OPERATION PREVENTION

HIGH SCHOOL

VIDEO TOPIC SERIES ACTIVITY

Episode Two: Effects on Our Brain and Body

U.S. Department of Justice Drug Enforcement Administration

Discovery EDUCATION

ACTIVITY OVERVIEW

Episode Two: Effects on Our Brain and Body

Overview

In this activity, students explore the negative impact that counterfeit drugs have on the teenage brain and body. Following an engage, investigate, and apply format, students use multiple sources of information to build their background knowledge. Students then create and share diagrams to demonstrate their understanding of how counterfeit drugs negatively impact the brain and body.

Learning Objectives

- Discover the negative impact that illegal drugs found in counterfeit pills have on the body.
- Model how fentanyl and methamphetamine disrupt neurological reward and pain pathways.
- Create a life-size infographic poster showing how and where counterfeit pills can have a life-threatening impact on the body and mind.

Timing

45–60 minutes

Grade Level

9–12

Inquiry Questions

- Why is fentanyl used in the legal manufacture of pharmaceuticals?
- What makes fentanyl so dangerous in counterfeit pills?
- How does fentanyl change the way the brain works?
- What are the effects of fentanyl on the rest of the body?

Materials

- Counterfeit Drugs Video Topic Series: Episode 2
- Capture Sheet 1: Your Brain on Counterfeit Drugs
- Capture Sheet 2: Pleasure and Pain Pathways
- Modeling clay
- Various craft supplies (scissors, colored paper, pipe cleaners, dry pasta noodles, pom poms, hot glue, glue sticks, markers, colored pencils, etc.)
- Facts Sheet: Fentanyl
- Facts Sheet: Methamphetamine

Background Information

Counterfeit pills often contain fentanyl and are more lethal than ever before. DEA officials report a dramatic rise in the number of counterfeit pills containing at least 2 mg of fentanyl, which is considered a deadly dose. Drug traffickers are using fake pills to exploit the opioid epidemic and prescription drug misuse. The Centers for Disease Control and Prevention reports more than 100,000 drug overdose deaths in the United States in the most recent 12-month reporting period—the most ever recorded. Fentanyl, the synthetic opioid most commonly found in counterfeit pills, is the primary driver in this alarming increase in overdose deaths.

To address this complex problem, federal agencies are working to inform parents, teens, and educators about the dangers of counterfeit pills. This guide was created to give educators ideas and strategies for presenting the content in the digital lesson. It provides detailed plans for educators to be prepared to engage, explain, discuss, and effectively facilitate the content in the presentation. The lesson is designed to cover one 45–60 minute class session, but it is flexible, depending on the student's needs and time available.

For more information on counterfeit drugs, please visit: One Pill Can Kill

ACTIVITY OVERVIEW (CONTINUED)

Teacher Preparation

It is essential to create a safe and comfortable classroom atmosphere for students to engage in the content of the Operation Prevention sessions. It is suggested that the instructor set up classroom norms/rules such as:

- We value participation by everyone.
- We are open to hearing opinions that may be different from ours.
- We will respect what others have to share and allow them to share it without judgement.
- What we share will be kept confidential. We will not use names when sharing stories.

Discuss these norms with your students prior to beginning the lesson and explain that the purpose is to have a safe place where everyone can feel comfortable sharing and learning.

At different points in the lesson, students may be tempted to share personal information about opioid misuse by themselves or others. As always, be sure to follow school or district policies about the sharing of personal information about minors.

HEALTH STANDARDS

National Health Standards:

- Standard 2: Students will analyze the influence of family, peers, culture, media, technology, and other factors on health behaviors.
- Standard 4: Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks.
- Standard 8: Students will demonstrate the ability to advocate for personal, family, and community health.

Next Generation Science Standards

- HS-LS1-2 From Molecules to Organisms: Structures and Processes
  Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

English Language Standards

- CCSS.ELA-LITERACY.RL.11-12.1
  Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

PROCEDURE

ENGAGE

- After students have viewed Episode Two of the Counterfeit Drugs Video Series, explain to students that in September of 2021, the Drug Enforcement Administration (DEA) issued a public safety alert that warned people about a sharp rise in the number of fake pills containing fentanyl and methamphetamine. In this, the DEA reported that "counterfeit pills have been seized by DEA in every U.S. state in unprecedented quantities. More than 9.5 million counterfeit pills were seized so far this year, which is more than the last two years combined. DEA laboratory testing reveals a dramatic rise in the number of counterfeit pills containing at least two milligrams of fentanyl, which is considered a lethal dose. A deadly dose of fentanyl is small enough to fit on the tip of a pencil."
- Ask students to share their reaction to this information with the whole group. Next, ask students if they know why fentanyl and methamphetamine are so deadly—how do they impact a person's body and brain? Allow students to share their thoughts.
- To begin the activity, students will be rotating through four information stations to learn how drugs, such as fentanyl impact the brain. Assign each student one letter A–D. This will be the article they will start with and the group they will move through the stations with.

LINKS to FACTS SHEETS

Station A—The Truth About Opioids:
https://store.samhsa.gov/sites/default/files/d7/priv/pep19-08.pdf

Station B—The Brain's Response to Opioids:
https://nida.nih.gov/sites/default/files/mom_opioids.pdf

Station C—Facts About Fentanyl:
https://www.cdc.gov/stopoverdose/fentanyl/pdf/Fentanyl_Fact_Sheet_508c.pdf

Station D—Drugs and the Teen Brain:
https://teens.drugabuse.gov/sites/default/files/NIDA_YR17_INS1_StuMag.pdf

- Each student should get a copy of the "Your Brain on (Counterfeit) Drugs" Capture Sheet. The instructor should set up four stations (A–D) and place 6–8 copies of each article at the appropriate station.
- Students should start at their assigned station with their group. Set a timer for three minutes. Students should take this time to read through the article at their station and fill in the section in the capture sheet. Students can discuss their thoughts with those in their groups as they read the articles.
- When the time is up, student groups should circulate to the next station. They will take the next three minutes to review the article and complete the appropriate section of their capture sheet.
- Once students have visited all four stations, they should return to their seats. Divide the front board into four sections, one for each station, A–D. Give each student four sticky notes and ask them to write their takeaway sentence for each station on each of the sticky notes. Students should place their sticky notes on the front board in the appropriate section.
- If time allows, the teacher can share some of the takeaway sentences for each article with the whole group.

INVESTIGATE

- Explain to students that for the next part of the activity, they will be working in pairs to create models that show the effects that drugs, such as opioids and methamphetamine have on receptors and neurotransmitters in the brain.
- To introduce or review the brain reward and pain pathways, give each student a copy of the "Pleasure and Pain Pathways" capture sheet. Ask students to label the diagrams and answer the questions on the sheet as they watch two video clips.
- Show students the video clip Brain Reward: How the Brain Responds to Natural Drugs and Rewards, ending at 5:00. Next, show the video clip Susan's brain: the science of addiction, **stop at 1:00**.
- Next, ask students to pair up. They should use the notes on their capture sheet to help them create a model using clay and other craft supplies that shows how drugs disrupt normal pathways in the brain. Allow each pair to choose if they will model the effect of fentanyl or methamphetamine and give them either a fentanyl or methamphetamine fact sheet.
- Students should work together to create their models that show how the pathway is changed by the introduction of methamphetamine or fentanyl using craft supplies to represent various parts of the model. The fact sheet should be a reference for them, or if they have student devices (laptops or iPads) they can do research on their own in addition to the fact sheet.
- When students finish their models, ask them to show and explain their model to another group who has chosen a different pathway to model to give each other feedback and understand both processes.

Instructor Note: *The videos show how these drugs disrupt the reward and pain pathways at the end of each video. This can be used as a key for the instructor or can be shown as a way for students to self-grade their models.*

APPLY

- In the final portion of the activity, explain that students will form groups of three to four and create an infographic about the impact that fentanyl and methamphetamine found in counterfeit pills can have on the mind and body.
- Give students a piece of butcher block paper, or other material, that is at least 5–6 feet long. Students should choose one student to lay down as another traces the outline of their body on the paper. They should then divide the outline in half, lengthwise and label one side "Fentanyl" and the other side "Methamphetamine."
- Provide each group with a copy of, or access to, the Mind Matters Opioids and Mind Matters Methamphetamine information packets. Students should also have access to markers, scissors, construction paper, glue, tape, or other poster-making supplies.
- Groups should work together to create their infographic or informational life-size poster. The instructor may want to suggest that they place information about the brain where the brain would be in the body outline, etc. The infographics can be displayed around the classroom or school to teach others about the dangers of some of the illegal drugs found in counterfeit pills.

CAPTURE SHEET 1: YOUR BRAIN ON COUNTERFEIT DRUGS

Article A

Topic:

3 Facts:

Takeaway Sentence:

Article B

Topic:

3 Facts:

Takeaway Sentence:

Your brain on (counterfeit) drugs

Article C

Topic:

3 Facts:

Takeaway Sentence:

Article D

Topic:

3 Facts:

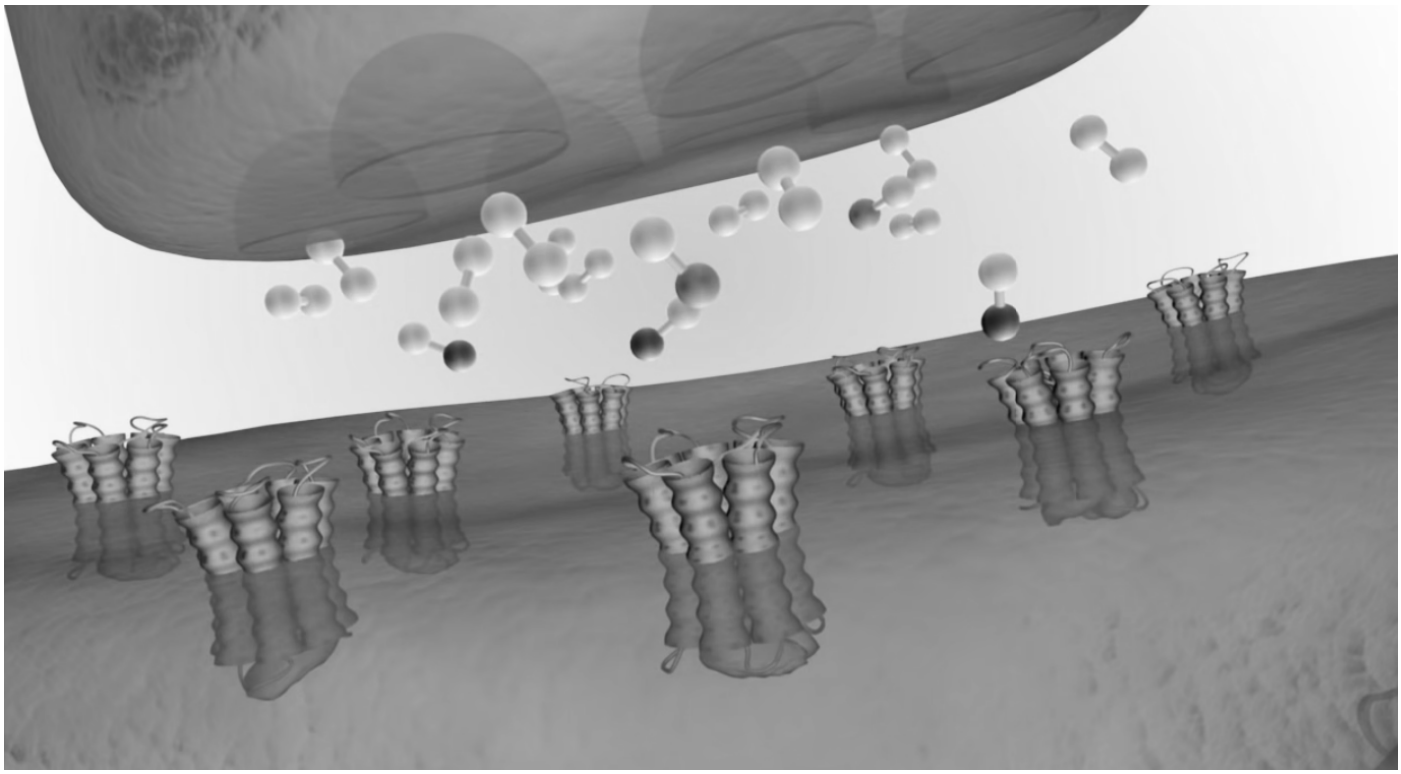
Takeaway Sentence:

CAPTURE SHEET 2: PLEASURE AND PAIN PATHWAYS

VIDEO 1–Dopamine Pathway

Define and Label each of the following on the diagram:

TERM	DEFINITION
Synapse	
Presynaptic neuron	
Postsynaptic neuron	
Vesicles	
Dopamine	
Dopamine Receptor	
Dopamine Transporter	



CAPTURE SHEET 2: PLEASURE AND PAIN PATHWAYS

1. What happens when dopamine neurotransmitters are released into the synapse?

2. In a healthy brain, there is always _____ of dopamine in the synapse.

3. What happens when a natural reward (such as food) is encountered?

PREDICT: What do you think a drug, such as methamphetamine, might do to alter this pathway? Why?

CAPTURE SHEET 2: PLEASURE AND PAIN PATHWAYS

VIDEO 2–Endorphin Action

Define and Label each of the following on the diagram:

TERM	DEFINITION
Opioid Receptor	
Neuron	
Endorphin	

CAPTURE SHEET 2: PLEASURE AND PAIN PATHWAYS

1. What happens when the brain receives a pain signal?

2. In a healthy brain, there is always _____ of dopamine in the synapse.

3. What happens when a natural reward (such as food) is encountered?

PREDICT: What do you think a drug, such as fentanyl (an opioid), might do to alter this pathway? Why?