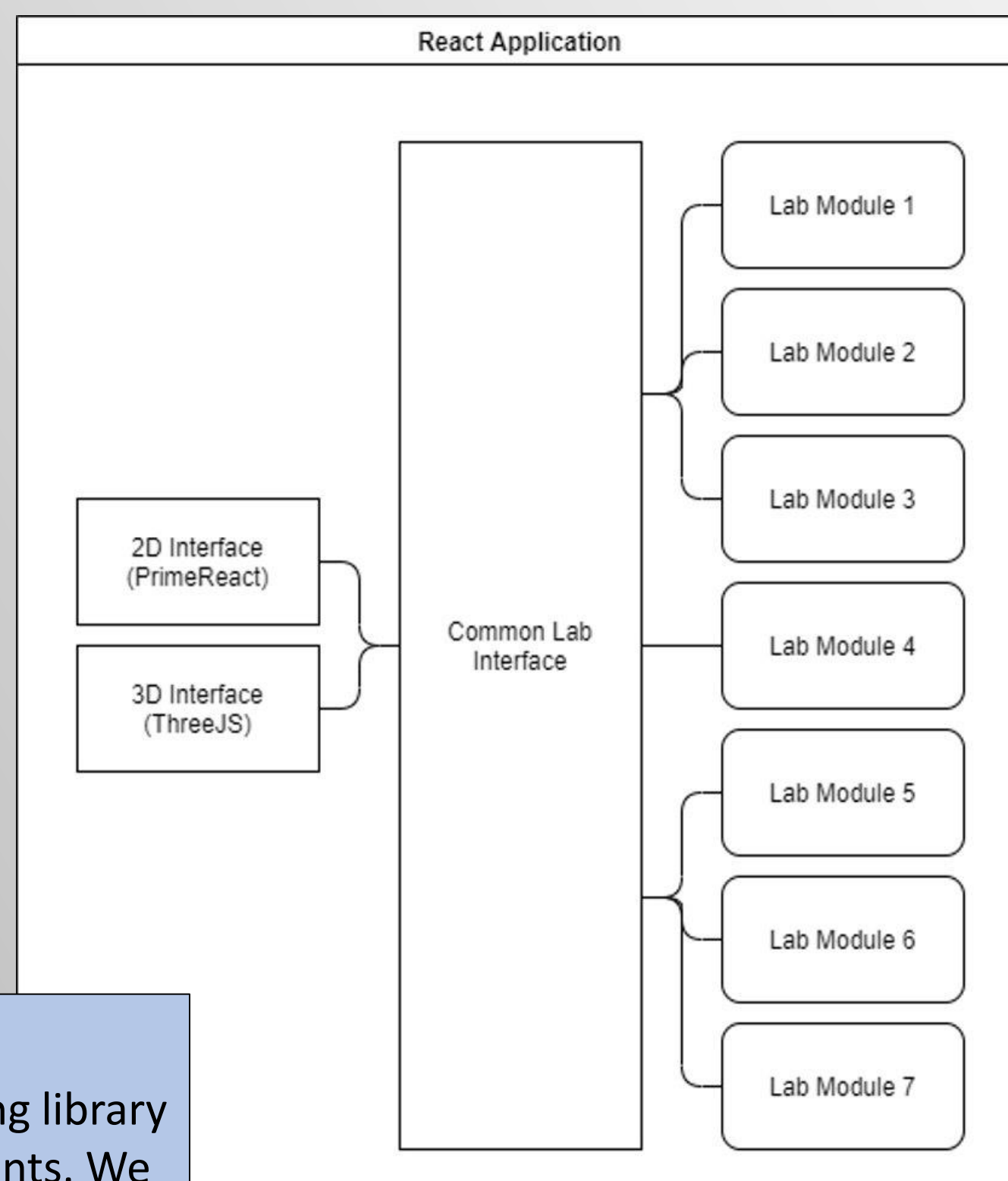


Biochemistry Virtual Lab sdmay21-12

Introduction / Motivation

- Virtual Instruction: When Iowa State University transitioned to an online class structure in early 2020, Professor Stone searched for solutions to provide biochemistry students the lab modules of BBMB 102 under new lab capacity regulations
- Webapp Laboratory: An online interactive lab allows students to complete these lab modules remotely, while also reducing wait times on equipment and allowing for labs to be repeated.



Design Requirements

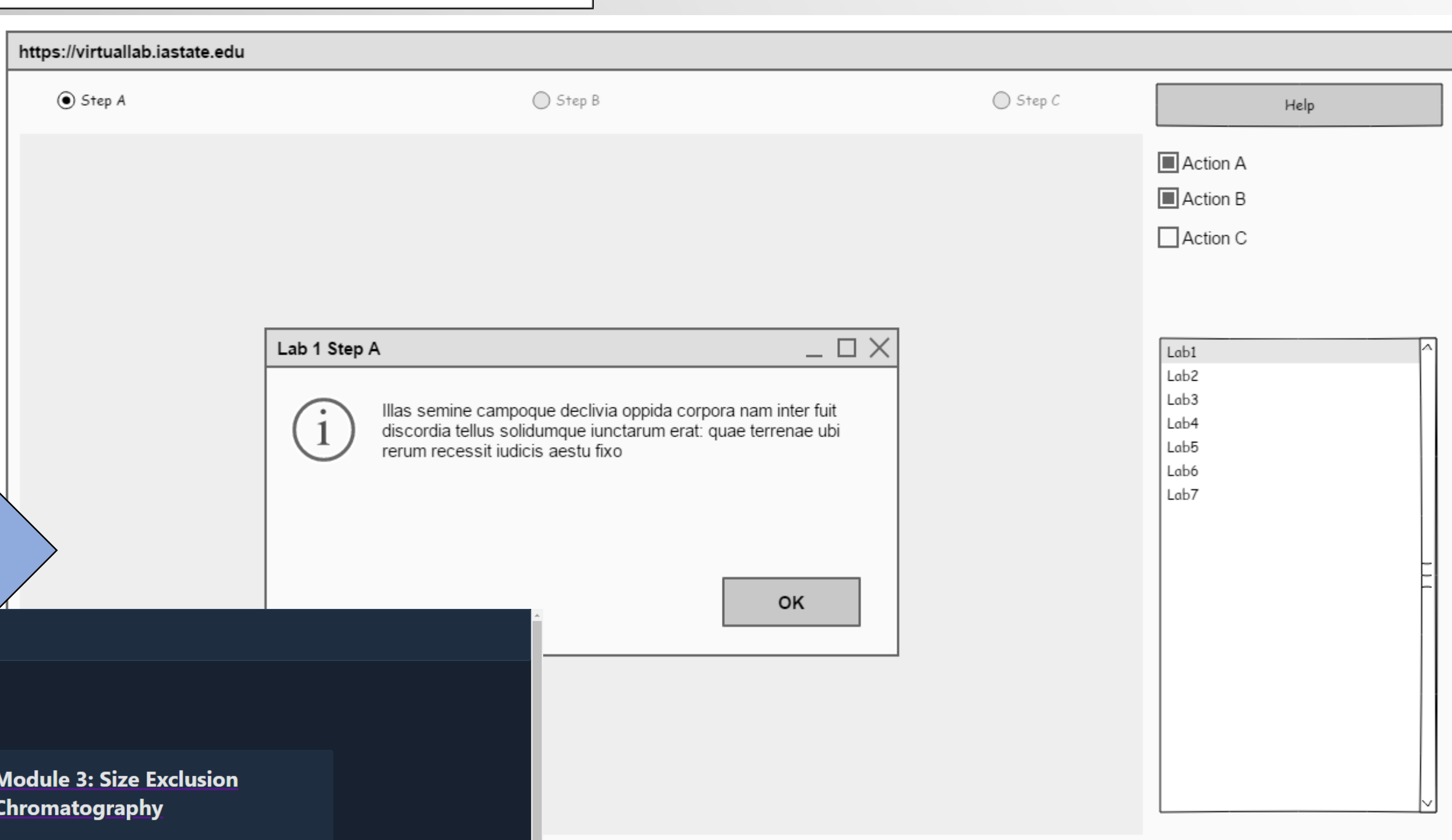
- 3D Environment: Users can see and interact with a 3d virtual lab, including objects, tables, PPE, and a notebook
- Must function on all major web browsers
- User can interact with the environment smoothly and intuitively

Design Approach

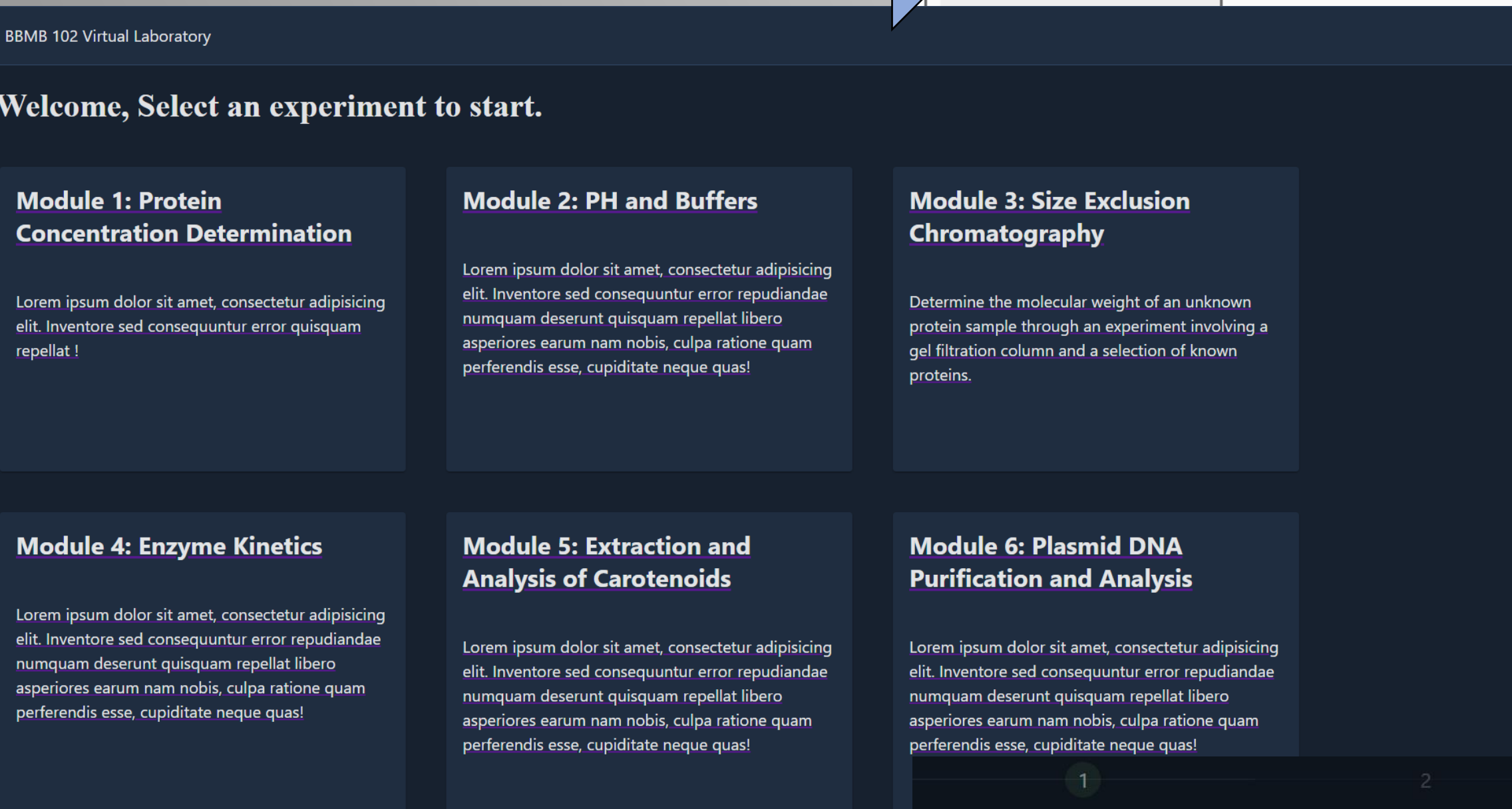
- React Application split into 7 distinct modules, 1 per lab
- Each lab implements a common interface, which defines the interactions between it and the main application engine
- The main application is further divided into two components
 - 2D Interface with PrimeReact
 - 3D interface with ThreeJS

Testing

- React Testing Library: The react testing library is a library for testing React components. We use this library to ensure that the lab is working as expected. The react-dom allows us to create tests that resemble the way the lab is used.
- Acceptance Testing: We hold demonstrations of our current progress every two weeks to ensure the project is advancing in a manner acceptable to the client. The team carefully reviews and resolves any feedback from the client and the faculty advisor.



Design Mockup

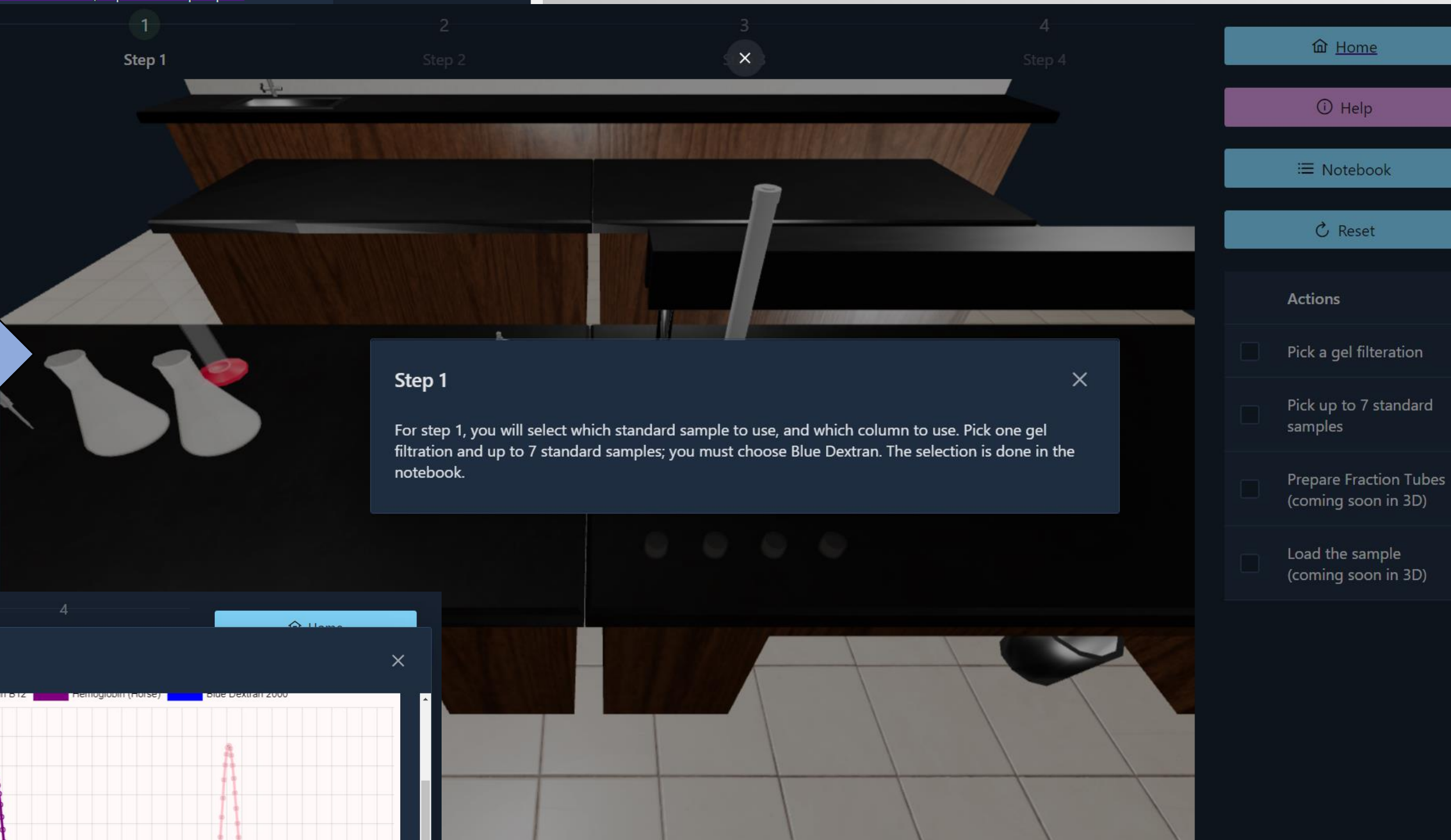


Intended users and uses

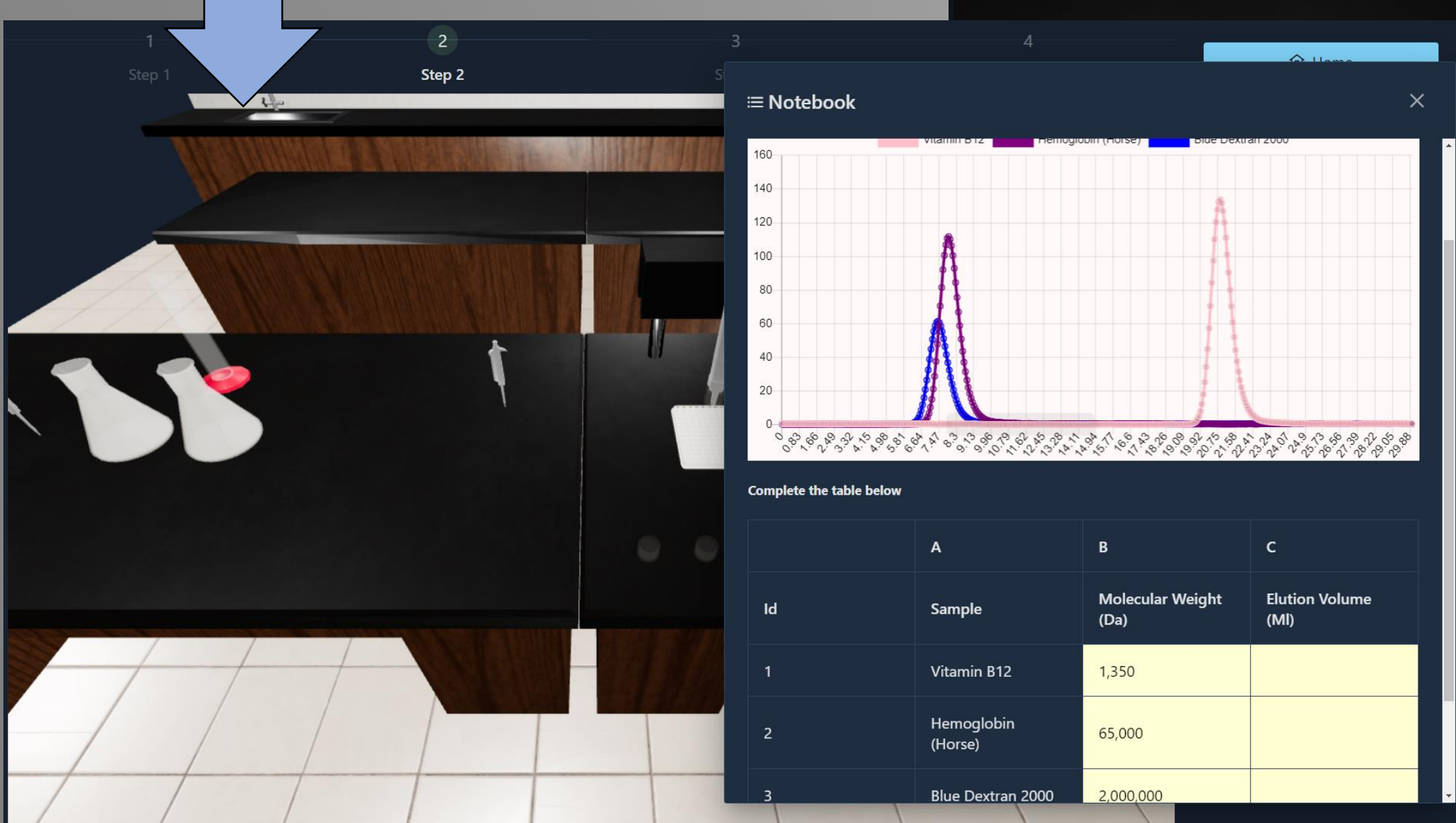
- This software is intended to assist students taking BBMB 102 by allowing them to complete labs virtually, without physical access to the lab.
- The students will be the primary users of the application, with the professor utilizing it as a teaching aid.

Landing Page

Starting a Lab



Notebook Interaction



Technical Details

The software is a static single-page web application, intended to run on all major browsers.

- Main framework used is React
- Main UI-Component library is PrimeReact
- 3D scene is handled by ThreeJS