

# A THIRST TO WIN

*Have you ever watched your favorite Thunder athletes during game breaks? Look closely and you will notice they are covered in sweat! The more time they spend on the court hustling on the offensive and defensive ends of the court, the more they seem to sweat. During the breaks, the players are doing more than discussing strategy. If you watch, you will see these athletes hydrating! It is important that the Thunder players replenish the fluids they lose when participating in rigorous activity. Thirst is our body's great reminder that we may need to take a drink.*

**Pro-tip: This activity can be done in the home or classroom. It can be done by an individual student or by a small student group.**

## HERE IS WHAT YOU NEED PER STUDENT OR STUDENT GROUP:

- Potato, and a way to cut the potato
- Scale
- Pieces of paper
- Measuring tablespoon
- Measuring cup
- Ruler
- Table salt
- Water
- (3) shallow dishes
- (3) Papers for labels
- Pencil
- Access to the internet or health information resources
- Safety goggles



**SCIENCE  
MUSEUM!**  
OKLAHOMA

## WARM-UPS

It requires a lot of energy to play basketball and with that effort comes a lot of sweat.

For this warm up, you may choose to work alone or in a small group. Think about an activity or even a situation that really made you sweat. This could be from an activity during P.E., an afterschool soccer game, a weekend basketball game, or even just a game of freeze tag during recess.

In your journal, write down your observations about sweating. When you exercise or expend a lot of energy do you start sweating right away or does it take time? What things do you notice about your sweat? How do you feel when you sweat? What does your sweat itself feel like?

Now that you have noted your observations, let's dig a little deeper by using online resources to find out more about sweat. With the advisement of your teacher, look for trusted health information resources online to find information about why people sweat. Can we sweat too much or not enough? What makes us sweat? How does it benefit us? What would happen if we did not sweat? Record your findings and then share and discuss them with your classmates.

Did you know that about 60% of your body is made up of fluids? These fluids do everything from moving nutrients to your cells, removing waste, and helping you maintain your body temperature. Fluid is found both inside cells and outside your cells. When you sweat, the liquid that shows up on your skin comes from the area outside your cells, or extracellular fluid. How does that fluid move from inside to outside your body and how does it affect the cells inside?

Let's experiment to see if we can find out.



## GAME TIME

Because we would not want to experiment on our own bodies, we will use an everyday item that is mostly water as a stand-in: a potato! While the human body is composed of about 60% water, potatoes can be composed of as much as 80% water.

For this activity, we also want to pay close attention to something else that is important to our bodies—sodium. When we sweat the fluid we lose is made up of more than just water. We lose nutrients including minerals like sodium, which is why our sweat tastes salty. Pay close attention to the role of salt (which is about 40% sodium) in this experiment.

Before you get started, protect your eyes by wearing a pair of safety goggles. This is science after all, and safety is always first.

1. Start by cutting the middle section of a potato into three 1cm (about ½”) widths. This will result in three circular slices and two hill-like potato ends. You will just need the circular sections for this experiment. Weigh each slice of potato (in grams) and designate each one to be either “control”, “salt and water”, or just “water.” Use your journal to record this information.

**Pro-tip: Potatoes can be difficult to cut due to their rounded shape and toughness. If you are new to slicing produce, seek assistance from an adult.**

2. Place one potato slice on an empty shallow dish and use a piece of paper to label this one “control.” A control allows us to monitor what changes may or may not occur when no variables are changed.
3. Pour one cup (8 ounces, or about 240mL) of water into a shallow dish. Place a potato slice in the dish and label this one “water.”
4. Pour one cup (8 ounces) of water into another shallow dish. Add 40 grams, or 2 tablespoons, of salt and mix thoroughly. Label this one “salt and water.”
5. After 15 minutes, weigh each potato section again. Record the weights in your journal. Have the weights of each slice changed? If so, by how much? Add any notes about how the texture or flexibility of the potato slice changed as well.
6. After 30 minutes, weigh each potato section again. Record the weights in your journal. Have the weights of each slice changed? If so, how? Add any notes about how the texture or flexibility of the potato slice changed as well. Repetition is key to collecting good data.
7. After 45 minutes, weigh each potato section again. Record the weights in your journal. Have the weights of each slice changed? If so, how? Again, add any notes about how the slices changed. Were the changes what you expected?
8. Save your potato slices to use in the Overtime activity.



### ANALYZE THE REPLAY

What happened?

How is the salt water similar to what your body may experience during a basketball game or after strenuous exercise?

Is the water similar to any experiences that you may have related to exercise?

In addition to the salt and water, what other things could affect the potato slices?

Whether through sweating or other processes, if you lose more fluid than you take in you can become dehydrated. When you become dehydrated, your body may not have enough water or other fluids to continue normal functions.

What other factors affect how hydrated or dehydrated a basketball player would be? Would the location of a basketball court affect how much water a basketball player would lose during a game? What about the temperature or humidity level in the arena? Would those same factors affect how hydrated or dehydrated a potato slice would become?



### OVERTIME

Let's take it further

Dehydration can be remedied by replenishing the water lost during exercise or exposure to environmental elements.

Typically, this is treated by drinking water or other clear fluids such as broth or sports drinks.

Consuming ice can also help. Finding a cool place to rest can also be beneficial. Sometimes

dehydration can be so severe that it requires intravenous fluids provided by a medical professional in order to rehydrate.

What would it take to rehydrate, or restore the fluids within, the potato slices from your Game Time activity?

Start by rinsing off the potato slices and drying them with a paper towel.

Develop several potential strategies. Be methodical and test each just as you did in the dehydration experiment as the Game Time activity.

Remember to use a control just as you did in the Game Time activity. A control is necessary in data collection so that we are able to notice changes connected with each changed variable.

Make measurements of all the different variables that can affect the amount of water you were able to replenish in the potato. Such measurements may include how much water the potato was submerged in or the temperature of the water. If you decide to add anything to the water, be sure to measure how much material was added. Record the effectiveness of each process over set spans of time. In the Game Time activity, 15 minute intervals were used, but you can use intervals as long as one day.

You might elect to try a process that is difficult to measure. If this is the case, document the process thoroughly and record the results.

You will likely find that salt was not only critical in dehydration, but it was also necessary for rehydration. This is because the sodium from the salt when dissolved in water changes the osmotic pressure inside and outside of the cells. Osmotic pressure simply refers to how much effort is needed to get a liquid through the membrane of a cell. This sodium makes it possible for our cells to get the water they need but also remove waste from the cells.

Like with most things, moderation is key. It is important that we consume a moderate amount of sodium and water. You may consider monitoring your own hydrating habits by keeping a journal. To do this, record how much water you drink each day and how you feel on those days.

**Pro-tip: Drink water from the same size cups or bottles each day and measure how much water each container can hold. This way you can use multiplication to figure out how much water you drink each day.**

Documenting your daily sodium content can be a bit trickier. Sodium can be found in many of our favorite snacks and fast food items. Though sodium is essential for our survival, because it is so abundant in readily available foods it can be easy to consume too much. For this reason, there are multiple online sources and even apps to help record daily sodium consumption.



## COACH'S CORNER

Additional  
information and  
explanations  
for parents and  
educators

Dehydrating food can be fun and delicious, but staying healthy means rehydrating when necessary. Water is essential to life. Water is vital to every cell in our body. It helps us regulate our body temperature. It lubricates our joints and acts as a shock absorber. It helps us convert food to components that we need to survive. It flushes waste from our body. It even forms saliva!

Some sports medicine studies show that an adult or even an older adolescent basketball player can lose between one and four liters of sweat during the course of a game or an intense and lengthy practice! This much sweating can be seen in the differences in a player's weight before and after a game or practice. This dehydration causes the player a lot more effects than just

a loss of weight. It affects the skills needed to play the game at peak levels. Significant dehydration will cause fatigue, slower response time, and alter decision-making.

But how do you know if you are properly hydrated? Look at your urine. This answer may seem gross but is an effective way to estimate your hydration status. If your urine is light yellow in color like lemonade, you are doing a great job drinking the right amount of water. If your urine is dark in color like apple juice, you are likely dehydrated and need to drink more water. If your urine is clear like water, you may have actually drank too much fluid and are overhydrated.

During a basketball practice or game be sure to drink water. Thirst is your body's best signal to hydrate. Consider getting a drink every 15 minutes or so. If you have to interrupt play to go to the restroom, you may be overhydrating. However, most often athletes underestimate how much water they need to replenish the sweat they lose while exercising.

Another way to rehydrate is to weigh yourself before the practice or game. Then weigh yourself again afterwards. For every half kilogram, or about a pound, of weight lost, drink a half liter, or about 16 ounces, of water over the next day.

Dehydration isn't just an issue for athletes. The climate, diet, not consuming enough fluids, and illness are some factors that can result in dehydration for anyone. For these reasons, it is important to be able to recognize symptoms of dehydration. Common signs are extreme thirst, fatigue, headache, dizziness, dry lips or eyes, feeling generally disinterested or confused, and not having the need to use the restroom for a long duration of time, such as eight hours.

Though there are many sports drinks designed to help athletes stay hydrated or rehydrate, water and a proper diet are usually enough to keep even top athletes healthy and hydrated.

### OKLAHOMA ACADEMIC STANDARDS

<b>SCIENCE</b>	<b>4th Grade</b>	<b>5th Grade</b>	<b>6th Grade</b>
<b>4.LSI.1: Molecules to Organisms: Structure and Processes</b>	●		
<b>4.LSI.2: Molecules to Organisms: Structure and Processes</b>	●		
<b>6.LSI.2: Molecules to Organisms: Structure and Processes</b>			●
<b>6.LSI.3: Molecules to Organisms: Structure and Processes</b>			●

<b>HEALTH</b>	<b>4th Grade</b>	<b>5th Grade</b>	<b>6th Grade</b>
<b>1.5.1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.</b>	●	●	
<b>1.8.1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.</b>			●
<b>3.5.2: Students will demonstrate the ability to access valid information, products and services to enhance health.</b>	●	●	
<b>7.5.1: Students will demonstrate the ability to access valid information, products and services to enhance health.</b>	●	●	
<b>7.5.3 : Students will demonstrate the ability to access valid information, products and services to enhance health.</b>	●	●	

<b>PHYSICAL EDUCATION</b>	<b>4th Grade</b>	<b>5th Grade</b>	<b>6th Grade</b>
<b>S3.E6: Demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.</b>	●		