



6-12 POWER Curriculum



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# Mini-unit Description and Outline

In Mini-unit 3: Power of the Brain-Body Connection, we introduce the structure of the brain, along with simple neuroscience that will help students begin to understand the functions of our brains in relation to our bodies and behavior. In the first two lessons, students will learn how different structures of the brain relate to physiological systems of the body and to the emotional needs of all humans.

A foundational understanding of various brain functions leads to lessons on the neural network, specifically how messages are passed

### Essential Questions

What is the connection between the brain and the body?

How can an understanding of our nervous system help us to manage our physical health and emotions?

What is the impact of mindfulness on the nervous system?

What is the relationship between mindfulnessand stress? between the body and the brain. The two branches of the Autonomic Nervous System, as well as the vagus nerve and its extension to the gut and the heart (which has its own neural network) are introduced.

Through conscious breathing, we learn how to adjust our relationship to one of the major elements of modern life: stress. Stress, defined by Dr. Hans Selye as "the body's response to external stimulus," is framed as neutral in nature. Some stress is good, like the stress that increases bone density or creates excitement during a ball game. Other stress is harmful, like that which accrues due to excess work, responsibilities, and environmental demands. Excess stress takes a toll on our bodies; maladies such as high blood pressure, diabetes, and depression have been linked to unsustainable levels of stress.

Mini-unit 3 concludes with a lesson on turning stress into a positive force through understanding how the sympathetic, parasympathetic, voluntary and involuntary nervous systems function. The sympathetic nervous system is considered our accelerator, and the parasympathetic is considered our brake pedal. When we become overwhelmed by stress, our brake pedal (parasympathetic) becomes impaired, and the engine keeps revving (sympathetic). Identifying how this exchange occurs in the body is a preventative tool when paired with techniques that help us slow down and regain control over our vehicle.

#### **Enduring Understandings**

The brain and nervous system are integral to every function of the body and mind.

#### **Learning Objectives**

Students will be able to do the following...

- 1 Power of the Brain-Body Connection
- Understand that the activities of the four parts of the brain are expressed in every bodily function, as well as in our ability to think and reason.
- Understand that the brain is made up of four anatomical parts.
- Identify the four parts of the brain (bolded in "Teach").
- 2 Finding Safety, Contentment, and Connection
- <sup>•</sup> Identify our three basic human needs.
- Understand how safety, contentment, and connection are correlated with brain function.
- 3 Three Functions of the Nervous SystemDescribe the functions of a neuron.
- 4 Emotions and the Vagus Nerve
- Identify the vagus nerve as the nerve that is associated with emotions

- 5 Breathing and the Nervous System
- Identify how breath is interconnected with the nervous system.
- 6 Sympathetic and Parasympathetic Nervous Systems
- Characterize and contrast the main functions of the sympathetic and the parasympathetic nervous system.
- 7 Wired for Stress
- Identify potential sources of physical, emotional, and socialstress.
- Understand how the brain and body respond to stress
- 8 Turning Stress into a Positive Force
- Understand and articulate the meaning of healthy stress

# Structuring Your Lesson

#### 1 Connect

Remind students of the content from the previous lesson.

2 Teach

Share neuroscience lessons with students.

3 Teach & Active Engagement

Ask students to keep an aspect of the day's lesson in mind as they complete a mindful movement practice.

#### 4 Movement

- Use Ocean Breathing throughout the movement sequence (instructions are in lesson one).
- Emphasize breath-movement connection throughout the movement sequence.
- End with 2-3 minutes of Guided Rest.
- Starting in lesson three, students complete a 1-2-minute mindfulness exercise after guided rest.

#### 5 Link

Briefly Review what was taught today and set up the next lesson.



### Vocabulary

Brain stem Cerebellum Cerebrum Cognizant Limbic system

# Lesson 1

# Power of the Brain-Body Connection

#### Objectives

Students will be able to do the following:

- Understand that the activities of the four parts of the brain are expressed in every bodily function, as well as in our abilities to think and reason.
- Understand that the brain is made up of four anatomical parts.
- Identify the four parts of the brain (bolded in "Teach").

#### Materials

 Image of the brain, with the four parts highlighted and clearly labeled (to be projected or distributed)—see end of lesson

# Guiding Questions

- What are the four parts of the brain?
- How do we use each part of the brain in daily activities and endeavors?

#### Connect

In this unit, we will be learning about how the brain processes physical sensations, feelings, emotions and thoughts. We will also learn about how our bodies and minds process stress, and some strategies to managestress. Each lesson includes a mindfulness practice that includes breathing, mindful movement, and guided rest exercises.

#### Teach

The main connective network linking our bodies and breath and our thoughts is called the nervous system, and the central headquarters of the nervous system is located in the brain.

The human brain weighs about three pounds and is the size of your two fists put together. (Demonstrate and ask students to mimic action with fists.) The brain and spinal cord together make up the Central Nervous System (CNS). The brain is made up of four parts: the brain stem, the limbic system, the cerebellum, and the cerebrum.

These four parts developed over millions of years in response to the human organism's changing environment. The basic needs of our ancestors 20,000 years ago are similar to ours now—food, shelter, and reproduction. But the world we exist in now is significantly different. Can you think of an example of how our modern lives differ from our ancient ancestors' lives?

The brain stem houses our survival mechanisms: respiration, heartbeat, blood pressure, digestion, elimination, and reproduction. The limbic system processes emotions and feelings of safety and

(Project or distribute illustration of brain with brain stem, limbic system, cerebellum, and cerebrum highlighted and clearly labeled.) contentment, ora lack thereof. The cerebellum literally "little brain"—is largely responsible for movement and stability. The cerebellum maintains muscle control, coordination (how yourmuscles work together), movement (walking, running), and balance. The cerebrum, also called the "cortex," is where we do all our strategic thinking, long-term planning, and empathizing. A large part of the brain is made up of the cortex, which is a feature that is unique to humans.

The brain and the body are always working together. Knowing the parts of the brain and how they function together allows us to see the relationship between the two seemingly separate, yet inseparable, entities.

#### Active Engagement

Explain to students that you are going to lead them in a sequence of movements, culminating in rest. Encourage them to follow along to the best of their ability.

Exercise 1:

Inhale through your nose. As you exhale, whisper the sound "ahh" out through your mouth. Repeat two or three times. On the second or third time, close your mouth, exhale, and send the whisper sound through your nose.

#### Exercise 2:

Fogging the mirror: Pretend that you are fogging a mirror while breathing through your mouth. Then pretend you are fogging a mirror while breathing through your nose.

### Movement

Mountain Mountain-Chair x3 Standing Side Stretch Tree Seated Cat/Cow Seated Twist Seated Mountain Guided Rest

\*Dark blue denotes new postures for thelesson.

#### Exercise 3:

Bring your hands to your ears. Press gently so that outside sounds are muffled. Concentrate on the sound of your breath as you inhale and exhale through your nose. You might notice that what you hear is similar to the sound of a seashell. Funfact: The cochlea is the part of your ear that enables you to hear this sound. The name is derived from the Latin for "snail shell," because it is spiral-shaped, like a snail shell!

With Ocean Breath, you will make a soft sound on the inhale and the exhale. If you don't find the sound right away, just keep practicing these exercises and eventually you will get it. Remember to breathe in and out the nose. If you feel tension in your face, neck or shoulders, see if you can soften those muscles and keep a relaxed approach as you learn this new technique.

From here, proceed to lead students through the movement practice.

#### Link

Take a moment to consider how you felt (physically and mentally) before you arrived on your mat and how you feel now that you've learned these simple exercises. How do you feel now, after rest?

Can you remember the four parts of the brain? They all perform different functions, but are always working together. Health and wellness practices strengthen the brain by activating the brain's main functions.

# Mini-mit The Four Parts of the Brain





### Vocabulary

Connection Contentment Mindfulness Prefrontal Safety Lesson 2

Finding Safety, Contentment, and Connection

#### Objectives

Students will be able to do the following:

- Identify our three basic human needs.
- Understand how safety, contentment, and connection are correlated with brain function.

#### Materials

- Image of the brain, with the four parts highlighted and clearly labeled (to be projected or distributed)—see end of lesson
- Brain model (if available)

# Guiding Questions

- · What does safety mean to you?
- · What does contentment mean to you?
- What does connection mean to you?
- How can mindfulness practice create, support, and enhance our feelings of safety, contentment, and connection?
- What factors do you suspect influence brain development?
- Do you think it is possible to develop your brain in new ways?

#### Connect

We've learned that the brain has four parts. Do you remember what they are (e.g., brain stem, limbic system, cerebellum, and cerebrum) and what functions they perform (e.g., survival, emotions, movement and balance, and planning)? This week we will discuss the three basic functions that are connected with those particular parts of the brain.

#### Teach

The brain is the uppermost part of our central nervous system, which is a vast network of cells that remains in constant communication with the body, regulating all of our bodily processes and functions, including those of the sense organs, which gather information from the outside world.

The brain stem, the oldest part of the brain, directs our bodily survival mechanisms, such as heart rate, circulation, respiration, digestion, and reproduction. When our survival is secure and these mechanisms are working properly, we feel safe.

The limbic system, the second oldest part of the brain, is a relay station for hunger, thirst, memory, fear, and emotions. When the limbic system is balanced, we feel content.

The prefrontal cortex is the most recent addition to the mammalian brain. "Cortex" means "bark"—the cortex is a thin layer that makes up the outer layer of the brain.<sup>1</sup> The prefrontal cortex makes up the foreground of the cerebrum, which is responsible for thinking, memory, reason, cooperative planning, social responsibility, empathy, reflection, and language. When the prefrontal cortex is functioning well, we are able to connect with ourselves and others.

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The functions of these parts show how the brain is more than just an anatomical structure. Rather, it is responsible for addressing the three basic needs all people share: the need for safety, the need for contentment (or satisfaction), and the need for connection (or community).<sup>2</sup>

Can you think of the opposite of safety? Of contentment? Of connection? When we do not feel safe, we tend to feel fear or insecurity. When we do not feel content, we tend to feel as though we are lacking. When we do not feel connected, we might feel rejected or alone.

Mindfulness can be defined as "the ability to notice what is happening as it is happening." This sounds simple, but we know from experience that it is not necessarily easy to notice what is happening as it is happening, even if we are just trying to notice what is happening in our own minds.

#### Active Engagement

As we move and breathe, I'll keep reminding you to 1) Notice when your mind has wandered away from a point of concentration (the posture, the breath, and/or the gaze); and then to 2) Bring your mind back to that point of concentration. It is not bad or wrong for your mind to wander. Mindfulness is not about determining whether what you are thinking is right or wrong. In this practice, we are simply noticing that the mind has wandered or that the mind is filled with thoughts, and then gently guiding it back to where we want or need it to be.

### Movement

Mountain-Chair × 3 Standing Side Stretch Standing Kite Tree Seated Eagle Arms Seated Sandwich Seated Cat/Cow Seated Twist Seated Mountain Guided Rest

#### Link

Now that we have mapped four of the brain's anatomical parts and described their individual and collectivefunctions, we will spendournextlesson traveling farther into the wider nervous system.



### Vocabulary

Axon Hippocampus Neurogenesis Neuron Neurological

# Lesson 3

## Three Functions of the NervousSystem

#### Objectives

Students will be able to do the following:

Describe the functions of a neuron.

#### Materials

- See images at end of lesson
  - —Image of neuron (to be projected or distributed)
  - —Image of axon (to be projected or distributed)
  - Image of brain with hippocampus highlighted and clearly labeled (to be projected or distributed)
  - Illustration of neurogenesis (to be projected or distributed)

# Guiding Questions

- What is a neuron? An axon?
- Can the human nervous system grow new neurons?
- · What is neurogenesis?
- What is the best time of life to learn a new habit, and why?
- What is the relationship between neurogenesis and mindfulness?

#### Connect

In our last lesson, we learned that safety, contentment, and connection are three fundamental human needs. Today we are going to look at how messages move through our nervous system, letting ourbrains and bodies know what to do and what and how to feel.

#### Teach

We have been exploring and discovering the connection between our bodies, our breath, and our thoughts. As we learned last week, everything from breathing to sleeping to empathizing is related to and impacted by the function of our nervous system.

The nervous system is made up of millions of microscopic cells called neurons. Our body's messengers, neurons link up with one another via microscopic branches called axons.<sup>1</sup> When we are born, our brains have been formed with almost all the neurons we will ever have, but these neurons are not all connected. Neurons forge connections through experience, repetition, and conditioning.<sup>2</sup>

Child and teenage brains are the most "plastic," meaning childhood and adolescence are the best periods of life for establishing positive, beneficial habits. Adults can generate new neurons,<sup>3</sup> but the number is typically low. One area of the brain where neurons are created into adulthood is the hippocampus,<sup>4</sup> which is related to learning and memory. As we learn and grow, neurons connect with each other to create pathways. The creation of new pathways is called neurogenesis.<sup>5</sup> For example, everything you have learned to do up until this very moment required some degree of neurogenesis.

5: Maurice A. Curtis, Monica Kam, and Richard L. Fall, "Neurogenesis in Humans," European Journal of Neuroscience, 2011. http://www.culturacientifica.org/textosudc/neurogenesis/neurogenesis\_humans.pdf.

<sup>1: &</sup>quot;Axon," Science Daily. https://www.sciencedaily.com/terms/axon.htm 2: Eric H. Chudler, "Neuroscience for Kids," University of Washington, 2016. https://faculty.washington.edu/chudler/cells.html.

<sup>3:</sup> Gage, Fred H. "Neurogenesis in the Adult Brain," The Journal of Neuroscience, 2002. http://www.jneurosci.org/content/22/3/612.full.pdf 4: "Memory, Learning, and Emotion: the Hippocampus," PsychEducation, 2014.

http://psycheducation.org/brain-tours/memory-learning-and-emotion-the-hippocampus/.

Acquiring and maintaining knowledge or skill requires an ongoing upkeep of the pathways you've already established.

#### Active Engagement

Throughout practice, keep in mind that every posture that now feels comfortable was once a brand-new shape. If a pose still seems confusing, pay close attention to the steps required to move into and out of it, as well as how your breath feels while you are holding the posture. Over time, with practice and determination, the brain and the body will absorb a distinct impression of the pose, and it just might become more natural.

#### Link

When you think about neurogenesis as the wiring that underlies your thoughts, habits, and skills, it becomes possible to imagine that you can truly participate in your brain's ongoing development. By mindfully choosing and cultivating the habits and skills you desire, you begin to mold your brain to be the kind of instrument that works best for you. In our following lesson, we will learn about another special aspect of our brilliant neurological instrument: the vagus nerve.

### Movement

Mountain-Chair × 3 Standing Side Stretch Standing Kite Twisted Chair Figure 4 Seated Figure 4 Seated Eagle Arms Seated Sandwich Seated Cat/Cow Seated Twist Seated Mountain Guided Rest Mindfulness: Easy In-Extend Out







### Vocabulary

Vagus

# **Jesson 4** Emotions and the Vagus Nerve

#### Objectives

Students will be able to do the following:

- Identify the vagus nerve as the nerve that is associated with emotions.

# Guiding Questions

- What is the vagus nerve?
- · What does vagus mean?
- What are some of the places the vagus nerve wanders through?
- · What are emotions?
- · Do scientists know where emotions come from?
- How does mindfulness practice help tone the vagus nerve?

#### Connect

In our last lesson, we learned about neurogenesis and how the brain processes and hardwires new information. Today we are going to talk about a part of our nervous system that operates largely by transmitting messages from the body to the brain.

#### Teach

Even though the brain is the most central part of the nervous system, we also have nervous systems in our heart and our gut, which function independently of the brain and send constant updates to our brain about their condition. The vagus nerve<sup>1</sup>, "vagus" means "wanderer" in Latin, delivers messages directly from the internal organs (e.g., heart, lungs, digestive tract) to the brain. In fact, 80 percent of its activity consists of this bottom-up transfer of information.

The vagus nerve is also associated with the sensing and expression of emotions. It innervates the vocal cords and modulates how we change our voices to express emotion; our faces, where we convey emotion; and courses along our hearts, where we often feelemotions.<sup>2</sup>

Emotions are triggered by a single event or series of events, like seeing a beautiful sunset or hearing a moving piece of music. Our brains register our emotions, but scientists don't fully agree on how and why emotions are produced.<sup>3</sup> Recent research shows that the organs in our body, not just our faces, are affected by and involved with the production and experience of emotional states. Stress, for example, which might derive from feeling overwhelmed or frustrated, can cause physical symptoms, such as stomachaches, headaches, or restricted

<sup>1:</sup> Christopher Bergland, "How Does the Vagus Nerve Convey Gut Instincts to the Brain?", PsychologyToday, 2014. https://www. psychologytoday.com/blog/ the-athletes-way/201405/how-doesthe-vagus-nerve-convey-gut-instincts- the-brain.

<sup>2:</sup> David DiSalvo, "Forget Survival of the Fittest: It Is Kindness That Counts,"

ScientificAmerican, 2009. http://www.scientificamerican. com/article/forget-survival-of-the-fittest/

<sup>3:</sup> Antonio R. Damasio, "The Science of Emotion," Library of Congress. http://www.loc.gov/loc/brain/emotion/Damasio. html.

respiration. Conversely, feelings of love, gratitude, and compassion can actually support heart health.<sup>1</sup>

#### **Active Engagement**

Our guided rest routine is one of the best things we can do for the health of the vagus nerve. When the vagus nerve is relaxed, strong emotions are quelled and stress is reduced. Every time you exhale, especially every time you exhale lengthily, the vagus nerve is toned, or refined.

#### Link

Today we explored the nervous system in depth through the lens of the vagus nerve. Health and wellness practice gave us an opportunity to tone our vagus nerves through long, concentrated exhalation. In our next lesson, we'll explore why the vagus nerve responds so favorably to mindful movement and breathing.

#### **Closing Routine**

Reinforce the Closing Routine established in the first days/weeks of class.

### Movement

Mountain-Chair × 3 Standing Side Stretch Standing Kite Twisted Chair Figure 4 Eagle Desk Down Dog Seated Figure 4 Seated Cat/Cow Seated Twist Seated Mountain Guided Rest Mindfulness: Easy In-Extend Out

<sup>1:</sup> Patti Neighmond, "Gratitude Is Good For The Soul And Helps The Heart, Too," National Public Radio, 2015. http://www.npr. org/sections/health- shots/2015/11/23/456656055/gratitude- isgood-for-the-soul-and-it-helps-the- heart-too 2: Manuela Lenzen, "Feeling Our Emotions," Scientific American, 2005. http://www.scientificamerican.com/ article/feeling-our-emotions/



### Vocabulary

Accelerator Autonomic Brake pedal Central nervous system Peripheral nervous system Physiological

# Lesson 5

# Breathing and the Nervous System

#### Objectives

Students will be able to do the following:

Identify how breath is interconnected with the nervous system.

#### Materials

- See images at end of lesson (to be projected or distributed)
  - -Illustration of the nervous system
  - -Illustration of a neuron
  - -Illustration of anaxon
  - -Illustration of the brain
  - -Illustration of the heart
  - —Illustration of thegut

# Guiding Questions

- · What part of the brain controls breathing?
- What is the name for automatic functions of the brain stem?
- How can we influence an autonomic function?
- How might our breath patterns reflect our emotional states?
- Can certain breathing techniques help us change our emotional states?
- What are two wellness practices that support brain health?
- What is the brake pedal of the nervous system called?
- What is the accelerator of the nervous system called?

#### Connect

The vagus nerve, which we learned about in our last lesson, is a nerve that is associated with emotion. Emotions show themselves in our bodies in the form of sensations. How does anxiety feel in your body? How do happiness or excitement feel in your body?

Have you ever noticed a change in your breath or heart rate depending on your mood? How does your breath feel when you are angry? What happens in your heart? When we are in a state of anger, and our breath is shaky and our hearts are racing, it tends to be easier to say something hurtful or reactive. Have you everfelt so overwhelmed by an emotion like anger that you snapped and said or did something you later—or immediately—regretted? In this lesson, we will learn how and why we can use the breath as a guide to avoiding emotional mistakes.

#### Teach

The act of breathing directly affects our nervous systems. Breathing, or respiration, is ruled by the brain stem. Though it is an "autonomic" function, it is also something that we can modulate by breathing consciously. Therefore, it is one of the most direct ways to access our nervous systems.

We can use the breath to gauge what and how we are feeling. When we are angry, we might hold the breath. When we are sad or crying, the breath might become jagged. When we are relaxed or asleep, the breath will be calm, deep, and smooth.

We can also use the breath to interpretor influence the way we feel physically, mentally, and emotionally. The breath is connected to the nervous system in the same way that an accelerator and a brake pedal are connected to a car. Inhaling accelerates, and exhaling brakes. When we need to psych ourselves up for something, we take a deep breath. When we need to relax, taking long, slow exhales will make us feel calmer. When we are upset, focusing on the exhalation is most useful.<sup>1</sup>

#### **Active Engagement**

In our health and wellness practice, every action is linked with either an inhalation or an exhalation. As we move into and out of postures, we inhale (usually during upward or expansive movements) and exhale (usually during downward or contracting movements) deliberately. The physical actions of the limbs and trunk are wedded to the breath, and the breath is wedded to the nervous system. Thus, health and wellness practice is working not only on a musculoskeletal level, but on a physiological and neurological level as well.

#### Link

Today we dug deeper into the kinship between the breath and the nervous system. In our next lesson, we will examine the two main parts of the autonomic nervous system.

### Movement

#### Mountain

Mountain-Chair × 3 Chair Pose Twist & Forward Bend Stork Eagle Desk Down Dog Seated Sandwich Seated Cat/Cow Seated Twist Seated Mountain Guided Rest Mindfulness: Mindful Listening

# Mini-mit Lesson 5 Handout





### Vocabulary

Autonomic nervous system Parasympathetic nervous system Sympathetic nervous system

# Lesson 6

Sympathetic and Parasympathetic Nervous Systems

#### Objectives

Students will be able to do the following:

 Characterize and contrast the main functions of the sympathetic and the parasympathetic nervous systems.

#### Materials

 Illustration of the sympathetic and parasympathetic nervous systems as they are located along the spinal column—see image at end of lesson

# Guiding Questions

- What is the sympathetic nervous system, and when should it be dominant?
- What is an example of a situation that might trigger a fight response?
- What is an example of a situation that might trigger a flight response?
- What is an example of a situation that might trigger a freeze response?
- · Under what circumstances do we want our parasympathetic nervous systems to be dominant?
- How can mindfulness help us detect the dominance or overactivity of either branch of the ANS?

#### Connect

Last time we met, we elaborated upon our ongoing conversation on the relationship between the breath and the inner workings of our bodies. This week we will go a little deeper into our study of the sympathetic and parasympathetic branches of the autonomic nervous system.<sup>1</sup>

#### Teach

There are two branches of the autonomic nervous system that are functioning all the time: the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS). "Autonomic" means "involuntary." The sympathetic nervous system rules everything in our body that expands, or moves toward activity. The parasympathetic nervous system rules constriction and rest. Dilation in the pupils, for example, occurs via the sympathetic nervous system, while constriction in the pupils occurs via the parasympathetic.

We live in a fast-paced, technology-driven world, so our sympathetic branch is activated more often than the parasympathetic one. Wellness practices counter unnecessary activation of the sympathetic nervous system through even breathing, long exhalations, deep rest, and the repetition of positive, peaceful thoughts.

The sympathetic nervous system provides the fuel required to engage with and take care of circumstances outside the body.<sup>2</sup> In a sympathetic state, the body does not have the energy it needs to heal from sickness or injury, digest food or information, or restore itself. In order to recover from and prepare for our interactions with our external environments, the parasympathetic system must have the upper hand.<sup>3</sup> In a parasympathetic

<sup>1:</sup> Eric H. Chudler, "Autonomic Nervous System," Neuroscience for Kids, University of Washington, 2014. https://faculty. washington.edu/chudler/auto. html.

<sup>2: &</sup>quot;Sympathetic Nervous System," Encyclopedia Britannica, 2016. http://www.britannica.com/science/sympathetic-nervous-system

state, our inhalations and exhalations become smooth and quiet and the nervous system becomes calm.

In our last lesson on breathing and the nervous system, we established that the inhalation is our accelerator, while the exhalation is our brake pedal. Considering everything we've learned about sympathetic and parasympathetic duties, which branch of the autonomic nervous system do you think serves as our accelerator? Our brake pedal?

#### Active Engagement

Throughout our movement practice, keep track of which poses involve sympathetic engagement and which poses involve parasympathetic engagement. Also notice if and how your inhalation boosts your energy, while your exhalation winds you down.

#### Link

By mindfully tuning in to what is happening within us and around us, we can learn to regulate our emotions and reactions, thus avoiding unnecessary or unwanted stress. Begin to hone your awareness of your own autonomic nervous system. Notice when you feel rushed, energetic, hyper, or worried—that's sympathetic. Notice when you feel relaxed, at ease, mellow, or unperturbed—that's parasympathetic. Which one is turned on more often? How can mindfulness help us detect the dominance or overactivity of either branch of the ANS? In our next lesson, we will begin to discuss stress as a natural, physiological process.

### Movement

Mountain Chair Pose Twist & Forward Bend Figure Four Stork Whirligig Desk Down Dog Seated Eagle Arms Seated Eagle Arms Seated Sandwich Seated Cat/Cow Seated Twist Seated Mountain Guided Rest Mindfulness: Attitude of Gratitude Mini-unit Lesson 6 Handout





### Vocabulary

Adrenaline Cortisol Stress

# Lesson 7

## Wired for Stress

#### Objective

Students will be able to do the following:

- Identify potential sources of physical, emotional, and social stress.
- Understand how the brain and body respond to stress.

# Guiding Questions

- What does physical stress feel like in the body? In the mind?
- What does mental stress feel like in the body? In the mind?
- · What is adrenaline?
- What is cortisol?
- What are some techniques for helping the body return to a state of homeostasis?
- How can stress be harmful? Helpful?
- · How can stress hormones become toxic?

#### Connect

In this lesson we will start learning about the physiological purpose of stress. The nervous system uses stress in order to respond to the world around us. Some stress is good, some stress is bad—it all depends on how much of it there is, what form it takes, and where it is directed.

#### Teach

We tend to think of stress as a negative force, but it is actually one of nature's most essential processes. Stress initiates and responds to movement in the body. When we get up to walk across the room, our bodies release two hormones: cortisol and adrenaline. These hormones carry the messages that let our bodies know it's time to perform an activity. Our bodies then respond to these messages by increasing our heart rates and shifting the rhythm of our breath everso slightly, among other things. <sup>1</sup> Cortisol and adrenaline are also released when our environments demand that we are alert and focused.

Certain types of uncertainty fuel the stress response in a fun way. This is one reason why so many people like action movies and video games. The right dose of uncertainty or challenge can be exhilarating. It is possible, however, for the nervous system to become accustomed to a constant flow of cortisol and adrenaline. This is what's become known as feeling stressed out.

There are particular places in the brain where excess stress hormones can get stuck. These are the prefrontal cortex (PFC), related to our ability to reason, plan, and respond, the amygdala, and the hippocampus. The amygdala and the hippocampus reside within our limbic system and are related to fear and memory. When stress hormones run rampant, the PFC becomes temporarily impaired, and the limbic system can become overactive. The impressions left by stress are a feature of our survival instinct. We want to perceive and respond appropriately to danger. But we also want to be aware of when our bodies and minds are anticipating danger that has never been or is no longer present. When we imagine a threat, the body takes a cue from the mind. In these instances, it helps to understand the relationship between thought-based stress and how the body manifests that stress.

Being able to mindfully identify stress is one of the key factors to effective self-regulation.

#### **Active Engagement**

Exercise and mindfulness practices help flush excess cortisol out from our systems. If you feel an inkling of stress before we get our bodies moving, notice if there is any reduction in stress during or after rest.<sup>2</sup>

#### Link

Mindfully identifying your physical and emotional reactions to stress is a learned skill. If you work on developing this skill every day, you will gradually become more attuned to your needs. This mindful awareness begins by simply taking a breath and acknowledging to yourself or others, "I need a moment," "I need to sit," or "I need to lie down" before stress throws you too far off course. Once you can identify that there is too much going on for you, you can take a step back and take a break to stretch, breathe, and rest.

### Movement

Mountain Chair Pose Twist & Forward Bend Stork Whirligig Warrior 3 Seated Figure 4 Seated Sandwich Seated Twist Seated Mountain Guided Rest Mindfulness: Toking in the Good



### Vocabulary

Challenge Resilience Trigger

# <u>Lesson</u> 8 Turning Stress into a Positive Force

#### Objectives

Students will be able to do the following:

 Understand and articulate the meaning of healthy stress.

# Guiding Questions

- How can we distinguish between healthy and unhealthy stress?
- Whataresomewaysthatwecanturnpressure into healthy stress?
- Can you name some wellness practices that help build resilience?
- How does healthy stress activate and strengthen the mindfulness muscle?
- How does healthy stress build stronger muscles and bones?
- How does mindful breathing exert enough stress to fortify the lungs?

#### Connect

In our last lesson, we learned that stress hormones can become toxic when produced and circulated in high doses. In our current lesson, we will learn how to divert or modify stress. Once we understand how to manage stress through self-regulating, self-care techniques, we can actively participate in bringing the mind and body toward balance.

#### Teach

Health and wellness practices offer an effective method for stress management. In general, exercise encourages circulation of the blood and brings oxygen to every cell of the body, including our brain cells, making it one of the best ways to flush out excess stress hormones. Our breathing techniques reduce the feelings of anxiety and upset that often accompany a sense of being stressed out, and mindfulness practice helps us listen in to what we feel and need.

Do you think any or all of these practices movement, breathing, and mindfulness—actually requirestress to be effective? It's true—we must apply stress to our bodies in order to become strong and more flexible, just as we must breathe intentionally in order to increase our lung capacity. And after all, we can't flex our mindfulness muscle without a little mental weight.

Through changing our perception of stress, we can take a different approach to the things that usually make us feel stressed out, like homework, tests, and social pressures. We might still feel challenged by these aspects of daily life, but we can rise to the challenges and open ourselves to the possibility of learning and growing. Some stressful or challenging circumstances can actually give us the opportunity to set the bar higher, recalibrate our minds and bodies, and develop resilience to conditions that used to knock us off course.<sup>1</sup>

#### Active Engagement

During today's practice, bring your attention to how you experience healthy stress in your body, breath, and mind. What does stress feel like in the muscles? On the joints? How does Ocean Breath work your nose and lungs in a way that helps you breathe clearly and deeply? How does distraction cause a bit ofmental stress, and how does this stress activate your mindfulness muscle?

#### Link

Over the course of this unit, we have unpacked parts of the brain, branches of the nervous system, the physiological process of stress, and some of the mental, emotional, and physical effects of stress. We have also learned how to participate in seemingly automatic events and mechanisms within our bodies. Our wellness practices can help us become more attentive and responsible participants in our own health.

### Novement

Mountain-Chair × 3 Tree Stork Eagle Warrior 3 Seated Sandwich Seated Cat/Cow Seated Twist Seated Mountain Guided Rest Mindfulness: Toking in the Good

# Mini-mit Posture Guide

This posture guide provides a basic overview of the postures included in the Mini-unit.







45 6-12, POWER CURRICULUM | MINI-UNIT © 2018 Pure Edge, Inc.

### Sequences

Mountain-Chair



Chair Pose Twist & Forward Bend



# Mini-mit Glossory

#### Α

Accelerator: something that brings about an increase in speed

Adrenaline: a hormone secreted by the adrenal glands, especially in conditions of stress, increasing rates of blood circulation, breathing, and carbohydrate metabolism, and preparing muscles for exertion

Autonomic: involuntary or unconscious

Autonomic nervous system: the part of the nervous system responsible for control of the bodily functions not consciously directed, such as breathing, the heartbeat, and digestive processes

Axon: the long, threadlike part of a nerve cell, along which impulses are conducted from the cell body to other cells

#### В

Brain stem: the central trunk of the mammalian brain, consisting of the medulla oblongata, pons, and midbrain, and continuing downward to form the spinal cord

Brake pedal: the pedal used by a driver to operate brakes in order to slow down or stop a vehicle

#### С

Central nervous system: the nervous system within the brain and spinal cord

Cerebellum: the part of the brain at the back of the skull in vertebrates that

coordinates and regulates muscular activity

Cerebrum: the principal and most anterior part of the brain in vertebrates, consisting of two hemispheres, which is responsible for the integration of complex sensory and neural functions and the initiation and coordination of voluntary activity in the body

Challenge: a task or situation that tests someone's abilities

Chronic: persisting for a long timeor constantly recurring

Cognizant: having knowledge of or being aware of something

Connection: a relationship in which a person, thing, or idea is linked or associated with something else

Contentment: a state of happiness and satisfaction

Cortisol: a steroid hormone produced by the adrenal cortex

#### Н

Hippocampus: the elongated ridges on the floor of each lateral ventricle of the brain, thought to be the center of emotion, memory, and the autonomic nervous system

#### Ι

Involuntary: done without will or conscious control

L

Limbic system: a complex system of nerves and networks in the brain, involving several areas near the edge of the cortex concerned with instinct and mood, that controls the basic emotions (fear, pleasure, anger) and drives (survival)

#### Μ

Mindfulness: the quality or state of being conscious of or aware of something

#### Ν

Neurogenesis: the growth and development of nervous tissue

Neuron: a specialized cell transmitting nerve impulses

Neurological: of or relating to the central and peripheral nervous systems

#### Ρ

Parasympathetic nervous system: the branch of the autonomic nervous system that serves to lower heart rate, increase intestinal and glandular activity, and relax muscles

Peripheral nervous system: the nervous system outside the brain and spinal cord

Physiological: the functions and activities of a living organism and its parts

Prefrontal: in or relating to the foremost part of the frontal lobe of the brain

#### R

Resilience: the ability to bounce back from a challenge or setback

#### S

Safety: the condition of being protected from or unlikely to cause danger, risk, or injury

Stress: pressure or tension exerted on a material object; a state of mental or emotional strain resulting from adverse or very demanding circumstances

Sympathetic nervous system: the branch of the autonomic nervous system that serves to accelerate heart rate, constrict blood vessels, and raise blood pressure

Т

Trigger: to cause an event to happen or exist

Toxic: poisonous, noxious, dangerous

#### V

Vagus: each of the tenth pair of cranial nerves, supplying the heart, lungs, upper digestive tract, and other organs of the chest and abdomen

Voluntary: done, given, or acting of one's own free will



### Mindfulness Guide

#### Easy In, Extend Out

Breathe in naturally. Breathe out slowly, making the exhalation longer than the inhalation.

#### Guided Rest

(Can be practiced lying down or sitting up.) Feel your body lying down or sitting, resting. Feel your feet resting. Feel your legs resting. Feel your hips resting. Feel your belly and your back resting. Feel your chest and your shoulders resting. Feel your arms resting. Feel your hands resting. Feel the muscles of your neck and face resting. Feel your eyes, ears, nose, mouth, and skin all resting. Feel your whole head resting. Feel your brain resting. Optional: Begin with the head and work down toward the feet.

#### Mindful Listening

Breathing in and out mindfully, tune into the sounds outside the room. Once you feel as though you've observed all the sounds outside the room, move your awareness to the sounds inside the room. After calmly noticing sounds inside the room, hear the sounds within your own body (thoughts, heartbeat, breath, digestion).

*Optional:* Repeat steps in reverse, beginning with the body and progressively expanding awareness to sounds inside and outside the room.

#### Taking in the Good

Begin by taking 20-30 seconds to focus on a positive, reassuring, or joyful thought or memory. Observe any thoughts, feelings, or physical sensations that emerge during or after this exercise. Eventually work your way up to spending a whole minute or two on taking in the good. The exercises used within the Pure Edge, Inc. Health and Wellness Program are based on tested practices. Yoga-based exercises have been shown to have many benefits for young people, including reduction of stress and anxiety;1-3 increase in selfregulatory capacities,<sup>4</sup> including decreased anger;<sup>5,6</sup> increased ability to maintain focus;<sup>7</sup> reductions in negative affect,<sup>1,3</sup> depression,<sup>5</sup> and body dissatisfaction,8 and reduction of negative behaviors.5 Physically, yoga has been shown to enhance cardiovascular fitness,9-11 balance,<sup>12,13</sup> and grip strength.<sup>14</sup> At least one study has shown that the position we hold our bodies in has a direct correlation to raising levels of confidence, risk-taking, and competence, lowering cortisol levels, and configuring the brain to sensibly cope with stressful situations.<sup>15</sup>

While participating in this program, children will exercise and connect with their own bodies while increasing their connection to and understanding of the world around them. The simple, regulated breathing exercises help students relax by focusing on their breath and the simplicity of the moment. Each session includes relaxation, which gives students a break from their full, and often stressful, school days andlives.

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