

Lesson 3

Sports and Science Get Along





Before You Begin

Watch how science-based training can bring out better performance in athletes. Then talk about what you find most interesting.



Lesson Overview

Theme 운동과 건강 / 스포츠와 과학

- L & S** 일상 운동의 효과와 다양한 스포츠에 대해 듣고 말한다.
- R** 육상, 컬링, 야구에 작용하는 과학 원리에 대해 읽는다.
- W** 교내 스포츠 동아리 회원 모집을 위한 홍보물을 완성한다.

Self-check

Check if you know the expressions below.
진술하기

☐ Many bike rental shops **are** along the river.

확인 요청하기

☐ **Did you say** figure skaters can use music with lyrics?

Compare the structural differences between the sentences on the right and those below.

- They can take **more** steps **than** we do.
- This is the reason **why** they have to do it.

Listening & Speaking

진술하기 **There are** many bicycle rental shops along the river.

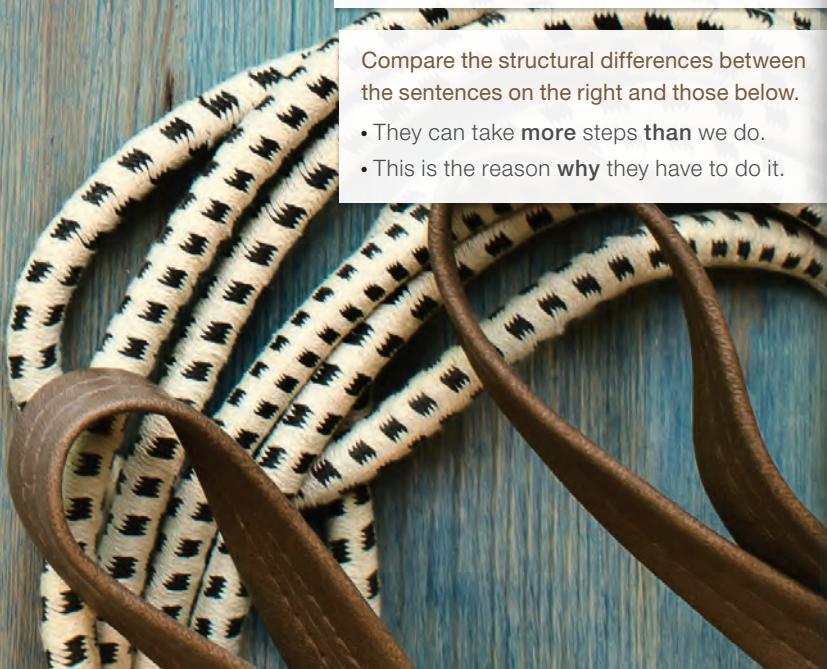
확인 요청하기 **Do you mean** figure skaters can skate to music with lyrics?

Language Structures

- Adult cheetahs can take **twice as** many steps **as** we do.
- This is **why** players have to direct the stone's path carefully.

Plan Ahead Skim the pages that follow and write about what you expect to learn in this lesson.

- I will learn about _____.
- The title of the part that looks most interesting is _____.



진술하기 There are many bicycle rental shops along the river.

Get Ready >

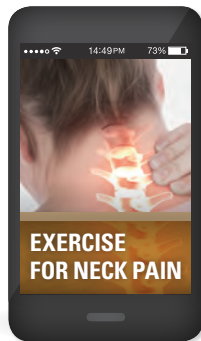
Check the exercise you usually do.

- ☐ running
 ☐ cycling
☐ skateboarding
 ☐ _____
 (your own)

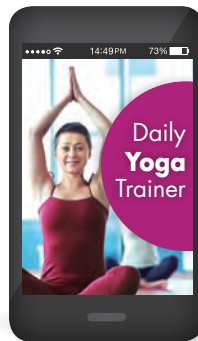
A Listen

- What is the purpose of the girl's phone call?
 - to ask her friend to ride a bike together
 - to recommend a good bicycle shop to her friend
 - to get information about the health benefits of cycling
- Which app is the girl most likely to try after the dialog?

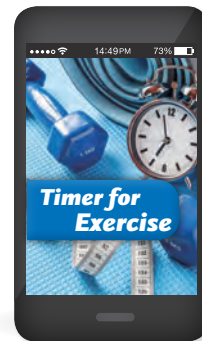
a



b



c



B Speak Out

Suppose you are at a fitness center. Practice the dialog with your partner.

- A** Excuse me. I'm interested in a class that will help me lose weight.
B There's a good swimming class available.
A Great. When is the class?
B On Mondays from 5 to 6 p.m.

Health Benefits	Class	Time
build muscles in arms and legs	indoor rock climbing	Tue. 7-8 p.m.
improve flexibility	yoga	Thur. 6-7 p.m.
improve balance	_____	_____
	your own	your own

Talk further Talk about a kind of exercise you'd like to learn for your health.

확인 요청하기 Do you mean figure skaters can skate to music with lyrics?

Get Ready >>

Choose what you think is true.

- a Olympic gold medals are made of pure gold.
- b An official soccer ball has 32 pieces of leather.

A Listen

- 1 Why is music with lyrics allowed in figure skating now?
 - a because it is easier for skaters to dance to
 - b because it is expected to attract more fans
 - c because it helps skaters make more graceful movements
- 2 Which picture best illustrates the movement of the arrow?



B Speak Out

Talk with your partner about the sports facts given below.

- A It's interesting. They say "love" when a player has not scored in a tennis game.
- B Do you mean "love" refers to zero points in tennis?
- A Yes. There are many fun facts in sports.



- Tug of war was an Olympic event in the early 1900s.
- People played tug of war in the Olympics.



- Golf was the first sport played on the moon.
- An astronaut took a golf club to the moon.



- The oldest Olympic competitor was 72 years old.

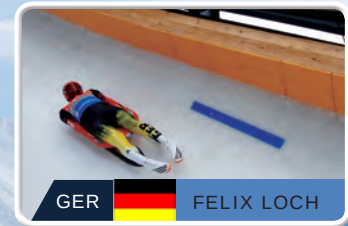
your own

Talk further Talk about some interesting facts about sports that you know of.

A Listen

Listen and fill in the blanks.

A good start depends on a hard push and a fast acceleration with the spiked _____.



Indeed. He makes an explosive _____ out of the gate.

SPORT NEWS

Luge World Cup – Men's Singles

LIVE ▶

B Speak Out

Complete the following with your ideas. Then take turns broadcasting the game to your group members.



Viewers, welcome to the World Swimming Competition. The men's _____ freestyle final will begin in a minute. There have been a lot of reports and expectations that Michael Johnson has the best chance of _____.

Will he be able to set a new record today? We'll see soon.

Help Box

- 100m / 200m / 400m
- win the gold / touch the finish line first / break the Olympic record

✓ Peer-check

Exchange books and evaluate one of your group members' presentation.

Was the speaker's voice lively?	/ 5
Was the speaker's pronunciation clear?	/ 5
Was the comment appropriate for the game?	/ 5

Before You Read

A Get Connected

Do you like sports? Find out how much you know about sports.



- 1 The world record in the men's 100-meter dash is 9.88 seconds. ☐ ☐
- 2 The warmer the temperature, the better the 100-meter race records. ☐ ☐
- 3 Curling is a winter sport played with five members on each team. ☐ ☐
- 4 Ball parks in lower areas allow more home runs than in higher areas. ☐ ☐

B Vocabulary

Guess the meanings of the underlined words and talk about them with your partner.



She sweeps the floor every day to get rid of dust.



Try to find an optimal solution to all these problems.



A sprinter runs a short distance race.



If you spin the stick, friction makes heat that starts a fire.



She has such a long stride that it's hard to follow her.



The power plants generate electricity for the city.

✓ Self-check Timed Reading



The more you read, the better you understand. Read the text (pp. 60-65) and record your reading time below.

1st ____ min. ____ sec.

* While reading, check where your understanding fails.

When Sports Meet Science

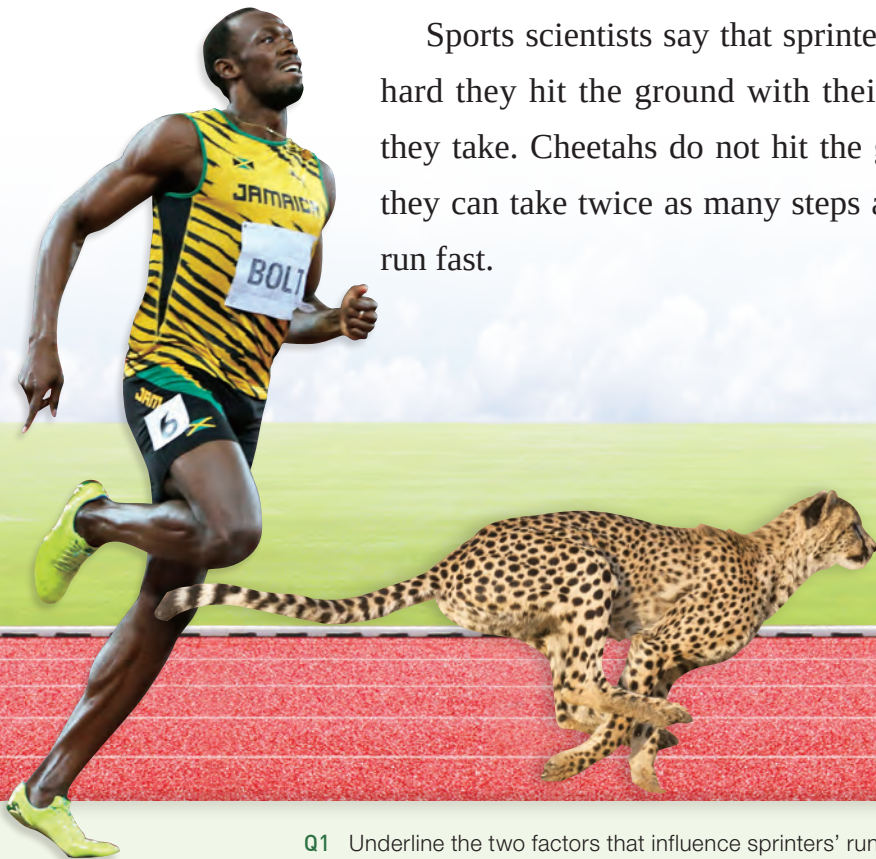
Human beings are capable of doing amazing things through sports. Look at sprinters running through the field or baseballs flying into the catcher's glove. The precision and power they show seem like magic. Whatever we do on earth, however, is governed by the rules of nature. In fact, science can explain a lot about the magic in sports.

- be capable of
- sprinter
- precision
- govern

How Fast Can a Human Run 100 Meters?

Usain Bolt, the Jamaican sprinter, broke the world record for the 100-meter sprint in 2009, clocking a time of 9.58 seconds. Animals like the adult cheetah can run 100 meters in about six seconds. So what is the limit to how fast a human can run 100 meters?

Sports scientists say that sprinters' speed is influenced by how hard they hit the ground with their feet and by how many steps they take. Cheetahs do not hit the ground as hard as humans, but they can take twice as many steps as we do. This is why they can run fast.



Q1 Underline the two factors that influence sprinters' running speed.

Q2 Why do cheetahs run faster than humans?

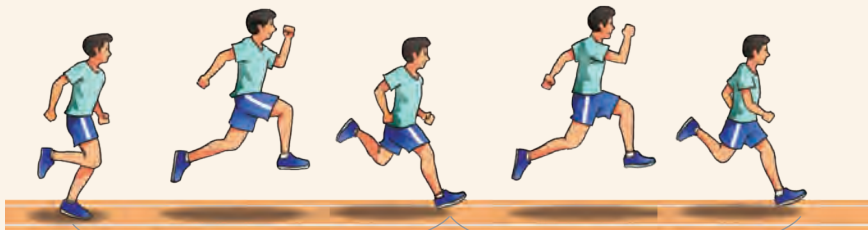
The problem for humans is that the harder they hit the ground, the more time they spend in the air, which makes their steps longer but reduces the number of steps they can take. Therefore, maximum running speed is attained when the combination of force applied to the ground and stride frequency is optimal.

Unfortunately, this combination also depends on the runner's size, leg length, and other factors that vary among individuals. Many experts predict, however, that a human being could probably run the 100-meter sprint in just over nine seconds. Maybe future technology will help runners run even faster than they do today.



- attain
- apply
- stride
- frequency
- optimal
- vary

- focusing on taking longer steps (**length-focused**)



- focusing on taking a greater number of steps (**frequency-focused**)



When runners train, they use two methods as shown here. To attain the best performance, they should find the optimal combination of stride length and frequency.

Q3 It is important for a sprinter to find a balance between _____ and _____ to achieve the maximum running speed.

Why Do Curlers Sweep the Ice?

- sweep
 - broom
 - furiously
 - fist
 - indicate
-
- curl

? Did You Know?

Secrets of Curling Ice

The curling ice or *curling sheet* consists of small bumps made by sprinkling water drops on the ice. They reduce the contact surface between the stone and the ice.

“Hurry! Hurry up!” Two people with brooms furiously sweep the ice in front of a rock that slides across a sheet of ice. “Whoa!” The sweepers stop as the rock settles into the house. “Nice job!” All four players bump fists indicating success. Have you guessed the sport? It’s called curling.

5

One might expect that a curling stone sliding across the ice would continue in a straight line according to Newton’s first law of motion. However, the stone will begin to curl when it loses its speed even though it is three or four times as heavy as a bowling ball. This is why players have to direct the stone’s path carefully, and they do this by sweeping.

10



Q4 What is the purpose of the first paragraph?

a to introduce a new topic

b to describe the rules of a game



The heat generated by the sweeping melts the ice, which reduces friction. Reduced friction helps the stone move farther.



By rubbing the ice with the broom, the sweepers are generating heat to reduce friction between the stone and the ice. This results in the stone going straighter and farther. If the sweepers stop, the stone begins to curl again. Although the house—the area where the curlers
 5 aim the stone—is often blocked by an opponent’s stone, curling teams can actually guide one stone behind another, which is one of the major strategic elements to the game. The precision with which the team can control the direction and speed of the stone is a major factor in the strategy of the game.

Reading Strategy

Identifying Cause & Effect

Identifying cause-effect relationships helps you to think analytically. While you read, think about what effects sweeping has on the curling stone. (→ Q5)

- rub
- generate
- friction
- result in
- opponent
- strategic

Q5 Complete the cause-effect relationships between sweeping and the stone.

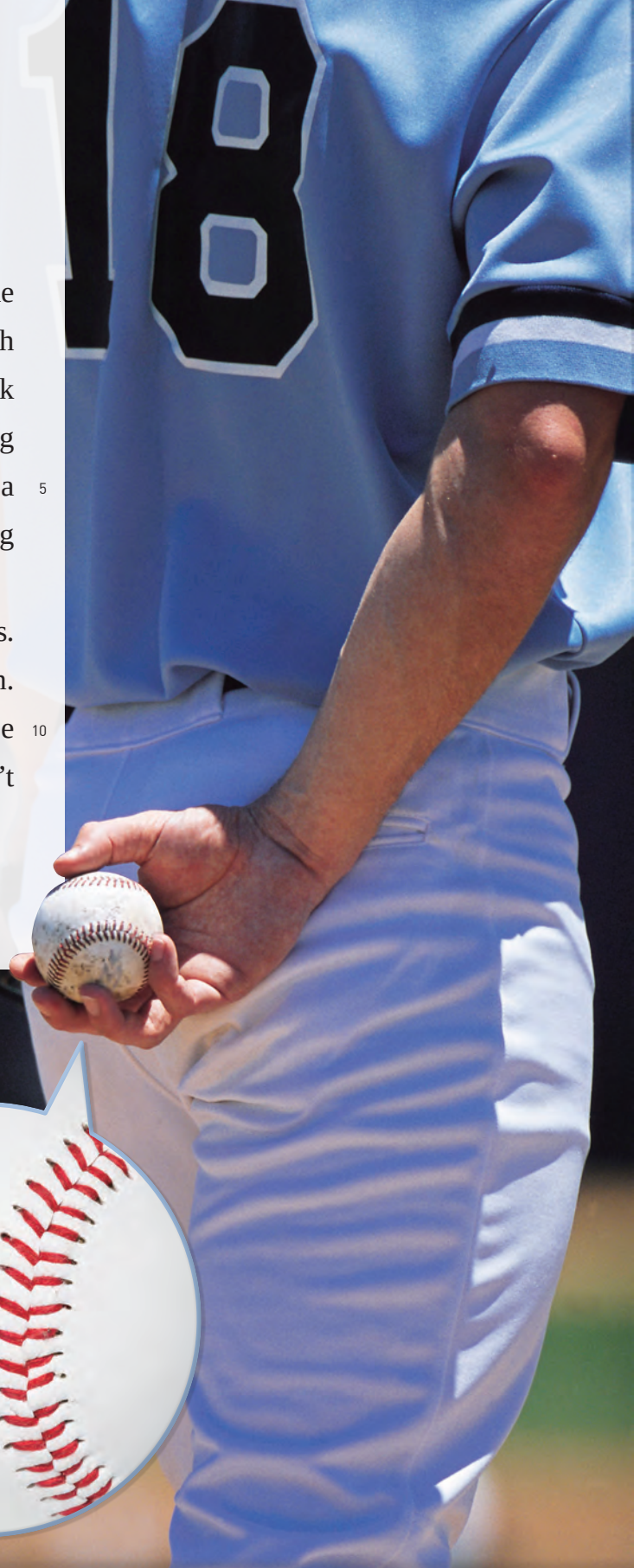
[sweeping the ice → generates _____ → _____ the ice into water → reduces _____ between the stone and the ice → the stone goes _____ and _____]

Why Does a Baseball Have Stitches?

The batter swings and hits a foul ball into the stands. You reach up with your glove and catch it as other spectators clap and cheer. You look at the baseball with its smooth leather covering and bright red stitches. Do the stitches serve a purpose other than to keep the leather covering over the ball?

A typical baseball has 108 double hand stitches. They serve more than just a decorative function. The stitches on a baseball actually affect the flight of the ball. Without them, a pitcher couldn't throw it as fast or as accurately.

- stitch
- batter
- spectator
- serve
- decorative
- pitcher



Q6 What does *them* in line 11 refer to?

Q7 The stitches on a baseball help the pitcher throw the ball _____ and _____.

When a round object like a ball is thrown, the front part of the ball hits the air, increasing the air pressure there while the air becomes thinner at the back of the ball, making the air pressure low. This difference in air pressure creates an unwanted effect called “drag” that

5 literally drags the ball backward and slows it down. This is where the stitches come into play.

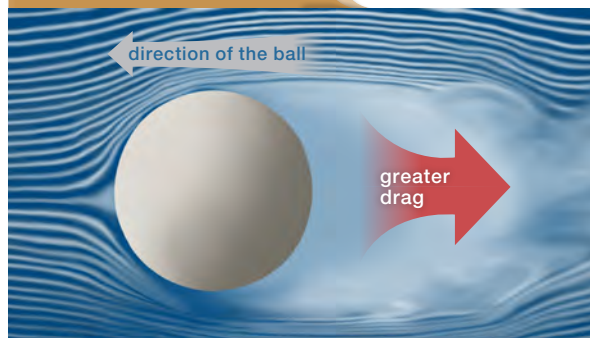
- drag
- literally
- come into play

The stitches more or less scoop the air and direct it inwards towards the back of the ball. This effectively increases the net air pressure at the back of the ball, which reduces the drag. Further, as a baseball is

10 released, the pitcher can put spin on the ball. As the ball spins, the stitches help the ball to fly in the direction the pitcher intends.

- scoop
- net (a.)

A Ball Without Stitches



A Ball With Stitches



The shading at the back of each ball represents the lower air pressure zone, showing how the stitches work to weaken drag by catching the surrounding air and directing it inwards.

Stitches scoop up the air inwards towards the back of the ball.

Self-check

I can see the cause-effect relationships in the text. / 5

I understand how science works in each sport. / 5

- Read the text again and record your reading time.

2nd ____ min. ____ sec.

- **Read More!** Go to page 148.

Q8 How do baseball stitches reduce the effect of drag?

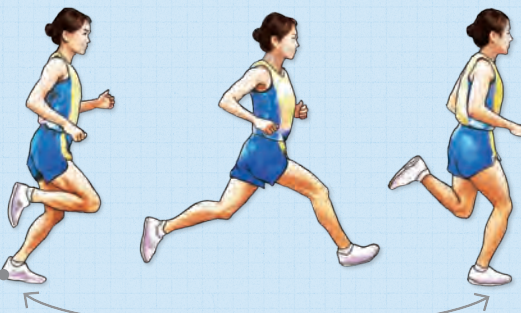
Q9 **How about you?** Which scientific concepts behind the three sports did you find most interesting?

After You Read

A Fill in the blanks with the given words to describe the pictures below.

100m sprint

The ¹⁾ _____ you apply to the ground determines how long you stay in the air.



The longer you stay in the air, the fewer ²⁾ _____ you take.

Curling

Without sweeping, the stone will ³⁾ _____.



Sweeping the ice in front of the stone makes it go ⁴⁾ _____.

Baseball

The difference in air pressure creates ⁵⁾ _____.

high air pressure area



low air pressure area

⁶⁾ _____ catch the surrounding air and fill the back area with the air.

WORDS

stitches

force

drag

curl

steps

straight



B Number the sentences about curling in order. Then practice the dialog with your partner.

1 I still wonder why the players bother to sweep the ice with brooms.

2 That's because if the stone is left alone, it begins to curl.

A-ha! Then there must be some water between the ice and the stone.

Exactly. The water makes the stone go farther.

Right, but I don't understand exactly what happens when they sweep the ice.

As far as I know, sweeping the ice creates friction, and this friction generates heat, which then melts the ice.

Now I get it.



C Complete the following passage using the given phrases.

Did You Know?



Hand Stitches on a Baseball

Did you know stitches on a baseball are not there just for decoration? They play an important role. They

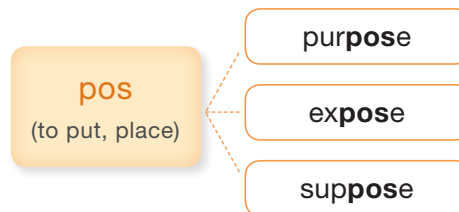
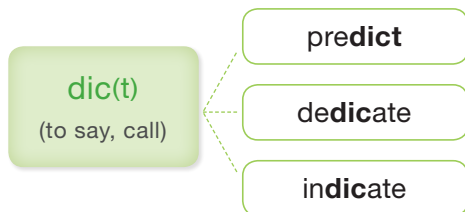
Like all other things in the world, there is a purpose behind what we see.

- reduce the drag effect
- fly faster

SPORTS TODAY

Language Focus

A Word Forms



Complete each sentence with a word from above. Change the form if necessary.

- 1 Don't _____ your skin to the sun for too long. It could cause damage to your skin.
- 2 Economic analysts _____ in their latest report that the domestic manufacturing industry will recover soon.
- 3 The statistics _____ that the sales of furniture increase during the Christmas season.
- 4 The _____ of this article is to convince readers to make a donation for the construction of the memorial hall.

B Expressions in Use

- **be capable of** to be able to do or achieve something
- **come into play** to start to happen or have an effect
- **result in** to produce something or to lead to a certain outcome

Complete each sentence with an expression from above. Change the form if necessary.

- 1 The heavy rain _____ several transportation delays last night.
- 2 I think I _____ performing the jobs described in this document.
- 3 Don't let your personal emotions _____ when you make decisions on public matters.

✓ **Self-check** Make your own sentence, using one of the expressions above.

C Grammar in Use

Point 1

- Adult cheetahs can take **twice as** many steps **as** we do.
- The curling stone is **three or four times as** heavy **as** a bowling ball.

cf. This is twice **as big as** that. = This is twice **the size of** that.

Reshuffle the words in parentheses to complete the paragraph.

How many calories do you burn when you sit, stand, or walk? A recent study of office workers revealed an interesting finding. Sitting and standing turned out to burn almost the same calories per hour. Walking, however, was different: It burned ¹⁾(as / many / twice / calories / as) sitting or standing. Now, given the fact that running burns about ²⁾(of / the calories / three or four times) walking, you have an answer to a healthy life: Run!

Point 2

- Cheetahs can take twice as many steps as we do. This is **why** they can run fast.
the reason
- The stone will begin to curl. This is **why** players have to direct the stone's path carefully.
the reason

cf. This is (the place) **where** they first met. • Today is (the day) **when** I was born.

✓ **Self-check** Skim through page 148 and underline the sentence with the structure above.

Fill in each blank with *where* or *why*.

- 1 A** Let me go over your résumé. You were born in Seoul, right?

B No, that's not _____ I was born. I'm from Busan.
- 2 A** I heard that cats are extremely sensitive to light.

B Yeah, it's true. That's _____ they can see in the dark.

A Get Ideas

If you were allowed to form a new sport club at your school, which sport would you choose? Read and check.

Ultimate Frisbee	Cheerleading	Skateboarding
<i>a full body exercise</i>	<i>a perfect team sport</i>	<i>a sport of coordination</i>
		
Benefits • social interaction • increased endurance	Benefits • leadership development • strong joints and muscles	Benefits • muscle building • improved balance
Toss and Catch the Frisbee in the Open Field!	Spread Your Happiness to Others!	Dash through the Park on a Skateboard!

B Organize Ideas

Write about your plan for a recruitment flyer about the sport you chose.

- How would you define the sport you chose?
→ _____ is _____.
- What are the health benefits of the activity?
→ You can _____ and _____.
- Who do you want in your club?
→ We welcome those who _____.
- Which day, what time, and where do you plan to meet?
→ We will meet on _____, from _____ to _____ at _____.

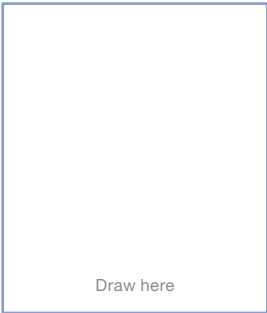
C Write

Based on your ideas, complete the flyer to promote your club.



Come and Join Us Now!

_____ is _____!



Draw here

_____ High School _____ Club has been newly formed and is looking for new members. By joining us, you get the chance to _____.

You can also _____.

We'll meet on _____ this year. We welcome everyone, but those who _____ will be particularly welcomed. If you're interested, please feel free to contact _____ at _____.

Let's _____!

_____!

plus

definition

health benefits

contact information

catch phrases

Writing Tips words for catch phrases

- now is the time to ~
- share your passion for ~
- don't hesitate to ~
- seize the opportunity to ~

✓ Peer-check

STEP 1 Exchange books and evaluate your partner's flyer. Leave comments where necessary.

Is the flyer inviting overall?	/ 5
Does the flyer have all the necessary information?	/ 5

STEP 2 Revise your flyer based on your partner's feedback.



A Listen and answer the questions.

1 What is the boy most likely to do after the dialog?

- ① buy new running shoes
- ② download the running application
- ③ search for new running routes
- ④ sign up for a fitness program

2 Which picture best illustrates how basketball was played in the past?

①



a soccer ball

②



a basketball

③



a soccer ball

④



a basketball



B Complete the dialog using the given sentences and practice it with your partner.

3

A Hurrah! The Korean archery team won all of the gold medals!

B _____

A They shoot more than 1,000 arrows a day. But that's not the only secret.

B _____

A Definitely. Athletes use advanced equipment and receive psychological treatment during their training, too.

B _____

a Now I understand why Korean archers have stayed on top.

b Do you mean there's something else behind their success?

c Unbelievable! I wonder how they can be so successful.





C Read the passage and answer the questions.

A typical baseball has 108 double hand stitches. They serve more than just a decorative function. The stitches on a baseball actually affect the flight of the ball. Without them, a pitcher couldn't throw it as fast or as accurately.

When a round object like a ball is thrown, the front part of the ball hits the air, (A) the air pressure there while the air becomes thinner at the back of the ball, making the air pressure (B). This difference in air pressure creates an unwanted effect called "drag" that literally drags the ball backward and slows it down. This is where the stitches come into play.

4 Which pair of words best fits in (A) and (B)?

- | | | | |
|---------------------|-----|--------------------|-----|
| (A) | (B) | (A) | (B) |
| ① increasing – high | | ② increasing – low | |
| ③ decreasing – high | | ④ decreasing – low | |

5 What would the paragraph that follows deal with?

- | | |
|---------------------------------|---|
| ① the role of baseball stitches | ② differences between baseballs and basketballs |
| ③ how the drag effect works | ④ the complex process of making baseball stitches |



D Read the passage and write your answers.

One might expect that a curling stone sliding across the ice ① would continue in a straight line according to Newton's first law of motion. However, the stone will begin to curl when it ② loses its speed even though it is three or four times as ③ heavy as a bowling ball. This is ④ what players have to direct the stone's path carefully, and they do this by sweeping.

6 Find the grammatically incorrect word among ① ~ ④ and fix it.

_____ → _____

7 Write the meaning of do this.

→ _____

Self-check Which question(s) did you miss?

Listening	Speaking	Reading	Writing
1	2	3	4
5	6	7	

What do you need to review?:

My Learning Log

Looking back at what I learned in this lesson will help me become a better learner!

Look through the Self-checks and Peer-checks, and rate your learning below.



My Learning

I have realized that sports are related to science.	☹️ 😐 😊
I had a chance to better understand scientific concepts in running, curling, and baseball.	☹️ 😐 😊
Overall, I am better able to understand scientific texts.	☹️ 😐 😊

- What sports facts do you want to find more information about?

ex) After reading the text about baseballs, I got curious if the same scientific rules work for a golf ball.



My Attitude

Did I read or listen again when I couldn't understand?	☹️ 😐 😊
Did I refer to the visual aids included in the text for better understanding?	☹️ 😐 😊
Did I give positive feedback to my partners or group members when necessary?	☹️ 😐 😊

- What will you do differently next time?

ex) I think I need to get used to looking at things from a scientific point of view.

STEP 1

Gather & Research

Make a group of three. Search the Internet to find out about various sports-related jobs and choose one your group will make a presentation about.

** Gather information about the job you chose to make presentation slides in the next step.

STEP 2

Discuss & Design

Discuss what to include in your presentation and make presentation slides.

** Discuss what kinds of visual aids to include.

** You may use video or audio clips if you wish.



STEP 3

Present & Evaluate

Give a presentation to your class and evaluate other groups' work. Then vote for the best one!

Sports Career

Search

▶ a soccer coach



▶ a sports agent



▶ an ice maker for curling



▶ a physical therapist



▶ a sports journalist



your own



CONTENTS

2/6

- I What Ice Makers Do
- II How to Pursue a Career in Ice Making
- III A Video Clip of the World's Top Ice Maker
- IV Q&A

I What Ice Makers Do

3/6

An ice maker ...
gets the ice ready before a curling game begins

by ...

- making sure the surfaces are level
- sprinkling water onto the ice to make small bumps

Is the presentation informative?

/ 5

Group 2

/ 5

Group 3

/ 5

Group 4

/ 5

Is the speech appropriate in speed and tone?

/ 5

/ 5

/ 5

/ 5

Are the slides visually attractive?

/ 5

/ 5

/ 5

/ 5

Technology Doping

OPINION

No. 30,222

© THE DAILY SPORTS

Tuesday, July 7th, 2020

Doping in sports usually involves drugs that players illegally take to gain an unfair advantage in performance. As technology advances, however, doping is done not only with drugs but also with their equipment. That's why the term 'technology doping' was coined, referring to any form of unfair advantage gained from technology by a player or a team.

In the 2008 Olympic swimming competitions, when 23 out of 25 world records were set by those in a particular swim suit, investigations concluded that

it was a case of technology doping. Recently, in a 2016 international cycling event, a cyclist from Belgium was accused of

technology doping when a small machine was found inside her bike frame that gave her extra power while she pedaled.

A specially designed swim suit or a small device in a bicycle clearly gives an unfair advantage. They only discourage athletes who train day and night to improve their performance. Such attempts should be banned in all sports competitions. In order to preserve and promote the core value of fair competition among players, the governing bodies of various sporting events should seek measures to prevent technology doping from entering into their events. Technology has not been developed as an illegal weapon for gaining an unfair advantage. It is to be used as a tool for progress.



A Little Physics

Whole-body swim suits

Whole-body swim suits, banned after the 2008 Olympics, were made from special material with tiny pockets of gas. This allows swimmers to float more easily and reduces drag.

