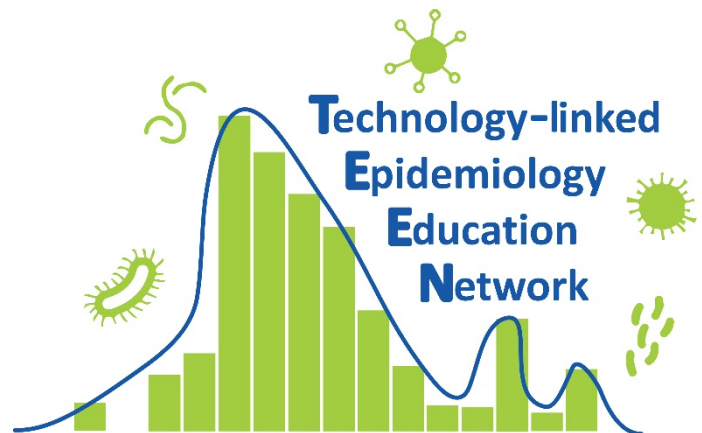


THE TECHNOLOGY- LINKED EPIDEMIOLOGY EDUCATION NETWORK (TEEN) EDUCATOR GUIDE PREVIEW



Robin Taylor Wilson, PhD & Alexandra Ruth, MPH
TEMPLE UNIVERSITY COLLEGE OF PUBLIC HEALTH

TEEN Guiding Principles and Goals

Project-based learning has been shown in multiple age-group settings to increase self-efficacy in scientific learning as well as a maturation in understanding regarding the sources and certainty of scientific knowledge.

Our goals are to increase student:

1. critical thinking skills and scientific self-efficacy
2. interest and persistence in the sciences even among students who may not consider science as their primary interest
3. understanding regarding health risks and exposure assessment
4. meaningful in-class problem-focused interactions with other students and educators

Practical Uses

The TEEN Program is designed to be used either during a class period for course credit or as an afterschool club. The program may also be used as a step by step guide to prepare students for completing either team based or individual science fair projects.

Educational Philosophy

For the Educator. This program is designed to help educators engage students in project-based learning through a stepwise academic coaching model. The program is not designed to supplant or replace the major role of the educator in the classroom. As a coach, the educator is engaging students to think critically about the problem at hand

For the Student. Student activities may be self-led by students or as mini lectures by educators. It is designed to increase critical thinking and scientific self-efficacy. The overall philosophy is that students already bring important life experience to the table and can contribute this toward construction of their team or individual hypothesis-driven projects. In our experience, students come up with innovative

For the Administrator. The program incorporates a formal approval process mechanism that is customizable to each institution for student-developed projects. The system promotes ease of data collection and analysis while protecting privacy and institutional norms and processes.

How does Epidemiology benefit schools, educators, and students?

According to the National Science Foundation, the US faces a "gathering storm" due to a deficit of science, technology, engineering, and mathematics (STEM) professionals. Over one-half of US high

school students express a low interest in STEM careers, even among students with a high proficiency in these subjects, and disparities persist by gender, income, and race/ethnicity among students in STEM college majors. By participating in hypothesis-driven, project-based learning (PBL), students investigate their own questions in teams, while learning important career- and community-building skills. These skills include public speaking, teamwork, and leadership.

What Standards does this program meet?

This program is designed to meet all the Next Generation Science Standards (NGSS) Science and Engineering Practices. The NGSS is based on the National Research Council “A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas.” The Framework’s eight practices that are covered by this program include:

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Logistics and Lesson Preparation

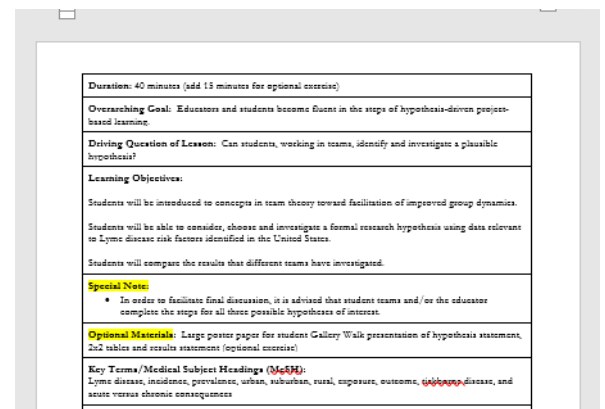
Each 40–60-minute lesson is designed to move educators and students toward independent hypothesis-driven project-based learning and is comprised of the following basic elements:

1. A case example based on real-world data, highlighting one or two facets of project-based learning
2. In class participation starter/orientation activities
3. Key terms using the National Library of Medicine Medical Subject Heading (MeSH) classification system
4. Team activities that require students to participate in an inclusive environment that is problem-focused
5. All-Class share closing activity with key take home points and wrap-up
6. Options for additional individual and/or team activities

Educator Lesson Plan. Each 40-minute lesson consists of a quick-reference lesson organizer. An example appears in Figure 1, below. These organizers can provide quick references to key vocabulary terms.

Learn More Activities. It is likely that student teams will work at very different paces. For those teams who are able to complete activities more quickly, we provide deeper dives into either a principle, case study or lesson topic.

What this program does not provide. This program is intended to engage students in hypothesis-driven project-based learning in a collaborative team-based environment. This program does not provide a databank of quizzes and tests. However, the vocabulary and exercises may be used by educators to develop formative and summative assessments.



| |
|--|
| Duration: 40 minutes (add 15 minutes for optional exercise) |
| Overarching Goal: Educators and students become fluent in the steps of hypothesis-driven project-based learning. |
| Driving Question of Lesson: Can students, working in teams, identify and investigate a plausible hypothesis? |
| Learning Objectives: Students will be introduced to concepts in team theory toward facilitation of improved group dynamics. Students will be able to consider, choose and investigate a formal research hypothesis using data relevant to Lyme disease risk factors identified in the United States. Students will compare the results that different teams have investigated. |
| Special Note: <ul style="list-style-type: none">In order to facilitate final discussion, it is advised that student teams and/or the educator complete the steps for all three possible hypotheses of interest. |
| Optional Materials: Large poster paper for student Gallery Walk presentation of hypothesis statement, 2x2 tables and results statement (optional exercise) |
| Key Terms/Medical Subject Headings (MeSH): Lyme disease, incidence, prevalence, urban, suburban, rural, exposure, outcome, <u>disseminated</u> disease, and acute versus chronic consequences |

DEFINED TEEN BLENDED-LEARNING STUDENT ENGAGEMENT STRATEGIES



Analysis Tools. Includes survey construction, survey email, data collection, graphical plotting, and contingency table (2x2) analysis.



Blended Learning. Activities are designed to be able to be completed online individually or with discussions led by an educator in a classroom setting. We use the _____ definition of blended learning.



Career Link. A publicly available resource link highlighting a career in epidemiology and/or public health.



Explore More. These links are provided at the end of each TEEN lesson or in the answers to TEEN quizzes and provide option for students to learn more about a topic. Explore More may be links to original research or newspaper articles and provide students with the origin of the information provided.



Key Terms and Phrases. Key terms and phrases are provided in each lesson and in an internet-linked Glossary. In each lesson, those key terms that are linked with critical thinking goal activities are highlighted.



Timed Quiz. Quiz determines demonstrated ability of students to apply the concept of prevention.



















References. Freely available references as primary sources are provided for each lesson and within the glossary.

























Voiceover Lecture Slides. Voiceover lecture slides with a written script enable learners to see, hear and read the lecture content.

Example TEEN Epidemiology Challenge Lesson Plans

Technology-Linked Epidemiology Education Network (TEEN) Introduction to Epidemiology Lesson Plan

| Course Map Case Study Topic: Introduction to Epidemiology | |
|---|--|
| Course Map Project-Based Learning Location: Team Science | |
| Duration: Approximately 1 hour | |
| Materials: Computer or smartphone with internet connection | |
| Long-Term Goal: Increase interest and persistence in STEM careers | |
| Key Message/Big Idea: Epidemiology is a discipline that identifies major factors associated with health. Epidemiologists track down these factors by understanding Person, Place and Time characteristics. | |
| Learning Goal Category NGSS/EPI | Activity/Learning Objectives |
| 1.  Semantics |  Glossary and hyperlinked key phrases within the lesson. |
| 2.  Real-World Application |  Voiceover Lecture Slides  Quiz to test knowledge about mortality rates. |
| 3.  Critical Thinking |  Use mortality rates to introduce using rates or ratios to describe health outcomes.  Brainstorm health outcomes that may impact teens in their community. |
| 4.  Prevention |  Voiceover Lecture Slides |
| 5.  Project Based Learning |  Select team name for Master Proposal.  Teams will write a code of conduct to follow throughout the semester. <i>Optional</i> – Identify a role or responsibility for each member of the research team. |
| 6.  Learning Reflection |  Pre-lesson: <i>What do you think an epidemiologist does?</i>  Post-lesson: <i>Write about a health-related concern that is important to address in adolescents, teens and/ or young adults in your school, community, or country. Please justify your answer. Provide references in the form of links for where you found your information whether that be published research, news reports,</i> |

| | |
|--|--|
| | <i>personal observations and/or anecdotes. Please do not spend more than 10 minutes on this activity.</i> |
| 7.  Teamwork |  Work in collaboration with team to complete lesson and create a team code. Students can communicate through chat function throughout the course. |
| 8.  Explore More |  Locate accurate, actionable, and reliable information on the internet via the Career and In-depth Links. |
|  Key Terms and Phrases Learn key terms and phrases: Global Health, Epidemiology, Epidemics, Disease, Health, Health Disparity, Mortality Rate, Prevention, Social Determinant, Team Science, Team Cycle (Forming, Storming, Norming, Performing, Adjourning) | |
| Activating Strategy/Starter | |
|  Pre-Reflection. (150-word limit). | |
| Procedures and Expected Time Frame | |
| <ol style="list-style-type: none"> 1. Lesson Overview  Voiceover Lecture Slides – 2 minutes 2.  Pre-Lesson Reflection. (100-word limit) - 3 minutes 3. Introduction to Epidemiology  Voiceover Lecture Slides - 5 minutes 4. Understanding Global Health Disparities  Voiceover Lecture Slides – 4 minutes 5. Mortality  Quiz – 2 minutes 6. Infant Mortality Matching Exercise – 3 minutes 7. Team Science video  Voiceover Lecture Slides – 3 minutes 8. Introduction to Master Proposal  Voiceover Lecture Slides – 2 minutes 9. Team Code Exercise  Project-Based Learning – 5 minutes 10. Team Name Exercise  Project-Based Learning – 5 minutes 11.  Post-Lesson Reflection. (200-word limit) – 10 minutes 12.  Explore More links – (optional) | |
| Summarizing Strategies/Procedures | |
|  Post Reflection: (200 words) | |
|  Blended Learning | |
| Formative Assessments | Summative Assessments |
| <ul style="list-style-type: none"> •  Pre/post reflection exercises | <ul style="list-style-type: none"> •  Project based learning exercises •  Quiz • Experience points (XP) |



Explore More Links

T Topic— Public Health Overview

- [Centers for Disease Control and Prevention](#)



Career















- [Explore Health Careers](#)
- [Tips from Association of Schools & Programs of Public Health \(ASPPH\)](#)



































In Depth

- [Why Education Matters to Health: Exploring the Causes](#)

Technology-Linked Epidemiology Education Network (TEEN)
Avian Flu
Lesson Plan

| Course Map Case Study Topic: Avian Influenza | |
|--|---|
| Course Map Project-Based Learning Location: Outcome | |
| Duration: Approximately 1 hour | |
| Materials: Computer or smartphone with internet connection | |
| Long-Term Goal: Increase interest and persistence in STEM careers | |
| Key Message/Big Idea: Scientists estimate that more than 6 out of every 10 known infectious diseases in people can be spread from animals, and 3 out of every 4 new or emerging infectious diseases in people come from animals. During an outbreak of Avian Influenza in Thailand, the H5N1 virus from poultry caused 17 human cases and 12 deaths in 12 provinces. | |
| Learning Goal Category NGSS/EPI | Activity/Learning Objectives |
| 1.  Semantics |  Glossary and hyperlinked key phrases within the lesson. |
| 2.  Real-World Application |  Identify <i>person</i> , <i>place</i> , and <i>time</i> characteristics as well as <i>exposure</i> & <i>outcome</i> from a case study abstract. |
| 3.  Critical Thinking | Exposure matching exercise  Project Based learning exercises |
| 4.  Prevention |  Transmission prevention reflection exercise  Voiceover Lecture Slides |
| 6.  Project Based Learning |  Project outcome selection  Students will work together to choose their outcome of interest, outcome timeframe, outcome question, and outcome intensity from a predetermined list. |
| 7.  Learning Reflection |  Pre-lesson: <i>Reflecting on what you have learned last week, what are some social determinants of health that may contribute to new, emerging infection diseases?</i> |


















| | |
|---|--|
| |  Post-lesson: <i>Write a social media post explaining, in your own words, the difference between exposure and outcome.</i> |
| 8.  Teamwork |  Students will collaborate in their group to agree upon an outcome. Students can communicate through chat function throughout the course. |
| 9.  Explore More | Locate accurate, actionable, and reliable information on the internet via the  Career <i>and</i>  What I Can Do links. |
|  Key Terms and Phrases Learn key terms and phrases: Descriptive Epidemiology, epi, dem, logy, person, place & time characteristics, exposure, outcome, zoonosis, Influenza type A Virus, Avian Flu, and Highly Pathogenic Avian Influenza. | |
| Activating Strategy/Starter | |
|  Pre-lesson reflection. | |
| Activities and Expected Time Frame (44 minutes) | |
| <ol style="list-style-type: none">  Pre-Lesson Think-pair-share - 3 minutes Introduction  Voiceover Lecture Slides – 1 minute Descriptive epidemiology  Voiceover Lecture Slides – 4 minutes Exposure and outcome  Voiceover Lecture Slides – 1 minute Avian Influenza background  Voiceover Lecture Slides – 2 minutes Zoonoses  Voiceover Lecture Slides – 1 minute Choose that exposure exercise – 2 minutes Avian Influenza in Human's  Voiceover Lecture Slides – 2 minutes Study abstract activity – 5 minutes Practical measures to prevent transmission reflection exercise – 3 minutes Prevention of Avian Influenza  Voiceover Lecture Slides – 1 minute Avian Influenza Outbreaks & Health Outcomes  Voiceover Lecture Slides – 5 minutes  Post-lesson reflection exercise – 3 minutes Choose your exposure exercise  – 5 minutes Choose your exposure question exercise  – 3 minutes Choose your exposure timeframe exercise  – 3 minutes | |

























| | |
|---|--|
| 17. Outcome intensity exercise  – 3 minutes 18.  Explore More links - (Optional) | |
| Summarizing Strategies/Procedures  Post Reflection  Blended Learning | |
| Formative Assessments <ul style="list-style-type: none">  Pre/post reflection exercises | Summative Assessments <ul style="list-style-type: none">  Project based learning exercises  Quiz Experience points (XP) |
| <div>  <h2>Explore More Links</h2> </div> <div> <p>T Topic—Avian Flu</p> <ul style="list-style-type: none"> Centers for Disease Control and Prevention World Health Organization What is the meaning of the numbers next to 'H' and 'N' in influenza strains? </div> <div> <p> What I Can Do</p> <ul style="list-style-type: none"> Food Safety Prevention Tips </div> <div> <p> Career How do Scientists study Avian Influenza in birds?</p> </div> <div> <p> In Depth Highly Pathogenic avian influenza (H5N1) timeline of major events</p> </div> | |

Technology-Linked Epidemiology Education Network (TEEN)

Cholera

Lesson Plan

| Course Map Case Study Topic: Cholera | |
|--|--|
| Course Map Project-Based Learning Location: Hypothesis Formation | |
| Duration: Approximately 1 hour | |
| Materials: Computer or smartphone with internet connection | |
| Long-Term Goal: Increase interest and persistence in STEM-PH careers | |
| Key Message/Big Idea: Since April 2017, there have been more than 1.2 million reported cases of Cholera in Yemen, with children constituting 58% of cases. (Federspiel & Ali) | |
| Learning Goal Category NGSS/EPI | Activity/ Learning Objectives |
| 1.  Semantics |  Glossary and hyperlinked key phrases within the lesson. |
| 2.  Real-World Application |  Voiceover Lecture Slides |
| 3.  Critical Thinking |  Brainstorm exposures that may impact the health outcome that the students selected.  After learning about causal diagrams, students will state which of the two models is better and state why (200 words or less). |
| 4.  Prevention |  Voiceover Lecture Slides |
| 5.  Project Based Learning |  Select an exposure for their team project.  Learn and understand causal diagrams and complete exercises that relate.  Develop a hypothesis for the semester project, using the team selected exposure and outcome. |
| 6.  Learning Reflection |  Pre-lesson: <i>What was the outcome variable that your team chose last week?</i> |
| 7.  Teamwork |  Work in collaboration with team to complete lesson and project-based learning activities. Students can use the chat function to communicate. |

| | |
|---|---|
| 8.  Explore More | Locate accurate, actionable, and reliable information on the internet via the T Topic & I In Depth links |
| <div data-bbox="203 289 240 331"></div> Key Terms and Phrases Use key terms and phrases: Exposure, Causation, Causal Diagram, Cholera, Hypothesis, John Snow, | |
| Activating Strategy/Starter <div data-bbox="203 472 240 514"></div> Pre-Reflection. (200-word count) | |
| Procedures and Expected Time Frame (Approximately 45 minutes) <ol style="list-style-type: none"> Lesson Overview  Voiceover Lecture Slides – 1 minute  Pre-Lesson Reflection. (Quiz Question) – 2 minutes Let's Review Exposure  Voiceover Lecture Slides – 1 minute Brainstorm Exposure Exercise – 5 minutes Exposure Selection  Project-Based Learning – 3 minutes Exposure Question Selection  Project-Based Learning – 5 minutes Exposure Timeframe Selection  Project-Based Learning – 3 minutes Causal Diagrams  Voiceover Lecture Slides – 2 minutes Causal Diagram Reflection Exercise – 3 minutes Causal Diagram Brainstorm Exercise  Project-Based Learning – 4 minutes What is a Hypothesis?  Voiceover Lecture Slides – 1 minute Who was John Snow?  Voiceover Lecture Slides – 2 minutes The Broad Street Pump hypothesis  Voiceover Lecture Slides – 3 minutes Cholera in the 21st Century  Voiceover Lecture Slides – 4 minutes Your Project Hypothesis: How to  Voiceover Lecture Slides – 1 minute Hypothesis Formation  Project-Based Learning – 5 minutes  Explore More links – (optional) | |
| Summarizing Strategies/Procedures <div data-bbox="203 1407 240 1449"></div> Post Reflection: (200 words) <div data-bbox="203 1459 251 1501"></div> Blended Learning | |
| Formative Assessments <ul style="list-style-type: none">  Pre reflection exercises | Summative Assessments <ul style="list-style-type: none">  Critical thinking exercise  Project based learning exercises Experience points (XP) |
| <div data-bbox="203 1701 240 1743"></div> Explore More Links T Topic—Cholera <ul style="list-style-type: none"> World Health Organization | |

- [Centers for Disease Control and Prevention](#)



What I Can Do [Keep Hands Clean, Keeping Drinking-water Clean](#)



Career [Get to know the Father of Epidemiology - John Snow](#)



Real-Life Application [Climate and Health - CDC](#)















































In Depth In-Depth— [Understanding the Cholera Epidemic, Haiti](#)

Technology-Linked Epidemiology Education Network (TEEN)

Flint, MI Water Crisis

Lesson Plan

| Course Map Case Study Topic: Flint Water Crisis | |
|---|---|
| Course Map Project-Based Learning Location: 2x2 Table | |
| Duration: Approximately 1 hour | |
| Materials: Computer or smartphone with internet connection | |
| Long-Term Goal: Increase interest and persistence in STEM-PH careers | |
| Key Message/Big Idea: Drinking water is an important contributor to public health. | |
| Learning Goal Category NGSS/EPI | Activity/Learning Objectives |
| 1.  Semantics |  Glossary and hyperlinked key phrases within the lesson. |
| 2.  Real-World Application |  Voiceover Lecture Slides |
| 3.  Critical Thinking |  Identify what the rows and columns of a 2x2 table represent .  Populate a 2x2 table with blood lead level data from Flint, Michigan. |
| 4.  Prevention |  Voiceover Lecture Slides |
| 5.  Project Based Learning |  Label a 2x2 table to demonstrate how the answers to team's exposure and outcome questions will be organized. |
| 6.  Learning Reflection |  Pre-lesson: <i>How does our public water supply contribute to health? What happens without effective treatment?</i> (300-word limit)  Post-lesson: <i>Create a social media post that educates people about the Flint water crisis</i> (400-word limit) |
| 7.  Teamwork |  Work in collaboration with team to complete lesson and to label 2x2 table. Students can communicate through chat function throughout the course. |

| | |
|--|--|
| <p>8.  Explore More</p> | <p> Locate accurate, actionable, and reliable information on the internet via the Career and In-depth links.</p> |
| <p> Key Terms and Phrases Learn key terms and phrases: Toxicity, Water Pollution, Lead Poisoning, Coliform Bacteria, Environmental Protection Agency, 2x2 table</p> | |
| <p>Activating Strategy/Starter  Pre-Reflection. (300-word limit)</p> | |
| <p>Activities and Expected Time Frame (Approximately 41 minutes)</p> <ol style="list-style-type: none">  Pre-Lesson Reflection - 3 minutes Lesson Introduction  Voiceover Lecture Slides - 2 minutes Lead Exposure in Flint, MI  Voiceover Lecture Slides – 1 minute Health Outcomes in Flint, MI  Voiceover Lecture Slides – 2 minutes Lead in Drinking water  Voiceover Lecture Slides – 2 minutes Health Effects of Lead  Voiceover Lecture Slides – 2 minutes Hypothesis Testing in Flint, MI  Voiceover Lecture Slides – 1 minute What is a 2x2 Table?  Voiceover Lecture Slides - 2 minutes 2x2 Table Row Quiz  - 3 minutes 2x2 Table Column Quiz  - 3 minutes Hypotheses and 2x2 Tables  Voiceover Lecture Slides – 1 minute Flint, MI 2x2 table exercise  – 5 minutes Let's Review!  Voiceover Lecture Slides - 2 minutes Project 2x2 Table Setup  Project-Based Learning – 5 minutes Lead Exposure Prevention  Voiceover Lecture Slides – 3 minutes  Post-lesson Reflection - 4 minutes  Explore More links - Optional | |
| <p>Summarizing Strategies/Procedures  Post Reflection: (300-word limit)</p> <p> Blended Learning</p> | |
| <p>Formative Assessments</p> <ul style="list-style-type: none">  Pre/post reflection exercises | <p>Summative Assessments</p> <ul style="list-style-type: none">  Critical Thinking  Project-Based Learning exercises  Quiz Experience Points (XP) |
| <p> Explore More Links</p> | |

T Topic— Contingency Tables

- Boston University School of Public Health
 - [Summarizing Data](#)
 - [Measures of Association](#)
- Centers for Disease Control and Prevention (CDC)
 - [Measures of Association](#)
 - [Frequency Measures](#)

I In Depth— Flint Michigan Water Crisis

- [Lead Poisoning Prevention](#)
- [The Flint Water Crisis: A Coordinated Public Health Emergency Response and Recovery Initiative](#)
- [Flint Water Crisis: What Happened and Why?](#)
- [A Case Study of Environmental Injustice: The Failure in Flint](#)
- [Flint Michigan: Lethal Water](#)
- [Voices from Flint: Community Perceptions of the Flint Water Crisis](#)
- [Flint Water Crisis Timeline](#)
- [Drinking Water Contaminants](#)

Master Proposal Project-Based Learning Template Preview

Technology-Linked Epidemiology Education Network (TEEN) Master Proposal Template

This copy of the master proposal is intended for educators to be used as a guide to help students complete their project-based learning exercises.

1. Team Information – LESSON 1 (10 minutes)

a. Name of School

The Silver Strand High School

b. Team Number / Name

The Dolphins

c. Team Members (Last Name, First Name)

1. **California Condor**

2. **Canis Lupus**

3. **Amargosa Vole**

4. **Chinook Salmon**

e. Team Coaches (Science Educators)

1. **Great Blue Heron**

2. **Pandion Haliaetus**

f. Team Values, Team Code and Personalized Team Code

Values--what we say and do

- Set clear goals
- Expect conflict and resolve it
- Implement strategies to avoid conflict

Our Core Team Code

1. Every member contributes
2. Every member is valued
3. Every member leads in some area--either overall or in a specific area
4. Decisions openly discussed and are made by the group

Personalized Team Code

In addition to the four Core Team Code elements, please add any additional items to personalize your team's code. This could include, for example, "every team member speaks in turn and others do not interrupt." Others could include: "when working on a project outside of class, we limit contact time to ____ day and ____ time for our meetings."

During brainstorming, every team member is recognized by that team's leader and given 5 minutes maximum to speak on an idea. During this time, no one interrupts the speaker.

2. Problem Statement—Post Lesson-Reflection Exercise—LESSON 1

2a. Health Related Concern

Write about a health-related concern that is important to address in adolescents, teens and/or young adults. The population of focus may be at your school, in your community or around the world. Please justify your answer. For each statement you make, you must cite a source. You may cite published research, news reports, personal observations and/or anecdotes. (300 words maximum)

One big concern facing teens today is anxiety and depression due to the COVID-19 pandemic. In one study, the prevalence of mental health problems was nearly doubled (i.e., increased from 9.8% to 19.7%) among children ages 7 to 17, when compared to the prevalence before the pandemic (Ravens-Sieberer, 2021). Some of this may be due to increasing prevalence among family members. Two studies in the United States and United Kingdom report that prevalence rates of mental health problems rose from 10% to 19% in the UK (depression only) and from 11 to 42% in the US (anxiety and depression) (Abbott, 2021).

2b. References

Ravens-Sieberer U, Kaman A, Erhart M, Devine J, Schlack R, Otto C. Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *Eur Child Adolesc Psychiatry*. 2021 Jan 25:1–11. doi: 10.1007/s00787-021-01726-5. Epub ahead of print. PMID: 33492480; PMCID: PMC7829493.

Abbott A. COVID's mental-health toll: how scientists are tracking a surge in depression. *Nature*. 2021 Feb 3. doi: 10.1038/d41586-021-00175-z. Epub ahead of print. PMID: 33536600. <https://www.nature.com/articles/d41586-021-00175-z>, date last accessed, February 9, 2021.

2b. How I found these References

I searched PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/>) using the following search string: “adolescent and anxiety and depression and covid-19 and epidemiology”

I searched Google using the search string: “mental health toll and COVID and nature

3. Outcome Variable— “Health-Related Concern”— Team Activity— LESSON 2

a. What is the outcome variable your team has chosen to study?

Students may choose one of the following without obtaining additional approval from their school’s administration.

- Vaping/smoking (current)
- Low sleep (<7 hours/night)
- High Social Media Use (>4 hours/day)
- Sports/Athletic Injury (since age 12)

- b. **Outcome Variable Question.** What is the question you will ask to measure your outcome?

Vaping/Smoking = “Have you vaped or smoked in the past 30 days? Vaping is defined as the use of e-cigarettes, e-cigs, electronic cigarettes, JUUL or JUULing. Smoking is defined as smoking tobacco in bidis, cigarettes, cigars, cigarillos, kreteks (clove cigarettes), hookahs or water pipes.”

Low Sleep = “During the past week, did you get about 7 or more hours of sleep on average?” (Yes/No)

High Social Media Use = “During the past 24 hours, would you say you spent 4 or more hours on social media? (Yes/No) social media is defined as communication from one-to-many and includes Facebook, Instagram, Snapchat, Twitter, YouTube and any other one-to-many communication platform. For the purposes of this question, time spent on social media is not defined as person-to person communication involving e-mail, facetime, texting, or other person-to-person communication.

Sports/Athletic Injury = “Have you ever had a sports or athletic injury since the age of 12 up to now? (Yes/No) A sports or athletic injury is defined as an injury to any muscle, tendon, ligament, or tissue (including concussion) that occurred during any sporting or athletic event which took longer than one week to heal or has never healed. A sporting or athletic event is defined as a low- to high-intensity physical exertion activity necessary to participate in school athletics, non-school athletic teams, or other general physical fitness activities (e.g., dancing, jogging, running, walking at a brisk pace, or weightlifting). General walking is not included in this definition.

- c. **Outcome Variable Time Frame.** What is the timeframe you will use to assess your outcome?

Vaping/smoking = within the past 30 days

Low Sleep = over the past week

High Social Media Use = during the past 24 hours

Sports/Athletic Injury = from age 12 to now

d. **Outcome Variable Dose. How will you measure the intensity of your outcome?**

Questionnaires

Vaping/smoking = “About how many times would you say you vaped or smoked in the past 30 days? For example, if you smoked twice per day then you would answer 60. If you did not vape or smoke, you would answer zero. _____ (number).”

Low Sleep = “About how many hours per night would you say you slept? _____ (number). For example, if you slept 4, 5, 6, 7, 8, 9, and 10 hours per night in the past 7 nights then please report the average $(4+5+6+7+8+9+10 = 49 \text{ hours} / 7 \text{ days} = 7 \text{ hours/day})$.”

High Social Media Use = “About how much time in the past 24 hours did you spend on social media (using the above definition of social media)? For example, if you used social media one hour in the morning, one hour at lunch and three hours in the evening, then you will report a total of four hours of social media use in the past 24 hours. _____(number).”

Sports/Athletic Injury = Using the above definition of a sports/athletic injury, about how many times would you say that you have had such an injury since age 12? For example, if you were injured twice during age 12, once at age 15 and four times at age 17, you would report a total of seven times. _____(number).”

4. EXPOSURE VARIABLE- LESSON 3

4a. Thinking about the health outcome that you and your team have selected, what exposures do you think led to this outcome? Work with your team in the chat function to come up with at least three exposures and state how you identified this exposure—personal experience/observation, a website, a research article in the space provided. (Individual, 5 minutes).

| Vaping/Smoking Outcome | |
|------------------------|--------------------------|
| Exposure | How Identified |
| Low self-esteem | Personal Observation |
| Advertising Tobacco | CDC Website on Youth and |
| Male sex | Personal Observation |
| High income | Personal Observation |

4b. Select your exposure variable.

Students may choose one of the following without obtaining additional approval from their school's administration. Students must choose a different variable than they have selected for their outcome.

- Energy Drinks and Caffeine (≥ 1 energy drink consumed)
- Number of honors/AP classes (Currently enrolled in ≥ 1 Honors/AP classes)
- E-cigarette use/vaping (current user)
- Low Sleep (< 7 hours/night)
- High Social Media Use (> 4 hours a day)
- Sports Played (≥ 2 sports played)

4c. Exposure Variable Question. What is the question you will ask to measure your exposure?

Energy Drinks = "In the past week, did you consume 1 or more energy drinks?" The CDC defines an energy drink as a type of beverage that typically contains large amounts of caffeine, added sugars, other additives, and legal stimulants." (Yes/No)

Number of Honors/AP classes = "Are you currently enrolled in 1 or more honors, AP, or weighted grading system equivalent courses?" (Yes/No)

Vaping/Smoking Use (Current user) = “Have you vaped or smoked in the past 30 days? Vaping is defined as the use of e-cigarettes, e-cigs, electronic cigarettes, JUUL or JUULing. Smoking is defined as smoking tobacco in bidis, cigarettes, cigars, cigarillos, kreteks (clove cigarettes), hookahs or water pipes.” (Yes/No)

Low Sleep (<7 hours/night) = “During the past week, did you get about 7 or fewer hours of sleep on average?” (Yes/No)

High Social Media Use (>4 hours/day) = “During the past 24 hours, would you say you spent 4 or more hours on social media? Social media is defined as communication from one-to-many and includes Facebook, Instagram, Snapchat, Twitter, YouTube and any other one-to-many communication platform. For the purposes of this question, time spent on social media is not defined as person-to person communication involving e-mail, facetime, texting, or other person-to-person communication.” (Yes/No)

Sports played (0-1 sport(s) played/≥ 2 sports played) = “During the last 3 years, how many sports have you participated in? Sports can be school based sports, club sports, or any team-based physical activity that is attended regularly. If you played school basketball and club basketball, please count that as two sports.” (0-1 sport(s) played/2 or more sports played)

4d. Exposure Variable Time Frame. What is the timeframe you will use to assess your outcome?

Energy Drinks and Caffeine = over the past week

Number of Honors/AP classes = current semester/trimester/quarter

Vaping/smoking = within the past 30 days

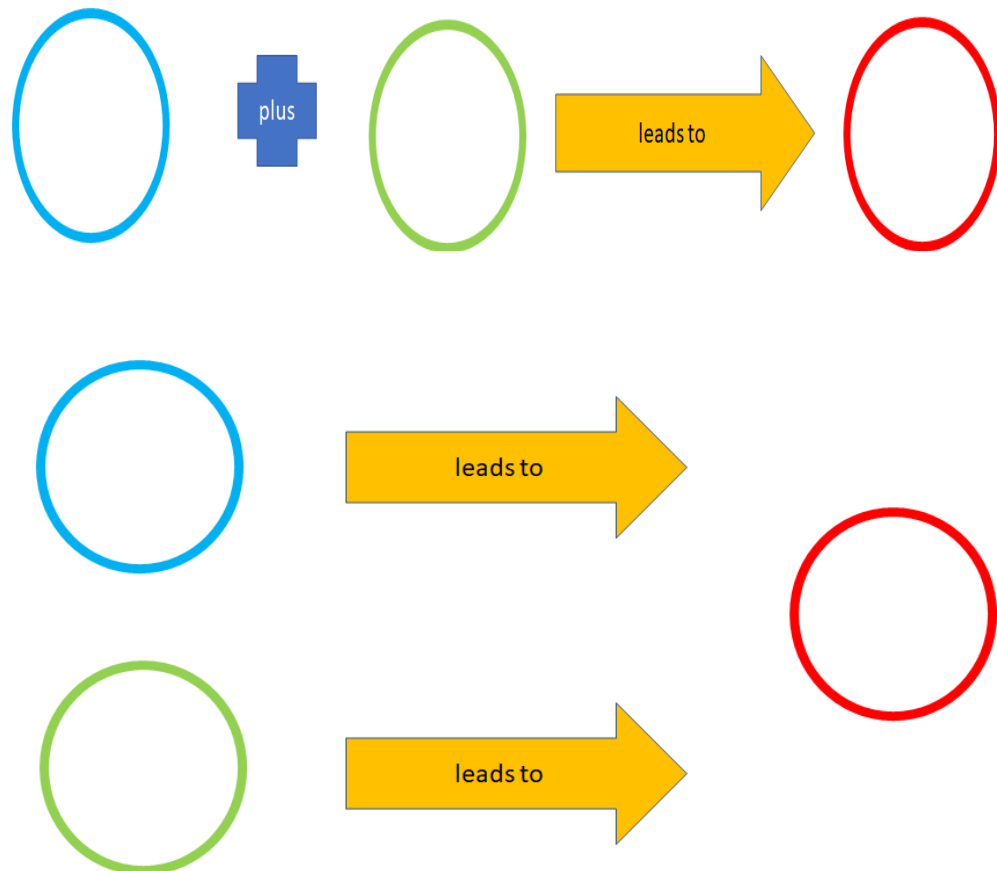
Low Sleep = over the past week

High Social Media Use = during the past 24 hours

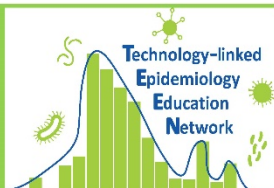
Sports Played = Over the past 3 years

5. Exposure-Outcome Causal Graph Models—LESSON 3

- a. It is possible that different risk factors are linked to an outcome in multiple ways. Thinking about the exposures you identified, work with your teammates to explain how your exposure and outcome may fit into the two causal graphs below. To complete this exercise, you and your teammates will need to brainstorm another variable that may lead to your outcome.



In the first diagram, vaping/smoking in combination with playing video games may lead to low sleep. In the second diagram, vaping/smoking may lead to low sleep and playing video games may lead to low sleep.



Your Study Title

John Q. Researcher¹

Jane Q. Researcher¹

¹Team X, School name XYZ

You may include your school logo here

Background

The background is a description of your team's work. This should include a summary of the rationale for your study with literature that supports why investigating your exposure and outcome is important. The background should be brief, as the details of the project will be included in other sections. Be clear and concise.

Results

What were the results of your research? Include your PR for exposed, unexposed, PRR, and confounding calculations. Was your hypothesis supported by the results? Feel free to include images or graphs to enhance your poster.

Purpose

What were/are the specific aims of your project? What did you try to measure and why? What information were you trying to gather? Include your team hypothesis here.

Conclusion

What does your data mean? What are the interpretations of your findings? What did you find out during your research?

References

Always remember to cite your sources! Your sources will likely come from your background section.

Methods

A description of the methodologies used in your research. What type of study did you conduct? Who was your target population? What was your final sample size? How did you collect the data? What variables did you include? Did you use statistical analysis to analyze the data?

- Break this section into subsections like data source, outcome variable, etc., to keep it concise.

HELPFUL HINTS:

- Research posters are meant to be concise and to the point.
- Use bullet points, sub-headers, and bolded font to draw attention to what you would like your audience to learn about your project.
- During your presentation you may supplement your bullet points with your presentation speech.
- You do not need to use complete sentences on your poster as long as your message is clear.
 - i.e., "Exposure variable: E-cigarette/Vaping use" versus "Our exposure variable was e-cigarette/vaping use"

Acknowledgments

Here you can thank colleagues, sponsors, and anyone else who contributed to the research and the poster who were not included in title section.

TEEN Epidemiology Challenge Calendar

March 2022

| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|--|-----------------|---|---|---|----------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Lesson 1 7 | Lesson 2 8 | Lesson 3 9 | Lesson 4 10 | Lesson 5 11 | 12 | 13 |
| Lesson 6 14 | Lesson 7 15 | Lesson 8 16 | Lesson 9 17 | 18 Break to distribute student team questionnaires | 19 | 20 |
| Lesson 10 21 | Lesson 11 22 | Lesson 12 23 | Lesson 13 24 | 25 Poster Workshop | 26 | 27 |
| 28 Educators send team posters to Temple by COB | 29 | 30 Presentation symposium 1 @ 7 PM | 31 Presentation symposium 2 @ 7 PM | | | |

EVENTS

Poster Workshop

Students will use their completed master proposals to fill in the provided poster templates.

Presentation Symposium 1

Temple will host schools in group 1 via zoom for students to have a chance present their program projects. An itinerary will be provided.

Presentation Symposium 2

Temple will host schools in group 2 via zoom for students to have a chance to present their program projects. An itinerary will be provided.

TEEN Epidemiology Challenge

Example Schedule

Week 1

| | |
|-----|----------|
| MON | Lesson 1 |
| TUE | Lesson 2 |
| WED | Lesson 3 |
| THU | Lesson 4 |
| FRI | Lesson 5 |

Week 2

| | |
|-----|--|
| MON | Lesson 6 |
| TUE | Lesson 7 |
| WED | Lesson 8 |
| THU | Lesson 9 |
| FRI | Break to distribute student questionnaires |

Week 3

| | |
|-----|-----------------|
| MON | Lesson 10 |
| TUE | Lesson 11 |
| WED | Lesson 12 |
| THU | Lesson 13 |
| FRI | Poster Workshop |

Week 4

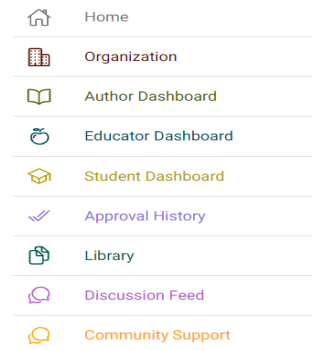
| | |
|-----|------------------------------|
| MON | Student posters due |
| TUE | |
| WED | Student poster presentations |
| THU | |
| FRI | |

Thinkdemic Platform Guide

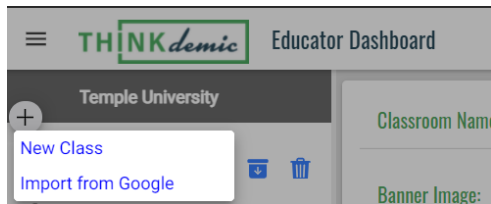
Educator Dashboard

Logging in: Once assigned a unique TEEN ID, head to <https://www.thinkdemic.com/home> to log into the platform for the first time. Please use the exact ID assigned because educator level access has been linked to this specific username.

How to access the Educator Dashboard: Once logged in, to access the educator dashboard click the three lines in the top left-hand corner of the browser. The fly-out menu seen below will appear. Select “Educator Dashboard”

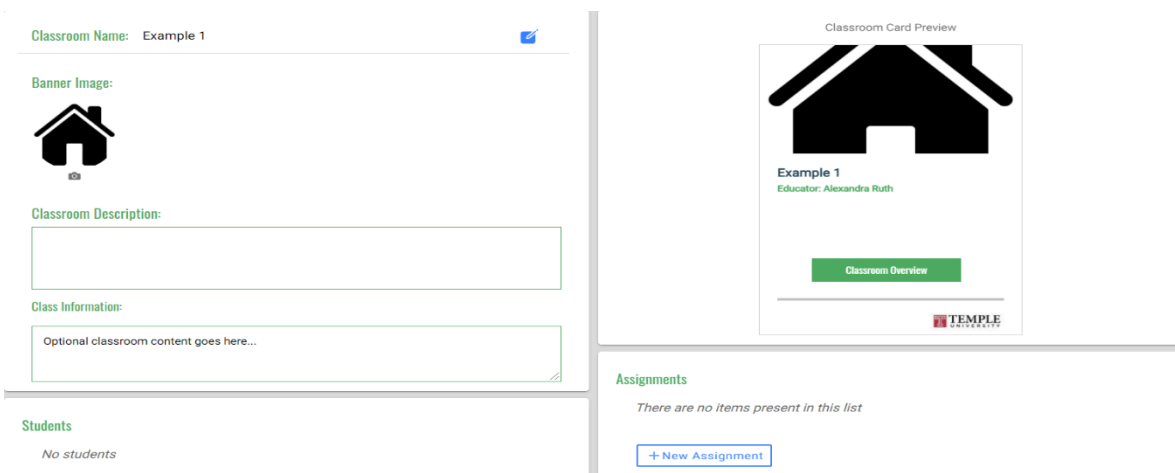


Creating a Classroom: Before students can begin the Epidemiology Challenge, they need to be assigned to a classroom. This is done within the Educator Dashboard.

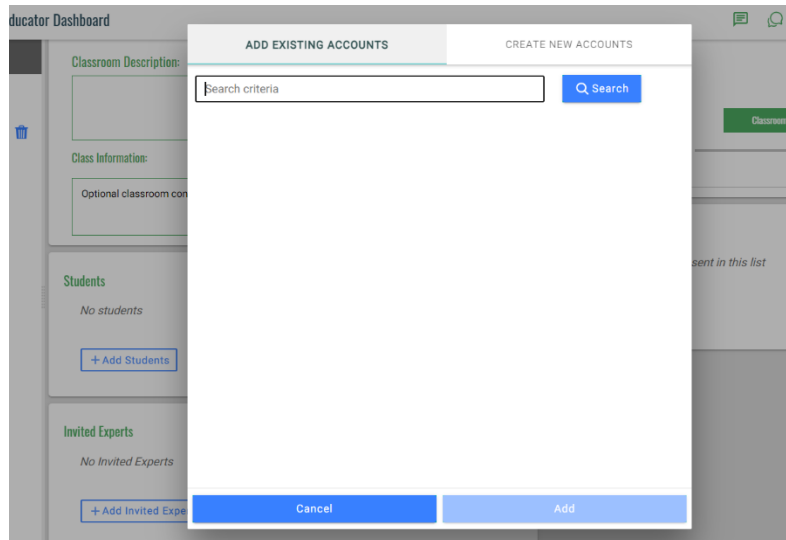


To begin creating a classroom, select the plus sign icon seen in the image on the left. Then select “New Class”. A fly-out will appear to enter the name of the class. After this is done, select “Create”.

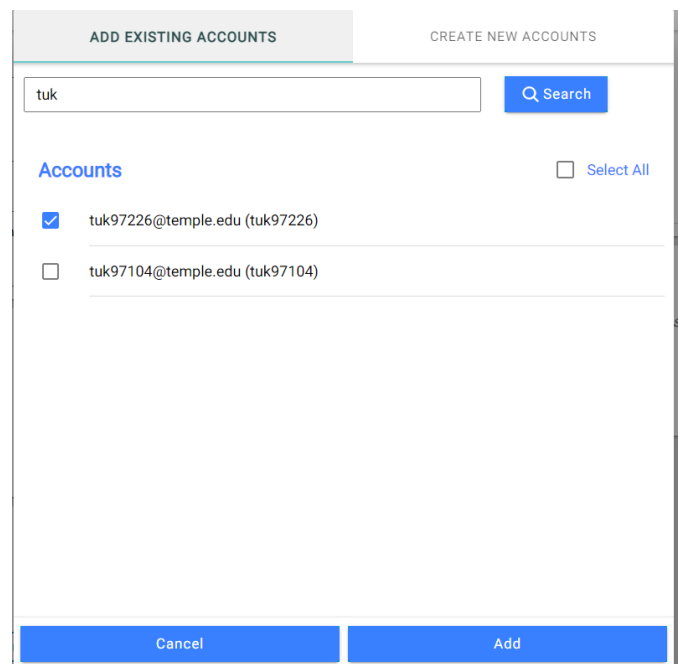
Once a new class is created, access your classroom information page (please see image below for reference). Here the classroom description and class information can be edited, and a classroom banner image can be added. On this page students can be added to the classroom and assigned to the Epidemiology Challenge track.



Adding students to your Classroom: To begin, select “Add Students” under the “Students” card. Students who have completed the study consent will have their own pre-assigned TEEN user IDs. Since these user IDs are pre-assigned, select “Add existing accounts”. Then begin searching for each student by entering their TEEN ID.



While entering the TEEN ID accounts will begin to pop up. When the correct account is displayed, select the account, and click “Add”. This process will need to be repeated for each student in a class.



Assigning your students to a track: Once students are assigned to a classroom, they will need to be assigned to the Epidemiology challenge track. This track contains all the courses that students will complete for the Epidemiology Challenge. Within the classroom page, select “New Assignment” from the “Assignments” card.

Once “New Assignment” is selected the pop-up to the left will appear. Toggle the “Assign:” drop down and select “A Track”. You will then select the “Epidemiology Challenge” from the track drop down.

The structure of student’s teams can be changed by selecting different numbers of students per team.

We ask that you allow teams to edit team names, as well as require teams to write Team Codes (selected in the image above). These tasks are associated with two activities on the student’s master proposal.

To add a team, select “Add Team”. There is not a limit to how many teams in a classroom can be made, however, there cannot be more students per team as previously selected.

Students can be clicked and dragged onto a team, or “Randomize Teams” can be selected. Randomizing teams will randomly place each of your students onto a team.

Once students are organized amongst the teams, select “Next”. An “Assign Track” message as seen on the right will be displayed.

Assign Track

Once assigned, students will be able to open and work on the courses. Are you sure you are ready to proceed?

CANCEL ASSIGN

Assigning Tracks that include a survey exercise: Courses and tracks that include a survey exercise will include some extra steps when you assign the course or track. As creating a survey is a part of the TEEN master proposal, the following steps are necessary.

Survey: Create a survey to gather data for your study (A Summer Amusement Park Mystery)

Your students can either collect data by sending out a new survey, or can use data that we already have. If you choose to have your students collect new data, you will need to provide contact information for approvers who will be able to review any survey that your students want to send out. You will also be able to choose the audience.

Survey Type: Your students will send out new surveys

Minimum Responses: Your students will send out new surveys

Approvers:

| Email | Display Name | |
|--------------------------------|-----------------------|---|
| victor.aprea@wickeddevice.com | Victor Aprea | ✗ |
| dirk.swart@wickeddevice.com | Dirk Swart | ✗ |
| robin.taylor.wilson@temple.edu | Enter Approver's Name | ✗ |
| alexandra.ruth@temple.edu | Enter Approver's Name | ✗ |
| tul17919@temple.edu | Alexandra Ruth | ✗ |
| tug94884@temple.edu | Allison Stranick | ✗ |
| tul50937@temple.edu | Robin Taylor Wilson | ✗ |
| mboschitsch@gmail.com | mboschitsch | ✗ |
| kjoyce2994@gmail.com | Enter Approver's Name | ✗ |

Cancel Back Assign

For courses or tracks with a survey the above pop-up will be displayed before being able to assign any lessons to students. We ask that you select “Your students will send out new surveys” as the survey type as students will be collecting their own data for the Epidemiology Challenge.

You can then change the minimum number of responses each team’s survey is required to receive before it is considered complete. It is important to note that if the educator selects fewer minimum responses required than the course/track author, the minimum amount selected by the author will override the educator selected minimum response.

Approvers are those who need to approve each team’s survey before it can be distributed. We recommend you only include yourself or other educators within your school as the approver(s) for your classroom. Others can be deleted by selecting the red x. Additional approvers can be added by clicking the blue person icon.

Distribute Survey:

Cancel

Lastly, select the method in which the students in a classroom can distribute their surveys. If “Provide an anonymous link” is selected, after the approvers have approved the teams survey, they will be given a link to distribute their survey. If “All members in the organization” is chosen, after a team’s survey is approved a survey invitation will immediately be sent out to all members of the organization. For the TEEN Epidemiology Challenge this will include all classrooms involved in the project, as well as the research team at Temple University.

After completing the above selections, the track can be assigned to students.

Managing your Classroom: Once students are assigned to the Epidemiology Challenge track, the student’s progression throughout the courses in a track can be monitored.

On the classroom page click any of the assignments to see the assignment page.

Assignments

Survey Test (Jul 8, 2021)



[+ New Assignment](#)

[← Back to Educator Page](#)
Testing 1: Survey Test (Jul 8, 2021)










| Team | XP | Progress |
|--------|-----|----------|
| Team 1 | 0 | ○ ○ ○ |
| Team 2 | 100 | ○ ● ○ |
| Team 3 | 0 | ○ ○ ○ |

☐ Not completed
☐ 0-60% XP earned
☐ 60-85% XP earned
☐ 85-100% XP earned

Student Supplemental Resources

After selecting an assignment, the assignment page will be displayed. Here each of the teams created will be listed and their progress throughout the assignment. Each circle represents a different exercise. A black circle demonstrates that exercise has not been completed. Circles may be filled red, yellow, or green, each representing a percentage range a team has earned on an exercise. Clicking the eye icon by team name will show where exactly that team is within a course.

Approving a team's survey: As briefly mentioned earlier, a team's survey must be approved before they are able to distribute the survey and collect data.

| | |
|---|--------------------|
|  | Home |
|  | Organization |
|  | Author Dashboard |
|  | Educator Dashboard |
|  | Student Dashboard |
|  | Approval History |
|  | Library |
|  | Discussion Feed |
|  | Community Support |

Like going to the educator dashboard, there is an “Approval History” tab on the main menu. This is where approvers will go to approve or reject student surveys. It is important to note that any approvers you add **MUST** also be members of Thinkdemic.

THINKdemic

Approval History

Alexandra Ruth741

Active Surveys

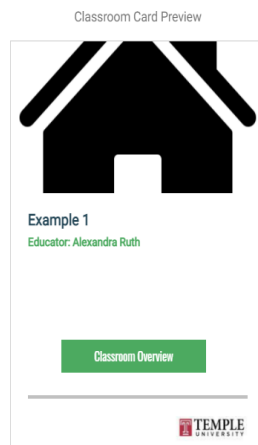
| Last Modified | Class Name | Team Name | Educator Email | Survey Title | Status |
|-----------------|------------|-----------|---------------------|----------------|--------------------|
| 7/9/21 10:06 AM | Testing 1 | Team 2 | tul17919@temple.edu | Who owns pets? | Approved |
| 7/9/21 12:28 PM | Testing 1 | Team 3 | tul17919@temple.edu | Allie Survey | Under Construction |

Event Timeline

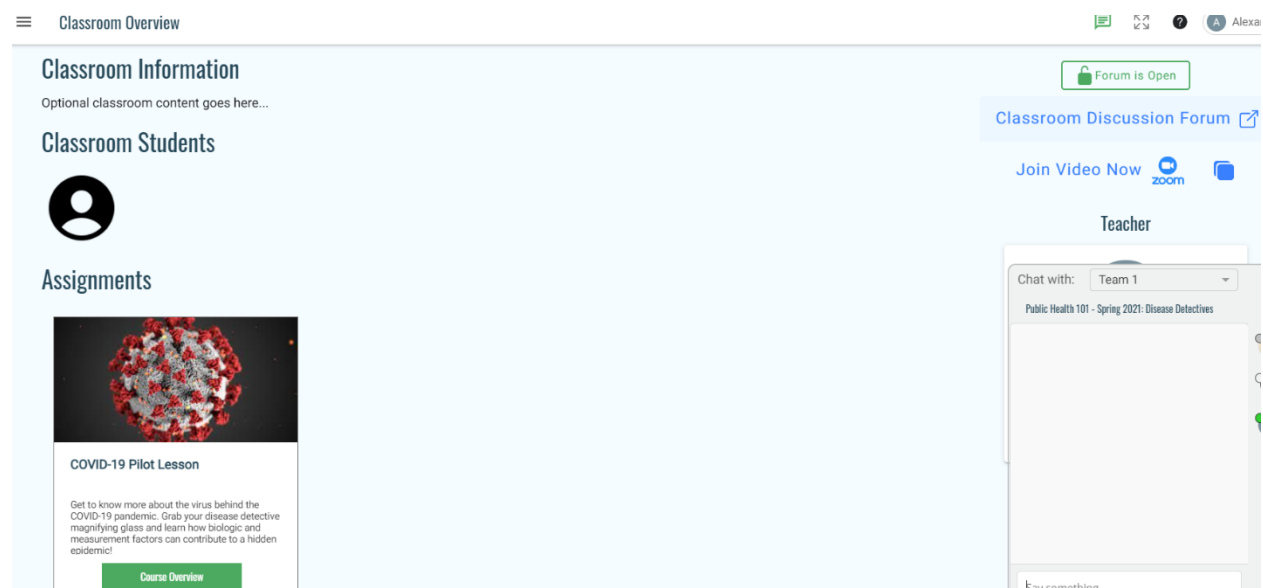
| Date | Class Name | Team Name | Educator Email | Survey Title | Comment | Decision |
|-----------------|------------|-----------|---------------------|----------------|-------------|----------|
| 7/9/21 12:37 PM | Testing 1 | Team 3 | tul17919@temple.edu | Allie Survey | Good work! | Approved |
| 7/9/21 10:23 AM | Testing 1 | Team 2 | tul17919@temple.edu | Who owns pets? | Great work! | Approved |

The Approval History page will look like the image above. To review an active survey, select the fly-out icon under the status column.

Classroom chat, discussion posts, and Zoom: To foster a collaborative environment the platform includes a chat function, embedded Zoom chat, and a discussion post forum.



To access the classroom discussion forum and the Zoom video, click “Classroom Overview” from the classroom page on the educator dashboard.



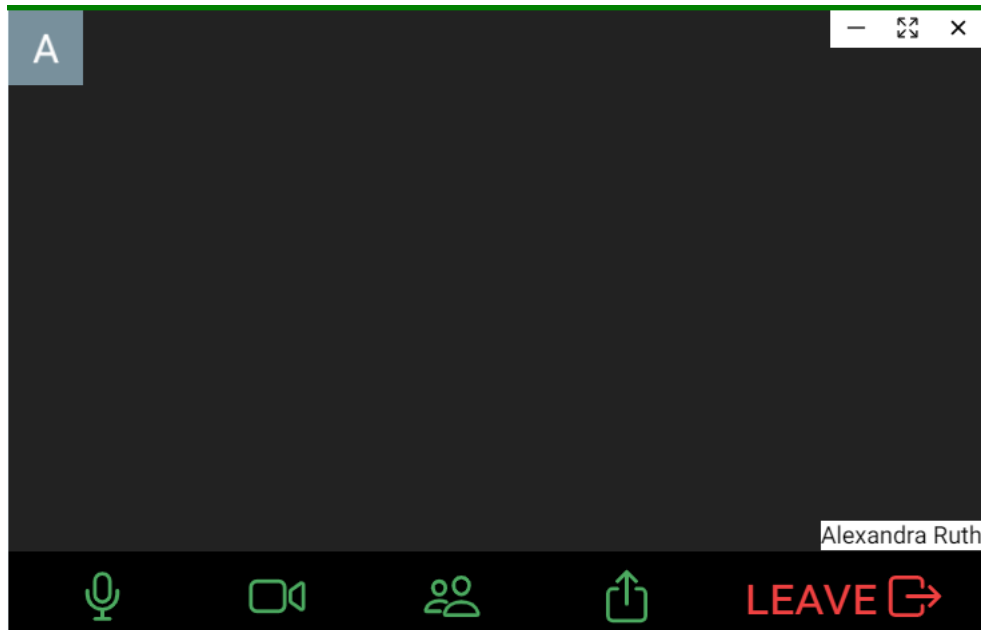
The classroom overview page will also include classroom information, the students, and the assignments.

The green icon in the top right corner will open the classroom chat. This is accessible throughout the platform. Chats are at the classroom level by default, the “Chat with” drop down can be used to change the chat to a specific team.

“Join Video Now” will start a Zoom chat with the classroom if the Zoom icon is selected. The overlapping boxes will copy a link to the classroom Zoom chat.

The “Classroom Discussion Forum” fly-out will direct to a discussion forum page. The forum can be closed by toggling the lock icon underneath the top toolbar in the image above.

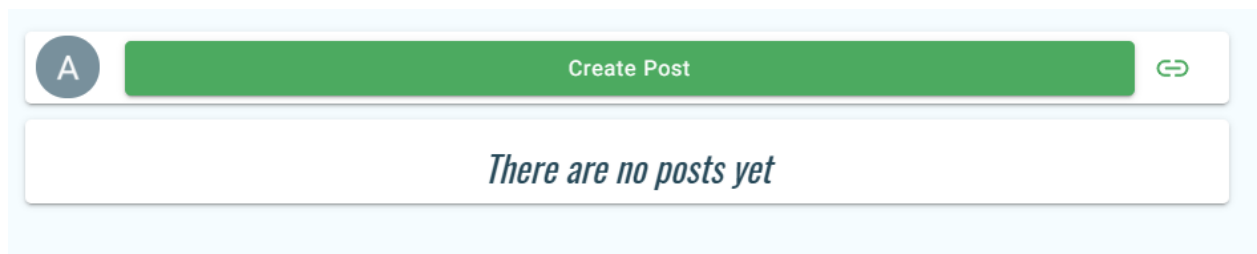
Zoom Video function: As briefly described on the previous page, Thinkdemic has a Zoom video chat embedded within the platform. After clicking “Join Video Now” on the classroom overview page the video chat will pop-up within the browser page as seen below. The functions within the video chat operate similarly to an in app Zoom call.



The microphone and camera icons can be used to mute/unmute and turn the camera on/off. Clicking the people icons will show who is on the call. The box with an arrow may be used to share screen. The video chat screen may be minimized or expanded using the icons on the top right.

The camera will only display who is speaking like an in app zoom call. A person may be pinned to the screen by selecting their name, for example the “A” in the top left corner. Students may enter, leave, or re-enter the zoom call as they please, a new zoom link is not necessary as they can just select “Join Video Now” to enter the call. The same holds true for educators. The chat function can be used to supplement the zoom call as necessary.


Discussion Forum function: The discussion forum can be used to supplement the exercises throughout the Epidemiology Challenge by allowing students to discuss concepts and ideas with other students in their classroom outside of just their teams. The discussion forum can be accessed by clicking “Classroom Discussion Forum” on the Classroom Overview page.



















After clicking Classroom Discussion Forum click create post to begin a discussion post.

Create a post

Forum: COVID-19

 POST

 LINK

  **B** *I* U x_2 x^2              

Markdown Mode

What are your thoughts?

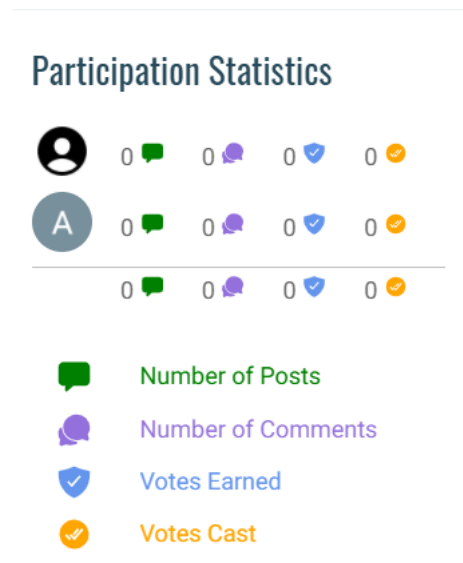
Please enter a title for your post

Post

The forum will have the title of the classroom it is being posted in. A post needs a title before it can be posted. Links, images, and video can be added to a post. Educators will have the ability to remove any discussion post they deem inappropriate.

The screenshot shows a forum post interface. At the top, a post by user 'A' is titled 'Test' and has a status of 'Testing'. It has 1 comment. Below the post title, there are icons for comments, edit, and delete. A comment box is visible with the placeholder text 'What are your thoughts?' and a 'Comment' button. Below the comment box, there is a section for 'Test 2' by user 'A', with icons for up-vote, down-vote, reply, edit, and delete.

A post can be up-voted (red up arrow), down-voted (grey down arrow) and commented on. Educators are also able to delete any comments they deem inappropriate.



On the Classroom Discussion Forum page, there are participation statistics in the corner. This will allow the educator to see how much a student has participated in classroom discussion on the forum.

Thinkdemic level of access Matrix:

| | Organizational | Author | Educator | Student |
|---|----------------|--------|----------|---------|
| Create a classroom | | | X | |
| Add students to classroom | | | X | |
| Create a course | | X | | |
| Create a track | | X | | |
| Create course exercises | | X | | |
| Upload course content (i.e videos, images, documents, or data) | | X | | |
| Monitor student progression through assignments | | | X | |
| Chat with students | | | X | X |
| Delete discussion posts | X | | X | |
| Approve a student survey | | X | X | |
| Add people to/from an organization | X | | | |
| Grant level of access to members of an organization | X | | | |
| Decide whether a course/track will use stored data or if students will send out new surveys | | | X | |
| Decide the method of survey distribution | | | X | |
| Set the minimum requirement for survey responses | | X | X | |
| Monitor the number of responses to a survey | | | X | X |
| Take a course/track | | | | X |
| Participate in a classroom Zoom call | | | X | X |