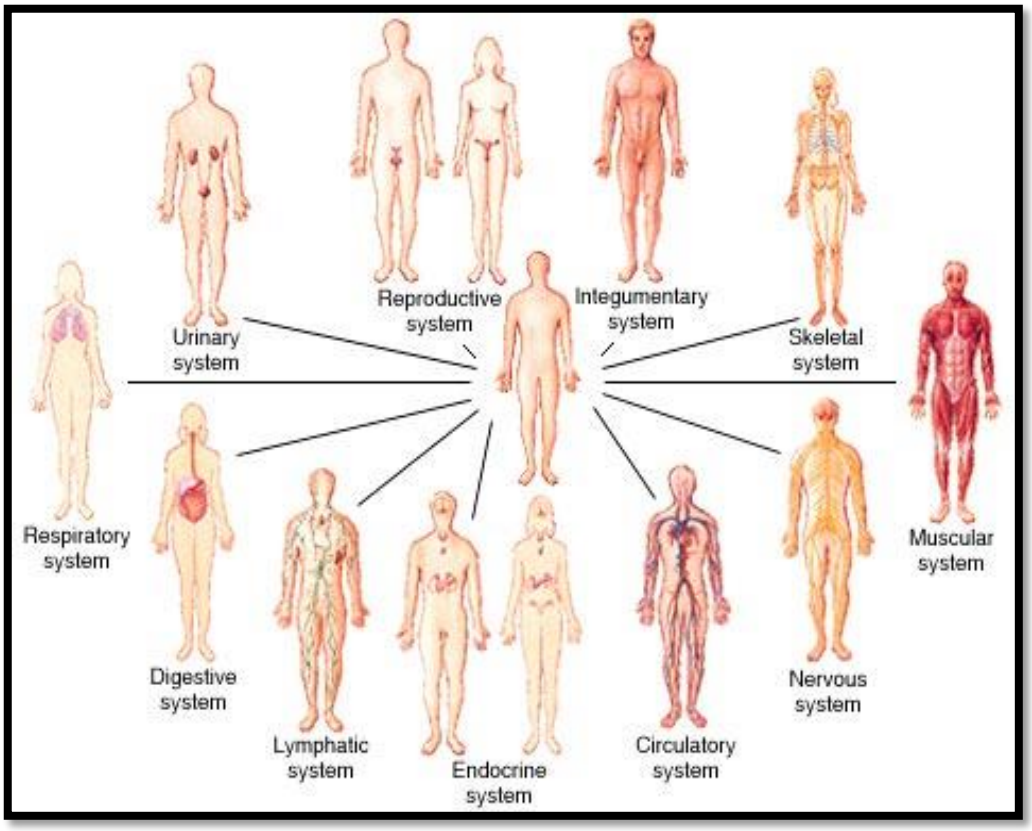
Body Systems: Endocrine System: Adapted

Name: _____

Big Idea (5): Multicellular organisms have organ systems that enable them to survive and interact within their environment
Big Idea (6): Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment
Content (5): Basic structures and functions of body systems: Digestive, musculo-skeletal, respiratory, circulatory
Content (5): First Peoples concepts of interconnectedness in the environment
Content (6): The basic structures and functions of body systems: Excretory, reproductive, hormonal, nervous
Curricular Competency: Questioning and Predicting: Make observations in familiar or unfamiliar contexts
Curricular Competency: Questioning and Predicting: Make predictions about the findings of their inquiry
Curricular Competency: Processing and analyzing data and information: Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data
Curricular Competency: Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies
Curricular Competency: Evaluating: Identify possible sources of error
Curricular Competency: Evaluating: Suggest improvements to their investigation methods
Curricular Competency: Processing and Analyzing Data and Information: Compare data with predictions and develop explanations for results
Curricular Competency: Applying and Innovating: Transfer and apply learning to new situations
Curricular Competency: Processing and analyzing data and information**:** Identify First Peoples perspectives and knowledge as sources of information
First Peoples Principles of Learning: Learning is experiential. Learning is reflective



Purpose

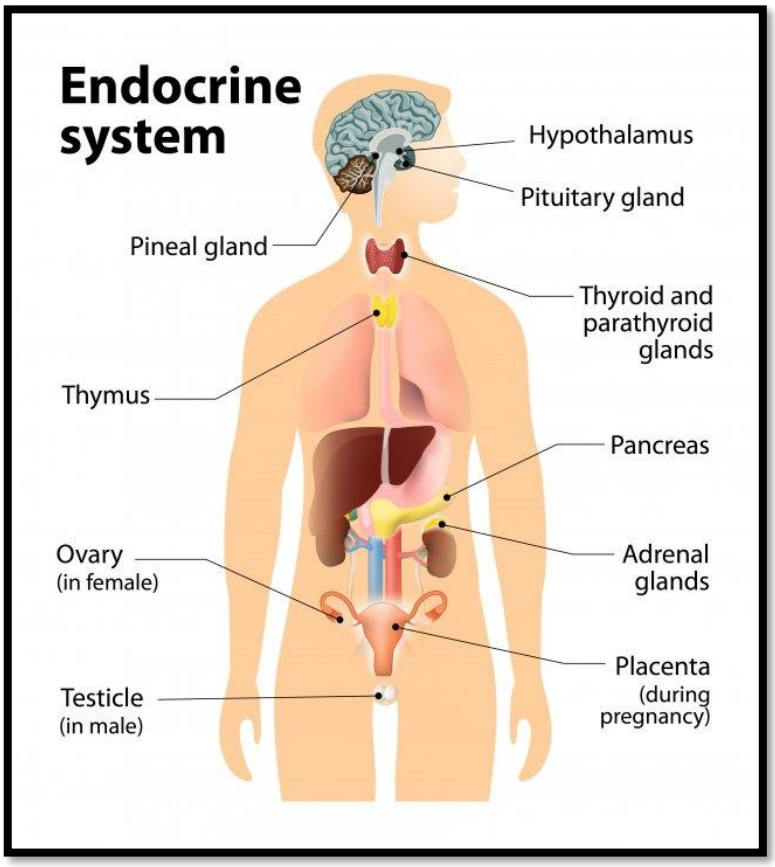
To observe how hormones affect our body

Materials

- 1 stopwatch, or a clock with a second hand
- Pen/pencil

Background Information

The Endocrine system is what regulates our hormones. Hormones act as chemical messengers that are released into the blood stream to act on an organ in another part of the body. There are over 50 hormones in our bodies.

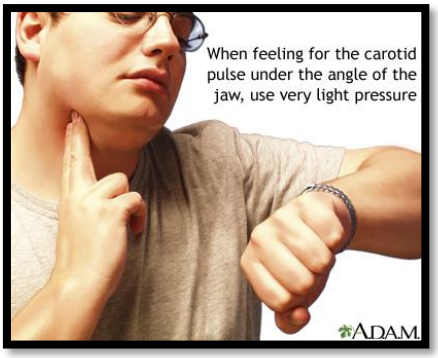


Hormones control things such as:

- blood sugar control (insulin);
- differentiation, growth, and function of reproductive organs (testosterone and estradiol); and
- body growth and energy production (growth hormone and thyroid hormone).

Curricular Competency: Questioning and Predicting: Make predictions about the findings of their inquiry

You will be asked to experiment with a few things. You will write down what your predictions are.

 You will be asked to check your pulse when you are calm. You will then be asked to expose yourself to perceived danger, and then check your pulse. When we are exposed to danger, or perceived danger, our body releases adrenaline – Adrenaline increased your heart rate. Adrenaline (epinephrine) is a hormone your adrenal glands make to help you prepare for stressful or dangerous situations. Adrenaline rush is the name for the quick release of adrenaline into your bloodstream. This gets your body ready for a "fight or flight" response.	What will happen? Will your heart rate increase? Will it remain the same? What are your predictions? ☐ My heart rate will stay the same ☐ My heart rate will decrease ☐ My heart rate will increase
You will try to remember 10 different vocabulary words when you are rested and calm. You will then be asked to think of stressful things, and then try to remember 10 different vocabulary words.	What will happen? Will you remember the words better when you are calm, or stressed? Will it remain the same? What are your predictions? ☐ I will remember all 10 words no matter what ☐ I will remember all 10 words when I am calm, but not when I am stressed ☐ I will remember more words when I am calm, than when I am stressed ☐ I will remember more words when I am stressed, than when I am calm ☐ I will remember a mix of words from each try

Procedure: **Curricular Competency:** Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies

Testing Adrenaline

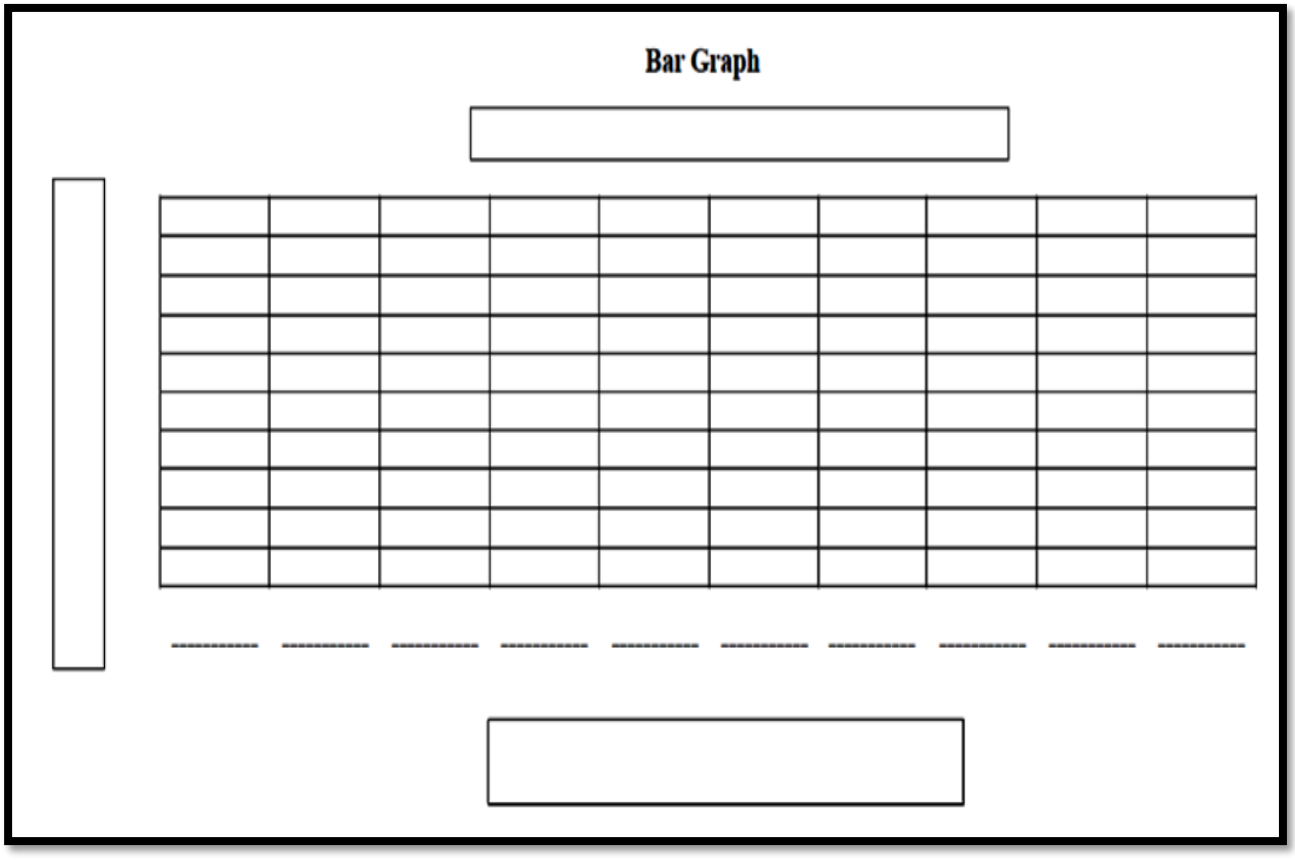
Adrenaline (epinephrine) is a hormone your adrenal glands make to help you prepare for stressful or dangerous situations. Adrenaline rush is the name for the quick release of adrenaline into your bloodstream. This gets your body ready for a "fight or flight" response.

1. Find a place where you can sit quietly, and alone, for 5 minutes.
2. Bring a watch with you, or make sure that you can see the clock without moving.
3. Sit or lay down for 5 minutes. Be as calm as possible.
4. At the end of 5 minutes, count how many beats per minute your heart beats. To do this, wait for the minute hand to be exactly on a minute, or wait for the second hand to be on the 12. Start counting your heart beats, for the duration of an entire minute. How many times did your heart beat in a minute? _____
5. Find a group or work with a partner. You are simulating danger. Find a location where you can see the clock, or wear a watch. Face away from your group. One of your group members will try to scare you (no touching – just shouting 'boo' or 'aaah' loudly, but not directly in the ear) from behind. The group member can wait anywhere between 10 seconds to 2 minutes to shout.
6. Immediately after they shout, begin counting your heart beats. How many times did your heart beat in a minute? _____
7. Switch roles.

Repeat 3 times per person.

Curricular Competency: Processing and analyzing data and information: Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data

Graph your results.



Procedure: **Curricular Competency:** Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies

Testing Cortisol

Cortisol is a hormone made in the adrenal glands. It helps you respond to stress. Cortisol, the primary stress hormone, increases sugar, also called glucose, in the bloodstream, enhances the brain's use of glucose and increases the availability of substances in the body that repair tissues. Cortisol also slows functions that would be nonessential or harmful in a fight-or-flight situation. Cortisol is a steroid hormone secreted into the blood as a response to stress. Anything stressful can make cortisol levels to rise. It can be commonplace, like stress at work or at home. Or it can be stress from physical treats like a car accident, a hard fall, or any encounter with danger. Elevated cortisol is part of your body's natural reaction to these stressful situations. It's hard to think clearly when you're stressed out. If you've ever been running behind and couldn't find your shoes or your car keys, you know this to be true. Heightened cortisol levels can cast a haze over your memory and make it difficult to recollect important information.

1. Sit somewhere really calm and quiet. Lay down, or sit still for 5 minutes
2. After 5 minutes, your partner will read off 10 common, but unrelated words (such as: butterfly, house, green, sink, Africa, chimney, Saturn, granola, mountain, milk). Have the partner write down the words so they don't forget.
3. Wait one minute.
4. You have 20 seconds to list off as many of the 10 words as possible. How many words did you remember correctly?

   _____

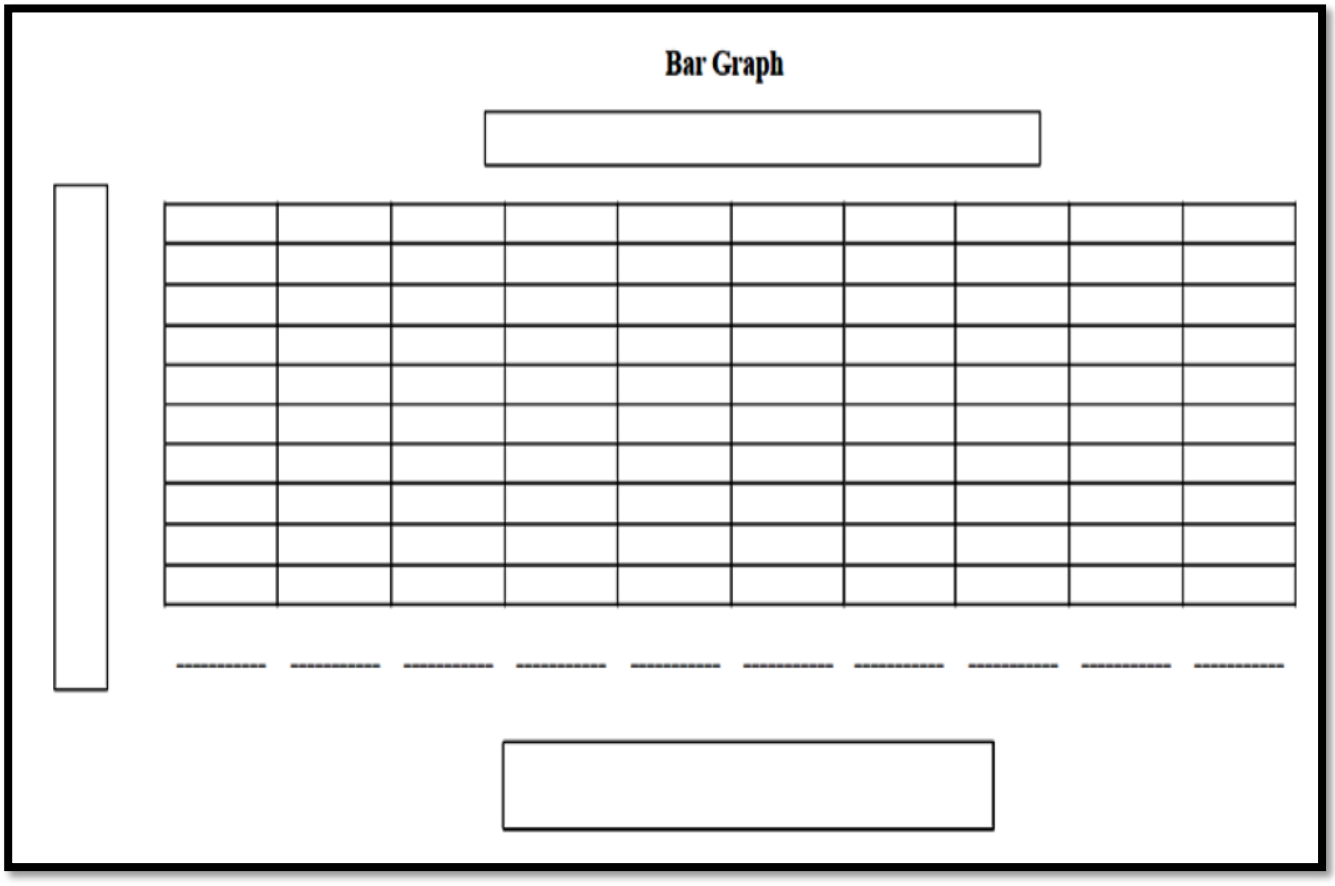
5. Have one partner listen as you tell them **three** stories of times when you were really stressed
6. Repeat steps 1-4, but with different words. How many words did you remember correctly?

   _____

Repeat 3 times per person.

Curricular Competency: Processing and analyzing data and information: Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data

Graph your results.



Curricular Competency: Processing and Analyzing Data and Information: Compare data with predictions and develop explanations for results

How did your predictions compare with your results? Why is that? Discuss.

- ☐ I was really accurate in my predictions
- ☐ I was pretty close in my predictions
- ☐ I was way off in my predictions

Curricular Competency: Planning and Conducting: Use equipment and materials safely, identifying potential risks: How did you ensure safety while doing this lab?

- ☐ I was aware of my surroundings.
- ☐ I moved carefully and slowly
- ☐ I did not hurt people

Curricular Competency: Evaluating: Identify possible sources of error: What are the limitations of this lab?

- ☐ We weren't given the same words – everyone could choose different words
- ☐ We didn't all learn in the same spot
- ☐ The instructions were not clear enough

Design a lab, like this one, which would be better at testing circulation or pulse rate. How would you do a better job of testing circulation? What would be more realistic? **Curricular Competency:** Evaluating: Suggest improvements to their investigation methods

Draw a picture of something else that we could do, in a lab like this:

Emerging	Developing	Proficient	Extending
Most sections completed. Answers are legible, and mostly reasonable.	All sections completed. Answers are legible, and reasonable.	All sections completed thoroughly. Answers are neat, logical, and reasonable.	All sections completed thoroughly. Answers are neat, logical, reasonable, and insightful.