**File name: VR_4T_LP6_Geology_Science_12**
**Topic: Environmental Science**
**Keywords: Erosion, weathering, precipitation, acidic**
**Suggested grade level: Grade 12**
**Estimated activity time: 15 min**

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**Geology – Science 12**

**Minerals, rocks, and earth materials**

**VR $360^0$ exploration:** Drone 360/VR Video of Pacifica, CA, Cliff Erosion - Apartments Falling Into the Ocean    https://www.youtube.com/watch?v=BOMn-vRua9M

**General Introduction:**
Doing a VR $360^0$ exploration/expedition is like going on a vacation or trip. You have to plan e.g. your destinations, places to eat, relax, and meet friends and family. It means identifying your objectives.

**For teachers:**
In this section, you will see a modified planning and preparation arranged into three (3) steps. As a teacher, these steps help you maximize the learning opportunities a VR $360^0$ exploration/expedition can potentially offer.

Three steps:

1) Pre-exploration: Preview the playlist exploration yourself. By doing this, you are identifying possible questions and activities that might enrich students' VR experience.

2) During exploration: Provide guide or key questions or ask the students to formulate new questions about the playlist and encourage students to refer to other resources (e.g., YouTube videos, articles, etc.) to connect and enrich the playlist.

3) Post-exploration: Follow-up on the new questions and wonders students have identified. These questions might lead to an interdisciplinary inquiry project, blog posts or short video clips to link with the original unit or chapter coverage.

**Description:**
In this 15-minute exploration activity, you'll see a $360^0$ panorama of apartments falling into the ocean due to coastal erosion in Pacifica, California.

**Objective:**
The core learning outcome of this playlist is to enrich students' understanding of minerals, rocks and earth materials as exemplified by the powerful force of weathering and erosion.

However, unlike a regular 2D video, this VR provides a $360^0$ panorama, which allows your students to focus on different points of interest that might vary from student to student. So, take time to explore the playlist using different angles and positions.



Erosion and Weathering: Earth Time Lapse

**Suggested Guide:**

1) **Pre-exploration:**
   Erosion and weathering:
   https://www.nationalgeographic.com/science/earth/the-dynamic-earth/weathering-erosion/

2) **During exploration:**
   What key questions could pique students' interest as they watch this playlist?
   As well, ask them to think of interesting questions they want to answer as they watch the playlist. Let them discuss these questions and their possible answers.
   They can do this by groups of two or three.

   With limited number of Google cardboards, let students work in pairs. Let them take turn to watch the playlist and do a Q & A. For example, Student 1 will describe to student 2 what he/she is seeing right now. Student 2 will explain the playlist, to Student 1 and each student will take turns doing Q & A.

3) **Post-exploration:**
   Give time for the pair/class to think about the questions and answers they have generated after watching the playlist.

   Let them recall experiences that might relate to the playlist e.g. early preparation and research before hiking on mountain ranges or active volcano or the hazards/effects of volcanic ash on aircraft.

   Then invite them to read the link below. With the playlist, let them express their understanding, reactions into any interdisciplinary inquiry projects, blog posts, short video clips, etc.

   Erosion and Weathering: Earth Time Lapse not VR 360
   https://www.youtube.com/watch?v=ysgZogSBMio

**References:**
https://edu.google.com/products/vr-ar/expeditions/?modal_active=none

https://www.youtube.com/watch?v=BOMn-vRua9M

https://www.nationalgeographic.com/science/earth/the-dynamic-earth/weathering-erosion/

https://www.youtube.com/watch?v=ysgZogSBMio