

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 HABs and the human activities that contribute to them.

You can find the H2Know case study at H2Knowlearning.org.

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. This activity is designed to test the effects of temperature and nutrient levels on eutrophication and the development of algal blooms. <ul style="list-style-type: none"> You can find instructions to this activity on the H2Know Resources page 	30 minutes (active time)

	Activities within H2Know Case Study	Activities & Resources Outside H2Know	Estimated Time
Day 1	Complete the H2Know Case Study Introduction section Pre-Test: Complete the pre-test using the H2Know function or create your own to distribute to the class Location: H2Know Homepage		5 - 10 minutes
	Watch introductory video from The Nature Conservancy regarding the Toledo water crisis. Location: Section 01 - The Issue	To get more information about HABs and eutrophication, students complete the e-learning course titled Water Quality located here: http://elearning.grownextgen.org/ . Suggestion: Assign the e-learning course as pre-homework, then lead an in-class discussion about possible impacts from other human activities Location: GrowNextGen.org	15 - 20 minutes + discussion
	Explore news reports from the 2014 water crisis to gain more context of the situation. Location: Section 01 - The Issue		10 minutes
	Watch interview with Doug Wagner, Water Treatment Superintendent at City of Oregon Water Plant Location: Section 01 - The Issue		5 minutes

	View the Lake Erie History presentation Location: Section 01 - The Issue	To learn more about the historical connection to the Canal, reference this article from The Toledo Blade. Location: The Toledo Blade (http://www.toledoblade.com/gallery/Toledo-Magazine-Still-Connected-to-Canal-History)	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. Justin Chaffin, PhD, OSU, Ohio Sea Grant, senior researcher, research coordinator, Stone Laboratory 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 . Location: YouTube Video (https://youtu.be/XZTMyBMilQo)	5 - 10 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 Logan Haake, farmer and Precision Ag Manager with Legacy Farmers Cooperative. Location: Section 04 - Research & Management		5 minutes
	Watch the video interview with Dr. Kevin King to learn more about watershed dynamics and theories.		5 - 6 minutes

	Location: Section 04 - Research & Management		
	Watch the video interview with Dr. Kevin King to learn more about edge-of-field research Location: Section 04 - Research & Management		3 minutes
	Watch the video interview with Dr. Libby Dayton to learn more about her research for Rewriting P risk index and creating On-Field Ohio Tool Location: Section 04 - Research & Management		6-8 minutes
	Complete On-Field Ohio Activity a) Complete the full activity on the web. Activity instructions can be found on the H2Know Resources page. b) If you do not have the time or tools to complete the web activity, the class can analyze data from the On Field Ohio. The data for this activity can be found on the H2Know Resources page.		a) 30 - 45 minutes b) 15 minutes

	Activities within H2Know Case Study	Activities & Resources Outside H2Know Case Study	Estimated Time
Day 4	Read the Consumers and Phosphorus article to learn more about phosphorus in consumer products. Location: Section 04 - Research & Management	Explore other sources to learn more about consumers and phosphorus: Location: Various Links -Polluted Urban Runoff: A Source of Concern http://learningstore.uwex.edu/Assets/pdfs/GWQ020.pdf -Spring Lawn Care Tips That Are Useful All Year http://www.minnehahacreek.org/blog/spring-lawn-care-tips-are-useful-all-year	20 - 30 minutes
	Review: Complete the Section 4 Review individually or as a class, discussing the reflection questions		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 the activity 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		5 - 10 minutes
	Navigate through Section 01 - 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 01 - The Issue		12 minutes + 10 - 15 minutes student work
	Navigate through Section 02 - The Science. Listen to the podcast with researcher Dr. Justin Chaffin and view the Lake Erie images to learn more about the science of algal blooms. Location: Section 02 - The Science	<ul style="list-style-type: none"> o Introduce the case study activity with students and set expectations for completion, pace, activities, assignments, etc. Provide any supplemental instructions. o Guide students to digital case study: H2Knowlearning.org o Before beginning the case study, complete the knowledge check. o You may choose to review some videos, articles or presentations as a whole class. o Conduct formative assessments at the end of each section by discussing the Section Review questions. 	12 minutes + 5 - 10 minutes student work
	Navigate through Section 03 - Watershed Dynamics. View the watershed presentation and practice reading topographic maps. Location: Section 03 - Watershed Dynamics		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	<ul style="list-style-type: none"> o Guide students through one of the On-Field Ohio activities provided. This activity has multiple steps and will require some preparation work such as providing the instructions, breaking students into groups, etc. o Complete the knowledge check at the end of the case study. o Assign the final activity, adjusting as necessary for your classroom needs. 	22 minutes + 30 - 45 minutes student work
	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		5 minutes + final activity
			Total Est. Time: 30 minutes + activities

