Instructor Guide: Using 360-degree Interactive Environments

How to use this guide: This guide provides a suggested structure for implementation of the 360-degree Interactive Environments (360 IEs) in the classroom. In each of the steps below, the guide identifies the instructor task, describes what the students will do, and explains the purpose for the task. This guide will help “standardize” the implementation of the 360 IEs for the purpose of the education research activities on the PolarPASS project.

Resources: PolarPASS 360-degree Interactive Environments: https://cires.colorado.edu/outreach/resources/vr-experience/polarpass-interactive-environments

---

**Step 1: EXPLORE**
Allow students time for open exploration of the 360 IE (minimum of 10 minutes). Encourage students to engage with all the information embedded within the IE, make observations of their own and have them note any questions that arise as they explore. The purpose of this step is to allow students to get familiar with how to navigate within the IE and allow for student inquiry.

**Step 2: GUIDE**
After the students have had time to explore, guide them sequentially through each of the stops in the 360 IE as though you were taking them on a field trip. At each stop, encourage students to share their observations and then questions aloud and use these to guide your explanation of the important features at the stop (typically called out in the IE using icons and info boxes). The purpose here is to let student inquiry guide how you describe the features of each stop - both by amplifying student observations and by filling in gaps in student knowledge.

**Step 3: APPLY & REFLECT**
After moving through each of the field trip stops, give students the opportunity to apply what they know to find different features within the IE using a scavenger hunt activity. Generate a list of features of interest that you want them to identify in the landscape or a set of questions that they would have to answer using the information provided in the IE. After completing the scavenger hunt, ask students to reflect on their learning to wrap up the class period. This allows students to use the IE as a tool, consider the knowledge they gained and describe how they felt while “in” the IE.

**Step 4: CONNECT**
As you move into other units in the module, reference the information and/or features within the 360 IE to connect it to other contexts within the curriculum. Let students revisit the 360 IE to re-emphasize a particular concept or topic. The purpose here is to have students recall information from the IE and connect it to new contexts.
**Student Exercise: Exploring Greenland in 360-degree Interactive Environments**

**Instructions:** This exercise introduces you to Greenland via 360-degree Interactive Environments (360 IEs). For each 360 IE you are assigned, complete the tasks in the boxes below. The exercise gives you the opportunity to explore the Greenland landscape while also learning about key features and concepts within the environment.

**Resources:** Access the various PolarPASS 360-degree Interactive Environments here: [https://cires.colorado.edu/outreach/resources/vr-experience/polarpass-interactive-environments](https://cires.colorado.edu/outreach/resources/vr-experience/polarpass-interactive-environments)

**Part 1:** Take time to explore the 360 IE you have been assigned. Get familiar with the navigation tools and engage with all the information embedded within the IE (icons, information boxes, videos, photos, etc.). Note your observations and write down questions that arise during exploration (make sure you write down the scene number for easy reference).

<table>
<thead>
<tr>
<th>Observations</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part 2: Your instructor will guide you through each stop in the 360 IE and highlight important features present in the scene. Take notes at each stop like you would as part of a field trip.

Virtual Field Notes
Part 3: Use your virtual field observations and scene notes to complete the scavenger hunt activity. Your instructor will provide key features to find and/or questions to answer using the information embedded within 360 IE. Make sure to note the scene(s) in which you find your answer(s).
Summary: Use the last bit of class to reflect upon what you learned about Greenland from exploring the 360 Interactive Environment.

1. What is something new that you learned from your field trip to Greenland that you didn’t know before?

2. Did the 360 Interactive Environment make you feel like you were in Greenland? Please explain.
INSTRUCTOR RESOURCE:
LIST OF KEY FEATURES WITHIN EACH POLARPASS 360 IE
Module 1 Unit 1 Part2a – Traveling to the Glacier Terminus

Explore the 'Traveling to the Glacier Terminus' Interactive Environment by following this link

Scene 1.1: Mouth of the Watson River, communications building
Scene 1.2: PFS staff in zebra suits, Sondestrom Atmospheric Research Facility
Scene 2: Town of Kangerlussuaq, Greenland Ice Sheet, Watson River headwaters
Scene 3: Sled dog kennels
Scene 4.1: Lake Ferguson, Watson River, town of Kangerlussuaq, striations
Scene 4.2: Sled dog kennels, mouth of the Watson River
Scene 5: Town of Kangerlussuaq, Watson River channel
Scene 6: Watson River braided channels
Scene 7.1: Ice sheet terminus
Scene 7.2: Musk oxen, arctic foxes
Scene 8: Ice sheet terminus, steep riverbed, cascades
Scene 9: Terminal moraines, proglacial lake, smooth bedrock, ice algae, cryoconite holes, crevasses, englacial channels
Scene 10: Supraglacial melt/stream networks, glacial erratic
Module 1 Unit 1 Part b – Kangerlussuaq

Explore the 'Kangerlussuaq' Interactive Environment by following this link

Scene 1: Kangerlussuaq International Science Support Center, post office and community center
Scene 2: At-risk youth residential program, daycare, bowling alley
Scene 3: Kangerlussuaq Vandrehjem
Scene 4: Local commercial airport
Scene 5: Kangerlussuaq Museum
Scene 6: US Air Force LC-130 planes
Scene 7: Polar Field Services Warehouse
Scene 7b: Tents
Scene 8: ‘Tuttu’, restaurant, Kangerlussuaq K-8th grade school
Scene 9: Watson River
Scene 10: Watson River
Scene 11: Watson River, ice sheet
Scene 12: Watson River, ocean
Module 1 Unit 4 - Watson River Discharge

Explore the 'Watson River Discharge Early Season' Interactive Environment by following this link
Explore the 'Watson River Discharge Mid Season 1' Interactive Environment by following this link
Explore the 'Watson River Discharge Mid Season 2' Interactive Environment by following this link
Explore the 'Watson River Discharge Late Season' Interactive Environment by following this link

Early Season Scene 1A, 1B: Low flow discharge of the Watson River
Scene 1C, 1D: Moderate flow discharge of the Watson River
Scene 2: Low flow of the Watson River

Mid Season 1 Scene 1A: Moderately high flow discharge
Scene 1B, 1C, 1D: High flow discharge of the Watson River
Mid Season 2 Scene 1A: Moderately-high flow discharge of the Watson River
Scene 1B, 1C, 1D: High flow discharge of the Watson River

Late Season Scene 1A: Late season low flow of the Watson River
Scene 1B: Late season low flow of the Watson River
Module 2 Unit 1 - Glacial Landforms

Explore the 'Glacial Landforms' Interactive Environment by following this link

Scene 1: Terminal moraine, lateral moraine, till, sub-rounded boulder
Scene 2: Terminal moraine, pro-glacial lakes, braided delta, glacial erratics, till
Scene 3: Sculpted and smoothed bedrock
Scene 4: Shimmery bedrock, glacial polish, linear striations
Scene 5: Smoothed bedrock, ice sheet margin, braided channels, glacial outwash
Scene 6: Terminal moraine, lateral deflation moraine, outlet glacier
Scene 7: Grooves in bedrock, foliations
Scene 8: Large scale abrasion of steep cliff face, quarried and steepened downstream bedrock, rounded upstream bedrock
Scene 9: Head of the fjord, marine fossil beds, ice sheet margin, outlet of Sondre Stromfjord