TEACHER INTRODUCTION

Welcome to the **H2Know** digital case study about algal blooms in Lake Erie. This case study is designed to take place over multiple class periods. This document outlines different timelines for completion with links to activities that may help students to better understand the complexity of **HAB**s and the human activities that contribute to them. You can find the H2Know case study at H2know.ca

Option 1: Most comprehensive – 4 days + assessment

	Activities within H2Know Case Study	Activities & Resources Outside H2Know	Estimated Time
2-3 Days Prior		• Two to three days prior to beginning H2Know, students create their own algae bloom (See **H2Know Resources**). This activity is designed to test the effects of temperature and nutrient levels on eutrophication and the development of algal blooms.	30 minutes (active time)

	Activities within H2Know Case Study	Activities & Resources Outside H2Know	Estimated Time
Day 1	Complete the **H2Know Case Study Introduction** section Location: H2Know Homepage	• Complete the pre-test • Have students complete questions found on Student Note sheet as they work through H2Know	5 – 10 minutes
	Watch introductory video from The Nature Conservancy regarding the Toledo water crisis. Location: Section 1– The Issue	• To get more information about HABs and eutrophication, have students complete the e-learningcourse titled Water Quality located here: http://elearning.grownextengen.org/ • ***Suggestion****: Assign the e-learning course as pre-homework, then lead an in-class discussionabout possible impacts from other human activities.*	15 – 20 minutes + discussion
	Explore news reports from the 2014 water crisis to gain more context of the situation. Location: Section 1– The Issue	• Have students read **Global News** article https://globalnews.ca/ news/1492850. • Have students analyze Drinking Water Intake Pipes map to locate some communities that access drinking water from Lake Erie. • Students may record their findings on the graphic organizer found in the Resources Section	10 minutes
	Watch interview with Doug Wagner, Water treatment Superintendent at City of Oregon Water Plant Location: Section 1– The Issue		5 minutes

	View the Lake Erie History Presentation Location: Section1 – The Issue		5 – 10 minutes
	Review: Complete the Section 1 Review individually or as a class, discussing the reflection questions		5 – 10 minutes

	Activities within H2Know Case Study	**Activities & Resources Outside H2Know Case Study**	**Estimated Time**
Day 2	Listen to the podcast interview with Dr. Tom Bruulsema from Plant Nutrition Canada and his work Location: Section 02 – The Science		10 – 15 minutes
	Investigate the Lake Erie images and maps Location: Section 02 – The Science		5 – 10 minutes
	Review: Complete the Section 2 Review individually or as a class, discussing the reflection questions		5 – 10 minutes
	View the Watershed presentation Location: Section 03 – Watershed Dynamics		5 minutes
	Complete the Watershed Activity to determine the direction of water flow. Location: Section 03 – Watershed Dynamics	To better understand how to read topographic maps and determine the direction of water flow, view this video. Ontario Watershed flow assessment tool This tool shows areas where surface water converges.	10 – 15 minutes

	Activities within H2Know Case Study	**Activities & Resources Outside H2Know Case Study**	**Estimated Time**
Day 3	View Introduction to 4Rs video to learn more about a topic that will be discussed throughout the section. Location: Section 04 – Research & Management		5 minutes
	Analyze the visual aid for 4R Nutrient Stewardship Location: Section 04 – Research & Management		5 minutes
	Watch the video interview with Colin Elgie, Agronomy Solutions Specialist with Sylvite Location: Section 04 –Research & Management		5 minutes
	Watch the video interview with Dr. Merrin Macrae to learn more about research happening in Ontario. Location: Section 04 – Research & Management		5 – 6 minutes

	Watch the video interview with Dr.Merrin Macrae to learn more about edge-of-field research Location: Section 04 – Research & Management		5 minutes
	Watch the video interview with Kevin MacKague from OMAFRA and the PLATO tool for farmers to determine the risk of P runoff from their fields. Location: Section 04 – Research & Management		6-8 minutes
	Complete the **PLATO** Investigation Activity		30-45 minutes

	Activities within H2Know Case Study	**Activities & Resources Outside H2Know Case Study**	**Estimated Time**
D 3	Read the **Consumers and Phosphorus** article to learn about phosphorus in consumer products. Location: Section 04 – Research & Management	Explore other sources to learn more about consumers and phosphorus. - Concentration of Phosphorus in Cleaning Products: Canadian regulations.	20 – 30 minutes
	Review: Complete the **Section 4 Review** individually or as a class, discussing the reflection questions Discuss answers to **Student Note** Questions (*Note: Teachers may choose to discuss answers during Case Study*)		5 – 10 minutes
	Post-Test: Complete the post-test using the H2Know function or create your own to distribute to the class		5 – 10 minutes
	Access the final activity, **Evaluate Solutions**. Location: Section 05 – Solutions & Strategies	Assign the **Evaluate Solutions** activity, using theactivity resource as a guide, and adding other directions to suit the needs of your class. Location: Section 05 – Solutions & Strategies & H2Know Resources Page	10 – 15 minutes + assignment completion

Option 2: H2Know Digital Case Study Only – 2 days + assessment

	Student Action	Instructor Action	Estimated Time
Day 1	Complete **H2Know Case Study Introduction & Pre-Test** questions. Location: H2Know Homepage Navigate through **Section 1**: **The Issue**. Using the site and narration prompts, view the embedded videos, read the news articles, and review the Lake Erie Overview presentation Location: Section 1– The Issue Navigate through **Section 02** – **The Science**. Listen to the podcast with Dr. Tom Bruulsema and view the Lake Erie images to learn more about the science of algal blooms. Location: Section 02 – The Science Navigate through **Section 03 – Watershed Dynamics**. Viewthe watershed presentation and practice reading topographic maps. Location: Section 03 – Watershed Dynamics	○ Introduce the case study activity with students and set expectations for completion, pace, activities, assignments, etc. Provide any supplemental instructions. ○ Have students complete questions found on **Student Note** sheet as they work through the H2Know Case Study ○ Guide students to digital case study: H2know.ca ○ Before beginning the case study, complete the **Knowledge Check**. ○ You may choose to review some videos, articles or presentations as a whole class. ○ Conduct formative assessments at the end of each section by discussing the **Section Review** questions.	5 – 10 minutes 12 minutes + 10 – 15 minutes student work 12 minutes + 5 – 10 minutes student work 6 minutes + 5 minutes student work Total Est. Time: 55 minutes
Day 2	Navigate to **Section 04 – Research & Management**. View multiple video interviews to learn more about agricultural research, management practices, and other contributors to algal blooms. Location: Section 04 – Research & Management Navigate to **Section 05 – Solutions and Strategies** for the final activities in the H2Know Case Study. Prepare for the final assignment and complete the post-test. Location: Section 05 – Solutions & Strategies	○ Guide students through the **PLATO** Investigation provided. This activity has multiple steps and will require some preparation work such as providing the instructions, breaking students into groups, etc. ○ Complete the knowledge check at the end of the case study. ○ Assign the final activity, adjusting as necessary for your classroom needs.	22 minutes + 30 – 45 minutes student work 5 minutes + final activity Total Est. Time: 30 minutes + activities