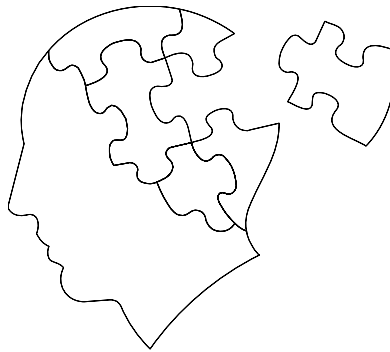


## Essential Question 2



# Concept Connections

## Part 1

Detectives in the Classroom - Investigation 2-10: Concept Connections

**Investigation 2-10: Concept Connections** is divided into two parts and will take two class periods to complete.

In Part 1, students will identify the important concepts that are needed to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?” Each Epi Team then creates a **Concept Map** that depicts and explains how the concepts connect to each other.

In Part 2, the Epi Teams will present their Concept Maps to the class.

At the conclusion of this investigation, students should have developed the second Enduring Understanding of *Detectives in the Classroom*: “Causal hypotheses can be tested by observing exposures and diseases of people as they go about their daily lives. Information from these observational studies can be used to calculate and compare risks and identify associations.”

**Next Slide**

**Essential Question 2**

**Observational  
Studies**

**Is there an association  
between the hypothesized  
cause and the disease?**

**Backpacks  
& Back Pain**

**The  
2x2 Table**

**What's Wrong  
with This Picture?**

**Compared to  
What?**

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

During the previous nine investigations, students learned how a disease detective tries to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?”

Briefly review each of the previous investigations in Module 2.

In **Investigation 2-1: The 2 x 2 Table**, students examined the results of a hypothetical study to determine if a medication prevented acne and identified the need for a control group.

In **Investigation 2-2: Compared to What?**, students gained experience in creating a 2 x 2 table, calculated risks and relative risks, and generated inferences about whether or not an exposure and a disease are associated with each other.

In **Investigation 2-3: What's Wrong with This Picture?**, students identified the circumstances under which it is ethical to conduct human experiments and examined codes of ethical standards developed to protect human rights, namely, the Nuremberg Code and Belmont Report.

In **Investigation 2-4: Backpacks and Back Pain**, students tested a hypothesis by performing their first in-class observational study.

In **Investigation 2-5: Observational Studies**, students designed, conducted, and presented the results of their own observational study.

**Next Slide**

**Essential Question 2**

**Observational Studies**

**Is there an association between the hypothesized cause and the disease?**

**Backpacks & Back Pain**

**The Journey**

**Designs, Diagrams, and Tables**

**Which Design Is Best?**

**The 2x2 Table**

**What's Wrong with This Picture?**

**Epi Team Challenge**

**Compared to What?**

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

In **Investigation 2-6: The Journey**, students explored the four basic analytical epidemiologic study designs: the controlled trial, cohort study, case-control study, and cross-sectional study.

In **Investigation 2-7: Epi Team Challenge**, students practiced distinguishing between the four study designs by participating in a competition.

In **Investigation 2-8: Which Design Is Best?**, students ranked the study designs according to different characteristics.

And in **Investigation 2-9: Designs, Diagrams, and Tables**, they identified, for each of the four basic analytical epidemiologic study designs, where data from a flow diagram fit into a 2 x 2 table.

Ask students to review their **Epi Talk** for Module 2 and identify the words and phrases that an epidemiologist needs to know in order to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?”

**Next Slide**

## Investigation 2-10 Worksheet

Detectives in the Classroom Name: \_\_\_\_\_

Investigation 2-10: Epi Log Worksheet Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

1. Write Essential Question 2 at the top of the paper.
2. Write the following words and phrases on index cards:
  - 2 x 2 Table
  - Analytical Epidemiology
  - Association
  - Belmont Report
  - Case-Control Study
  - CDC
  - Cohort Study
  - Control Group
  - Cross-Sectional Studies
  - Descriptive Epidemiology
  - Epidemiology
  - Ethics
  - Experimental Group
  - Hypothesis
  - Inference
  - Natural Experiments
  - Observational Studies
  - Population
  - Randomized Trial
  - Risk
  - Relative Risk
  - Study Designs
3. Arrange words and phrases to show connections.
4. Draw arrows, circles, and boxes to further show connections.
5. Label the connections on the arrows, circles, and boxes.

Detectives in the Classroom - Investigation 2-10: Concept Connections

Give each student an **Investigation 2-10: Epi Log Worksheet**.

**Next Slide**

## Epi Teams



Detectives in the Classroom - Investigation 2-10: Concept Connections

Divide the class into Epi Teams of four or five students per team.

**Next Slide**

## Essential Question 2

1

Is there an association between  
the hypothesized cause and the disease?

Detectives in the Classroom Name: \_\_\_\_\_  
Investigation 2-10: Epi Log Worksheet Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

1. Write Essential Question 2 at the top of the paper.  
Write the following words and phrases on index cards:

- 2 x 2 Table
- Analytical Epidemiology
- Association
- Belmont Report
- Case-Control Study
- CDC
- Cohort Study
- Control Group
- Cross-Sectional Studies
- Descriptive Epidemiology
- Epidemiology
- Ethical
- Experimental Group
- Hypothesis
- Inference
- Natural Experiments
- Observational Studies
- Population
- Randomized Trial
- Risk
- Relative Risk
- Study Designs

3. Arrange words and phrases to show connections.  
4. Draw arrows, circles, and boxes to further show connections.  
5. Label the connections on the arrows, circles, and boxes.

Leave Space

**Write Essential Question 2 at the top of the paper.**

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

Give each Epi Team a large (about 3 ft x 4 ft) piece of paper.

Review the steps to create a **Concept Map**.

Step 1: Write Essential Question 2 at the top of the paper.

Tell students to leave a 4- to 6-inch space at the bottom of their paper.

**Next Slide**

## Connections

2

Detectives in the Classroom Name: \_\_\_\_\_  
Investigation 2-10: Epi Log Worksheet Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Write Essential Question 2 at the top of the paper:  
2. Write the following words and phrases on index cards:

- 2 x 2 Table
- Analytical Epidemiology
- Association
- Belmont Report
- Case-Control Study
- CDC
- Cohort Study
- Control Group
- Cross-Sectional Studies
- Descriptive Epidemiology
- Epidemiology
- Ethic
- Experimental Group
- Hypothesis
- Inference
- Natural Experiments
- Observational Studies
- Population
- Randomized Trial
- Risk
- Relative Risk
- Study Designs

3. Arrange words and phrases to show connections.  
4. Draw arrows, circles, and boxes to further show connections.  
5. Label the connections on the arrows, circles, and boxes.

Association

Ethics

**Write the following words and phrases on index cards:**

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

Step 2: Write the words and phrases on index cards.

**Next Slide**

# Connections

3

Is there an association between the hypothesized cause and the disease?

Detectives in the Classroom Name: \_\_\_\_\_  
Investigation 2-10: Epi Log Worksheet Date: \_\_\_/\_\_\_/\_\_\_

- Write Essential Question 2 at the top of the paper.
- Write the following words and phrases on index cards:
  - 2 x 2 Table
  - Analytical Epidemiology
  - Association
  - Balton Report
  - Case-Control Study
  - CDC
  - Cohort Study
  - Control Group
  - Cross-Sectional Studies
  - Descriptive Epidemiology
  - Epidemiology
  - Ethics
  - Experimental Group
  - Hypothesis
  - Inference
  - Natural Experiments
  - Observational Studies
  - Population
  - Randomized Trial
  - Risk
  - Relative Risk
  - Study Designs
- Arrange words and phrases to show connections.
- Draw arrows, circles, and boxes to further show connections.
- Label the connections on the arrows, circles, and boxes.

xxxxxx      xxxxxx  
xxxxxx      xxxxxx  
xxxxxx      xxxxxx  
xxxxxx

Leave Space

**Arrange the words and phrases to show connections.**

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

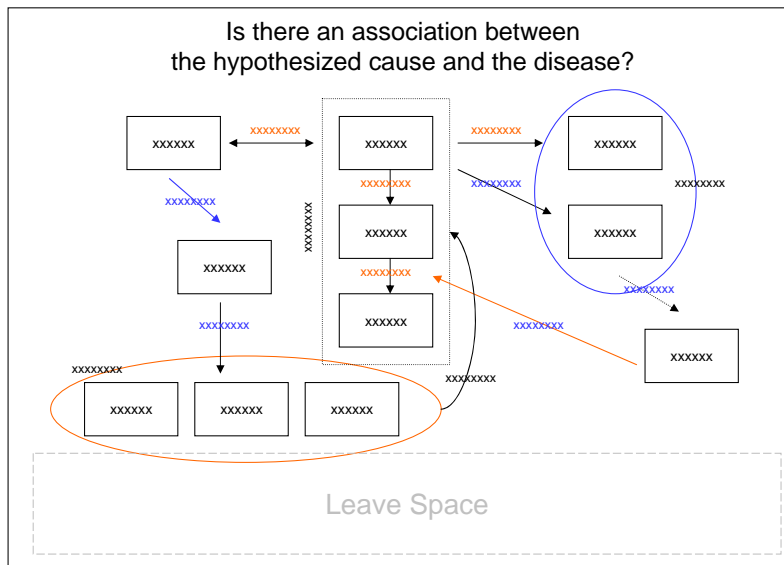
Step 3: Arrange the words and phrases to show connections.

**Next Slide**





## Connections



Detectives in the Classroom - Investigation 2-10: Concept Connections

By the end of today's investigation students will have drawn a **Concept Map** that might look something like this.

Next Slide

## Investigation 2-10 Worksheet

Detectives in the Classroom Name: \_\_\_\_\_

Investigation 2-10: Epi Log Worksheet Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

1. Write Essential Question 2 at the top of the paper.
2. Write the following words and phrases on index cards:
  - 2 x 2 Table
  - Analytical Epidemiology
  - Association
  - Belmont Report
  - Case-Control Study
  - CDC
  - Cohort Study
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  - Cross-Sectional Studies
  - Descriptive Epidemiology
  - Epidemiology
  - Ethics
  - Experimental Group
  - Hypothesis
  - Inference
  - Natural Experiments
  - Observational Studies
  - Population
  - Randomized Trial
  - Risk
  - Relative Risk
  - Study Designs
3. Arrange words and phrases to show connections.
4. Draw arrows, circles, and boxes to further show connections.
5. Label the connections on the arrows, circles, and boxes.

### Detectives in the Classroom - Investigation 2-10: Concept Connections

Ask students to complete Steps 1 through 5 on their **Investigation 2-10: Epi Log Worksheet**.

⚙ Teacher Alert: Listen to each Epi Team's conversation. Observe their work. Identify misconceptions. Conference as needed.

**Next Slide**

## Concept Connections

### Epi Assignment

Complete Concept Map.

Each Epi Team prepares a 5 minute presentation that:

Describes how the concepts depicted in their Concept Maps connect to each other.

Meets the **Presentation Rubric** criteria.

Due: Next Class

Detectives in the Classroom - Investigation 2-10: Concept Connections

With 5 minutes of class remaining, tell students that their Epi Assignment for next class is to

1. Complete their **Concept Maps**.
2. Prepare a 5-minute presentation that
  - Describes how the concepts depicted in their **Concept Maps** connect to each other.
  - Meets the **Presentation Rubric** criteria.

Next Slide

Presentation Rubric			
<u>Criteria</u>	<u>Got It</u>	<u>Getting It</u>	<u>Will Get It Soon</u>
<u>Participation</u>	All Epi Team members participate	Most Epi Team members participate	Some Epi Team members participate
<u>Use of Epi Talk</u>	All are appropriate and accurate	Most are appropriate and accurate	Some are appropriate and accurate
<u>Arrangement of Cards</u>	Clearly depict all concept connections	Clearly depict most concept connections	Clearly depict some concept connections
<u>Arrows, Circles, and Boxes</u>	Clearly depict all concept connections	Clearly depict most concept connections	Clearly depict some concept connections
<u>Labels</u>	Clearly describe all concept connections	Clearly describe most concept connections	Clearly describe some concept connections

Detectives in the Classroom - Investigation 2-10: Concept Connections

Review the **Presentation Rubric** to be used when evaluating the presentation.

- Participation: All Epi Team members participate.
- Use of **Epi Talk**: All are appropriate and accurate.
- Arrangement of Cards: Clearly depict all concept connections.
- Arrows, Circles, and Boxes: Clearly depict all concept connections.
- Labels: Clearly describe all concept connections.

Give each student a **Presentation Rubric**.

Allow Epi Teams a few minutes to assign presentation responsibilities.

**Next Slide**

## To Understand

Investigation  
2-10, Part 1  
has ended.

To be able to **explain**,  
interpret, and apply something,  
while showing insight from  
perspective, empathy, and  
self-knowledge.



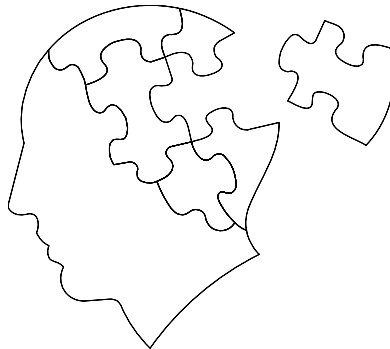
Detectives in the Classroom - Investigation 2-10: Concept Connections

Remind students that they demonstrated their ability to give sophisticated explanations of descriptive epidemiology when they showed how the descriptive epidemiologic concepts connected to each other to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?”

This concludes Part 1 of **Investigation 2-10: Concept Connections** and students can now put away their **Epi Logs**.

**Next Slide**

## Essential Question 2



## Concept Connections Part 2

Detectives in the Classroom - Investigation 2-10: Concept Connections

Remind students that in Part 1 of **Investigation 2-10: Concept Connections**, they identified the important concepts that are needed to answer the second Essential Question—“Is there an association between the hypothesized cause and the disease?”—and created a **Concept Map** that depicted and explained how the concepts connect to each other.

Now, in Part 2, the Epi Teams will present their **Concept Maps** to the class.

At the conclusion of this investigation, students will have developed the second Enduring Understanding of *Detectives in the Classroom*: “Causal hypotheses can be tested by observing exposures and diseases of people as they go about their daily lives. Information from these observational studies can be used to calculate and compare risks and identify associations.”

**Next Slide**

Presentation Rubric			
<u>Criteria</u>	<u>Got It</u>	<u>Getting It</u>	<u>Will Get It Soon</u>
<u>Participation</u>	All Epi Team members participate	Most Epi Team members participate	Some Epi Team members participate
<u>Use of Epi Talk</u>	All are appropriate and accurate	Most are appropriate and accurate	Some are appropriate and accurate
<u>Arrangement of Cards</u>	Clearly depict all concept connections	Clearly depict most concept connections	Clearly depict some concept connections
<u>Arrows, Circles, and Boxes</u>	Clearly depict all concept connections	Clearly depict most concept connections	Clearly depict some concept connections
<u>Labels</u>	Clearly describe all concept connections	Clearly describe most concept connections	Clearly describe some concept connections

Detectives in the Classroom - Investigation 2-10: Concept Connections

Tell the Epi Teams that their presentation should meet the **Presentation Rubric** criteria.

Review the **Presentation Rubric** to be used when evaluating the presentation:

- Participation: All Epi Team members participate.
- Use of **Epi Talk**: All are appropriate and accurate.
- Arrangement of Cards: Clearly depict all concept connections.
- Arrows, Circles, and Boxes: Clearly depict all concept connections.
- Labels: Clearly describe all concept connections.

**Next Slide**

## Epi Teams



Detectives in the Classroom - Investigation 2-10: Concept Connections

Divide the class into Epi Teams of four or five students per team.  
Allow Epi Teams 5 minutes to get ready for their presentations.

**Next Slide**

**Epi Teams Presentations**

Is there an association between the hypothesized cause and the disease?

**Concept Map**

Leave Space

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

Have one Epi Team present.

After the presentation, ask a student from this Epi Team to self-assess the presentation in terms of one of the **Presentation Rubric** criteria.

**Next Slide**

## Self-Assessment

<u>Criteria</u>	<u>Got It</u>	<u>Getting It</u>	<u>Will Get It Soon</u>
<u>Participation</u>	All Epi Team members participate	Most Epi Team members participate	Some Epi Team members participate
<u>Use of Epi Talk</u>	All are appropriate and accurate	Most are appropriate and accurate	Some are appropriate and accurate
<u>Arrangement of Cards</u>	Clearly depict all concept connections	Clearly depict most concept connections	Clearly depict some concept connections
<u>Arrows, Circles, and Boxes</u>	Clearly depict all concept connections	Clearly depict most concept connections	Clearly depict some concept connections
<u>Labels</u>	Clearly describe all concept connections	Clearly describe most concept connections	Clearly describes some concept connections

### Detectives in the Classroom - Investigation 2-10: Concept Connections

- Participation: All Epi Team members participate.
- Use of **Epi Talk**: All are appropriate and accurate.
- Arrangement of Cards: Clearly depict all concept connections.
- Arrows, Circles, and Boxes: Clearly depict all concept connections.
- Labels: Clearly describe all concept connections.

Compliment when appropriate.

Discuss differences between the teacher's assessment and the self-assessment.

Repeat this process until all Epi Teams have presented and self-assessed their presentations.

**Next Slide**

## Enduring Understanding 1



### Essential Question

How is this disease distributed and what hypotheses might explain that distribution?

### Enduring Understanding

Health-related conditions and behaviors are not distributed uniformly in a population. Each has a unique descriptive epidemiology that can be discovered by identifying how it is distributed in a population in terms of person, place, and time. Descriptive epidemiology provides clues for formulating hypotheses.

**Detectives in the Classroom - Investigation 2-10: Concept Connections**

Point out to students that when they completed the investigations in Module 1, they learned the way a disease detective tries to answer the first Essential Question: “How is this disease distributed and what hypotheses might explain that distribution?” They also uncovered a disease detective’s first Enduring Understanding: “Health-related conditions and behaviors are not distributed uniformly in a population. Each has a unique descriptive epidemiology that can be discovered by identifying how it is distributed in a population in terms of person, place, and time. Descriptive epidemiology provides clues for formulating hypotheses.”

**Next Slide**

## Uncovering Enduring Understanding 2

### Essential Question

Is there an association between the hypothesized cause and the disease?



### Enduring Understanding

Causal hypotheses can be tested by observing exposures and diseases of people as they go about their daily lives. Information from these observational studies can be used to make and compare risks and identify associations.

Detectives in the Classroom - Investigation 2-10: Concept Connections

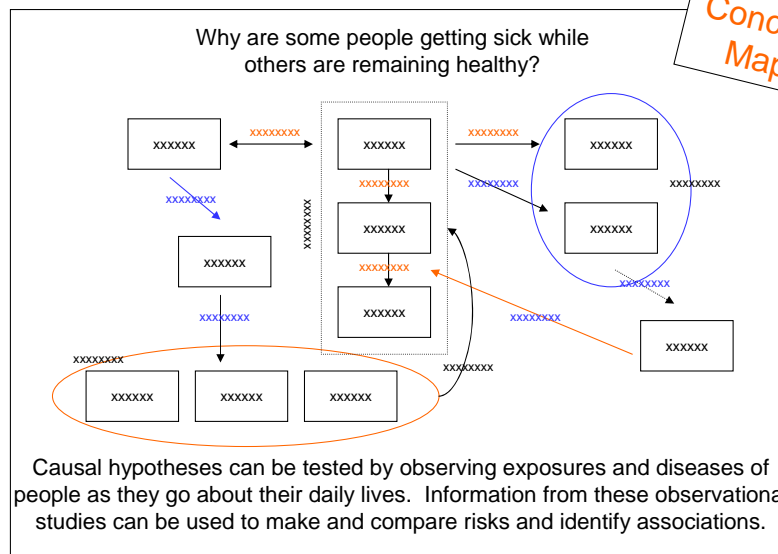
By doing the investigations in Module 2, now completed, students have been learning the way an epidemiologist, a disease detective, tries to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?”

Ask students:

- Have you uncovered an epidemiologist’s second Enduring Understanding? (“Causal hypotheses can be tested by observing exposures and diseases of people as they go about their daily lives. Information from these observational studies can be used to calculate and compare risks and identify associations.”)

**Next Slide**

## Enduring Understanding 2



Detectives in the Classroom - Investigation 2-10: Concept Connections

A student from each Epi Team should now write the second Enduring Understanding in the space at the bottom of his or her Epi Team's **Concept Map**.

Next Slide



## To Understand

To be able to **explain**, interpret, and apply something, while showing insight from perspective, empathy, and self-knowledge.



Detectives in the Classroom - Investigation 2-10: Concept Connections

Remind students that they demonstrated their ability to give sophisticated explanations of descriptive epidemiology when they showed how the descriptive epidemiologic concepts connected to each other to answer the second Essential Question: “Is there an association between the hypothesized cause and the disease?”

This concludes Part 2 of **Investigation 2-10: Concept Connections** and students can now put away their **Epi Logs**.