GSK Science in the Summer™

Science of Sports
ACTIVITY BOOK
ARE YOU READY FOR ACTION?

**Eat Smart**

If you want to be ready for action, you need fuel—calories from carbohydrates, proteins, and fats for power and energy. Food is your body's fuel. You need to eat healthy foods to stay healthy. Vitamins and minerals keep your heart, lungs, and other organs running well.

**DID YOU KNOW?**

A calorie is a unit of energy. The calories in food or drink give your body energy. Your body can either burn it right away or store it for later use.

**TRY THIS!**

What's for dinner?

The five food groups on this plate are the building blocks for a healthy diet. Plan a meal by drawing or writing the names of the food you want to eat.

Ask an adult if you can go online and learn more about healthy eating. www.choosemyplate.gov/kids

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**Science of Sports**

How does science help athletes perform in their sports?

Science helps athletes stay physically fit, mentally fit, and equipped to be fit.

Science helps athletes be ready and set to go!

Try these activities at home to help you stay ready and set to go!

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What has 18 legs and catches flies?
TRY THIS!
Are you warmed up?

Your body uses water to keep your muscles flexible. Before you begin to play, you need to warm up. These active stretches get your body moving and blood flowing. A focused warm-up also helps you clear your mind and get your head in the game.

**TORSO TWISTS:**
- Stand with legs shoulder-width apart.
- Raise arms with elbows bent.
- Slowly twist upper body from left to right and back again.
- Repeat 10 times.

**SHOULDER CIRCLES:**
- Stand tall and relax shoulders.
- Bring shoulders back, then up, forward, and down in slow smooth circles.
- Repeat 10 times.

**HACKY-SACK:**
- Lift left foot up and across body.
- Try to touch left foot with right hand without bending forward.
- Repeat 10 times on each side.

**REALLY NEAR!**

Use the clues to solve the puzzle.

**ACROSS**
5. This sport’s stick has a loose net at its end.
8. These shoes help players grip the field.
11. These baseball players wear masks and chest protectors.
12. Many sports require these for head protection.
13. Players use a stick to hit a puck on frozen water.
16. Shortstops and outfielders use these to catch fly balls.
17. You need a racket to play this sport on a court.

**DOWN**
1. Players wear shin guards in this sport.
2. This sport is played on grass with curved wooden sticks.
3. Players carry a set of clubs in this sport.
4. Swimmers need these to see.
6. Basketball players wear good ones on their feet.
7. This sport uses a shuttlecock, net, and rackets.
9. Football players wear these.
10. You need good aim to hit the target in this sport.
14. This sport is often played on the beach.
15. You need a tight boot and a sharp edge beneath you in this sport.

**ANSWER KEY**


ARE YOU SET TO SUCCEED?

Get Your Gear

When you prepare to play a sport, you often need special gear like helmets, pads, or sticks.

**TRY THIS!**

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**DID YOU KNOW?**
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HEADS UP
There are different kinds of helmets for different kinds of sports.
Some are called single impact helmets. They are lightweight and crush easily. Bicycle and baseball batting helmets are two common kinds of single impact helmets.
Multi-hit helmets, like ones worn by football players, have a tough shell and squishy foam inside. They protect the head really well, but are heavy to wear.

DID YOU KNOW?
Helmets help prevent concussions which are sudden jolts or blows to the head that injure the brain.

IF THE SHOE FITS
Most sports have special shoes to help you play better. Track and field athletes have at least nine different kinds of shoes to wear.
Sole flexibility, weight, cushioning, ankle support, and spikes—all depend on the nature of the event. How do athletes move? How far do they go? On what kind of surfaces do they compete?

TRY THIS!
How does my helmet look?
Helmets protect your head, but they can also add team spirit. Most helmets have colors and designs that show team loyalty.
Imagine that you are designing helmets for new teams. Add color, logos, or other decorations.

TRY THIS!
Match each shoe’s description with its event.

- Designed for short, straight races at top speeds, this shoe’s stiff bottom plate keeps runners balanced on their toes. It also has sharp spikes to allow a strong grip on a rubber track.

- Over 26.2 miles, weight matters. Marathon shoes are built to be as light as possible, with a cushioning, flexible sole. A shoe that is just four ounces lighter can save three minutes during a race.

- Discus throwers spin around to build momentum before throwing. Their shoes have smooth soles with no spikes to reduce friction and help them turn.

- Javelin throwers take a running start, and then release the eight-foot-long spear. Big, heavy boots provide stability and protect ankles from twisting during release.

IF YOU SET TO SUCCEED?
WILL YOU GO THE DISTANCE?

Reaction Time

Many sports depend on reaction time. Information travels from the eye to the brain, where the brain interprets the data and then tells the body what to do. This is a complex process. The more you practice your sport, the more quickly your brain can process the information. Over time, your reaction becomes second nature.

TRY THIS!

Fill in the blanks

Name a sport where you carry a ball. __________________________
Name a sport where you hit a ball. __________________________
Name a sport where you throw a ball. __________________________
Name a sport where you roll a ball. __________________________

TRY THIS!

Sports Math

Use the table of sports records to fill in the numbers and solve the math problems below.

TRY THIS!

How fast is your reaction time?

SUPPLIES:
Bat-shaped data sheet (see below), Scissors, Pencil

INSTRUCTIONS:
• Cut out the bat-shaped data sheet below.
• Working with a partner, take turns dropping the bat and measuring reaction times.
• Have your partner hold the top of the bat while you have your hand ready beneath it to catch it between your thumb and index finger. Your thumb and index finger should be 2 inches apart.
• Have your partner say “ready, set, go” and release the bat on “go.” Keep your thumb and finger 2 inches apart until you hear “go.” Then, catch the paper as quickly as you can. Hold the paper in place until you mark on it the closest reaction time to where you caught it.
• Take turns with your partner and repeat to see if your reaction time improves. Figure out your average reaction time. If your reaction time is .10 or lower, you might be ready to face the pitch!

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

DID YOU KNOW?

When you throw a ball, the air around it puts even pressure on it, causing it to slow down.

DID YOU KNOW?

When baseball players step up to bat, they have about one-tenth of a second (0.10 sec) to decide whether to swing at the pitch.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
**CENTER OF MASS**
In many sports, being aware of your center of mass helps you stay in the game.
For most people, the center of mass is near the stomach—about half of your mass is above it and about half is below it. We use our head, arms, and legs to help us keep our center of mass balanced so that we stay upright.

**TRY THIS!**
The Leaning can
ONCE YOU FIND THE CENTER OF MASS, YOU CAN BALANCE THE CAN ON ITS EDGE!
You’ll need a 12 ounce soda can and access to water. You’ll also need a waterproof surface and a towel in case any water spills. Start by trying to balance the empty can. Then, add water until you succeed.
The dot is where the can’s center of mass is located. With too little water, the can will not balance. With too much water, the can will also not balance. With just the right amount of water, the center of mass will be in line with the base so it balances.

**TRY THIS!**
It is impossible to jump forward while holding your toes. Bend over and hold onto the front of your shoes (or feet). Without letting go, jump forward. Some people call it the “impossible hop” trick.

**WILL YOU GO THE DISTANCE?**

**THE MORE YOU PLAY THE GAME, THE MORE YOU KNOW THE GAME.**
Many sports, like baseball and football, have signs and signals that players use to communicate with each other or with the coach. In other sports, like tennis, signals from the sidelines are not allowed.

**TRY THIS!**
Signs and Signals
USE THE KEY TO DECODE THE SECRET MESSAGES. THEN TRY WRITING ONE OF YOUR OWN.

**KEY**

A = ⚾
B = 🏏
C = 🏐
D = 🏆
E = 🎾
F = 🏒
G = 🎾
H = 🏏
I = 🏐
J = 🏆
K = 🎾
L = 🏒
M = 🎾
N = ⚾
O = 🏏
P = 🏐
Q = 🏆
R = 🎾
S = 🏒
T = 🎾
U = 🏏
V = 🏐
W = 🏆
X = 🎾
Y = 🏒
Z = 🎾
TRY THIS!
*Solve the Maze*

JUST FOR FUN, TRY SOLVING THIS MAZE.

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The Franklin Institute is proud to help bring GSK Science in the Summer™ to your community.

Summer is the perfect season for exploring science in the world around you.

AN EDUCATIONAL PRODUCT OF
The Franklin Institute
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