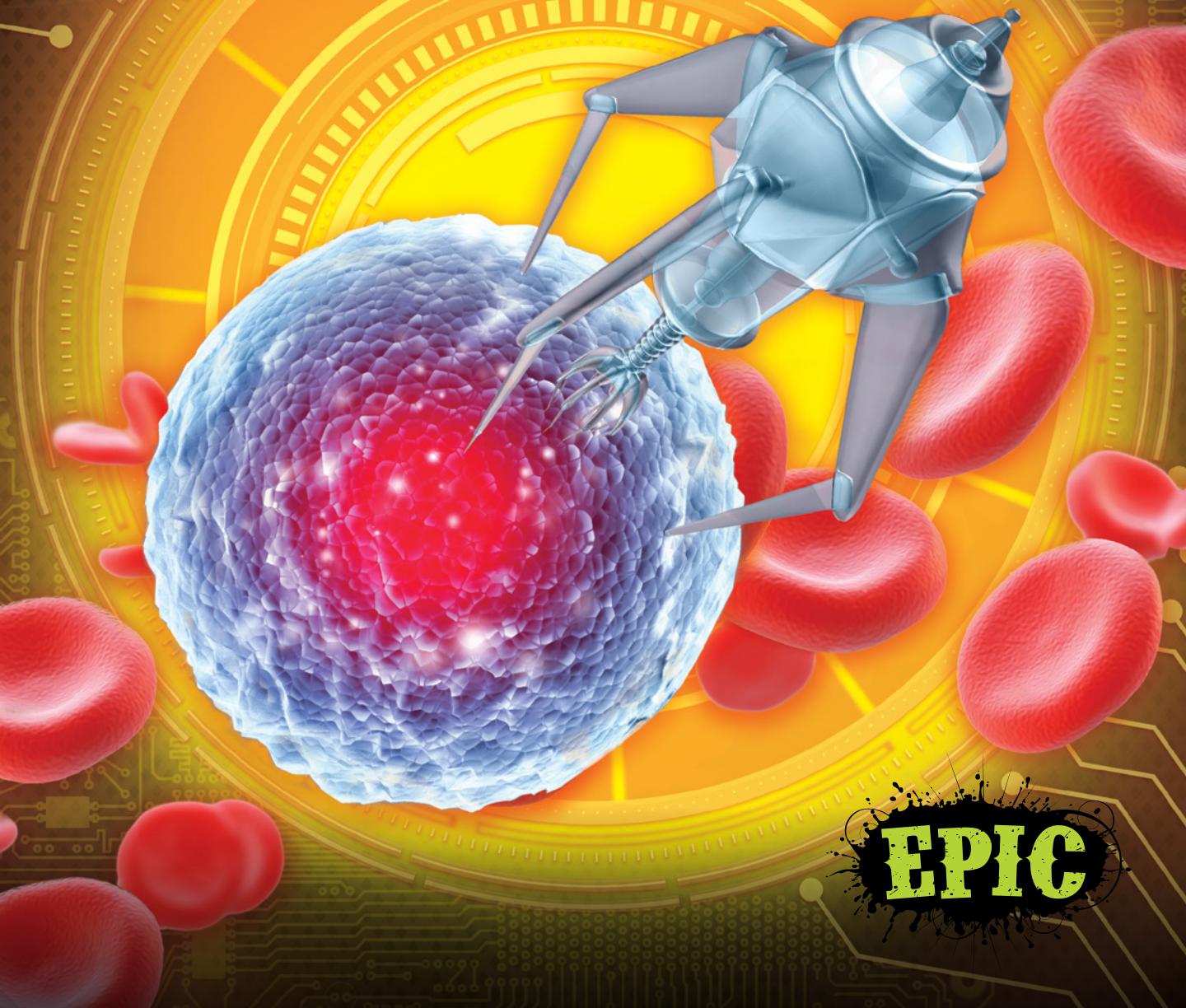


CUTTING-EDGE TECHNOLOGY

# NANOTECHNOLOGY



EPIC

# EPIC

Action and adventure collide in **EPIC**. Plunge into a universe of powerful beasts, hair-raising tales, and high-speed excitement. Astonishing explorations await. Can you handle it?

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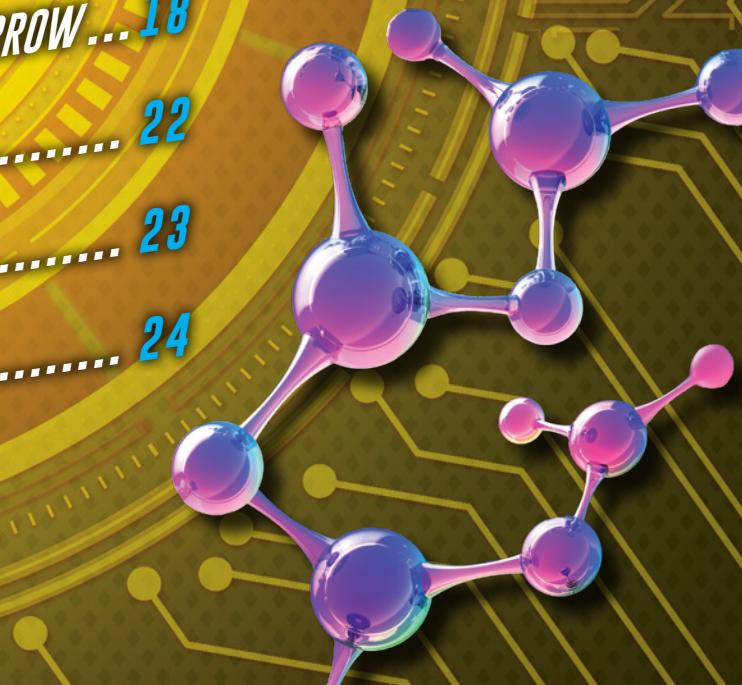
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# RAINY DAY CLOTHES

You are hiking through the woods. It starts to rain. But your shirt does not get wet. Rain rolls right off!

Your shirt was made with nanotechnology. It kept you dry on your hike!

**waterproof fabric**

A photograph of a person from behind, wearing a bright green hooded jacket and a grey backpack, walking away on a dirt trail through a dense forest of tall evergreen trees. The scene is set in a natural, outdoor environment.

## ANOTHER NAME

Nanotechnology is  
also called nanotech!

# WHAT IS NANOTECHNOLOGY?

Nanotech uses tiny materials up to 100 **nanometers** across. Scientists use the materials to make things more useful.



# HOW MANY NANOMETERS?

**Many tiny objects are thousands of nanometers thick!**



Nanotech is all around us. It makes machines lighter. It makes fabric stronger. It even senses changes in health!

# HOW IT WORKS

Everything is made of **particles**. Different particles are known to do certain things.

But **nanoparticles** act differently. They may become hard to see. They could even explode! Scientists look for ways to use these **properties**.





• • • nano material

**Microscopes** help scientists see materials up close. They help scientists study nanotech.

Scientists may cover objects in nanoparticles. This gives the objects new uses!



microscope

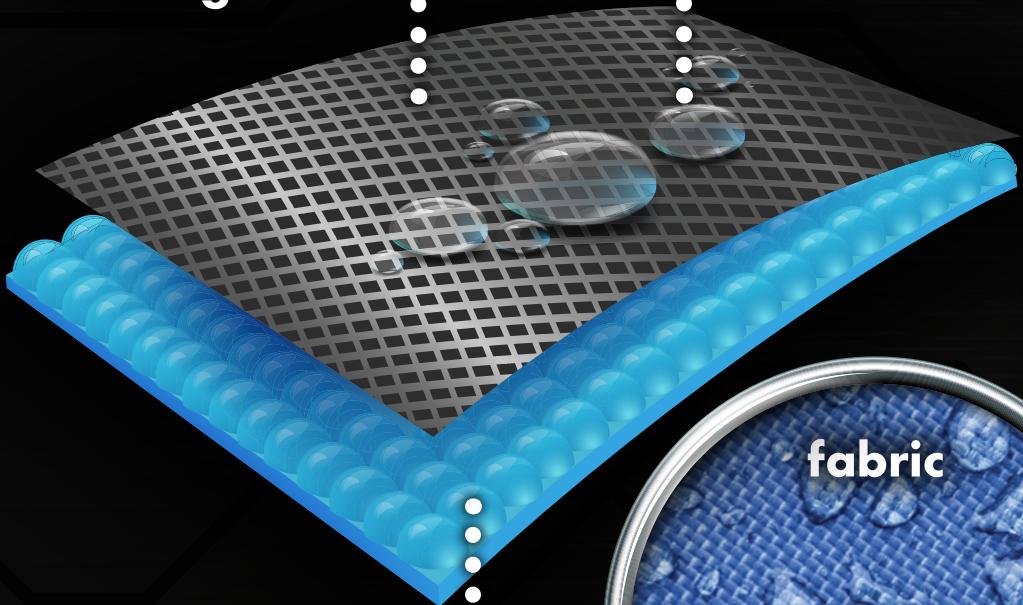
# **WATERPROOF FABRIC**

**Nanotech can be used to  
waterproof fabric.**

**nanoparticle  
coating**



**water**



**fabric**



# HISTORY

Modern nanotech began in 1959. Richard Feynman spoke about how nanoparticles could be used. But microscopes were not powerful enough.

**Richard  
Feynman** • • •

## EARLY ART

Ancient people used a form of nanotech, too. It helped them change the color of glass. The 1,600-year-old Lycurgus Cup is famous for its use of nanotech!



Still, people kept thinking about nanotech. In 1974, Norio Taniguchi gave the technology its name!

# NANOTECH TIMELINE



**1959**

Richard Feynman  
speaks about  
nanotech



**1992**

New nanotech  
discovered to help  
make gasoline

**1988**

Nanotech used  
to make  
new sunscreen



**2004**

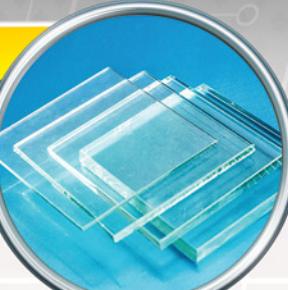
First nanotech  
bandages heal  
cuts faster



The 1980s brought a more  
powerful microscope. It helped  
scientists find uses for nanotech.

**2018**

New nanotech windows respond to hot and cold



**2005**

Nanotech baseball bats are released



**2019**

Scientists announce nanotech that could remove plastic trash from the ocean



**2008**

New nanotech rubber makes car tires stronger



By the early 2000s, some **consumer** products used nanotech. People could buy many useful items!



Today, nanotech is found in everyday objects. Containers are coated with tiny pieces of clay. This keeps drinks fizzy!

nanoparticle  
coated glass

# WHO USES IT?



military



doctors



scientists



tech companies

**Nanocarbon** makes metal stronger. Other materials help batteries charge faster!

# TECHNOLOGY OF TOMORROW

Nanotech could limit **climate change**. Lightweight carbon metal machines use less fuel.

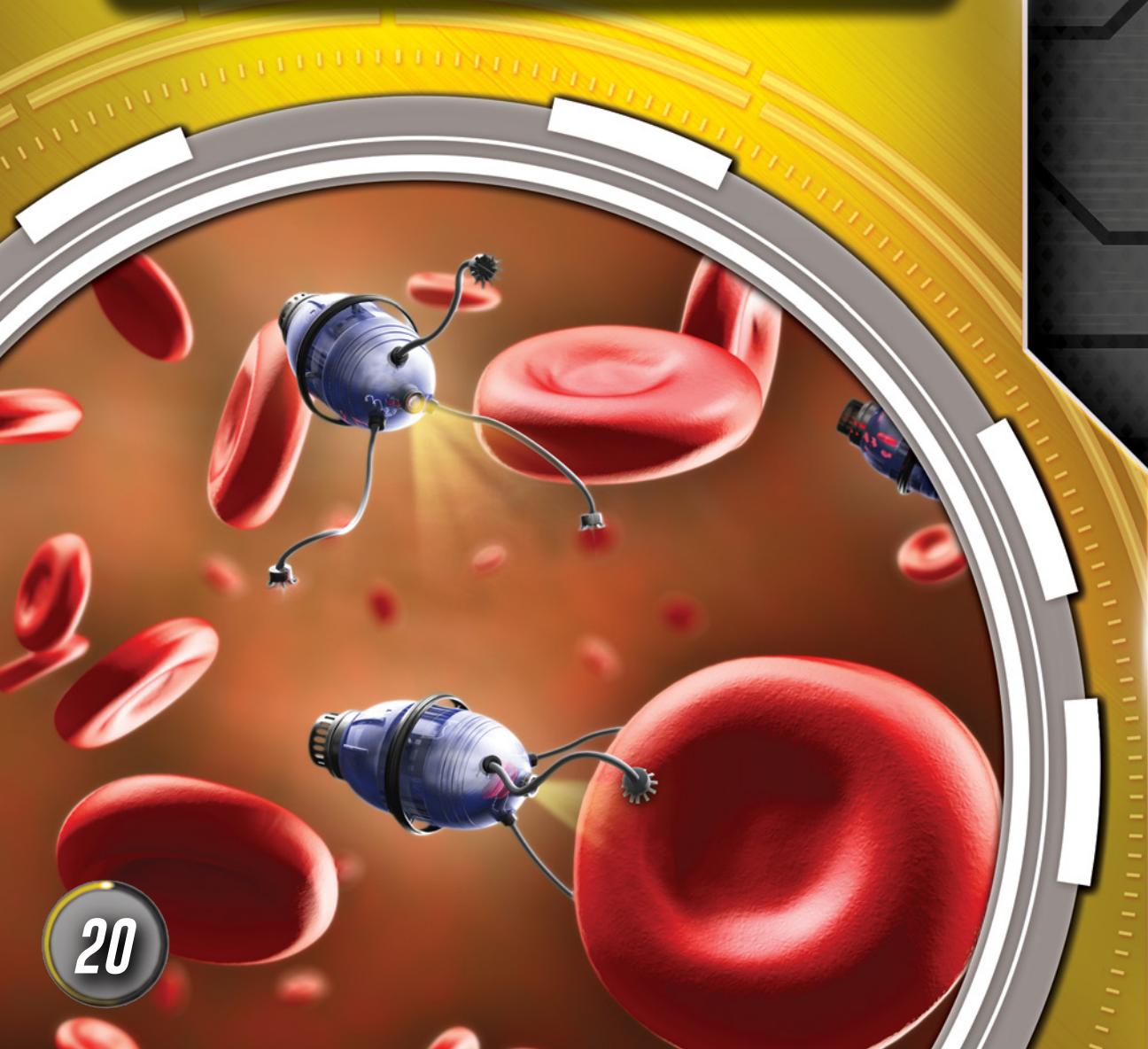
Better **solar panels** could be made with nanotech. Light-reflecting nanoparticles trap more energy!

**solar panels** • • •



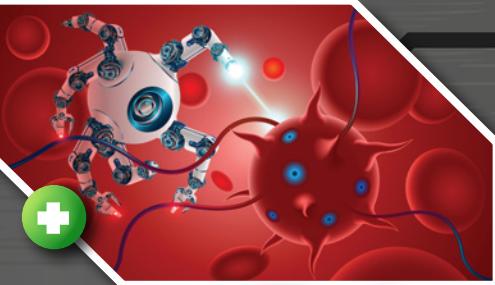
Nanotech robots are also being made. They will enter the body to find problems. They may even help people heal.

Scientists will continue researching nanotech uses. The future of this cutting-edge technology is full of possibility!

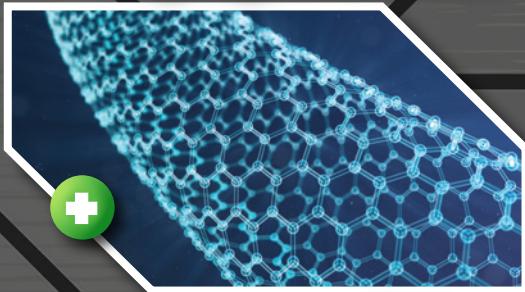


# PROS AND CONS

## Pros



**could make people healthier**



**stronger, lighter materials**

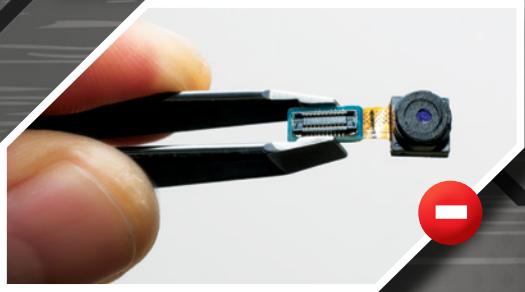


**could limit climate change**

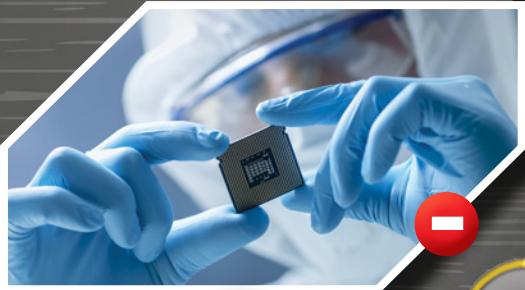
## Cons



**could be used as a weapon**



**less privacy**



**expensive**

# **GLOSSARY**

**climate change**—a human-caused process in which Earth's average weather changes over a long period of time

**consumer**—a person who buys products

**microscopes**—tools used by scientists to look closely at materials

**nanocarbon**—a tiny carbon-based material used to make things stronger; carbon is an element found in nature.

**nanometers**—units of measurement equal to one billionth of a meter

**nanoparticles**—tiny pieces of materials that can only be seen with microscopes; nanoparticles are measured in nanometers.

**particles**—tiny pieces of a material

**properties**—features of a person or thing

**solar panels**—panels that transform sunlight into energy

# **TO LEARN MORE**

## **AT THE LIBRARY**

Amstutz, Lisa J. *Discover Nanotechnology*. Minneapolis, Minn.: Lerner Publications, 2017.

Gitlin, Marty. *Nanomedicine*. Ann Arbor, Mich.: Cherry Lake Publishing, 2018.

Kulz, George Anthony. *Nanotechnology*. Chicago, Ill.: Norwood House Press, 2018.

## **ON THE WEB**

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