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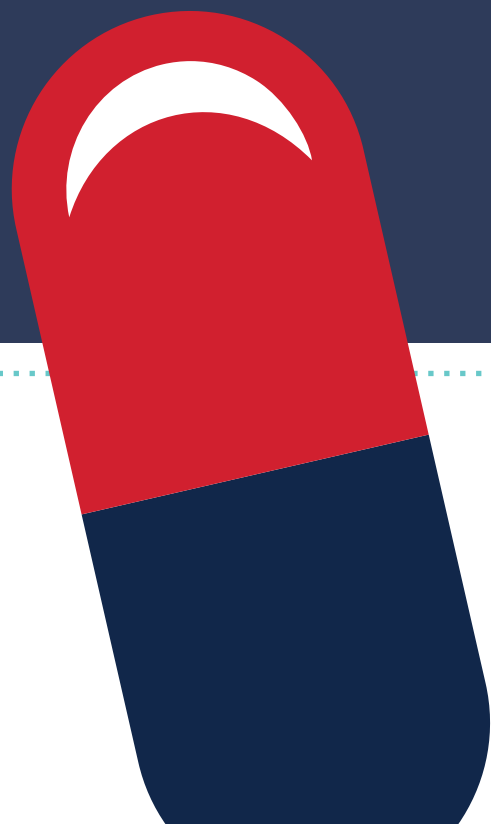
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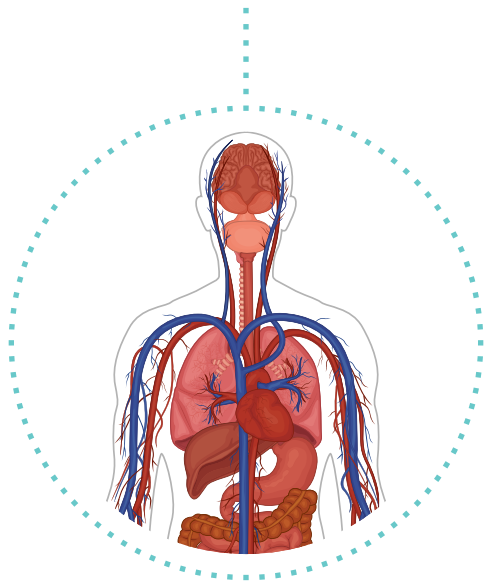
DIGITAL LESSON EDUCATOR GUIDE



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LESSON OVERVIEW



In this lesson, students will investigate the science behind the impact of opioids on the mind and body, focusing on different body systems. Through a series of activities, students will investigate changes in the body due to prescription opioid misuse and heroin use. They will use this information to explain the science behind physical dependency and withdrawal. Students then will communicate at least one key takeaway from the lesson by developing a social media campaign to reach a peer audience.

The accompanying presentation was created with PowerPoint so that it can be used in a variety of classrooms. If you are using a laptop with an LCD projector, simply progress through the PowerPoint by clicking to advance. All of the interactive aspects of the presentation are set to occur on click. Links to the corresponding videos can be found in the notes section of the PowerPoint. If you are using an interactive whiteboard, tap on each slide with your finger or stylus to activate the interactive aspects of the presentation. It does not matter where you tap, but you can make it appear as if you are making certain things happen by tapping them. In the notes for each slide, there will be information on how to proceed.

Content Areas

Life Sciences, Health, and Physical Education

Activity Duration

3 class sessions (45 minutes each)

Grade Level

Grades 6–8

Essential Questions

- Why do people misuse opioids?
- What are the short- and long-term effects of opioid misuse on the body?
- How do neurons transmit information throughout the body?
- What are the similarities and differences between endorphins and opioids?

Materials

- Timer
- Note cards
- Chart paper and markers
- Access to the Internet
- Blank outline of human body (one per student)
- *What Does It Mean to 'Misuse' Opioids?* article (one per student)

Objectives

- Describe the short- and long-term negative effects of opioid misuse on the body
- Explain how neurons (nerve cells) send and receive information. Differentiate between how endorphins and opioids affect the body
- Demonstrate how opioid use affects the nervous system and body by developing a social media campaign and presenting it to classmates

BACKGROUND INFO

The use and misuse of opioids such as heroin, morphine, and prescription medications is a serious national problem that affects the health of communities, including their social and economic welfare. There are approximately 144 drug overdose deaths per day in the United States with 63% of those deaths related to pharmaceutical opioids or heroin. About 12.5 million people indicated misusing prescription painkillers in 2015 while nearly one in six teens say they have used prescription medicine at least once in their lifetimes to get high. Because opioids are so highly addictive, prevention and education are keys to reducing misuse and addiction. To address this complex problem, federal agencies are working to inform patients, parents, teens, pharmacists, and educators about the dangers of opioid misuse.

This guide was created to give educators ideas and strategies for presenting the content in the digital lesson. It provides slide-by-slide details for educators to be prepared to engage with students as they explain, discuss, and effectively facilitate the content in the presentation. The presentation is designed to cover three 45-minute class sessions, but it is flexible, depending on the student's needs and time available.

During the lesson, students will learn about endorphins ("feel-good chemicals"). The human body produces natural endorphins in response to certain sensations—mainly stress, fear, or pain. These chemicals reduce pain and produce a sense of euphoria (feeling good). As an introduction to this topic, students will conduct activities that release natural endorphins and describe how they feel before and afterward.

Students will also be introduced to opioids, which are drugs that are either derived from the opium poppy plant or that are synthetically produced to have similar effects. Heroin is an example of the former type, but there are many other opioids, including legal drugs such as morphine, codeine, and fentanyl, which doctors prescribe to patients in extreme pain. Opioids have a chemical structure similar to endorphins, which enables them to attach to the same places

in the brain. As a result, the brain cannot tell the difference between the effects from activities that produce natural endorphins (e.g., exercising, laughing, and eating chocolate) and the effects caused by taking opioids.

Then, students will examine the structure of neurons and the process of neurotransmission to better understand how opioids affect the body, particularly the nervous system. Neurons are the tiny nerve cells that send messages along the human nervous system. Some of these messages control life-sustaining functions, such as circulation, respiration, and digestion. Opioids block pain signals from reaching the brain by attaching to certain parts of neurons called opioid receptors.

Finally, students will examine the short-term and long-term effects of opioid misuse on the systems of body. Opioids primarily affect the nervous system, but changes to this system impact a number of the body's other systems, including circulatory (slowed heart function), respiratory (slowed breathing), and skeletal (bone thinning). Repeated opioid use leads to physical dependency (changes in the body that cause systems to require the drug in order to function) and tolerance (the body's need to absorb more of a drug to achieve the same effects). When prolonged opioid use is stopped, the body experiences a shock called withdrawal, which has number of serious effects on the body's systems.

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.

SLIDES 1-6

ENGAGE

Overview: : Students will be guided through a series of brief activities that release endorphins (exercising, smiling, eating chocolate); then, they will describe how they feel before and after each activity. Students will be introduced to what endorphins and opioids are, why endorphins are released, why opioids are prescribed, and how the effects of opioids mimic the feeling of endorphins. Then, they will investigate what it means to misuse opioids.

Slides 1-3 contain activities to engage students in the release of endorphins.



SLIDE 1

Draw a T-Chart on a large blank sheet of chart paper. Write the words "Before" and "After" at the top of each column. Ask all students to stand up. Invite a few students to describe how they are feeling at this exact moment. Write these words on the "Before" side of the T-Chart.

Ask students to think of a physical activity they could do in place (e.g., push-ups, jumping jacks, or dancing). Let students know that you will ask about how the activity made them feel. When all students have an activity in mind, set a timer for one minute. Challenge students to do their chosen physical activity until time is up.

Then, direct students to describe how they feel after they did this activity. Write these words on the right side of the T-Chart on the board. If time allows, direct students to discuss how they felt before and after the activity with a partner.

Display the slide to the class. Exercise activities, particularly continual aerobic (cardio) ones, cause your body to release "feel-good" chemicals. Ask students whether they know anyone who is "addicted" to exercise. How might these chemicals affect their behavior? Explain that exercise creates a rush of chemicals in the body, commonly known as a "runner's high." A person who is "addicted" to exercise seeks the good feeling they experience after working out.

DAY 1



SLIDE 2

Ask students to think about activities that make them laugh. Ask a few volunteers to share. (You may wish to vet these suggestions before class to ensure they are appropriate to share.)

Direct students to think about how they feel after smiling or laughing. Students may report a mood “boost”—i.e., they feel more relaxed and less anxious. Write the words students use to describe how they feel on the right side of the T-Chart that you began in the previous slide.

Ask, “How does laughing or smiling produce a similar or different effect than exercise produces?” Then, display the slide. Guide students to draw conclusions about why laughing can change how they feel or “boost” their moods.

Once students have discussed and drawn their own conclusions, explain that “feel-good” chemicals are also released through laughter, which can improve how you feel and increase your pain threshold.



SLIDE 3

NOTE: The following activity includes eating chocolate. Prior to class, determine whether anyone has a food allergy or dislikes chocolate so that you can prepare something else for these students to eat.

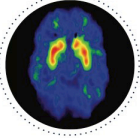
Distribute a small piece of chocolate to each student. Instruct them to eat it slowly with their eyes closed and focus on how it changes their mood. Ask students to describe how they feel after eating chocolate. Write these words on the right side of the T-Chart.

Ask, “What do you think caused the effects that you felt?” Then, display the slide. Guide students to draw conclusions about why chocolate makes them feel differently. Explain to students that eating chocolate also causes the release of chemicals in your body that make you feel pleasure. Chocolate is considered a “comfort” food because it makes people feel better when they are stressed or sad.

Ask students what might happen if they ate a chili pepper instead of chocolate. Some students might respond that it would hurt their mouths, while others might enjoy the taste. Then, explain that chili peppers contain a chemical called capsaicin, which puts the “heat” in chilies. This burning sensation causes the body to release the same “feel-good” chemicals that chocolate releases—in this case, the chemicals help to reduce the pain in your mouth. These chemicals also cause the pleasurable feeling associated with eating spicy foods.

Finally, ask each student to brainstorm one more example of an activity that might release “feel-good” chemicals. Ask: What activities make you feel happy afterward? What activities do you do to feel better? What activities may be painful but still enjoyable? (Examples may include scoring a point in a sport, hugging, or biting into a hot slice of your favorite pizza.)

WHAT ARE ENDORPHINS?



- These “feel good” chemicals are called endorphins.
- Your nervous system produces them to reduce pain.
- They are one type of neurotransmitter.

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SLIDE 4

Now that students have performed activities that release endorphins, they will learn what an endorphin is.

Click to display the image of the brain. Ask students if they’ve ever seen an image of a brain “lighting up” like this. What do they think is happening here?

Once students have shared their thoughts, explain that messages in the brain are transmitted, or sent, across cells. This image shows messages being sent between cells in the brain—the colors (particularly red and yellow) represent brain activity that corresponds to messages being transmitted.

Then, click the slide to reveal the text definition of endorphins. Identify that the “feel-good” chemicals produced by students’ bodies in the previous activities were endorphins. The body’s nervous system produces endorphins in response to certain sensations—mainly stress, fear, or pain. In scientific terms, endorphins block messages of pain from reaching the brain and stimulate pleasure centers in the brain. Endorphins are only one type of neurotransmitter, or chemical that sends messages through the nervous system.

WHAT ARE OPIOIDS?



- Opioids are drugs that work on the nervous system to reduce pain signals reaching the brain.
- Some opioids come from the opium poppy plant; others are made in laboratories.
- Common opioids include heroin and prescription drugs like morphine, oxycodone, and hydrocodone.

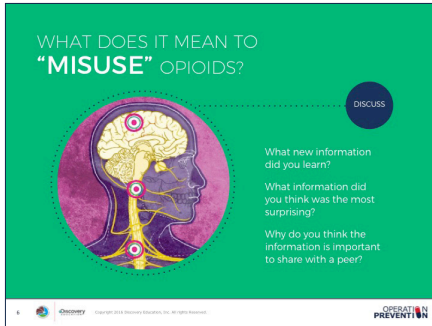
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SLIDE 5

Now that students know what endorphins are, they will learn what opioids are. Break down the word “opioid” into two parts: “opium” (a drug derived from a plant called the opium poppy) and “-oid” (meaning “like” or “similar to”). Ask students to identify a few examples of other words ending with “-oid”: for example, “factoid” (a tiny fact) and “android” (a machine that is like a human; “android is derived from the Greek root andros, which means “man”). Connect the two parts of the word so that students understand that the effects of opioids are like the effects of opium.

Click the slide to display the definition of opioids. Ask students if they know where opioids come from. Then, click to reveal that opioids can be synthesized, or made, from natural sources (like the poppy plant) and artificial sources (like chemicals in a laboratory).

Click the slide to reveal the last bullet point. Explain that morphine, codeine, and heroin are in a class of drugs called opioids. Heroin is illegal, but doctors prescribe opioids to patients in extreme pain. These people might be recovering from surgery or a serious injury. In scientific terms, these drugs reduce the intensity of pain signals reaching the brain.



SLIDE 6

Now that students have learned what opioids are, they will learn what it means to misuse them.

Click the image on the slide to open the article.

Divide the class into small groups of three to four students. Make sure each group has access to the **What Does It Mean to 'Misuse' Opioids?** article (provided on page 26), either on a digital device or a printout. Give students time to read the article and take notes on a separate sheet of paper.

Ask students to discuss the following questions in their small groups:

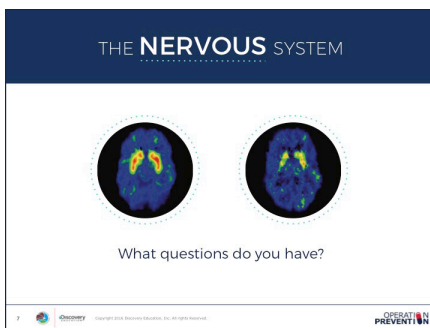
- What new information did you learn?
- What information did you think was the most surprising?
- Why do you think the information is important to share with a peer?

Then, as a whole class, share out small-group responses.

SLIDES 7-11

EXPLORE

Overview: In this section, students will compare an image or a model of a healthy, functioning nervous system to one that has been impacted by opioid misuse. Students will study the parts of a neuron and the process of neurotransmission to understand how opioids affect the body and why this matters.



SLIDE 7

Now that students know what opioid misuse means, they will examine the effects of opioids on the human nervous system.

Display the two images of the brain, which is part of the body's nervous system. Ask students to identify which image shows a healthy brain (left) and which shows the brain of a person who misuses opioids (right).

Click the slide to reveal the question at the bottom. Explain that one of the most important practices that scientists do is ask questions. Scientific questions help identify relationships and clarify information. Direct students to generate a list of questions they have about opioid misuse. Examples may include:

- What's the relationship between endorphins and opioids?
- How does misusing opioids affect the human nervous system and other body systems?
- Why is quitting opioids so difficult?

DAYS 1 & 2

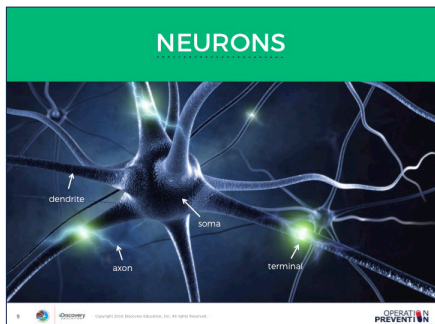


SLIDE 8

In this activity, students will use their bodies to model neurotransmission before they learn the science behind this process. Conduct the following activity in the classroom.

1. Direct students to stand around the room, a little more than an arm's-length apart. They should not be able to touch each other.
2. Ask: How can we send a message from student to student using our arms and fingers only?
3. Students should try to extend their arms and spread their fingers to send signals like sign language. Encourage other creative ways to send a message using only students' arms and fingers.
4. See if students can point out a drawback of this model. (There isn't a direct connection between students.) This will segue into the purpose of neurotransmitters.

Open up a full-class discussion to summarize what students learned from this model and what questions they have about the model.



SLIDE 9

Now that students have modeled neurotransmission, they will learn the structure of a neuron to investigate how neurotransmission works.

Depending on the grade level, explain or recall that the body's nervous system is made up of a network of tiny nerve cells called neurons. Your sense organs (e.g., eyes, ears, nose, skin) send messages to your brain about stimuli outside your body; your brain processes these messages and sends back its own messages that command your body to respond in appropriate ways. All this communication happens through extensive networks made up of neurons.

Click to display the image of the neuron, with four labeled parts. Describe how neurons are composed of several parts: soma (cell body), dendrites (branches), and an axon (fibers) leading to a terminal (bulb). Point to each part. Make connections, or encourage students to do so, between their body parts in the model activity and the neuron. (The body is the soma, the arm is the axon, and their fingertips are the terminal.) Then, ask students to predict what each part of a neuron does.

Once students have had a chance to explore the image, explain the purpose of each part. The branches (dendrites) receive messages from neighboring neurons. The middle (soma) processes the information. It creates an electrical signal (a major impulse called the action potential) and sends it down the fiber (axon) toward the bulb at the tip (terminal); the signal can then be transferred to the dendrites of a neighboring neuron. Use your finger or the onscreen pointer to trace this movement on the slide.

DAYS 1 & 2



SLIDE 10

Now that students have modeled neurotransmission and the parts of a neuron, they will learn about the process of neurotransmission (sending a message). Direct students to label a sheet of paper with Steps 1, 2, 3, 4, and 5. Alternatively, students can use five note cards.

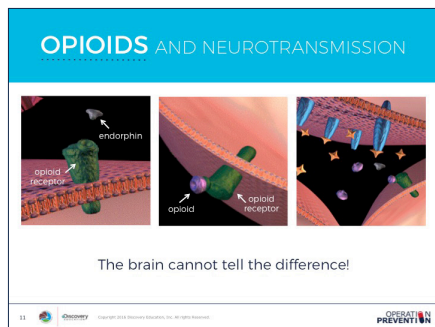
Direct students to label the five steps of neural transmission as they watch the following video. If you do not have enough time for students to do this individually and then discuss, complete the five steps together as a class.

Watch the video [“Thinking Brain – Mysteries of the Brain”](#) (4:49) together as a class. This video explains the process of neural transmission. You may wish to pause frequently for students to take notes, or plan to watch the video several times as a class.

From watching the video, students should list five steps similar to these:

1. Dendrites receive information as electro-chemical signals.
2. Soma (cell body) processes information.
3. Action potential travels down the axon of the “talking” neuron until it reaches the terminal.
4. Neurotransmitters are released into the synapse (gap).
5. Neurotransmitters bind to spines on dendrites of a “listening” neuron.

Discuss how something like a neurotransmitter would have helped students send a message during the model activity in slide 8.



SLIDE 11

Now that students understand the role of neurotransmitters, they will learn how opioids simulate natural endorphins during neurotransmission. This everyday analogy may help students better understand this process: Neurotransmitters are like “keys” that fit certain “locks” in the brain. Different keys fit different locks. Because the shapes of opioids and endorphins are similar, opioids are able to fit into “locks” intended for endorphins.

Click to display the image and ask students a series of questions to guide their inquiry:

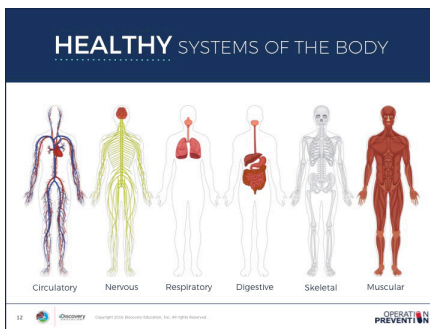
- What do you notice about the shape of each “key”—i.e., the natural endorphin and an opioid like morphine? (Circle the bottom section of each—i.e., the section that fits into the opioid receptors. They are similar.)
- The opioid receptor is the “lock” from the analogy. What type of “lock” does each key fit into? (Both natural endorphins and opioids such as morphine fit into opioid receptors.)
- What conclusion can you draw from this relationship? (The brain cannot tell the difference between natural endorphins and opioids.)

After students have drawn their own conclusions, explain that opioids mimic the action of endorphins by fitting in the same locks (binding to opioid receptor sites in the brain). This affects feelings of pain as well as a person’s overall emotional state. However, endorphins are not harmful or addictive like opioid drugs are. Endorphins come from positive activities such as exercising, laughing, and eating certain foods. Click the slide to display the text (“The brain cannot tell the difference!”).

SLIDES 12-17

EXPLAIN

Overview: In this section, students will examine how opioids impact body systems. Students will evaluate this information to describe which body systems are most impacted by opioid misuse. This will lead to a discussion around the science of physical dependency (what happens when you misuse the drug over time?) and withdrawal (what happens when you suddenly stop using opioids?).

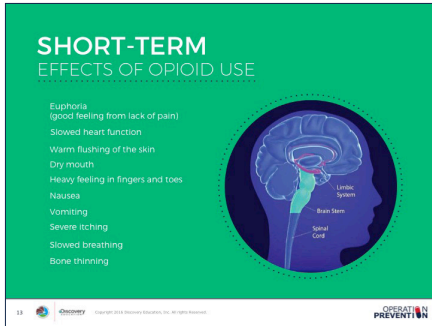


SLIDE 12

This slide is a review of human body systems. Click the slide to display the images of the bodies. Ask students to identify what each image represents.

Then, click to display the text labels. From left to right, the images show the circulatory, nervous, respiratory, digestive, skeletal, and muscular systems.

Ask students to reflect on how each body system functions in a healthy person. If time allows, each student should write a brief (six words) description of each system. (For example: Circulatory = "Heart pumps blood back and forth." Digestive = "Mouth eats, stomach digests, intestines move.")



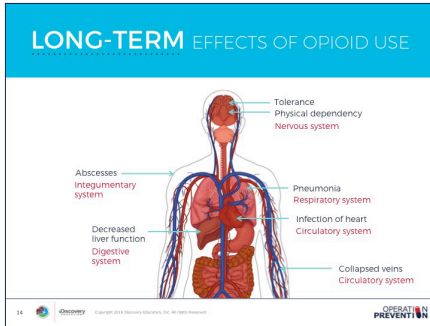
SLIDE 13

Now that students have considered healthy, functioning body systems, they will examine the short-term effects of opioid misuse on these systems.

First, ask students to consider ways that an endorphin rush affects each system in the body. Ask: What effects appear during or immediately after? What effects might appear years later? Then, direct students to organize their effects into “short-term” (seconds, minutes, hours, days) and “long-term” (weeks, months, years).

Then, display the slide. Using a large sheet of chart paper, direct students to organize the effects listed on the slide into each system: nervous (euphoria), circulatory (slowed heart function), respiratory (slowed breathing), digestive (dry mouth, nausea and vomiting), muscular (warm flushing of the skin, heavy feeling in fingers and toes, itching), and skeletal (bone thinning).

- Connect these short-term effects to the brain and nervous system by interacting with the image and saying the following:
- “Opioids can slow breathing by altering activity in the brainstem (point to this section), which controls automatic body functions such as breathing and heart rate.”
- “Opioids can increase feelings of pleasure by altering activity in the limbic system (circle these system), which controls emotions.”
- “Opioids can block pain messages transmitted through the spinal cord (draw an arrow up along this section) from the body.”



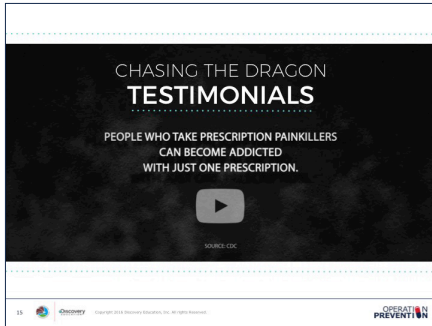
SLIDE 14

Now that students have examined the short-term effects, they will examine the long-term effects of opioid misuse on the body.

First, ask students to consider ways that opioid misuse affects other systems in the body. Ask: Which effects occur over the long term? Remind students that long-term refers to weeks, months, or years after use.

Then, display the image. **Using the Long-Term Effects of Opioid Misuse** student activity sheet (provided on page 27), direct students to organize the effects listed on the slide into each system: circulatory (infection of heart, collapsed veins), respiratory (pneumonia), digestive (decreased liver function), and nervous (tolerance, physical dependency). Note that abscesses, or sores caused by the buildup of pus, can affect a variety of systems, most noticeably the integumentary (skin).

The most important conclusion is that a long-term effect of opioid use is physical dependence. Once a person becomes physically dependent on opioids, they require increasing amounts of the drug (tolerance) and suffer withdrawal (defined in slide 17) if they cease using the drug. They also risk becoming addicted, which happens when seeking and using the drug becomes a compulsion, or the primary purpose in life. This greatly increases the risk of experiencing the other long-term effects.²



SLIDE 15

Now that students have a general understanding of how opioids initially affect the body, they will examine specific problems caused by opioid misuse. Ask, "After seeing all these effects on the body, how could opioid misuse lead to tolerance and physical dependency?"

Show students the following series of clips from the "Chasing the Dragon" documentary. Click the links in the slide notes or the links below to watch each clip.

- Clip 1 - [Physical Dependency \(1:03\)](#)
Ask: How would you define someone who is physically dependent on opioids? What behaviors suggest that someone is misusing opioids?
- Clip 2 - [Stealing \(0:24\)](#)
Ask: Why might individuals misusing opioids steal?
- Clip 3 - [Shift to Prescription Opioids \(0:47\)](#)
Ask: Why do you think physical dependency on opioids has shifted from heroin to prescription opioid misuse?
- Clip 4 - [Challenges \(1:07\)](#)
Ask: What challenges does physical dependency present for opioid misusers and their families?

After watching and discussing the segments, direct students to write or draw a conclusion of how the effects of opioids help to explain why people may misuse opioids.

SHORT-TERM EFFECTS	LONG-TERM EFFECTS
Coma	Insomnia
Drowsiness	Muscle and bone pain
Euphoria	Physical dependence
Unconsciousness	Restlessness
	Tolerance

Overdose

SLIDE 16

Now that students understand the overall effects of opioids on the body, they will compare the short-term and long-term effects of opioid misuse on the nervous system.

Ask students to imagine how a person would feel if they experienced endorphin rushes every day, multiple times per day. What would happen to the way they feel? If students have misconceptions, ask if they have ever eaten several spicy things back to back. Does the food taste less spicy over time?

Discuss the concept of tolerance: the need to take large amounts of a substance to get the same effect as before. Then, display the slide containing the table. Review each effect. Discuss the concept of physical dependence³: a normal adaptation to repeated use of a substance, which is not the same as addiction.

Click to display the text (“Overdose”) below the table. Explain that an overdose is when someone takes too much of a drug and the body starts to shut down, sometimes leading to death. Overdoses are common with opioid misuse because many prescription drugs are very strong and some people do not take them as directed. Elaborate on how an overdose can happen immediately after misusing an opioid or later:


- Because your body and brain are still growing, they are very sensitive to substances that change how your body works. Introducing even a little bit of an opioid can have larger, life-long effects. Doctors prescribe opioids in very exact doses for exact amounts of time. If the prescription isn’t meant for you, then it may be too much for your body to handle.
- When people develop a tolerance for opioids, they must take a higher dose to achieve the same painkilling effects. However, their body does not usually develop a similar tolerance to the other effects. When people take more and more opioids to feel a small good effect, the bad effects multiply and overcome the body, leading to an overdose.

Finally, distribute a blank outline (provided on page 28) of a person to each student. Ask students to label the effects of opioid misuse on different parts of the body.

WITHDRAWAL

Withdrawal occurs if drug use is reduced abruptly after physical dependence.

Symptoms include: sweating, mydriasis (dilated pupils), vomiting, tachycardia (fast heart rate), goosebumps, abdominal cramps, muscle cramps, and involuntary leg movements.



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SLIDE 17

Now that students have examined physical dependency, they will examine what happens when a person who is physically dependent on opioids suddenly stops. Ask students if they have any routines (like brushing their teeth every morning) and how their bodies would feel if this routine were interrupted.

Click the slide to reveal the definition of withdrawal. Ask students to identify the causes of withdrawal (physical dependence and tolerance) and describe the possible effects.

Then, click to display the image. Ask students to describe what they see and identify the short- and long-term effects.

Recall that physical dependence causes the body to adapt to the presence of a drug. Explain that withdrawal symptoms occur if drug use is stopped or reduced suddenly. Withdrawal may occur within a few hours after the last time the drug is taken. Symptoms of withdrawal include restlessness, anxiety, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with “goose bumps,” and involuntary leg movements. Major withdrawal symptoms peak between 24–48 hours after the last use and subside after about a week. However, some people have shown persistent withdrawal signs for many months.

Give students a few minutes to revisit their questions from the beginning of **Explore**. They may add new questions, revise existing ones, or respond to questions answered by the videos in this section.

SLIDES 18-23


ELABORATE

Overview: In this section, students will be presented with a story showing the common symptoms of an individual under the influence of opioids. Students will identify whether each example is a symptom of opioid misuse or withdrawal and identify the body system affected.

Slides 18-23 present short first-person text narratives and images of a teenager first misusing opioids, then becoming physically dependent, and finally going through withdrawal. Now that students have examined the science of opioid misuse and its effects on the body, they will examine a “true life” story of a teenager exhibiting the common symptoms of an individual under the influence of opioids. Students will identify whether each part of the story shows a symptom of misuse or withdrawal and identify the body system affected (nervous, respiratory, digestive, or skeletal). Pause after you display each slide in order to help explain the science behind each symptom.

SYMPTOM 1

“My friend gave me some of his dad’s pills. I said I didn’t do drugs, but she said it’s fine because it’s medicine. I took one pill and felt relaxed all over.”



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SLIDE 18

The first part of the story describes the teenager experiencing euphoria from opioid misuse.

- This shows an effect on the nervous system.
- The euphoria is caused by opioid molecules locking into receptors, causing the body to release endorphins, which intensify feelings of pleasure and decrease or eliminate pain.

SYMPTOM 2

“The next day, I took another pill. I felt really good again, but my chest hurt. I felt out of breath when I got back from walking the dog.”



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SLIDE 19

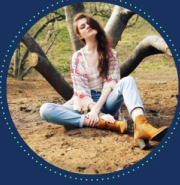
The second part describes the teenager experiencing slowed breathing from opioid misuse.

- This shows an effect on the respiratory system.
- Opioids depress, or slow, the brain’s ability to regulate the organs that cause us to breathe.

DAY 3

SYMPTOM 3

"I kept taking the pills every day after school. After a week, I noticed that my ankles popped when I walked. That weekend, the bones in my ankle really hurt, so I took two pills at once."



SLIDE 20

The third part describes the teenager experiencing bone pain from opioid misuse.

- This shows an effect on the skeletal system.
- Using opioids stimulates the release of certain chemicals, such as endorphins, but it can interfere with the release of other chemicals, such as testosterone, that are necessary to build and maintain strong bones.

SYMPTOM 4

"After several weeks, I stopped feeling as good as I did before, even when I took two pills. So I started taking three at a time."



SLIDE 21

The fourth part describes the teenager experiencing physical dependency from opioid misuse.

- This shows an effect on the nervous system.
- With frequent use, opioids wear down the "locks" (receptors) and some stop working. As a result, the person needs to take a greater amount (higher dose) to get the same pain-relieving effects.

SYMPTOM 5

"I started taking three pills at a time, but it still didn't feel the same as when I started taking them. That night, I couldn't sleep no matter what I tried."



SLIDE 22

The fifth part describes the teenager experiencing difficulty sleeping from opioid withdrawal.

- This shows an effect on the nervous system.
- Opioid withdrawal can cause a variety of negative physiological effects, including pain, nausea, and twitching; any of these effects can interfere with sleep patterns.

SYMPTOM 6

"The next day during school, I couldn't stop thinking about the pills. All my teachers looked like they knew I was taking them. I was nervous to talk to anyone, so I skipped my usual Monday hangout in the library."



SLIDE 23

The last part describes the teenager experiencing anxiety from opioid withdrawal.

- This shows an effect on the nervous system.
- When the body becomes physically dependent on opioids, it needs the drug to function. As a result, the absence of the drug can cause a person to feel anxious.

SLIDES 24-27

EVALUATE

Overview: In this section, students first summarize their learning by completing an informal matching assessment. Then, students communicate one key takeaway they learned by developing a social media campaign to reach a peer audience.

KEY TERM QUIZ

TERMS	DEFINITIONS
endorphin	when the body stops drug use
neuron	when the body needs a drug to function
opioid	when the body needs more drugs to feel same effect
physical dependency	a drug that relieves pain
tolerance	a neurotransmitter found in body
withdrawal	a cell in the nervous system

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SLIDE 24

Students will first review the key vocabulary they have learned.

Instruct students to match each key term on the left of the slide with its definition on the right. You may wish to ask a series of student volunteers to come to the board to draw a line between the columns, or have students individually write each pair of matching letter and number.

Then, display the correct answers. Clear up any confusion students have about certain terms.

PUBLIC AWARENESS CAMPAIGNS

A public awareness campaign...

- shares knowledge of facts.
- sends a positive message.
- challenges negative perceptions.
- increases support for new approaches.
- influences people to make better choices.

Possible Topics:

- Sick Children
- Refugees
- Public Health
- Disease

Discovery

OPERATION PREVENTION

SLIDE 25

Now that students have investigated opioid misuse, they will share with their peers the most important thing they learned.

This slide introduces the idea of a public awareness campaign and provides a few different examples of campaigns. Click to display the bullet points that define public awareness campaign⁴, and review it with students to make sure everyone understands what a campaign is.

Then, click to display possible topics.

- Refugees: Save the Children #HelpIsComing
<http://helpiscoming.org/>
- Sick Children: #ShareYourEars
<http://wish.org/content/disney/share-your-ears?cid=WBST-SHAREYOUREARS-MICROSITE>
- Disease: ALS Ice Bucket Challenge
<http://www.alsa.org/fight-als/ice-bucket-challenge.html>
- Public Health: Truth #FinishIt
<https://www.thetruth.com/>

DAY 3



SLIDE 26

Now that students understand the goals of a campaign, they will look at two different social media campaigns promoting awareness around prescription opioid misuse. Discuss each with students:

“When the Prescription Becomes the Problem,” created by the Centers for Disease Control and Prevention:

http://www.cdc.gov/drugoverdose/media/rx_resources.html

- The CDC encouraged people affected by prescription opioid misuse to share their stories on social media. The campaign urged people to write a six-word message, create an original picture, or record a video and post it on Facebook, Instagram or Twitter with the hashtag #RxProblem. Friends and followers would share the message.

“AWARxE Prescription Drug Safety Program,” created by the National Association of Boards of Pharmacy (NABP) Foundation:

<https://awarerx.pharmacy/>

- This campaign encouraged people to share their personal stories about prescription drug misuse. It connects website users with prescription-drug-awareness events happening across the United States.

Explain that these campaigns don’t focus on science. In contrast, the social media campaigns that students will be creating should communicate the science of opioid misuse.

Ask students to spend a few minutes brainstorming ideas for a social media campaign.

SOCIAL MEDIA CAMPAIGN DIRECTIONS

- 1 Choose one idea you learned in this lesson about opioid misuse.
- 2 Decide how your social media campaign will communicate the science of opioid misuse.
- 3 Write a hashtag.
- 4 Create an example post.
- 5 Submit this post to your teacher.

SLIDE 27

Finally, students will communicate their most important takeaway from this lesson by creating a social media campaign to raise public awareness. This is the final assignment for this lesson.

Read the directions on this slide for how students should complete the assignment. Click the slide to reveal each step one at a time.

1. **Choose one idea you learned in this lesson about opioid misuse.**
Encourage students to think about the most important thing they learned that they would want to share with a peer. Was it about natural endorphins? Physical dependency? Withdrawal?
2. **Decide how your social media campaign will communicate the science of opioid misuse.**
Students should consider whether they will include diagrams of the brain or body, videos comparing endorphins to opioids, or other visual elements that reveal the science behind opioid misuse.
3. **Write a hashtag.**
Students will likely be familiar with using hashtags, but if not, provide a brief explanation: hashtags are words/phrases that begin with “#” and accompany social media posts. They are meant to group messages on a specific topic.
4. **Create an example post.**
Encourage students to use their imagination, but their ideas should be based on evidence from the lesson. Students can use computers or paper, depending on the available technology.
5. **Submit this post to your teacher.**

Works Cited:

- ¹ Miech, R. A., Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2016). Monitoring the Future national survey results on drug use, 1975–2015: Volume I. Secondary school students. Ann Arbor: Institute for Social Research, The University of Michigan. Available at <http://monitoringthefuture.org/pubs.html#monographs>
- ² NIH Publication No. 12-4180 Printed 1999; Reprinted July 2000, February 2008; Revised April 2009; December 2012 at <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/frequently-asked-questions/there-difference-between-physical-dependence>
- ³ Prescription Drug Abuse. (2014, November). National Institute on Drug Abuse, 1-16. Retrieved from https://d14rmgtrwzf5a.cloudfront.net/sites/default/files/prescriptiondrugrrs_11_14.pdf.
- ⁴ Creating Public Awareness Campaigns That Work. (2013, June 12). Retrieved September 29, 2016, from <http://coas.howard.edu/centeronraceandwealth/news&events/06122013-creating-public-awareness-campaigns-slides.pdf>

WHAT DOES IT MEAN TO “MISUSE” OPIOIDS?

THE NIDA BLOG TEAM

May 31, 2016

Opioid pain medications are now the single deadliest drug in the U.S. There were almost 19,000 deaths from prescription opioid overdoses in 2014, compared with about 4,000 deaths back in 1999. That’s an increase of 375 percent in 15 years. Fortunately, fewer than one percent of those deaths were teens.

The number of teen deaths from opioids is much lower than for adults, because fewer teens than adults are misusing prescription opioids. Last year, NIDA’s annual Monitoring the Future (MTF) survey found that teens’ use of opioids has been decreasing in recent years. That means more teens are making smart choices about misusing opioid pills. That’s the good news.

The dangers of misuse

It’s still important to know that teens are at risk for misusing opioids. Even though the percentage of deaths for teens is low compared to adults, we still lost 76 young people in 2014 from prescription opioid overdoses, which resulted from misuse of the drug.

“Misusing” opioids could mean different things, including: taking an opioid that was prescribed for someone else (even if you’re taking it to reduce your own pain) or taking a higher dose of an opioid than you were prescribed. It can also mean taking an opioid (whether yours or someone else’s) to get high.

Opioids can bring relief—and risks

Some people may believe that because the opioid was prescribed by a doctor, that means it’s safe to take. But a prescription means the doctor wants you to take a certain amount of an opioid at specified time intervals (daily, twice daily, etc., depending on what the doctor says), and then to stop taking it as soon as you can get relief from over the counter medicines, like aspirin or Tylenol.

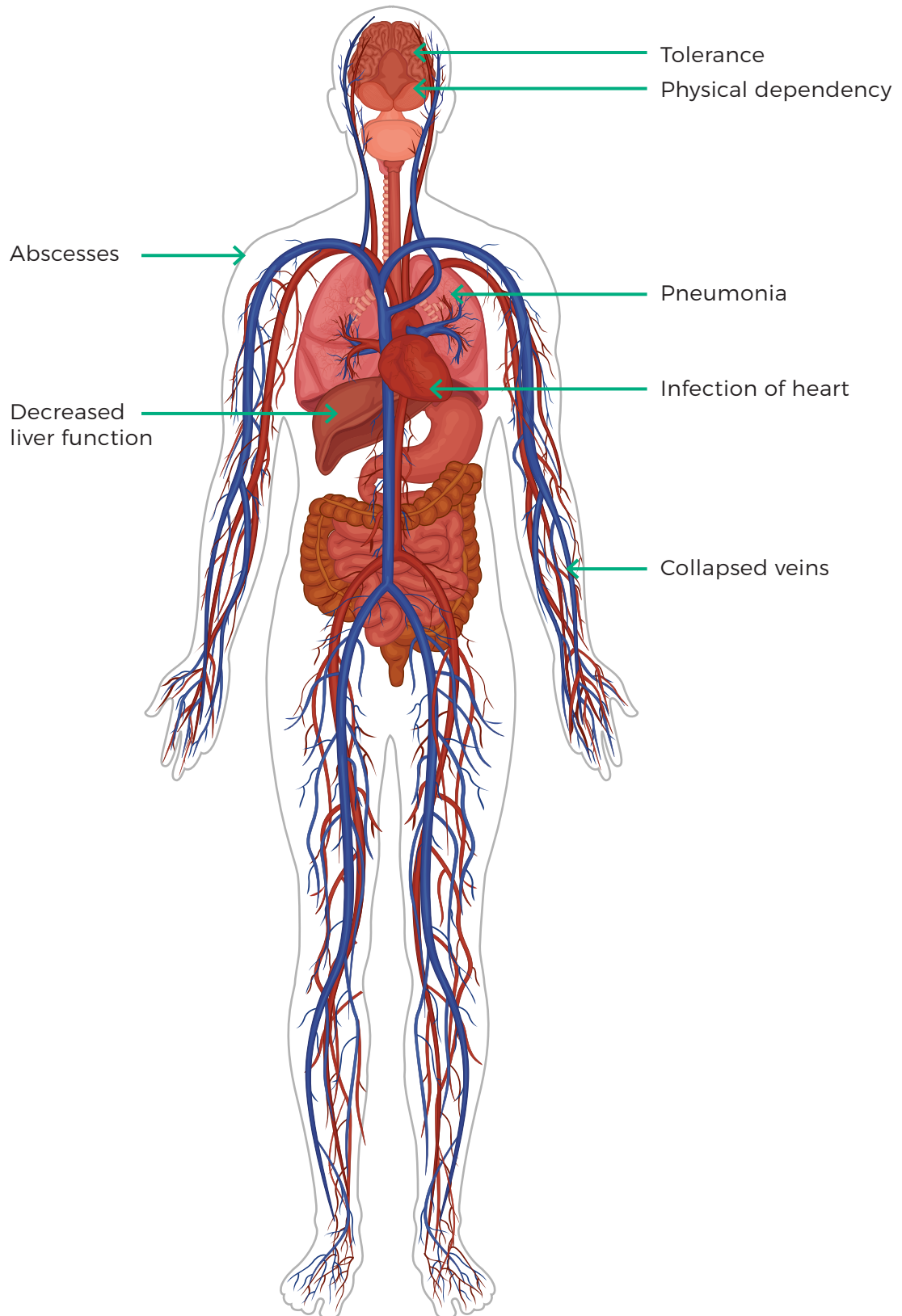


If you have leftover opioids, you should dispose of them. The Food and Drug Administration has guidelines on how to safely dispose of drugs.

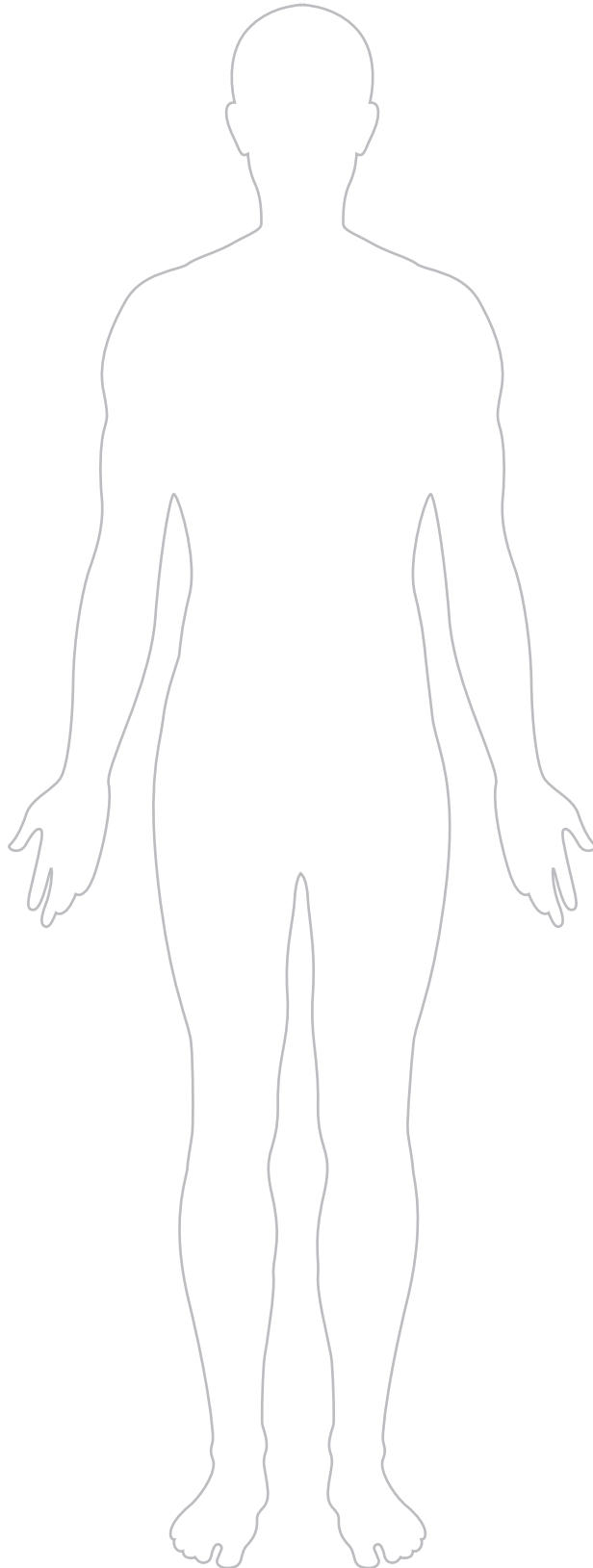
Bottom line: It’s worth remembering that opioids, like any prescription drug, can be helpful if used correctly, but dangerous if they’re not taken under a doctor’s order, exactly as directed. When it comes to teens’ misuse of opioids, do your part to keep the numbers heading down!

Adapted from: The National Institute on Drug Abuse Blog Team. What Does It Mean to “Misuse” Opioids? Retrieved from <https://teens.drugabuse.gov/blog/post/what-does-it-mean-misuse-opioids> on September 29, 2016

LONG-TERM EFFECTS OF OPIOID USE



HUMAN BODY OUTLINE



NATIONAL STANDARDS

This lesson plan has been developed based on the following national standards:

Next Generation Science Standards

PS1.B: Chemical Reactions

Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)

LS1.D: Information Processing

Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8)

LS1.A: Structure and Function

(circulatory, muscular, nervous)

In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3)

National Health Education Standards

Students will comprehend concepts related to health promotion and disease prevention to enhance health.

1.8.9: Examine the potential seriousness of injury or illness if engaging in unhealthy behaviors.

Students will demonstrate the ability to advocate for personal, family, and community health.

8.8.2: Demonstrate how to influence and support others to make positive health choices.

CCSS.ELA-LITERACY

CCSS.ELA-LITERACY.RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

CCSS.ELA-LITERACY.RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CCSS.ELA-LITERACY.RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.