

## **The Big Test: How We Experience Short-Term Stress (50 minutes)**

### **Section**

Your Life

### **Investigative Questions**

What is stress and what causes it? What are the physical and mental ways that our bodies respond to a stressful situation?

### **Description of Content**

In this activity, teachers will induce mild stress in students by announcing they are about to have a quiz that will be a major part of their grade. Once students learn that this is not true, they will describe their physical and mental changes in response to this stress.

### **Relevant Standards**

This activity fulfills [science and health education standards](#).

### **Objectives:**

Students will:

- Experience and describe a situation of short-term stress
- Record and analyze their physical and mental reactions to the stressful situation
- Make generalizations about how humans react to short-term stress, including that different people respond to stress in different ways

### **Ideas and Behaviors Common Among Students**

This activity offers information from the literature on [ways your students may already perceive stress and act on stressors in their lives](#).

### **Materials**

- Student Reproducible: *How Do We Respond to Stress?*

### **Safety**

Observe normal classroom safety procedures for this module.

### **Teacher Background**

We all experience stress every day. Causes of stress are many—the sick child who needs to go to the doctor before the end of the work day, the flat tire that makes us late to a meeting, the unannounced evaluation by your principal. And in many cases, stress can be positive—giving that little extra push that helps you perform your best.

Our ancestors responded to the stresses they faced (wild animals, natural disasters, starvation when there was no food available) with a “fight or flight” response. In other words, they either ran away from the stress or turned to combat it directly.

Today, our stress isn't caused by a wild animal that wants to eat us for dinner. (Although the lack of time to buy something for dinner may cause stress.) For your students, schoolwork and exams, a desire to "fit in," and peer and family relationships have replaced running away from predators as the main activators of the biological stress system.

Research to develop the *BAM! Body and Mind*<sup>TM</sup> Web site showed that kids and teens are very concerned about stress in their lives and interested in learning how to manage it. Parents are interested in helping their kids manage stress as well.

According to the National Institutes of Health and many other sources, the stress symptoms we feel today are because our bodies still go through that "fight or flight" response. Different people respond to stress in different ways. It may cause signs such as sweaty palms or a dry mouth when you are nervous. It may give a person knots in the stomach after an argument with a friend.

There are many signs of stress. They include both physical reactions (e.g., rapid heartbeat, cold hands) and mental reactions (e.g., anger, confusion, inability to concentrate). Of course, not everyone has the same response to stress. Certain signs of stress are completely normal, and they are a signal that your body is working the way it should. Once things settle down, the body turns off the stress response. Other, continued signs of stress signal a long-term problem.

For a good explanation of the physical responses to short-term stress that you can use with your students, visit the *BAM!* Web site at [www.bam.gov/sub\\_yourlife/yourlife\\_gotbutterflies.html](http://www.bam.gov/sub_yourlife/yourlife_gotbutterflies.html). The physical response to stress is explained more thoroughly in another *BAM!* classroom activity, "The Body-Mind Connection of Stress," available at [www.bam.gov/teachers/stress\\_body\\_mind.html](http://www.bam.gov/teachers/stress_body_mind.html).

## **Procedure**

*Engagement* (5 minutes)

One of the best ways to get kids to think and talk about stress is to have them experience the feeling themselves. In this lesson, you will set up a situation (with a bit of acting skill on your part) that causes stress in your students.

1. (Teacher role play) In a very serious tone, ask students to be quiet and to pay attention. Then, announce that in 2 minutes, they will be taking a test that will count for 50 percent of their grade for this marking period. Tell them to get out pencil and paper and prepare themselves for this test.
2. Give students a minute to absorb what you are saying. Maintain a calm but serious demeanor. Do not answer any additional questions. If students ask questions, simply repeat, "Get out paper and pencil and prepare for a test."

3. After a minute or so, turn your back to them as if you are going to get the question sheet for the test. Then turn around slowly and smile. Tell them this was a science experiment aimed at getting them to feel the effects of stress.

*Exploration (15 minutes)*

1. Now say to students, “Close your eyes and think about your reactions to my announcement about the test. Listen to your body. What did you feel physically? Now think about your mind. What did you think? What emotions did you feel?”
2. Tell students to make two columns on their paper. Label one “Physical” and one “Mental.” Have them take two or three minutes to jot down everything they felt and thought.
3. Explain to students that what they experienced is short-term stress. They might think of it as the “fight or flight” response. The stress response is a way our bodies are prepared for quick action, which is why the feeling goes away once whatever was stressing you out passes! It is normal to have both physical and mental responses to stress.
4. Now put students in groups of 3 or 4. Tell them that they are going to talk about their responses to short-term stress with other members of their group. Give each group a copy of the student reproducible, *How Do We Respond to Stress?* Ask students to list each of their responses to the stress of the exam. If more than one person had the same response, keep track of the total number of students in the group who had that reaction. Point out that people have different responses to stress, and that they should not be surprised if they had a reaction that was different from their neighbor.

A group’s description might look like this:

Physical

Rapid heartbeat 2  
Dry mouth 1  
Stomachache 1  
Shallow breathing 1  
Sweaty palms 1  
Queasiness 1

Mental

Feeling overwhelmed 1  
Confusion 2  
Anger 3

*Explanation (15 minutes)*

1. Ask groups to report their findings and write them on the board. Point out that for many people, understanding what’s happening in their bodies—what we’ve just learned—makes them less self-conscious about their own physiological reactions to stress and can even relieve those symptoms.
2. Discuss the following questions with students:

- What seem to be the most common physical reactions to stress? Did everyone in your group experience each of those physical reactions? (While there are several common reactions—faster heartbeat; nausea, which some people call “butterflies;” sweating—not everyone has the same responses or the same intensity of response.)
- What are the most common mental reactions to stress? (Anger, fear, confusion, sense of panic, and not feeling able to decide what to do.)
- Why do they think the body reacts this way to stress? (The faster heartbeat is part of the “fight or flight” response, which prepares you for quick action and allows you to run faster and feel less pain.)
- How do you feel now? (Most people will feel better, though they will probably still feel anxious. After something stressful is successfully dealt with, people frequently feel euphoric and keyed up. That’s why people ride roller coasters. After a little rest and relaxation, the effects of short-term stress will fade away.)

*Elaboration and Evaluation (15 minutes)*

1. Ask students: What if this had been a real test? What could students have done to help relieve the stress so they could do well on the test? (Answers might include taking a deep breath, closing their eyes for a minute, or thinking something such as “I have come to class every day and I have done the reading.”)
2. Ask students for other occasions when they feel stress. What do they do if they are playing on a team and they are in a big game? How might the stress they feel help them do better?
3. Once students have developed their own responses, you may wish to direct them to the *BAM!* Web site’s “Feelin’ Frazzled?” at [www.bam.gov/sub\\_yourlife/yourlife\\_feelingfrazzled.html](http://www.bam.gov/sub_yourlife/yourlife_feelingfrazzled.html). It includes 10 suggestions for relieving short-term stress.
4. Have students create a comic strip or put on a skit that deals with some source of stress in their lives and how they might deal with it. The skit or comic strip should also show how different people respond to the same stressful situation.

### Performance Descriptors

On each of the criteria below, rate students from 3 to 0, with 3 being the highest possible score and 0 being the lowest.

Scoring Rubric: The Big Test				
Performance Descriptor	Rating			
Student actively participated in the unannounced test experiment.	3	2	1	0
Student completed the student reproducible <i>How Do We Respond to Stress?</i> and discussed personal responses to the short-term stress of an unannounced test.	3	2	1	0
Student discussed ways to alleviate stress.	3	2	1	0
Student made generalizations about how humans react to short-term stress, including that different people respond to stress in different ways.	3	2	1	0
Student took an active role in creating a comic strip or skit that described a source of stress and possible ways to deal with the stress.	3	2	1	0

### Extension

You may engage advanced students in this activity, or it could be a science fair project. You or your students would build a “stress chamber” to create and maintain the variations in temperature, light, and humidity that induce mild stress. The chamber could be a large refrigerator box. The chamber would have volunteer participants:

- Lie down in a 6 degree head-down position
- Experience varying humidity (created by a bowl of melting ice or tea kettle)
- Experience varying light intensity (created by lights)
- Experience varying temperature (created by a heater fan)
- Measure changes in heart-rate with a heart-rate monitor
- Measure changes in skin-conductivity by presence and extent of perspiration
- Monitor respiration rates

In this chamber, volunteer students can measure their physiological responses to various minor stresses. (How does the body react when a bright light is turned on? What happens when the temperature rises?) Students could measure and record different individuals’ reactions to these short-term stresses. If available, computer-interfaced probes or key sensors could be used to measure, track, and graph changes in heart rate and body temperature.

Make sure to identify claustrophobic students and ensure that all volunteers can quickly exit the chamber before beginning the activity.

This activity also could take place in an informal science education (ISE) setting. In that case, the chamber would be placed in a controlled area and operated by trained personnel.

## Web Resources

Centers for Disease Control and Prevention (CDC): [www.cdc.gov](http://www.cdc.gov)

The CDC Web site includes data on stress in various professions, including statistics on stress suffered by first responders. The site includes a number of fact sheets on stress written for a general audience: “Stress Management for the Health of It” ([www.cdc.gov/nasd/docs/d001201-d001300/d001245/d001245.html](http://www.cdc.gov/nasd/docs/d001201-d001300/d001245/d001245.html)), “Stress Management: Taking Charge” ([www.cdc.gov/nasd/docs/d001201-d001300/d001246/d001246.html](http://www.cdc.gov/nasd/docs/d001201-d001300/d001246/d001246.html)), and “From Family Stress to Family Strengths” ([www.cdc.gov/nasd/docs/d001201-d001300/d001249/d001249.html](http://www.cdc.gov/nasd/docs/d001201-d001300/d001249/d001249.html)) are some examples of the fact sheets.

CDC *BAM! Body and Mind*<sup>TM</sup>: [www.cdc.gov/bam](http://www.cdc.gov/bam) or [www.bam.gov](http://www.bam.gov)

*BAM! Body and Mind* is brought to you by the Centers for Disease Control and Prevention (CDC), an agency of the U.S. Department of Health and Human Services (DHHS). *BAM!* was created to answer kids' questions on health issues and recommend ways to make their bodies and minds healthier, stronger, and safer. *BAM!* also serves as an aid to teachers, providing them with interactive activities to support their health and science curriculums that are educational and fun.

Kids Health: [www.kidshealth.org](http://www.kidshealth.org)

Stress: [www.kidshealth.org/teen/your\\_mind/emotions/stress.html](http://www.kidshealth.org/teen/your_mind/emotions/stress.html)

Basic information on stress, including information about the endocrine system. Written for a teenage audience.

American Academy of Child and Adolescent Psychiatry: [www.aacap.org](http://www.aacap.org)

Helping Teenagers with Stress: [www.aacap.org/publications/factsfam/66.htm](http://www.aacap.org/publications/factsfam/66.htm)

A fact sheet, written for a general audience, on things families can do to help teens reduce the level of stress in their lives.

## Text Correlations

Centre Point Learning, *Science II: Essential Interactions*, Unit 1: Cells, Tissues, Organs, and Systems

Glencoe, *Science Voyages*, Level Green, Chapter 22, The Endocrine System

Glencoe, *Teen Health Course 1*, Chapter 1, Mental and Emotional Health: Managing Stress

Glencoe, *Teen Health Course 2*, Chapter 7, Mental and Emotional Health: Managing Stress

Glencoe, *Teen Health Course 3*, Chapter 15, Your Body Systems: Your Endocrine System

## **Relevant Standards**

### *National Science Education Standards*

#### Content Standard F, Grades 5-8

The study of science-related personal and societal challenges is an important endeavor for science education at the middle level. By middle school, students begin to realize that illness can be caused by various factors, such as microorganisms, genetic predispositions, malfunctioning of organs and organ-systems, health habits, and environmental conditions. Students in grades 5-8 tend to focus on physical more than mental health. They associate health with food and fitness more than with other factors such as safety and substance use. One very important issue for teachers in grades 5-8 is overcoming students' perceptions that most factors related to health are beyond their control.

Students often have the vocabulary for many aspects of health, but they often do not understand the science related to the terminology. Developing a scientific understanding of health is a focus of this standard. Healthy behaviors and other aspects of health education are introduced in other parts of school programs.

### *Benchmarks for Science Literacy*

#### Chapter 6, Benchmark F, Grades 6-8: Mental Health

Sound mental health involves the interaction of psychological, physiological, and cultural systems. It is generally regarded as the ability to cope with the circumstances people encounter in their personal, professional, and social lives. Ideas about what constitutes good mental health vary from one culture to another and from one time period to another. This fact is probably the most important insight students can gain about mental health.

Students at this level are often drawn to situations involving intense emotions, such as those they encounter at sports events, concerts, playground fights, and in horror stories and movies. They may connect these extremes of emotion to their own thoughts and feelings. The consequences of unbridled emotion, such as violence, death, drug use, etc., are now so serious that it is important for students to understand the connection between emotion and risky behavior.

By the end of the 8th grade, students should know that

- Individuals differ greatly in their ability to cope with stressful situations. Both external and internal conditions (chemistry, personal history, values) influence how people behave.
- Often people react to mental distress by denying that they have any problem. Sometimes they don't know why they feel the way they do, but with help they can sometimes uncover the reasons.

## *National Health Education Standards*

### Standard 1

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

- Describe the interrelationship of mental, emotional, social, and physical health during adolescence.
- Explain how health is influenced by the interaction of body systems.
- Describe how family and peers influence the health of adolescents.
- Analyze how environment and personal health are interrelated.
- Describe ways to reduce risks related to adolescent health problems.

### Standard 3

Students will demonstrate the ability to practice health-enhancing behaviors and reduce health risks.

- Explain the importance of assuming responsibility for personal health behaviors.
- Analyze a personal health assessment to determine health strengths and risks.
- Distinguish between safe and risky or harmful behaviors in relationships.
- Demonstrate strategies to improve or maintain personal and family health.
- Demonstrate ways to avoid and reduce threatening situations.
- Demonstrate strategies to manage stress.

### Standard 6

Students will demonstrate the ability to use goal-setting and decision-making skills to enhance health.

- Demonstrate the ability to apply a decision - making process to health issues and problems individually and collaboratively.
- Apply strategies and skills needed to attain personal health goals.

### **Ideas and Behaviors Common Among Students**

#### *What Stress Is*

- When asked what stress means to them, middle school students responded that stress was characterized as “being under a lot of pressure,” “feeling angry or annoyed,” “too much on your mind and you can’t take it anymore,” and “pressure and more stomach problems” (D’Autuono, 1998).
- In general, children have identified the majority of the stressful events in their lives as stemming from school-related problems (i.e., tests, grades, assignments.) Other stressful areas in their lives were associated with peer relationship problems as well as home and family problems (Henderson & Kelbey, 1992).
- Middle school girls appear more likely to rate traumatic events as more stressful than boys, while those from socially disadvantaged areas rate everyday events as more stressful than children from more affluent backgrounds (Muldoon, 2003).



### *Effects of Stress*

- When describing stressful situations, 4<sup>th</sup> to 6<sup>th</sup> grade students were most likely to say that they felt headache and stomachache as their main physiological symptoms. Boys were also likely to say they felt their “heart beating fast,” while girls said that they felt “sweaty” (Sharrer & Ryan-Wenger, 2002).
- Middle school students also reported that stress made them feel “sad and lonely,” “uncomfortable and nervous everywhere I go,” “like it’s never going to end,” and “tense” (D’Autuono, 1998).
- When middle school students were asked specifically about school-related stress, this type of stress was associated with lack of concentration, trouble remembering, and frustration (Mailandt, 1998).
- When describing their reactions to general stressful situations, boys were most likely to say that they felt mad, worried, or nervous, while girls would cry or feel sad, as well as feel mad and worried (Sharrer & Ryan-Wenger, 2002).

### *How Stress Can Be Mitigated*

- Children who perceive a sense of control over their stressful situation are more successful at coping than those with less of a sense of control where they blame their situation on outside sources such as fate or luck (Chandler, 1985).
- Many children use similar coping strategies for different types of stressors in their lives, rather than different strategies for variety of stressful events (Donaldson, et al., 2000).
- Older children use coping strategies for stressful events in their lives more than younger children do (Donaldson, et al., 2000).
- When middle school students were asked what they do during stressful situations, they reported that they “go to [their] room and pound the pillow,” “go to sleep,” “worry a lot,” “watch television,” “yell or scream,” “cry,” and “cuddle the pet” (D’Autuono, 1998; Sharrer & Ryan-Wenger, 1995).
- Additionally, many children believe that coping strategies are moderately helpful in relieving stress (Donaldson, et al., 2000).

### **References**

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Student Reproducible:

### **How Do We Respond to Stress?**

**Directions:** List each of your responses to the stress you felt when your teacher announced the exam. If more than one person had the same response, keep track of the total number of group members who reacted in that way. Because people have different responses to stress, do not be surprised if you have some responses that are the same and others that are different from other members of your group.

<b>Physical (Body) Responses in Our Group</b>	<b>Mental (Mind) Responses in Our Group</b>