WHERE DID ANIMALS COME FROM

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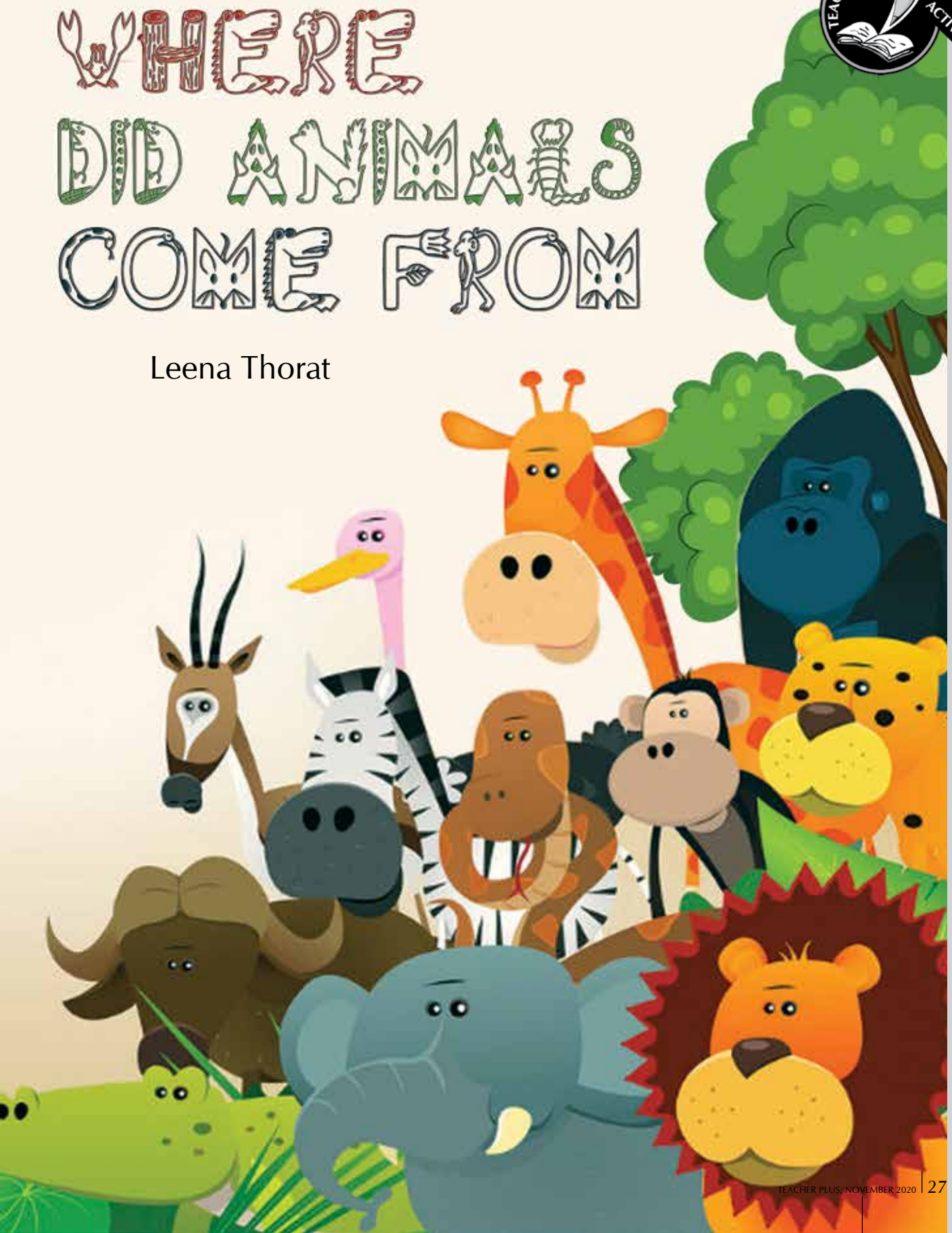
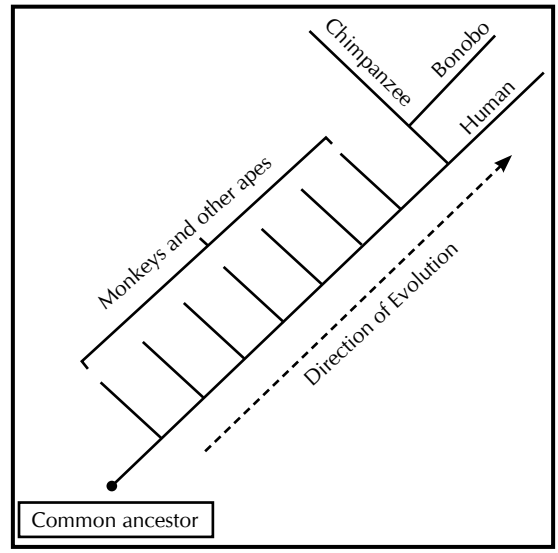


Teacher Plus Worksheet

Activity I: What is evolution? How did man evolve?

Have you heard of apes? Apes can be called as primates or monkeys without tails, like the chimpanzee and the bonobo. We must note that humans (you and me) did not develop directly from these apes. Instead, humans, chimpanzees and bonobos developed or evolved from a common ancestor. This means that a common animal (ancestor) underwent many changes and after several years, it evolved different features that gave rise to man, chimpanzees and bonobos by a process called evolution.



Today, we know that the chimpanzee and the bonobo are the closest relatives of man.

- *Let us see how similar or different we are compared to chimpanzees and bonobos. Can you choose the appropriate characters provided in the first column to fill up the blank spaces in the table below?*

Characters	Chimpanzees (great apes)	Bonobos (great apes)	Humans (you and me)
Live mainly in forests and jungles on trees or in shelter			
Communicate through different sounds or spoken language			
Tail present or absent			
Walk on two feet or four feet			
Give birth to young ones as babies or by laying eggs			

Activity II: Evolution of life on earth

It is believed that many years after the formation of our planet earth, the first living things appeared in water. These unicellular or single-celled organisms were tiny and simple in form. Over time, complex and multicellular organisms such as plants and animals evolved from the unicellular living things. In this lesson, let us consider the evolution of animals.

- *Evolution took place in several stages in animals. Those without a backbone appeared first and were called as 'invertebrates'. Whereas those with a backbone evolved later and were called 'vertebrates'. Group the following animals as either invertebrates or vertebrates.*

Invertebrates	**Vertebrates**

Mosquito, Humans, Frog, Turtle, Fish, Worm, Honeybee, Starfish, Earthworm, Crow, Snake, Penguin, Snail, Spider, Dog, Tiger

- *Vertebrate animals evolved in the following order:*

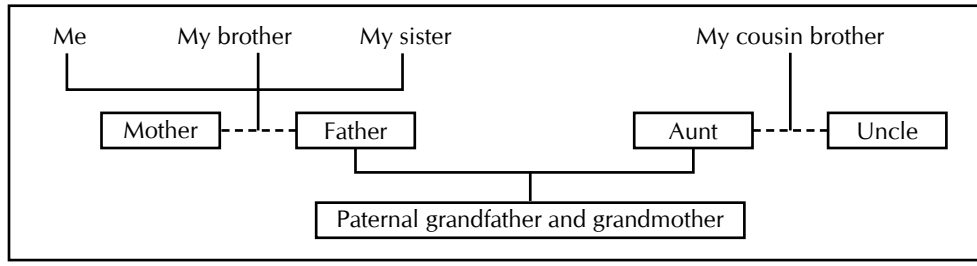
Aquatic animals (e.g. fish) → Amphibians (e.g. frog) → Reptiles (e.g. crocodile) → Birds (e.g. crow) → Mammals (e.g. humans)

Based on their features, classify the following animals in the correct groups.

	Lives in water or on land or both?	**Tail present or absent?**	**Outer body covering has feathers, fur, hair, scales or skin?**	**Lays eggs or gives birth to young ones directly?**	**Does the baby feed on mother's milk after birth?**	**Aquatic/ Amphibian/ Reptile/Bird or Mammal?**
Cow						
Fish						
Pigeon						
Toad						
Crocodile						
Mouse						
Lizard						
Ostrich						
Whale						
Bat						

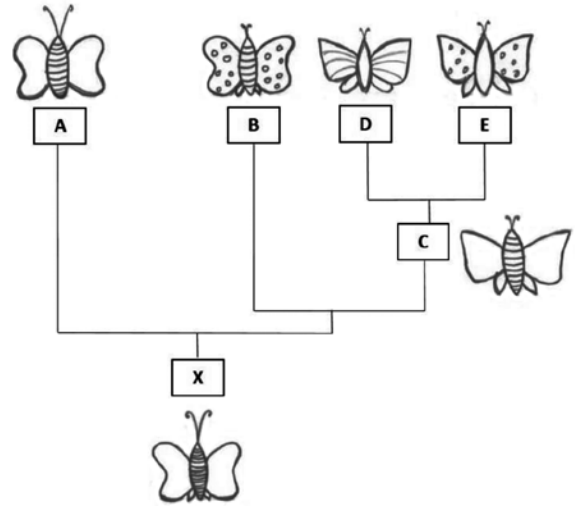
Activity III: Tree of life

The family tree below tells us about the members of your family and the link you share with your grandparents through your parents.



Similarly, in evolution, a tree of life tells us how new species were formed from previous ones. Now, what is a species? It is a group of similar individuals that can reproduce with each other to produce healthy young ones. Later, these young ones also produce young ones when they become adults. In a tree of life, the original species (ancestor) is at the base and the newest species (evolved species) is at the tips of the branches.

➢ *Based on this knowledge, colour the different butterfly species with the help of the cues given in the table below.*



Cues	Colour
Ancestral (original) butterfly species	Blue
Butterfly species evolved from species C	Red
In addition to species C, the other butterfly species that were formed from species X	Yellow

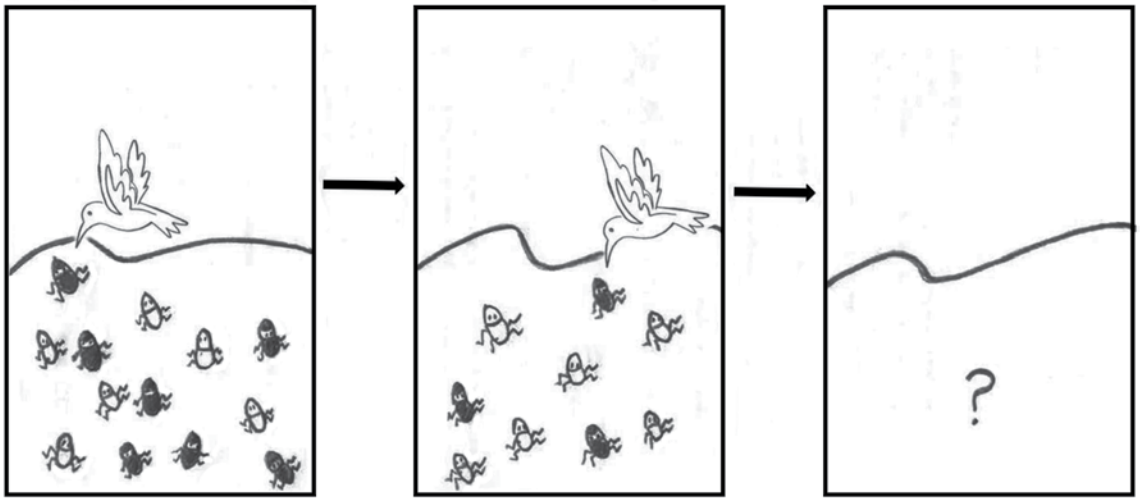
➢ *In the above case, spot the differences in the appearance between the butterfly species X and the newly evolved butterfly species A, B, D and E.*

Features	X	A	B	D	E
Wing pattern					
Length of antennae					

Activity IV: Survival and reproduction

In nature, living things adapt to their environment in order to suit the conditions in which they live. Adaptations are characteristic features of organisms that help to increase their fitness and enable them to survive and reproduce. Individuals with helpful features will leave more offspring in the next generation.

- *A population of black and white beetles has moved to a new area where the rocks are light coloured. On the light coloured background of the rocks, the black beetles are easily spotted and eaten up by birds (box 1). Only the surviving beetles reproduce to give birth to offspring in the next generation (box 2). As the black beetles are more frequently eaten up by the birds, what do you expect in the next few generations? Will you find higher numbers of white or black beetles? Can you fill box 3 with the appropriate beetles?*



In this case, which is the helpful feature - black or white body? Why?

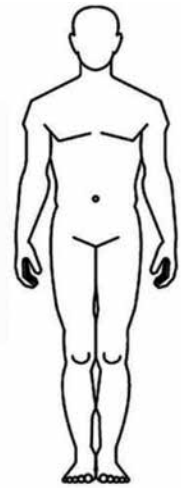
Activity V: Animal adaptations

Have you observed different animals or looked at books about animals? You will find a lot of variety among animal species all over the world. This is because of animal adaptations. Animals live in a variety of environments and in order to survive in their environments, they possess unique behavioural and physical features. Some animals have fins or wings for locomotion, while some animals have forelimbs and hindlimbs. Some animals migrate while some build their own shelters. These adaptations increase the chances of animals to survive in their particular environment and also pass on the adaptations to their babies in the next generation.

- *Write one function of the adaptive feature in the animals given below. The first one has been done for you:*
  1. Webbed feet in ducks – help to swim in water.
  2. Hump in camels –
  3. Thick fur of the Artic fox –

4. Fins of fish –
5. Sharp teeth in crocodiles –
6. Slimy mucus layer on the skin of frogs –

➢ *It is interesting to note that horses and humans are mammals, yet they are so different from each other. Can you spot at least three differences between them?*



1.

2.

3.

Activity VI: Proof for evolution

Past history tells us about events that took place on earth. It also tells us about the life forms that evolved and those that became extinct several years ago. Scientists use different methods to provide proof of the evolutionary events that occurred in the past.

➢ *Fossils are remains of animals and plants that lived many years ago. Animal fossils can be in the form of bones or footprints. Scientists study fossils to get clues of life that occurred in the past. The sentences below describe the process of fossil formation, but the steps are jumbled up. Can you re-organize the sentences by putting the correct number in the boxes provided on the left side of the sentences?*

☐ A dinosaur dies and sinks to the bottom of a riverbed.

☐ Scientists dig deep down the earth's surface to find the fossil.

☐ Gradually, bones are washed away piece by piece and the empty space left in the rock is the exact shape of the bone and acts as a mold.

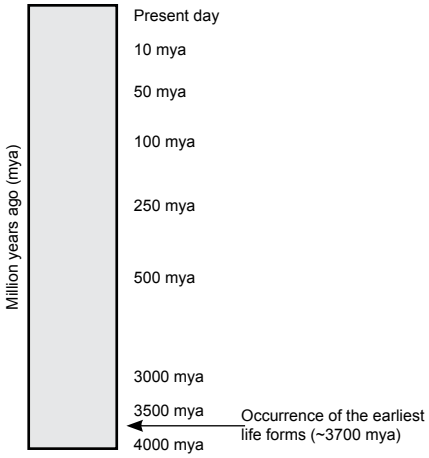
☐ The flesh is eaten up by other creatures in the water and only the bones remain.

☐ Over many years, tiny pieces of rock and minerals enter the mold and fill up the empty space.

☐ Layers of mud and sand cover the bones and over the years, these layers turn into hard rock.

☐ The structure hardens into rock and may rise to the earth's surface during earthquake or natural rising mountains.

➢ *With the help of fossil remains and imprints, a geologic time scale tells us the times when an organism first appeared, evolved and became extinct. Below is a time scale representing events that occurred millions of years ago (mya). With the help of the event list, can you indicate those events on the scale? The first one has been done for you.*



Event
Occurrence of the earliest forms of life (~3700 mya)
Invertebrates become common (~500 mya)
First appearance of vertebrate land animals (~380 mya)
First appearance of dinosaurs (~243 to 233 mya)
Extinction of dinosaurs (~66 mya)

Activity VII: What if?

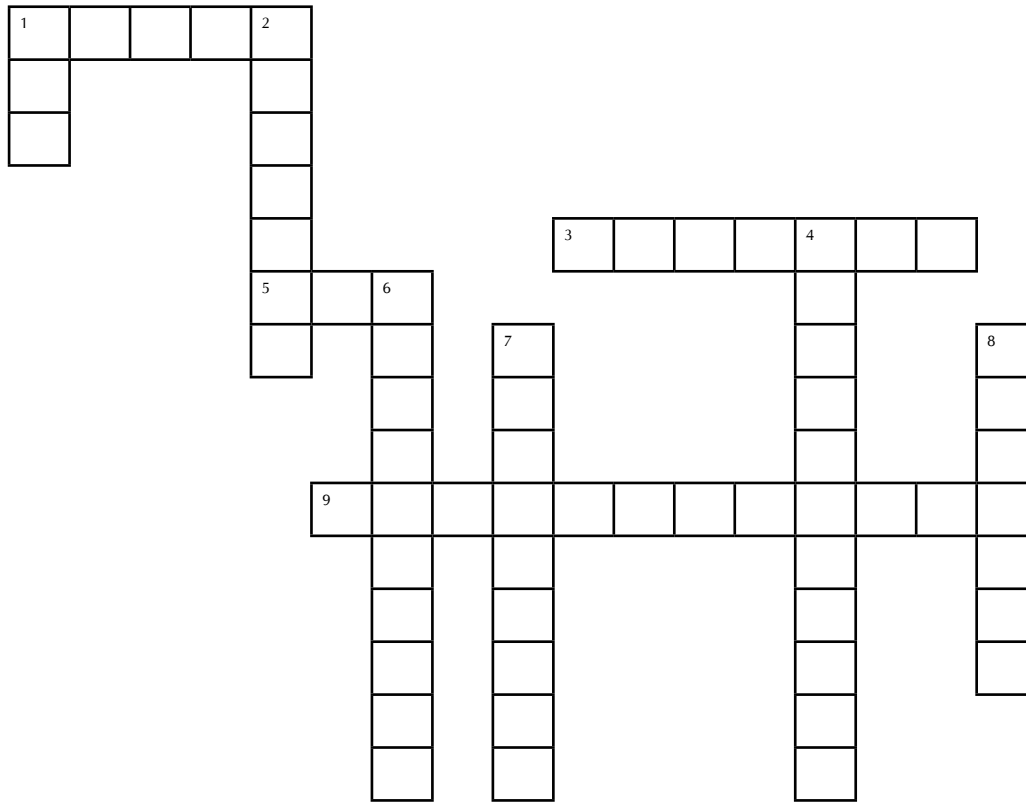
- *What if dinosaurs were alive today! Write a short narrative of your imagination of living with dinosaurs around you.*

What if dinosaurs were alive today?

- *What if your favourite pet animal became extinct and is no more around you? Write a short narrative of your imagination of living without your pet (e.g. your pet dog).*

What if my favourite pet animal became extinct!

Activity VIII: Revision through crossword puzzle



Across:

1. White and black coloured mice were living in an area with black coloured rocks. The _____ coloured mice can be easily spotted and eaten up by predators.
3. _____ are the most evolved among all vertebrate animals.
5. Between a mosquito and a cat, _____ is more closely related to a dog.
9. Hairy legs of honeybees are adapted to carry _____ from one flower to another.

Down:

1. Ability to build a _____ is an adaptation in spider that helps it to trap insects for food.
2. Since dinosaurs are no longer alive, we say that they are _____ animals.
4. Special features that help organisms to survive in the environment in which they are living are called as _____.
6. _____ is a representation showing the evolution of species from a common ancestor.
7. _____ is defined as a gradual and continuous change occurring in organisms.
8. Remains of plants and animals that help scientists to know about life in the past are called as _____.

https://sites.google.com/a/chs.coppellisd.com/six-kingdoms/kingdom-animalia

Developed by Leena Thorat. The author is currently associated with the Department of Biology, York University (Toronto, Canada) as a Postdoctoral Visitor. Apart from her research and teaching activities, she enjoys delivering talks to young students and writing articles on science pedagogy and science popularisation. A passionate educator, she has a knack for igniting young minds with her creativity! She can be reached at <leenathorat@gmail.com>.

Answers
Activity VI: 1, 7, 4, 2, 5, 3, 6
Activity VIII – Across: 1) White 3) Mammals 5) Cat 9 Pollen grains
Down: 1) Web 2) Extinct 4) Adaptations 6) Tree of life 7) Evolution 8) Fossils