Instructor Pifel Date\_\_2019-2020

Program/Class Psychology Period 3&5

**State Indicator/Competency**

*Memory*

**Content Standard 2:** Storage of memory   
2.1 Describe the differences between working memory and long-term memory.

2.2 Identify and explain biological processes related to how memory is stored.

2.3 Discuss types of memory and memory disorders (e.g., amnesias, dementias).

2.4 Discuss strategies for improving the storage of memories.

**Content Standard 3:** Retrieval of memory   
3.1 Analyze the importance of retrieval cues in memory.

3.2 Explain the role that interference plays in retrieval.

3.3 Discuss the factors influencing how memories are retrieved.

3.4. Explain how memories can be malleable.

3.5 Discuss strategies for improving the retrieval of memories.

**Instructional Objective(s)**

1. Students will be able to explain the relationship of heavy marijuana use and the teenage brain discussed in the article and cite evidence with 80% accuracy

## Materials

Handout: “Heavy Marijuana Use Alters Teenage Brain Structure” – Taken from Psychology Today

Worksheet: Article Analysis

**Method of Instruction**

Individual Work

**Activities**

**1. Individual Work**

*Objectives Covered*

*1. Students will be able to explain the relationship of heavy marijuana use and the teenage brain cited in the article and cite evidence with 80% accuracy*

Use the article from Psychology Today to complete the worksheet on the back of this page.

Topics covered in worksheet:

-Marijuana use & the teenage brain

**Assessment**

Informal:

-This assignment will be graded and count for a homework grade.

Name Period 1, 8 Due

Article Analysis

TITLE OF ARTICLE:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DATE OF ARTICLE:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

AUTHOR: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DOCUMENT INFORMATION:

1. According to researchers, what happens to the teenage brain during (and even after) marijuana use?

2. Why do you think this article was written? What evidence in the document helps you know why it was written? (Please quote the article.)

3. What alternatives were given in the article to smoking marijuana?

4. Write a question to the author that is left unanswered by the article.

5. What is your opinion of the article? Explain.

Heavy Marijuana Use Alters Teenage Brain Structure

Daily marijuana use changes teenage brain structure and impairs memory function.

Published on March 30, 2014 by [Christopher Bergland](http://www.psychologytoday.com/experts/christopher-bergland) in [The Athlete's Way](http://www.psychologytoday.com/blog/the-athletes-way)

Article taken from www.psychologytoday.com

It’s common sense that being a heavy [cannabis](http://www.psychologytoday.com/conditions/cannabismarijuana) user might make someone more spaced-out and less likely to perform well on [memory](http://www.psychologytoday.com/basics/memory) tasks. Excessive chronic use of any type of drug is going to have detrimental mental and physical side effects.

In a [study](http://www.eurekalert.org/pub_releases/2013-12/nu-hmu121013.php) published in December 2013, researchers at Northwestern Medicine discovered that the developing teenage [brain](http://www.psychologytoday.com/basics/neuroscience) may be particularly vulnerable to excessive marijuana use. The researchers found that teens who smoked marijuana daily for about three years had abnormal changes in their brain structures related to working memory and performed poorly on memory tasks.

Bottom of Form

In an alarming twist, the study found abnormalities in brain structure and also identified memory problems two years *after* the heavy marijuana users had stopped [smoking](http://www.psychologytoday.com/basics/smoking) pot as [teenagers](http://www.psychologytoday.com/basics/adolescence). The researchers found that memory-related structures in their brains appeared to shrink and collapse inward, reflecting a possible decrease in neuron volume. These findings indicate that there could be long-term detriments of chronic marijuana use as a teenager.

Cannabis use has long been associated with working memory impairments. However, the exact relationship between cannabis use and working memory neural circuitry remains somewhat of a mystery.

Previous [research](http://www.medicalnewstoday.com/articles/180724.php) has found that prolonged cannabis use is detrimental to mental health. This Northwestern study is the first to target key brain regions in the deep subcortical gray matter of heavy marijuana smokers using structural MRI and to correlate abnormalities in these regions with working memory.

The Northwestern [team](http://www.psychologytoday.com/basics/teamwork) examined whether a cannabis use disorder (CUD) was associated with differences in brain structure between control subjects with and without a CUD. The study reports that the younger the individuals were when they started chronically using marijuana, the more abnormally their brain regions were structured. The findings suggest that the brain regions related to memory may be more susceptible to the effects of cannabis if abuse starts at an earlier age.

**Conclusion: Endocannabinoids and "Just Say No 2.0"**

Some people consider marijuana to be a harmless drug when used in moderation. Some doctors believe that cannabis has a wide range of medicinal benefits. That said, this Northwestern study suggests that excessive use of marijuana can alter a teenager's brain development. As [parents](http://www.psychologytoday.com/basics/parenting) and caregivers, this study serves as a reminder that it's important that we strive to keep our children from heavily abusing marijuana.

What can we do to stop teenagers from developing a cannabis use disorder? I know there are no easy answers. But as I zealot for the power of daily lifestyle habits to improve brain function, health, [happiness](http://www.psychologytoday.com/basics/happiness)... it is worth noting that aerobic exercise releases endocannabinoids which have excellent stress-reducing benefits for a teenager who may be smoking marijuana to self-medicate for anxiety.

In my book, *The Athlete's Way* I write extensively about the power of [endocannabinoids](http://books.google.com/books?id=fxvsYPt8kMQC&pg=PA107&lpg=PA107&dq=endocannabinoids+the+athlete%27s+way&source=bl&ots=oUPGPolcie&sig=v5uemwcOFkWKPFWQFQLQaFWweHU&hl=en&sa=X&ei=YACvUsOOAsr0kQfciIHABA&ved=0CC4Q6AEwAA#v=onepage&q=endocannabinoids%20the%20athlete's%20way&f=false) and other neurochemicals to create the runner’s high and state of calmness. Our body naturally makes a wide range of substances endogenously that have receptors throughout the brain which are hijacked by ‘exogenous’ [drugs](http://www.psychologytoday.com/basics/psychopharmacology). Endo- means “from within.” Endocannabinoids are your body's own cannabis, endorphins are your body's own morphine, etc.

Also, other daily habits like: maintaining a strong [social network](http://www.psychologytoday.com/basics/social-networking), playing a musical instrument, making art, certain types of video gaming, [mindfulness](http://www.psychologytoday.com/basics/mindfulness) training and [meditation](http://www.psychologytoday.com/basics/meditation) have all been shown to change brain structure in positive ways that actually improve working memory and fluid [intelligence](http://www.psychologytoday.com/basics/intelligence).

Physical activity and meditation are not a panacea for [substance abuse](http://www.psychologytoday.com/basics/addiction) or addiction. However, I believe that if we can get more teenagers rigorously working out their bodies and minds most days of the week—and realizing how great breaking a sweat and meditation makes them feel—many would get in the habit of seeking a daily "runner’s high" or zen-like state of calm instead of developing a cannabis use disorder.