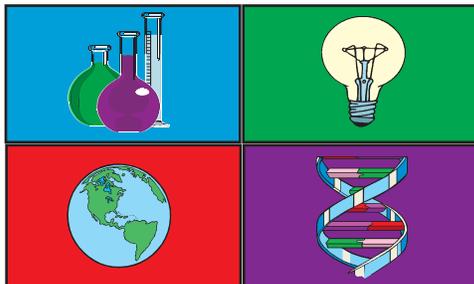


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How the new Olympic swimsuit gives athletes an edge

By: Jeff Lukens

How the new Olympic swimsuit gives athletes an edge

Speedo's new bodysuit, the Fastskin FSII, helps swimmers increase their speed by reducing drag after a dive or turn. The different fabrics, designed to work like a shark's skin, anticipate change in the flow of water along the swimmer's body. Suits are gender and stroke specific and can reduce drag by up to 4% more than the ones worn in Sydney.

Fastskin

Mimics the rough shark denticles, tooth-like scales that reduce drag along key areas of the body. Fabric compresses the body to stop skin and muscle vibration. This saves energy and reduces drag at faster speeds.

Flexskin

Smooth surface allows more freedom of motion and creates less drag at slower speeds.

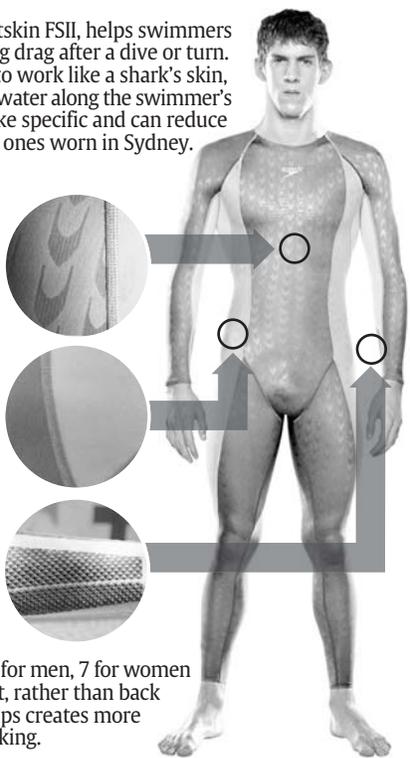
Titanium silicon scales

When swimming, Flexskin caused athletes to lose their feel of the water. Silicon scales applied to the inner forearm let swimmers regain their grip.

► **13 different types of suits:** 6 for men, 7 for women

► **Backstroke suit:** Zips in front, rather than back

► **Breaststroke:** Fabric along hips creates more freedom of motion when kicking.



Source: Speedo

Reporting by April Umminger; graphic by Marcy E. Mullins, USA TODAY

Activity Overview:

Each time the Summer Olympic Games roll around, the world marvels at the performances of the greatest athletes in the world. Every four years, millions of people are awestruck by the establishment of new world and Olympic records. Race times, event heights and distances that we once thought were untouchable become history. The three major factors that contribute to the perpetual shattering of records are superior athletes, advanced training techniques and advances in the technology of the available equipment. In this activity students will look at the potential impact of an improvement in the equipment used by world-class swimmers. They will also look at the improvement in the world records for men and women in the 100 Meter Freestyle race.

Activity at a Glance:

- Grade level: 8-12
- Subject: Biology, Physics, Physical Science
- Estimated time required: 30-60 minutes

Materials:

- TI-83 Plus family or TI-84 Plus family
- Overhead view screen calculator for instruction/demonstration
- Student handout
- Transparency

Prerequisites:

Students should be able to:

- enter data into the List Editor.
- manipulate data in the List Editor by entering formulas in lists.
- calculate percent change.



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Concepts:

- Observing trends in data
- Making predictions from data sets
- Calculating percent change
- Impact of technology on athletic performance

Objectives:

Students will:

- graph the progression of the women's and men's world records in the 100M Freestyle swimming race.
- calculate percent change from a data set.
- make predictions about future world records.

Background:

Every four years, interest in many of the "other sports" hits a fever pitch as the Olympics roll around. Sports such as competitive swimming seem to only get major attention during the Olympic Trials and the Olympics themselves. As people watch these events, either in person or on television, they hope that they will witness a record-setting performance. Some records are considered "unbreakable," yet we see them rewritten just the same. It is important to help students understand that there is more than simply natural ability that contributes to athletic excellence. The technology that is applied to training methods and equipment play critical roles, as well.

Classroom Management Tips:

- Students will have a better understanding of how to read the graphic and retrieve data if you use the transparency for a class discussion before the students start working.
- Remind students to read carefully all parts of the graphic before they start collecting data.
- Students can work individually or in small groups on this activity. Working in groups is especially helpful as they learn the various features of the calculator.
- Technology appeals to almost all students. Encourage all students to handle and use the graphing calculators. The TI graphing calculators are designed to be durable for daily classroom use and backpack portability.

Data Source:

Speedo

National Science Education Standards:

Grades 9-12: Science and Technology Understandings about Science and Technology

- Science often advances with the introduction of new technologies. Solving technological problems often results in new scientific knowledge. New technologies often extend the current levels of scientific understanding and introduce new areas of research.
- Creativity, imagination, and a good knowledge base are all required in the work of science and engineering.
- Science and technology are pursued for different purposes. Scientific inquiry is driven by the desire to understand the natural world, and technological design is driven by the need to meet human needs and solve human problems. Technology, by its nature, has a more direct effect on society than science because its purpose is to solve human problems, help humans adapt, and fulfill human aspirations. Technological solutions may create new problems. Science, by its nature, answers questions that may or may not directly influence humans. Sometimes scientific advances challenge people's beliefs and practical explanations concerning various aspects of the world. Technological knowledge is often not made public because of patents and the financial potential of the idea or invention. Scientific knowledge is made public through presentations at professional meetings and publications in scientific journals.

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Activity Extension:

- The USA TODAY Sports section is an ideal place to keep track of developments in the world of Olympic swimming.
- Have students research articles in USA TODAY for more news related to innovative technologies that provide efficiencies in our daily lives.
- This activity teaches students about one swimming event. Students will be interested in learning more about the records in other events. Encourage them to delve into additional events and report on them.
- In swimming, factors such as water depth and pool location may also play a role in performance. Have students explore the potential effects of these and other factors.
- Have students examine the progression of the world records in track and field events. The International Olympic Committee website is an excellent source for this information (www.usoc.org).
- Technology has played a huge role in most sports. Brainstorm with students how advancements in equipment have impacted athletic performance. Some examples to consider would be track surfaces, poles for vaulting and footwear.

Curriculum Connections:

- Algebra I
- Algebra II
- Physics
- Physical Science
- Physical Education

Additional Resources:

- Student handout
- Transparency
- TI Technology Guide, for information on the following: TI-83 Plus family, TI-84 Plus family, List Editor
- TI-Navigator™ Basic Skills Guide for information on using the TI-Navigator Classroom Learning System

Teacher Notes:

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Assessment and Evaluation:

Q. By how many seconds has the women's world record improved since 1958?

A. 7.54 seconds

Q. By how many seconds has the men's world record improved since 1956?

A. 7.56 seconds

Q. Based on the data, what do you predict will be the next women's world record?

A. Predictions should probably be between 53.0 and 53.5 seconds

Q. Based on the data, what do you predict will be the next men's world record?

A. Predictions should probably be between 47.0 and 47.5 seconds

Q. From 1958 to 1978, what was the percent change in the women's world record? What has been the percent change from 1978 to 2004?

A. -9.5% from 1958-1978. -3.2% from 1978-2004.

Q. What was the percent change in the men's world record from 1956 to 1976? What has been the percent change from 1976 to present?

A. -10.8% from 1956-1976. -3.2% from 1976-present.

Q. What difference do you notice from the early 1970s to present? Explain the difference.

A. The records are now recorded to the hundredths of a second, rather than only to the tenths. The reason is the advent of fully electronic timing devices, which made the times much more accurate.



If you are using the TI-Navigator Classroom Learning System, send the provided LearningCheck assessment to your class to gauge student understanding of the concepts presented in the activity. See the TI-Navigator Basic Skills Guide for additional information on how this classroom learning system may be integrated into the activity.