

Lesson 8 | Truth or Consequences?

Effects of THC and Marijuana on the Brain and Body

Rationale

Adolescents often overestimate the percentage of their peers who use marijuana and underestimate the negative effects of the drug's use. Perception of harm is an important factor for mitigating risk. Normative education methods effectively correct misconceptions about behavior.

Leadership and Character Development

This lesson promotes these character traits:

Responsibility

Cooperation

Integrity

Objectives





Following this lesson, the student will be able to:

- Discuss the physical, mental, social, and emotional consequences of marijuana use
- Discuss the misperceptions of marijuana and its use
- Examine the effects of marijuana on the body, particularly on brain function
- Evaluate the impact of marijuana impairment on goals, activities, and occupations
- Discuss the psychological addiction aspects of marijuana use

Activities

1. Clearing the Air..... 10 minutes
2. Fact Check..... 15 minutes
3. Arrested Development..... 15 minutes
4. Rank 10 minutes

Before You Start

- Distribute the **Student Workbooks** at the beginning of the lesson.
-  Access and prepare to display the **SPECT Scans of Brain Activity** images from the Lesson Resources.
- Review the **Fact Check** game materials, lesson script on Teacher's Manual pages 159-160, and answer sheet on Teacher's Manual pages 167-168.
-  Access and read the **Fact Check Game Instructions** from your Lesson Resources.
-  Access and print the **Occupation Cards** from the Lesson Resources for use in Section 4: Rank.
-  Prepare the **Bring It Home Newsletter Issue 8** to distribute to families.

Materials

To deliver this lesson, you will need:

From Your Kit:

- Student Workbook pages 18-19
- Fact Check Game Cards
- Fact Check Game Boards (for eBook Workbooks Only)
- Game Pawns

From Your Teacher's Manual:

- Fact Check Answer Sheet, pages 167-168

From Your Lesson Resources:

- Fact Check Game Instructions
- SPECT Scans of Brain Activity – THC and Marijuana
- Occupation Cards
- **Bring It Home Newsletter Issue 8**

Additional Materials:

- Self-Adhesive Note Pads

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body



1. Clearing the Air

Notes

In our last lesson, we talked about the harmful effects of nicotine use.

What are some of the negative effects of nicotine use? 🗣️ *Wrinkles, lung cancer, yellow teeth, nicotine addiction, bad breath, heart disease, shortness of breath, emphysema, etc.* **Very good! You know nicotine use has many negative effects. How can you protect yourself from the influence to use?** ✂️ *Encourage student response.*

Today, we are going to talk about a drug that is the subject of an ongoing debate about its legal status as well as its effects on the body.

Can anyone guess which drug I am talking about? 🗣️ *Marijuana.* That's right; the ongoing discussion about marijuana makes it difficult to understand its true effects.

Let's start by thinking about everything you know and have heard about marijuana. I'm going to put you into groups and give each group a pad of sticky notes. You will have five minutes to discuss the messages and information you know or have heard about marijuana. **Write down one piece of information on each sticky note.** ✂️ *Allow time for the students to complete the activity. While the students complete the activity, write the following information on the board. On the top left, write RUMOR, and on the top right, write THE TRUTH.*



Once you have your information written down, you will select a representative from your group to place your sticky notes on the board in the appropriate category. If you think the information on your sticky note is THE TRUTH, meaning that it is a scientifically proven fact, put it below THE TRUTH. If you think the information on your sticky note is not the truth but something you have heard, put it below RUMOR. ✂️ *Allow time for the students to complete the activity.*

✂️ *Review the students' notes and read aloud the common ideas. This activity is designed to give students the opportunity to share the information they have heard or think they know about marijuana. It is not necessary to debate or teach about these ideas. The rest of the lesson will present the facts and risks associated with the use of THC.*

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body

In our lesson today, we will discuss recreational marijuana use not medical marijuana use. You've heard a lot of information about marijuana. With all of the information out there, it can be difficult to know if the information is consistent with scientific facts or just hearsay.

Where can we find reliable information about the effects of marijuana use?  *Encourage student response.* A good example of a reliable source for drug information is the National Institute on Drug Abuse (NIDA). What are examples of unreliable sources?  *Movies, friends, users, dealers, some documentaries, etc.* These sources are unreliable because they offer opinions or interpretations about marijuana that are often only assumptions or hearsay.

2. Fact Check

15 min

To evaluate your knowledge about marijuana, we are going to play a game called Fact Check. Open your workbooks to page 18. This game will help you determine if your perception matches the scientific facts about the drug.

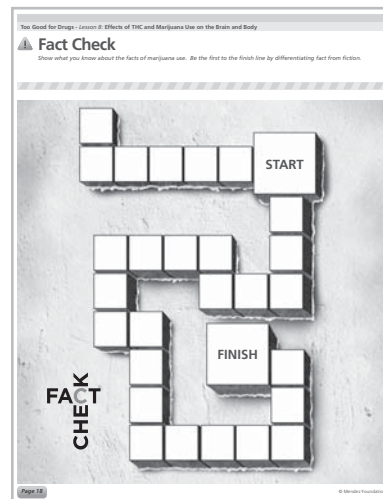
In a moment, I will put you in groups. Each group will receive game pawns, a deck of Answer Cards and a deck of Question Cards. Each group will use the game board from one player's workbook to play. The object of the game is to be the first person to reach the finish line by determining if the statements about marijuana are fact or fiction.

To set up the game, separate the Question Cards from the Answer Cards. Place the Question Cards face down on the table next to the game board. Deal each player one Fact Answer Card and one Fiction Answer Card. Place your game pawn on the start square on the game board. Select one player to be the first Announcer. Players will take turns being the Announcer in a clockwise fashion.

To play, the Announcer draws a Question Card and reads it aloud to the group. The other players must quickly decide if the answer is fact or fiction. Wait for the Announcer to finish reading the statement before answering. Answer by placing either your Fact Answer Card or Fiction Answer Card face down on the table. The Announcer will determine which player was the first to put their Answer Card down.

Teaching Tip

For classrooms using eBook Student Workbooks, game boards have been included in your kit. An image of the game board is provided on page 18 of the eBook Student Workbooks for reference. To play, distribute a game board, game pawns, a deck of Answer Cards, and a deck of Question Cards to each group.



Workbook page 18
Fact Check



Fact Check Game Cards

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body

Lesson 8 Truth or Consequences?
Effects of THC and Marijuana Use on the Brain and Body

Fact Check Answers

Marijuana is harmless because it is natural. Fiction
Many drugs are derived from plants: tobacco from the tobacco plant; cocaine from the coca plant; and heroin from the poppy plant. All of these plants are natural, but none of these drugs is harmless.

Smoking marijuana weakens the immune system. Fact
A group of California scientists examined 450 people who didn't smoke tobacco products but who did smoke marijuana every day. They found that these marijuana smokers had more sick days and more doctor visits for respiratory problems and other illnesses than did a group of people who didn't smoke at all.

Smoking marijuana slows the heart rate, so it's relaxing. Fiction
Marijuana increases the heart rate by 20-50 percent shortly after smoking. This effect can last up to 3 hours. The increased heart rate can reduce blood supply to the heart as well as cause chest pain.

Marijuana is not addictive. Fiction
Addiction can be physical and psychological. Occasional users may not yet be chemically dependent on marijuana, but psychologically they feel like they need to be high. Chronic (everyday) users, however, will develop a chemical dependency to THC. Chronic users experience withdrawal symptoms. Most teenagers in treatment are there for alcohol and marijuana addiction.

Marijuana use makes users less motivated. Fact
A lack of motivation is also called "amotivational syndrome." Marijuana causes users to lose interest in activities, school work, personal hygiene, and life in general.

The marijuana used by actors in movies and music videos is real. Fiction
Hollywood spends a lot of money making fake vampires and aliens look real; they do the same with marijuana and other drugs.

Marijuana bought from a dealer is pure and contains no other substances. Fiction
Marijuana dealers often secretly lace the drug with other substances including heroin, LSD, and cocaine.

Marijuana use affects a person's ability to safely drive a vehicle. Fact
Marijuana negatively affects a driver's attentiveness and perception of time and speed. Marijuana impairs judgment and motor coordination and slows reaction time. Marijuana users have an increased chance of being involved in and responsible for a collision.

Vaping THC has no risks. Fiction
Once THC has been combined in an oil solution, heated in a vape, and inhaled we no longer know the chemical composition. Laboratory data show that vitamin E acetate, an additive in some THC-containing e-cigarettes, or vaping products, is strongly linked to lung illness.

The THC in marijuana suppresses the appetite. Fiction
THC, the mind-altering substance in marijuana, increases the appetite causing the "munchies." The increased appetite often results in weight gain not weight loss.

Marijuana users have an increased risk for depression and schizophrenia, especially for teens with a genetic predisposition to either condition. Fact
Researchers have found an association between marijuana use and increased risk of depression, early-onset schizophrenia, and other psychotic disorders.

© Mendez Foundation Too Good for Drugs High School Teacher's Manual 167

Teacher's Manual pages 167-168
Fact Check Answers

Once all of the Answer Cards are down, the first player to answer turns over his or her Answer Card. If the answer is correct, the player moves forward two spaces on the board. If the answer is incorrect, the player moves back one space. The Announcer will then ask the other players to turn their Answer Cards over. All of the players who answered correctly will move forward one space. Players who answered incorrectly will move back one space. Once the players have completed their moves, the Announcer reads the information at the bottom of the Question Card.

If the Announcer draws a Joint Effort Card, the Announcer selects one player to answer the question. If the player answers correctly, the Announcer and the player both move forward two spaces. If the player answers incorrectly, both players move back one space.

✕ Put the class into groups of 3-6 students and distribute a set of game materials to each group.

✕ Allow time for the students to play the game.

✕ Collect the Game Materials.

3. Arrested Development

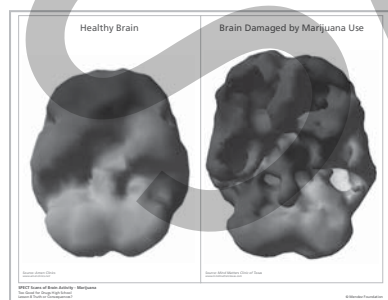


Did any of the answers in the game surprise you? ✕ Encourage student response. The questions, answers, and research supporting the answers in the game are located on pages 167-168 of this manual.

The game explored facts about marijuana and the effects its use can have on the body and brain. Does anyone recall, from the lesson on the effects of alcohol, when the brain stops developing? 🗣️ In the mid twenties. That's right; the brain continues to develop until we are in our mid-twenties. Tetra-hydro-cannabinol or THC interferes with the healthy development of the brain. Let's take a closer look at how the different areas of the brain are affected.

🎥 Display the SPECT Scans of Brain Activity.

These scans illustrate brain activity, but unlike the scans we looked at in the alcohol lesson, these scans show the underside of the brain.



Lesson Resources
SPECT Scans of Brain Activity -
THC and Marijuana

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body

Who can tell which one is the active, healthy brain and which one is less active because of marijuana use? ✂ *Encourage student response.* **The presence of THC in the brain reduces or slows down communication between the cells. What can you tell me about the holes you see in the scan?** 🗣 *They aren't really holes. They are areas of the brain that have been damaged or aren't working properly.* **That's right; they're not holes but actually brain cells that have been damaged or that have reduced activity.**

The THC in marijuana attaches to the cannabinoid receptors throughout the brain. It is this attachment that lets marijuana affect so many different functions of the body.

Look at the section in your workbook titled "Effects of THC on the Brain." This diagram identifies the areas of the brain that have large numbers of cannabinoid receptors. The chart to the right of the diagram includes the areas of the brain; what each area of the brain regulates; and how the area is affected by THC. Review the chart carefully and use the information to answer the questions that follow.

✂ *Allow time for the students to complete the activity.*

Let's review your answers. Which specific areas of the brain are useful when you are preparing for the SAT? 🗣 *Hippocampus, Neocortex, Amygdala.* **How could marijuana use affect a person's performance on the SAT?** 🗣 *They might forget to go to the test; they might struggle to recall information; they might not be able to focus on the questions; they might not be motivated to prepare for the test; etc.* **What consequences could result from lower SAT scores?** 🗣 *Losing a scholarship, not getting into the college of your choice, etc.* **The THC in marijuana impairs memory and learning by altering how information is processed in the hippocampus.**

Which specific areas of the brain are necessary to safely drive a vehicle? 🗣 *Basal Ganglia, Cerebellum, Hippocampus, and Neocortex.* **How could marijuana use affect a person's ability to drive a vehicle safely?** 🗣 *They might get into a crash; they might run a stop sign; they might get a DUI; they might hurt themselves or someone else; they might not be able to focus on driving; etc.* **Who else could be affected if someone**

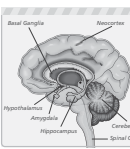
Teaching Tip

The SPECT Scan of the Brain Damaged by Marijuana Use shows changes that have occurred in the adult brain over an extended period of substance abuse.

Too Good for Drugs - Lesson 8: Effects of THC and Marijuana Use on the Brain and Body

Effects of THC on the Brain

The diagram below identifies some of the areas of the brain that contain large numbers of cannabinoid receptors. To the right of the diagram explains what each area of the brain regulates and how this area is affected by THC. Review the diagram and the table and use them to answer the questions that follow.



Area of the Brain	What It Regulates	Effects of THC
Neocortex	Conscious Thought, Spatial Reasoning, Sensory Perception	Altered Thinking, Impaired Judgment
Basal Ganglia	Innate Movement	Slowed Reaction Time, Reduced Motor Activity
Hypothalamus	Hunger and Thirst	Increased Appetite
Amygdala	Emotions, Emotional Behavior, Motivation	Causes Panic and Reduced Motivation
Hippocampus	Formation of New Memories, Memory Storage and Recall	Makes it Harder to Learn and Recall Information
Cerebellum	Pathway of Messages Between the Body and Brain	Altered Sensitivity to Pain
Spinal Cord	Balance, Posture, Coordination	Impaired Coordination

1. Which areas of the brain are useful when you are preparing for the SAT?

How could marijuana use affect a person's performance on the SAT?

2. Which areas of the brain are necessary to safely drive a vehicle?

How could marijuana use affect a person's ability to drive a vehicle safely?

3. How could marijuana use affect a person's relationships with their friends or family?

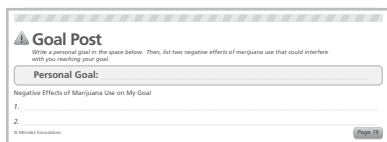
Workbook page 19
Effects of THC on the Brain

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body

drives under the influence of marijuana? 🗣️ *Family members, friends, another person who might be involved in a car crash, police officers, etc.*
It's easy to think the decision to use the drug only affects the user, but everyone the user encounters can be affected by their choice to use drugs.

How could marijuana use affect a person's relationships with their friends or family? 🗣️ *They might have fights with friends or family members; they might become paranoid that their friends are doing something mean to them; they might not trust family members anymore; family and friends might not trust the user anymore; etc.* **Marijuana use reduces or limits the motivation to go out and do things with friends and family. It can also weaken trust in relationships resulting in users disappointing or pulling away from family and ending relationships with friends who don't use.**



Workbook page 19
Goal Post

Think about how some of these negative effects can interfere with a person working to reach their goals. Look at the section in your workbook titled "Goal Post." Write down a personal goal in the space provided. This goal can be one you have already completed or one you are working toward. Then, write down two negative effects of marijuana use that could interfere with you reaching your goal.

✂️ *Allow time for the students to complete the activity and share their answers.*

4. Rank



Let's look at how marijuana use could affect various occupations.

I need eight volunteers to come to the front of the room. ✂️ *Select eight volunteers and give each an Occupation card. Line up the volunteers side by side in no particular order facing the class.*



Lesson Resources
Occupation Cards

Each of these volunteers represents an occupation. Your task is to line up the occupations according to the impact marijuana use would have on their job performance. Place the occupation whose job performance would be most affected by marijuana use on the far left and the person whose job performance would be least affected on the far right.

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body

✂ Allow several minutes for the students to direct the placement of the volunteers. Allow for the students to discuss the different occupations. Some students may say it is not possible to rank the effects of marijuana on these occupations.

Is it easy to rank the impact of marijuana use on these occupations?

💬 No. **Why are you having such a difficult time reaching a consensus?** 💬 Every occupation could be affected if the person used marijuana. **Every one of these occupations could be affected if the person used marijuana. Which job skills do you think are most impaired by marijuana use?**

✂ Allow time for the students to discuss the skills essential to the occupations and how marijuana use could impair these skills. The following points can be made in the discussion:

- Surgeon
Surgeons depend on accurate depth perception and sensitive motor skills when performing surgeries. They also need to be able to react quickly if there is a problem.
- Airline Pilot
Airline pilots are responsible for many people, not only the passengers, but also people on the ground. Pilots need good depth perception, reaction time, and concentration.
- Auto Mechanic
Mechanics need focus and concentration when working on a vehicle. Forgetting to tighten a bolt or improperly repairing a system would leave the car unsafe to drive.
- Construction Worker
Construction workers are responsible for everything from the heaviest earthmover to the smallest nail. They have to be able to focus on the smallest detail and not forget any step in the process.
- Pharmacist
Pharmacists are responsible for filling the correct prescription for the correct person. An error in dosage or labeling could prove fatal.

Notes

Lesson 8 Truth or Consequences?

Effects of THC and Marijuana Use on the Brain and Body

- *Childcare Worker* *Childcare workers are often responsible for many different children at one time. The ability to make split-second decisions and react on a moment's notice keeps children out of harm's way.*
- *911 Dispatcher* *Dispatchers must react quickly and with concern about the caller. They need to send help immediately, not whenever they feel like it.*
- *Student* *Being a student is an occupation. Marijuana use interferes with learning. If we don't have students, we won't have any of these other occupations.*

Some of you may have peers who use marijuana. You may think it doesn't negatively affect them. So far, their schoolwork, their social lives, and/or their athletic ability may not show any serious negative effects. Just because we can't see something, doesn't mean it isn't happening. We know the earth is rotating, but we can't feel it, and we certainly can't see it.

Research consistently shows that recreational marijuana use is harmful to the developing teenage body and brain. It isn't something safe to put into your body, and for this reason, it will remain illegal for teenagers to use regardless of the legal status of use for adults.

In our next lesson, we will talk about the harmful effects of street drug use and the misuse of prescription and over-the-counter drugs.

✕ *Collect the Rank Activity Materials.*

✕ *Collect the Student Workbooks.*