Visual Timeline Exploration Package

Inside this package you will find a teacher’s guide as well as worksheets that can be used at either the primary or intermediate level. Depending on how much time you have to explore the museum, and the learning needs of your class, students can either draw the specimens or list them in point form in the table on the worksheets provided below.

Included Activities
Vocabulary list ..................................................................................................................................................................2
How to locate specimens ..............................................................................................................................................3
Visual Exploration Worksheet Example Key 1 ..............................................................................................................4
Visual Exploration Worksheet Example Key 2 ..............................................................................................................5
Visual Exploration Worksheet 1 .....................................................................................................................................6
Visual Exploration Worksheet 2 .....................................................................................................................................7
Post Museum Lesson Plan ..........................................................................................................................................8-12

Curricular Connections:
Grade 1 and 2 Science
- Make and record observations
- Demonstrate curiosity and a sense of wonder about the world

Grade 3 and 4 Science
- Living things are diverse and can be grouped
- Demonstrate curiosity about the natural world
- Biodiversity in the local environment
- Represent and communicate ideas and findings in a variety of ways, such as diagrams
- Make observations about living and nonliving things in the local environment

Grade 5 and 6 Science
- Make observations in familiar or unfamiliar contexts
- Express and reflect on personal, shared, or others’ experiences of place
- The overall scale, structure and age of the universe

Grade 7 Science
- Evidence of climate change over geological time
- The fossil record provides evidence for changes in biodiversity over geological time
Before visiting the Beaty Biodiversity Museum and engaging in this activity, it is recommended that you introduce students to some of the terminology that is used in the exhibits. The museum is broken down into six sections – the Cowan Tetrapod Collection, the Marine Invertebrate Collection, the Herbarium, the Spencer Entomological Collection, the Fish Collection, and the Fossil Collection. Review the vocabulary list below to help familiarize students with the different sections of the museum.

**Vocabulary List**

**Tetrapod** - A tetrapod is an organism with four limbs. This includes mammals, amphibians, reptiles, and birds. Some tetrapods in our collection have descended from organisms with four limbs, such as whales and snakes. While they do not appear to have four limbs, they are still considered tetrapods.

**Invertebrate** - An invertebrate is an organism that does not have a backbone. In contrast, organisms with a backbone, or vertebrae, are called vertebrates. At the museum you will find several examples of marine invertebrates, including cnidarians (jellyfish, corals, and sea anemones), molluscs (snails, mussels, and squid), annelids (segmented worms), crustaceans (crabs, lobsters, shrimp and barnacles), echinoderms (sea stars and sea urchins), and poriferans (sponges).

**Herbarium** - The herbarium is where all of the plant and fungi specimens are housed. All of the specimens are carefully dried and preserved. The specimens show variation and distribution information about different species and can demonstrate how species change over time. Scientists, ecological consultants, conservation managers, agriculturists, archaeologists, police, government agencies, and the general public use the herbarium to gather information.

**Entomology** - Entomology is the study of insects. Examples include butterflies, spiders, and beetles. Insects are the most diverse group of animals on the planet – there are more than one million described species (and there is estimated to be millions more). Insects live in nearly all environments on Earth.

**Fish** – Fish are animals that live and swim in the water, breathe using gills (with the exception of lungfish), have vertebrae, generally have scaly skin, and generally have fins instead of limbs. Fish are an important food source worldwide, which has resulted in many fish species being at risk.

For further exploration of each of these sections, please visit:
How to locate specimens within the Beaty Museum collection

As this activity encourages students to try and find examples of their specimens in the museum, it is helpful to explain how the museum is organized. There are 52 rows of specimens in the museum. (See Map: [http://beatymuseum.ubc.ca/files/2019/06/BeatyVisitorGuide2018.pdf](http://beatymuseum.ubc.ca/files/2019/06/BeatyVisitorGuide2018.pdf)). The row under the blue whale skeleton is row 1. The row behind it, with all of the big taxidermy animals is row 2, and so on and so forth. The tetrapod section is comprised of 10 rows altogether.

Each cabinet also has a number. In the example key below, you will see that numbers are listed beside each of the examples. For example, the Lepidopterans has 37.29 written beside it. This means that an example of a Lepidopteran is located in row 37, cabinet 29.

Each of the specimens on the visual timeline is also colour coordinated with the section of the Museum that it belongs in (brown: tetrapod, orange: invertebrates, green: herbarium, blue: fish, purple: entomological, red: fossil). On the floor of the museum, you can see big coloured circles with the symbol for each of the 6 sections that the Museum is organized into. This is a great visual clue to help students narrow down their search.
Example Key

Visual Timeline Exploration:
What Else Lived During the era of the Dinosaurs?

If we were to hop into a time machine and travel back in time 66 million years, it might surprise you to see that many of the plants and animals that lived during the age of the Dinosaurs are still around today!

Find the big timeline in the Beaty Biodiversity Museum. Look along the side to see the dates.

Explore the Mesozoic era: Jurassic, Cretaceous and Triassic.

What else lived during the same time as the Dinosaurs that you still might see today?

Find two examples and draw them below.

- Turtles (06.11)
- Crocodiles
- Arachnids (38.30)
- Sturgeons (39.14)
- Lepidopterans (37.29, 37.30, 37.31) (ex. Butterflies)
- Cephalopods (ex. Octopus) (12.22)
- Hymenopterans (ex. Bees, sawflies, wasps)
- Orthopterans (ex. Grasshoppers)
- Hymenopterans (When you cross into the Entomology section, there is a display case between the rows. Here you can see Dipteras, Hymenoptera, coleopteros, orthopterans)
- Coleopterans (38.12, 38.13, 38.14)
- Dipterans (38.17, 38.18, 38.19)
- Ginkgo
- Conifers (In between Cases 20.23 and 20.24, you can see a display which houses Gingko, Cycads and Conifers; You can also see a fossil of a conifer at 25.16)
- Brown Algae (13.18)
- Coralline Algae (15.14)
- Grasses (27.10)
- Nematodes (Round Worm)
- Snakes and Lizards (05.04, 05.05, 06.09, 06.10)

Now see if you can find these specimens in the Beaty Museum collections!
Example Key
Visual Timeline Exploration: What Else Lived During the era of the Dinosaurs?

If we were to hop into a time machine and travel back in time 66 million years, it might surprise you to see that many of the plants and animals that lived during the age of the Dinosaurs are still around today!

Find the big timeline on the wall of the Beaty Biodiversity Museum.

Explore the Mesozoic era (Jurassic, Cretaceous, and Triassic).

What else lived during the same time period as the Dinosaurs?

<table>
<thead>
<tr>
<th>Tetrapod</th>
<th>Invertebrate</th>
<th>Herbarium</th>
<th>Entomological</th>
<th>Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>-crocodiles</td>
<td>-Cephalopods (12.22)</td>
<td>-Conifers</td>
<td>-Arachnids (38.30)</td>
<td>-Sturgeons (39.14)</td>
</tr>
<tr>
<td>-turtles (06.11)</td>
<td>-rotifers</td>
<td>-Cycads</td>
<td>Hymenopterans (38.12, 38.13, 38.14)</td>
<td>-dipterans (38.17, 38.18, 38.19)</td>
</tr>
<tr>
<td>-snakes &amp; lizards (05.04, 05.05, 06.09, 06.10)</td>
<td></td>
<td>-Gingko (In between Cases 20.23 and 20.24, you can see a display which houses Gingko, Cycads and Conifers; You can also see a fossil of a conifer at 25.16)</td>
<td>-dipterans (38.17, 38.18, 38.19)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Nymphaeales</td>
<td>(When you cross into the Entomology section, there is a display case between the rows. Here you can see dipteras, hymenoptera &amp; coleopteros)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Brown Algae (13.18)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Coralline Algae (15.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Grasses (27.10)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Now see if you can find some of these specimens in the Beaty Museum collections!
Visual Timeline Exploration:
What Else Lived During the era of the Dinosaurs?

If we were to hop into a time machine and travel back in time 66 million years, it might surprise you to see that many of the plants and animals that lived during the age of the Dinosaurs are still around today!

Find the big timeline in the Beaty Biodiversity Museum. Look along the side to see the dates.

Explore the Mesozoic era: Jurassic, Cretaceous and Triassic.

What else lived during the same time as the Dinosaurs that you still might see today?

Find two examples and draw them below.

Now see if you can find these specimens in the Beaty Museum collections!
Visual Timeline Exploration:
What Else Lived During the era of the Dinosaurs?

If we were to hop into a time machine and travel back in time 66 million years, it might surprise you to see that many of the plants and animals that lived during the age of the Dinosaurs are still around today!

Find the big timeline on the wall of the Beaty Biodiversity Museum.

Explore the Mesozoic era (Jurassic, Cretaceous, and Triassic).

What else lived during the same time period as the Dinosaurs?

Tetrapod Invertebrate Herbarium Entomological Fish

Now see if you can find some of these specimens in the Beaty Museum collections!
Post Museum Lesson Plan: Visualizations

Materials:

- Timeline photo
- Completed worksheets
- Chart paper/White Board

Procedure:

- Have the students review the Visual Timeline worksheet that was completed while at the Beaty Biodiversity Museum
- As a class, discuss some of the different things that students identified as living at the same time as the dinosaurs and some of the things that are no longer alive today (you may want to record this in a T-Chart and/or have students do the same)
- Record answers on chart paper or on the white board
- Project photo of the visual timeline (see below) after the class has had a chance to share
- Have students either write a letter to someone describing what they see when they get out of the time machine, or to draw a picture of what they think they would see.
- Depending on the grade/learning needs of your class, have the students include a specific number of species that lived during the same era as the dinosaurs that we still see today and a specific number of things that lived at the same time as the dinosaurs, but that are no longer alive today. For example, “In your letter/drawing, include at least 3 things that you can see that are still alive today, and 3 things that you can see but that are no longer alive today.”
- Have them refer to the chart made during the class discussion, their Visual Timeline Exploration worksheet and the visual timeline photo to assist them in completing the activity
Diagram of Beaty Biodiversity Museum’s timeline exhibit, featuring the last 500 million years.
A Letter to the Future

Imagine that you have just arrived 66 million years back in time. The doors to the time machine have just opened- you go to take a picture, but you forgot your camera! Luckily, you have a pen and paper with you. Write a letter to someone back home and describe to them the different things that you can see!

Dear _________________________________________________________,

_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________
_____________________________________________________________________________________________


A Picture from The Past
Imagine that you have just arrived 66 million years back in time. The doors to the time machine have just opened- you go to take a picture, but you forgot your camera! Luckily you have your sketch book with you. Draw a picture of what you see so that you can take it back home and share what you saw with everyone!