepts and Processes</strong>&lt;br&gt;1. Systems, order, and organization</td>
<td>Types of organization provide useful ways of thinking about the world.</td>
</tr>
<tr>
<td><strong>Unifying Concepts and Processes</strong>&lt;br&gt;5. Form and Function</td>
<td>Form and function are complementary aspects organisms in the natural world.</td>
</tr>
<tr>
<td><strong>A.1:</strong> Abilities necessary to do scientific inquiry</td>
<td>Ask a question about objects, organisms, and events in the environment.</td>
</tr>
<tr>
<td><strong>C.1:</strong> Characteristics of organisms</td>
<td>Each plant or animal has different structures that serve different functions in growth, survival, and reproduction.</td>
</tr>
<tr>
<td><strong>Principle 5 (K-2: A)</strong>&lt;br&gt;The ocean supports a great diversity of life and ecosystems.</td>
<td>There is a great diversity of organisms in the ocean.</td>
</tr>
<tr>
<td><strong>Principle 5 (K-2: A.4)</strong>&lt;br&gt;The ocean supports a great diversity of life and ecosystems.</td>
<td>Ocean organisms have a variety of different structures and behaviors that help them to survive in the ocean.</td>
</tr>
</tbody>
</table>
Why use scientific names and not common names?

What if your job was to help me protect the reef by keeping people from taking the wrong kind of fish? What if I said the fish not to take is red fish?

Sebastes

Lutjanus

Epinephelus morio
Red grouper
Common names are different in different places. Scientific names are the same around the world!

<table>
<thead>
<tr>
<th>Country</th>
<th>Species</th>
<th>Other common names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia, UK</td>
<td><em>Controboryx affinis</em></td>
<td>Redfish, eastern nannogai</td>
</tr>
<tr>
<td>Australia</td>
<td><em>Lutjanus erythropterus</em></td>
<td>Crimson snapper</td>
</tr>
<tr>
<td>Australia</td>
<td><em>Lutjanus malabaricus</em></td>
<td>Malabar blood snapper</td>
</tr>
<tr>
<td>Australia</td>
<td><em>Lutjanus sebae</em></td>
<td>Emperor red snapper</td>
</tr>
<tr>
<td>Barbados</td>
<td><em>Etelis oculatus</em></td>
<td>Queen snapper</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td><em>Lutjanus buccaneilla</em></td>
<td>Blackfin snapper</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td><em>Lutjanus purpureus</em></td>
<td>Southern red snapper</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td><em>Lutjanus synagis</em></td>
<td>Lane snapper</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td><em>Rhomboptilus aurorubens</em></td>
<td>Vermillion snapper</td>
</tr>
<tr>
<td>UK</td>
<td><em>Onchorhynchus nerka</em></td>
<td>Sockeye salmon</td>
</tr>
<tr>
<td>UK/USA</td>
<td><em>Sebastes fasciatus</em></td>
<td>Acadian redfish</td>
</tr>
<tr>
<td>USA</td>
<td><em>Lutjanus campechanus</em></td>
<td>Red snapper</td>
</tr>
<tr>
<td>USA</td>
<td><em>Sciaenops ocellatus</em></td>
<td>Red drum</td>
</tr>
<tr>
<td>USA</td>
<td><em>Sebastes norvegicus</em></td>
<td>Ocean perch</td>
</tr>
<tr>
<td>USA</td>
<td><em>Sebastes viviparus</em></td>
<td>Norway redfish</td>
</tr>
</tbody>
</table>
How do scientists sort living things?

Taxonomy: the study of how and why we name things the way we do!

- **Bacteria**
- **Protoctista** (algae, protozoa)
- **Plantae**
- **Animalia**
- **Fungi**
Sometimes it is easy to see how and why things are sorted the way they are.
Sometimes, it is more difficult to see why things are together. These are all molluscs!

Worm-like molluscs

Polyplacophora Chiton

Monoplacophora

Bivalvia (mussle, clams)

Scaphopoda (tusk shells)

Gastropoda (snail, slug, limpet, nudibranch)

Cephalopoda (octopus, squid, nautilus)
All living things are sorted into one of five Kingdoms

- Kingdom
  - Within each Kingdom, living things are further sorted according to their characteristics.
- Phylum
- Class
- Order
- Family
- Genus
- Species
There are about 30 different phyla of animals. How well do you know them? The images below show 25 different animal phyla. Move the cursor over a photo to see its phylum.

The vast majority of all animal species (over 95%) belong to the phyla listed here, sometimes called the ‘Big Nine’. These groups are covered by our Biology of series of video and DVD programs.

**Phylum Platyhelminthes**

**Phylum Nematoda**
(with coverage of other groups)

**Phylum Arthropoda**
<table>
<thead>
<tr>
<th>KINGDOM</th>
<th>PHYLUM</th>
<th>CLASS</th>
<th>ORDER</th>
<th>FAMILY</th>
<th>GENUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animalia</td>
<td>Chordata</td>
<td>Mammalia</td>
<td>Primate</td>
<td>Hominidae</td>
<td>Homo sapiens</td>
</tr>
<tr>
<td>Animalia</td>
<td>Chordata</td>
<td>Mammalia</td>
<td>Primate</td>
<td>Hominidae</td>
<td>Gorilla beringei</td>
</tr>
<tr>
<td>Animalia</td>
<td>Chordata</td>
<td>Mammalia</td>
<td>Primate</td>
<td>Hominidae</td>
<td>Orcinus orca</td>
</tr>
<tr>
<td>Animalia</td>
<td>Mollusca</td>
<td>Cephalopoda</td>
<td>Octopoda</td>
<td>Octopodidae</td>
<td>Hapalochlaena maculosa</td>
</tr>
<tr>
<td>Animalia</td>
<td>Mollusca</td>
<td>Gastropoda</td>
<td>Mesogastropoda</td>
<td>Strombidae</td>
<td>Strombus alatus</td>
</tr>
</tbody>
</table>
Animals without a Backbone

- **Invertebrates (animals without backbones)**
  - Worms, insects, sea stars, clams, snails, corals
Animals with a Backbone

- **Vertebrates (animals with a backbone)**
  - Fish (fish, sharks, sting rays, whale sharks)
  - Amphibians (salamanders, frogs, toads, newts)
  - Reptiles (alligators, lizards, snakes, turtles; they have scales, and lay hard eggs--amphibians do not!)
  - Birds (have feathers, most can fly, lay eggs, hollow bones)
  - Mammals-hair or fur, milk for young, keep the same body temperature (endotherm), live birth
Activity

Taxonomy: Sorting Living Things into Groups

1. Pick one animal and draw a picture of it on the back of this page.
2. Do you think your animal has a backbone? Circle invertebrate if you think no. Circle vertebrate if you think yes.

   Invertebrate  Vertebrate

3. Make your best guess as to the group the animal belongs to. Use the list below to help. Write what you think it is:___________________

   Invertebrates (animals without a backbone):
   worm  insect  clam  coral  Other invertebrate  sponge  sand dollar  crab  spider

   Vertebrates (animals with a backbone):
   Fish:  fishes  sharks  sting rays  eels  goldfish  other fish
   Amphibian:  frogs  toads  newts  salamanders  tree frogs  other amphibian
   Reptile:  alligator  lizards  snakes  turtles  dinosaur  other reptile
   Bird:  ducks  geese  eagles  herons  hawks  other bird
   Mammal:  raccoon  mouse  dog  human  cat  other mammal

4. List three characteristics of your animal (e.g., what makes it what it is? Does it have feathers, blubber, scales, fur, a shell, gills, spines, a blowhole, lay eggs?)

   1._________________________________  2._________________________________  3._________________________________
Acknowledgements

Lesson developed by Dr. Chris Simoniello for Bay Point Elementary 1st Grade (adaptable for use with grades K-2). Standards-cross-referencing and formatting by Grant Craig.