

YOUR BRAIN ON ANXIETY



Grades 8-12 Your Brain on Anxiety Science & Health Education

Purpose of the Lesson:

A great deal of the stigma that surrounds mental illness exists because people don't understand or think about the science behind how the brain works. One way to reduce stigma and de-mystify the experience of mental illness is by understanding it better. In this lesson, your students will explore where exactly in the brain anxiety, an extremely common mental illness, comes from. Additionally, your students will explore how they can reduce their anxiety by stimulating the hormones that work to combat anxiety in our brains. They will brainstorm and reflect on different coping strategies they can apply in their lives to reduce the stress hormones that create anxiety and elevate the hormones that fight anxiety.

Curriculum Competencies:

Health and Physical Education

- Participate daily in physical activity designed to enhance and maintain health components of fitness (Grade 8/9/10).
- Describe how students' participation in physical activities at school, at home, and in the community can influence their health and fitness (Grade 8/9).
- Explain how developing competencies in physical activities can increase confidence and encourage lifelong participation in physical activities (Grade 10).
- Propose healthy choices that support lifelong health and well-being (Grade 8/9).
- Identify and apply strategies to pursue personal healthy-living goals (Grade 8/9/10).
- Reflect on outcomes of personal healthy-living goals and assess strategies used (Grade 8/9/10).
- Analyze strategies for promoting mental well-being, for self and others (Grade 8/9).
- Analyze how health-related decisions support the achievement of personal healthy-living goals (Grade 10).
- Assess and evaluate strategies for managing problems related to mental well-being and substance use, for others (Grade 8/9).
- Evaluate and explain strategies for promoting mental well-being (Grade 10).
- Describe the relationships between physical activities, mental well-being, and overall health (Grade 10).

After grade 10, Health Education diverges into different content areas. However, this lesson plan is still suitable for grades 11-12.

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Science

- Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest (Grade 8/9/10).
- Make observations aimed at identifying their own questions about the natural world (Grade 8).
- Make observations aimed at identifying their own questions, including increasingly complex ones, about the natural world (Grade 9/10).
- Identify a question to answer or a problem to solve through scientific inquiry (Grade 8).
- Contribute to care for self, others, community, and world through personal or collaborative approaches (Grade 8/9/10).
- Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate (Grade 8/9/10).

After grade 10, Science diverges into different content areas. However, this lesson plan is still suitable for grades 11-12.

First Peoples Principles of Learning:

- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
- Learning involves recognizing the consequences of one's actions.
- Deep understanding of place and connection to the natural world.

Video

Neuroscience of Anxiety - The Atlantic

Guiding Questions:

- Did you learn anything new about anxiety and anxiety disorders from watching this video?
- How does your new understanding of the brain help you to view mental illness differently?
- How does regular stress differ from anxiety disorders?
- How can understanding the neuroscience of anxiety begin to reduce stigma around anxiety and other mental illnesses?

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Step-by-Step Lesson Plan

Preparation: Queue up video/set up projector

- 1. Have the students watch the video “Neuroscience of Anxiety”** This can be found [HERE](#).
- 2. Pause the video and use the Guiding Questions to spark discussion.**
- 3. Split the class up into groups and have them each discuss one of these parts of the anxiety response in the brain.**

#1. Anxiety Floods Your Brain with Stress Hormones

- When you feel anxious, your body goes on alert, prompting your brain to prepare itself for flight or fight mode. In an attempt to help you fight off whatever has made you anxious, your brain floods your central nervous system with adrenaline and cortisol. These hormones tell your body that something anxiety inducing is about to happen. Its role is to help you cope with danger. In order to do that, they sharpen your senses and make your reflexes faster. In a non-anxious brain, when the danger is gone, the sympathetic part of your nervous system takes over and calms you down. But when you suffer from anxiety, you may not be able to reach that sense of calm. Instead, the rush of stress hormones causes your brain to release even more stress hormones until you're simply overwhelmed.
- When excess amounts of stress hormones flood the brain over and over again, your baseline level of anxiety may increase. You might go from having mild anxiety, which most of us experience on a day-to-day basis, to moderate anxiety. Moderate anxiety is slightly more severe and overwhelming and makes you feel nervous and agitated on a regular basis. If your brain continues to be overly sensitive to anxiety, your baseline anxiety level might become so severe that you're unable to continue thinking rationally. Panic attacks are another sign of severe anxiety. If you have moderate or severe levels of anxiety, brain maps called Quantitative Electroencephalography (qEEG) may show a large amount of high beta brain waves on the right lobe.

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#2. Anxiety Makes Your Brain Hyperactive to Threats

- Anxiety can also make your brain hyperactive to threats. When you deal with anxiety on a consistent basis, your amygdala grows larger. The amygdala is a tiny almond-shaped structure located in the limbic system, the part of your brain that deals with emotions and moods. The amygdala is like your brain's watchman, staying on the lookout for any danger or threats. When the amygdala notices potential danger, it sends signals to the hypothalamus, which triggers a fight or flight response. In the anxious brain, the amygdala is large and hypersensitive. Because of this, the amygdala sends a lot of false alarms. You can think of a hypersensitive amygdala as a watchman who cries wolf too often. An overactive amygdala sends false alarms so often that your brain senses threats even in non-threatening situations. That's why people with anxiety disorders tend to feel threatened more often than someone without such a disorder.

#3. Anxiety Can Make It Hard for Your Brain to Reason Rationally

- Anxiety weakens the connections between the amygdala and the prefrontal cortex (PFC). When the amygdala alerts the brain to danger, the prefrontal cortex should kick in and help you come up with a rational, logical response. The PFC ensures that you're capable of processing information analytically and can make informed decisions, as well as helping you solve problems. You can think of the PFC as your brain's wise counselor. In non-anxious brains, the PFC responds rationally when the amygdala sends out alerts. This process doesn't work the same in anxious brains. Instead, when the amygdala alerts the PFC to danger, the connection is weak. Thus the rational, problem-solving part of the brain isn't heard, which can lead to irrational thoughts and erratic behavior.

#4. Anxiety Can Train Your Brain to Hold Onto Negative Memories

- When you're anxious, your body is under a lot of stress. Stress shrinks the hippocampus, the part of the brain that processes long-term and contextual memory. When the hippocampus shrinks, it may become more difficult for your brain to hold onto memories. But here's the tricky part: anxiety tricks the hippocampus into thinking that memories related to anxiety are safe to store and remember. So, the few memories you do hold onto will be those related to anxiety. In other words, anxiety wires your brain to remember failure, threat, and danger. Happier memories, like those of success, achievement, and safety, are buried deep in your brain's basement.

(Source: <https://pronghornpsych.com/how-does-anxiety-affect-the-brain/>).

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4. Once they have had a sufficient amount of time to discuss them in their groups, have them share their discussion with the class. Have one student from each group present what they learned about and discussed in their group with the class. This way, they will have a chance to learn from each other and understand all of the ways anxiety impacts our brains.

5. Pull up this infographic and discuss it with your students:

<https://www.nm.org/healthbeat/healthy-tips/emotional-health/the-science-of-anxiety>.

Review it generally as a class, then hone in on the last two sections of the infographic. Look closely at the neurotransmitters and discuss which ones they have heard of, what their functions are, and how they relate to the overall experience of anxiety.

6. Explain the curriculum connections to your students. Have your students work in groups to discuss the various ways they can combat anxiety by boosting the production of hormones in their brains that reduce anxiety or reducing the stress hormones that create anxiety. For example, serotonin can be boosted by physical activity. It can also be boosted by spending time with loved ones. Have them come up with a list of ways they can cope with anxiety through neuroscience.

7. Lesson Closure. Discuss with your students how we can begin to reduce stigma surrounding mental illness by understanding it better. By looking at mental illness from a scientific perspective, we can not only find different ways to boost our mental and emotional wellbeing but also reduce stigma. Some people believe that mental illnesses aren't as real as physical illnesses. However, once we can make the connection between mental illness and neuroscience, we can see that they are just as real and impactful as physical illnesses.