

A Run of Force and Motion



EXTREME ULTRA-MARATHON in
the SAHARA DESERT

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A RUN OF Force and Motion



1 Force and Motion in Sports

Gravity, friction and force all affect how you play a sport. Find out how surfing and soccer (football) are affected by these forces.

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How did the Simon brothers train for the ultra-marathon across the Sahara Desert?



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The runners must have enough energy for the toughest foot race on Earth.

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7 Who Won the Marathon?

Everyone who finishes this ultra-marathon is a winner. Find out who has won the most times.

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Forces in Soccer and Surfing

If we apply enough **force** to something, we set it in motion.

Once something is pushed, it will keep moving until something else stops it.

Gravity and **friction** are forces that can stop the moving object.

FORCE

Force is the energy used to push or pull an object. For example, if an object is heavy and moving fast, more force is needed to slow it down.

FRICTION

The rubbing of one thing against another.

GRAVITY

Gravity is the force that pulls all objects together in the universe. Large masses, like a planet, have stronger gravity than small masses, like a ball.

Forces in Soccer

- 1** The kick is a **force**.
- 2** The **force** pushes the ball up.
- 3** and **4** There is **friction** between the ball and the air, which slows it down.
- 5** **Gravity** pulls the ball towards Earth.



Forces in Surfing

FRICTION

There is friction between the water and the surfer's hand and board.

GRAVITY

Gravity pulls the surfer down the wave.

FORCE

The force of the waves make the surfboard move.

Skills in Surfing



BALANCE

A surfer needs good balance to surf waves.

BUOYANCY

The board floats because of the upward force of the water under the surfboard, which is less dense than the water.

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2 Force and Motion in a Marathon

Meet Two Brothers

In 2008, David and Mark Simon became ultra-marathon runners. They used their own energy and force to run the 245-kilometre *Marathon des Sables*. This is a six-day footrace in one of the hottest places on Earth, the Sahara Desert.

Like most marathon runners, David and Mark have slender bodies. This means they need less energy to move their bodies than heavier people.



David and Mark at the ultra-marathon in the Sahara Desert.

Sport and Social Studies

The World's Toughest Footrace

The *Marathon des Sables* is the toughest footrace in the world. It is run:

- over a long distance – 245 kilometres in six days (plus one day for rest)
- in a hot climate – during the day, it can be between 45 and 50 degrees Celsius
- in a harsh environment – over sand dunes, rocky ground, low mountain ranges and salt flats
- with a heavy backpack – runners carry a 12-kilogram backpack containing food, water, clothes, a sleeping bag and a first-aid kit.



the *Marathon des Sables*

AFTER RUNNING THE *MARATHON DES SABLES* OVER SIX DAYS, THE SIMON BROTHERS ARE NOW CALLED "ULTRA-MARATHON RUNNERS".

Stored Energy

When the Simon brothers trained for the marathon, they ate healthy food. It contained:

- carbohydrates for energy
- fats for energy
- protein for muscle movement.

The food gave them potential energy, which they could use in the marathon.

STORED ENERGY

In science, another term for stored energy is **potential energy**.

History

Marathon des Sables

"*Marathon des Sables*" is French for "Marathon of the Sands". A Frenchman, Patrick Bauer, had the idea when he walked for 200 kilometres across the Sahara Desert. He wanted other people to enjoy the same experience. Since it began in 1986, over 6000 people have entered the race. Their ages range from 18 to 78.

A Training Program for the *Marathon des Sables*

After Christmas dinner in 2006, David and Mark planned their training program. It would start in February 2007. This was their plan. The *Marathon des Sables* would be their biggest challenge ever!

MONTH 1 FEBRUARY 2007

Walk for long distances.

MONTH 2

Cycle for long distances.

MONTH 3

Run for long distances without a backpack.

MONTH 4

Run shorter distances with a 4 kg backpack.

MONTH 5

Run longer distances with a 4 kg backpack.

MONTH 6

Run longer distances with a 5 kg backpack.

MONTH 7

Run longer distances with a 6 kg backpack.

MONTH 8

Run longer distances with a 7 kg backpack.

MONTH 9

Run longer distances with an 8 kg backpack.

MONTH 10

Run longer distances with a 9 kg backpack.

MONTH 11

Run longer distances with a 10 kg backpack.

MONTH 12

Run longer distances with an 11 kg backpack.

Run in the Australian desert from Connellan Airport to Uluru and back = 30 kilometres.

Run halfway from Uluru to Kata Tjuta in the desert = 50 kilometres.

MONTH 13

Run longer distances with a 12 kg backpack.

MONTH 14

Run even longer distances with a 12 kg backpack.

SEVEN DAYS BEFORE THE RACE

Travel to Morocco to get used to the hot climate.

SIX DAYS BEFORE THE RACE

Three-day hike up the Atlas Mountains in south-west Morocco.

THE RACE IN MARCH 2008

Run the 245-kilometre race with a 12 kg backpack.

Climb to the highest mountain peak in the Atlas Mountains – 4165 metres high!