Grade 7 Natural Science Worksheet

Assessment Task: Biology: classification

Vertebrates and invertebrates

Let's look at the Animal Kingdom a little more closely. All organisms in this group are multicellular and they cannot produce their own food like plants, so they have to eat their food. Biologists have subdivided the organisms in the Animal Kingdom into two groups: invertebrate animals and vertebrate animals.

Biologists classify animals according to whether or not they have a vertebral column. Maybe when you were younger at primary school, you learned that vertebrate animals have a backbone. This is a little misleading, because a vertebral column is more than just one backbone; it's a whole chain of smaller bones, called vertebrae (singular: vertebra) which are jointed together and through which the spinal cord runs. The spinal cord is a collection of nerves that runs from your brain right down your back. The vertebrae and the spinal cord make up the vertebral column.

Part One: Classifying animals

You and your partner are now going to be biological detectives and classify animals into the two groups: Invertebrates and vertebrates. Just like a good detective, you will base your decisions on evidence – what you have learned so far about these two types of animals.

In your workbook, divide a page in half. At the top of the left-hand side of the page, write a heading INVERTEBRATES. Put a heading VERTEBRATES at the top of the right-hand side of the page.

1. Now look at the pictures of the animals illustrated here. You must sort, or classify, the animals into their correct group. Discuss your decisions with your partner.

[24 marks]

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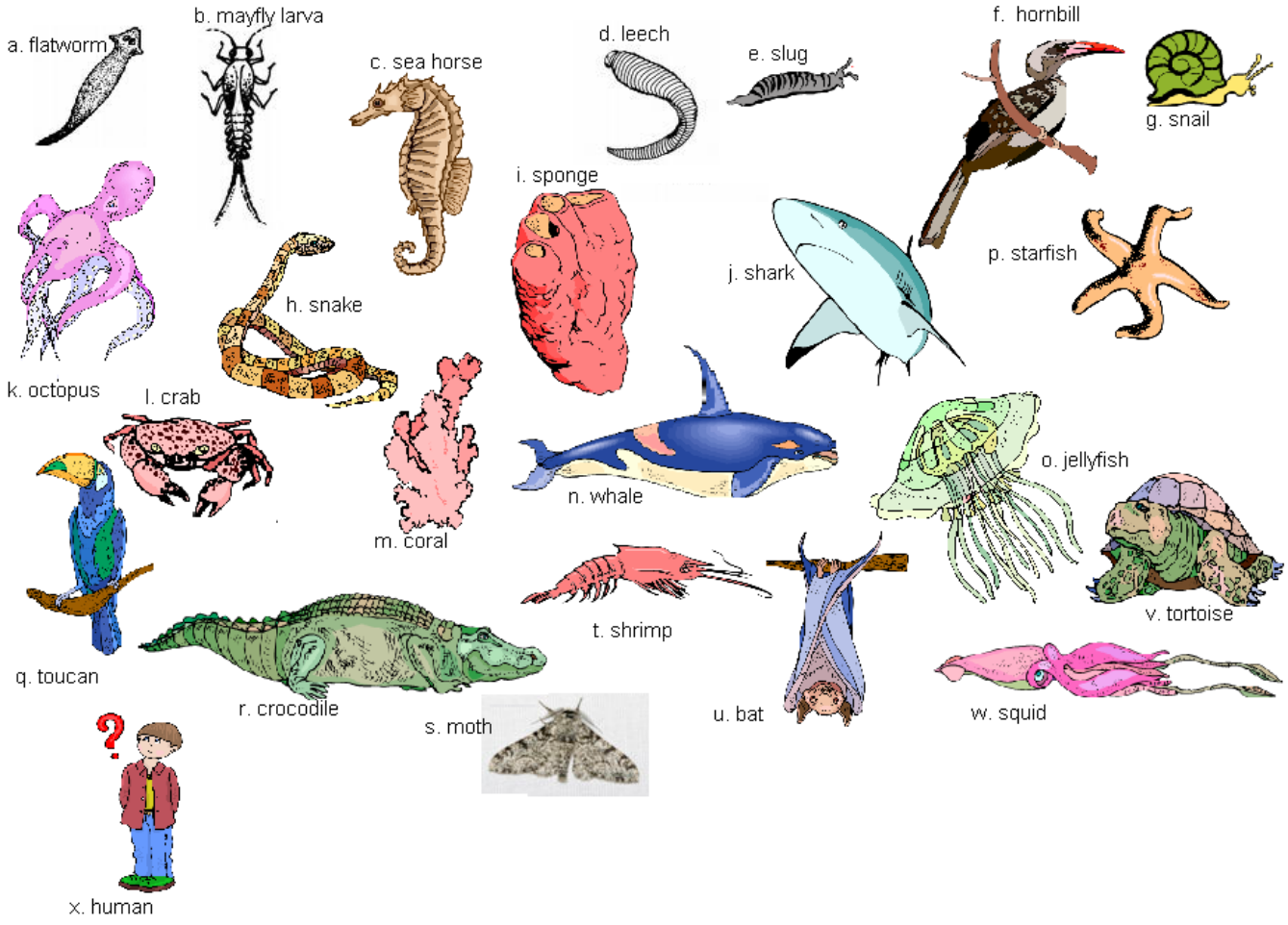
2. Think of at least three other examples of invertebrates and three other examples of vertebrates which are not illustrated, and write them into your columns too. Does your partner agree with your classification?

[3 marks]



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Part Two: Distinguishing characteristics of vertebrates

2.1 What are the distinguishing characteristics of vertebrates? (All vertebrates will have the distinguishing characteristics in common.) [10 marks]

2.2 Into what five classes can the vertebrates be divided? [10 marks]

2.3 You are going to once again be a biological detective! This time, you are given clues in the boxes below. The clues describe **distinguishing characteristics** of the five different classes of vertebrates. Based on what you know about the different classes of vertebrates, decide which characteristics describe which class. Once you have matched the class with its distinguishing characteristics, fill in the name of the class. Check your decisions with a partner once you have completed your activity.

[10 marks]

BOX ONE: CLASS: _____

- Mostly live on land, but some can spend periods of time in water.
- Air breathing.
- Skin covered with scales.
- Most have four limbs for walking.
- Internal fertilisation.
- Egg laying.
- About 10 – 20 eggs laid at a time.
- Some show parental care.

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BOX TWO: CLASS: _____

- All live in water.
- Have gills to extract oxygen from water.
- Skin covered with scales.
- Limbs modified as fins for swimming.
- External fertilisation.
- Egg laying.
- Thousands of eggs laid at a time.
- No parental care.

BOX THREE: CLASS: _____

- Mostly live on land, but some can live in water.
- Air breathing.
- Skin covered with hair.
- Four limbs, very often modified.
- Internal fertilisation.
- Give birth to live young.
- Between 1 and 5 young born at a time.
- Extended parental care which begins with feeding from mammary glands of female.

BOX FOUR: CLASS: _____

- Live on land and in water.
- Some are air breathing, some have gills.
- Moist naked skin.
- Four limbs may be modified.
- External fertilisation.
- Egg laying.
- Hundreds of eggs laid at a time.
- No parental care.

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BOX FIVE: CLASS: _____

- Live on land.
- Air breathing.
- Skin covered with scales and feathers.
- Limbs modified for flying.
- Internal fertilisation.
- Egg laying.
- About 1 – 10 eggs laid.
- Parental care present.

Part Three: Distinguishing characteristics of invertebrates

1. Read the following descriptions of the different groups of invertebrates. Place the invertebrates from the picture in Part One into the different groups.

Sponges are placed in the group **Porifera**. They are the simplest animals. The sea anemone and the jellyfish belong to a group called the **Coelenterates** (pronounced soo-len-te-rates). These invertebrates all have soft bodies and live in water. They don't have recognisable heads and their bodies are arranged on a circular plan. They also have stinging cells that they use to poison their prey before they eat it. Have you ever been stung by a blue-bottle on the beach? Blue-bottles belong to this group too. **Echinoderms** (pronounced ee-kine-oh-derms) also have a circular body plan and include animals such as starfish and sea urchins. The tapeworm belongs to the group of **flatworms**. Their soft bodies have segments and are flattened. All the organisms in this group live as parasites inside other animals. Many of the flatworms cause disease in humans and other animals. The earthworm belongs to the group called **segmented worms**. They have soft bodies and some live in moist soil while others live in water. Some can also live as parasites inside other animals and cause diseases.

The snail, slug and octopus all belong to the group known as **Mollusca**. Molluscs also have soft bodies, although some, like the snails, have shells that protect their bodies. Some live in moist places on land, while others live in water. Have you ever eaten calamari? Calamari is a kind of squid which is a mollusc. The sea shells you pick up on the beach are from molluscs that have died.

The locust, spider and crab all belong to the group **Arthropoda**. The word 'arthropoda' means 'jointed legs'. All members of this group have jointed legs and hard external skeletons called exoskeletons. There are different kinds of arthropods that all have jointed legs and exoskeletons, but other characteristics differ. The **millipedes** and **centipedes** have many jointed legs. The arthropods with five pairs of jointed legs are **crustaceans**. You know crustaceans as crabs, crayfish and shrimps. **Arachnids** have four pairs of jointed legs. Spiders and scorpions belong to this group. **Insects** have three pairs of jointed legs, as well as two pairs of wings. The insects are very diverse: ants, bees, locusts, beetles, bugs and butterflies are all insects.

[14 marks]

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3. You are given an earthworm, a jellyfish, a crayfish, a snail, a wasp and a spider.

   Make a dichotomous key to classify these invertebrates. [12 marks]

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Suggested Solutions

<table>
<tr><th>Question number</th><th>Possible marks</th><th>Solution</th></tr>
<tr><td>1.1</td><td>24</td><td>
<table>
<tr><th>Invertebrates</th><th>Vertebrates</th></tr>
<tr><td>a</td><td>c</td></tr>
<tr><td>b</td><td>f</td></tr>
<tr><td>d</td><td>h</td></tr>
<tr><td>e</td><td>j</td></tr>
<tr><td>g</td><td>n</td></tr>
<tr><td>i</td><td>q</td></tr>
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<tr><td>t</td><td></td></tr>
<tr><td>w</td><td></td></tr>
</table>
</td></tr>
<tr><td>1.2</td><td>3</td><td>Three own examples.</td></tr>
<tr><td>2.1</td><td>10</td><td>All vertebrates have a vertebral column. ✓✓
All vertebrates have a skull which contains a brain.✓✓
All vertebrates are bilaterally symmetrical. ✓✓ This means that they have two equal halves along a longitudinal axis from head down the vertebral column. They have a left hand side and a right hand side. This helps to make their movement more coordinated.
Vertebrates have two pairs of appendages for locomotion. ✓✓ These limbs are modified depending on the type of locomotion, e.g. flying, swimming, walking, etc.
All vertebrates reproduce sexually. ✓✓</td></tr>
<tr><td>2.2</td><td>10</td><td>Pisces: fish ✓✓
Amphibia: amphibians ✓✓
Reptilia: reptiles ✓✓
Aves: birds ✓✓
Mammalia: mammals✓✓</td></tr>
<tr><td>2.3</td><td>10</td><td>Box One: Class Reptilia ✓✓
Box Two: Class Pisces ✓✓
Box Three: Class Mammalia ✓✓
Box Four: Class Amphibia ✓✓
Box Five: Class Aves ✓✓</td></tr>
<tr><td>3.1</td><td>14</td><td>Porifera/sponges: i
Coelenterates: m, o</td></tr>
</table>

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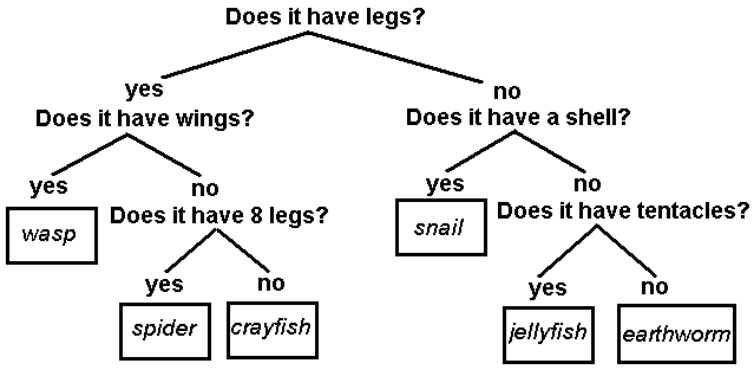
		Echninoderms: p Flatworms: a Segmented worms: d Mollusca: e, g, k, w Arthropoda: b, l, s, t	
3.2	12	 correctly keyed.	This is one possible answer. Learners may have another way of keying the organisms. 2 marks per animal