

LITTLE BOOKS OF
BIG FACTS

PHYSICS

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Heat



Liquid



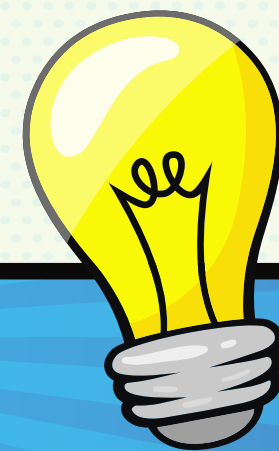
What is physics?

The field of physics is all about matter and energy.

Solid

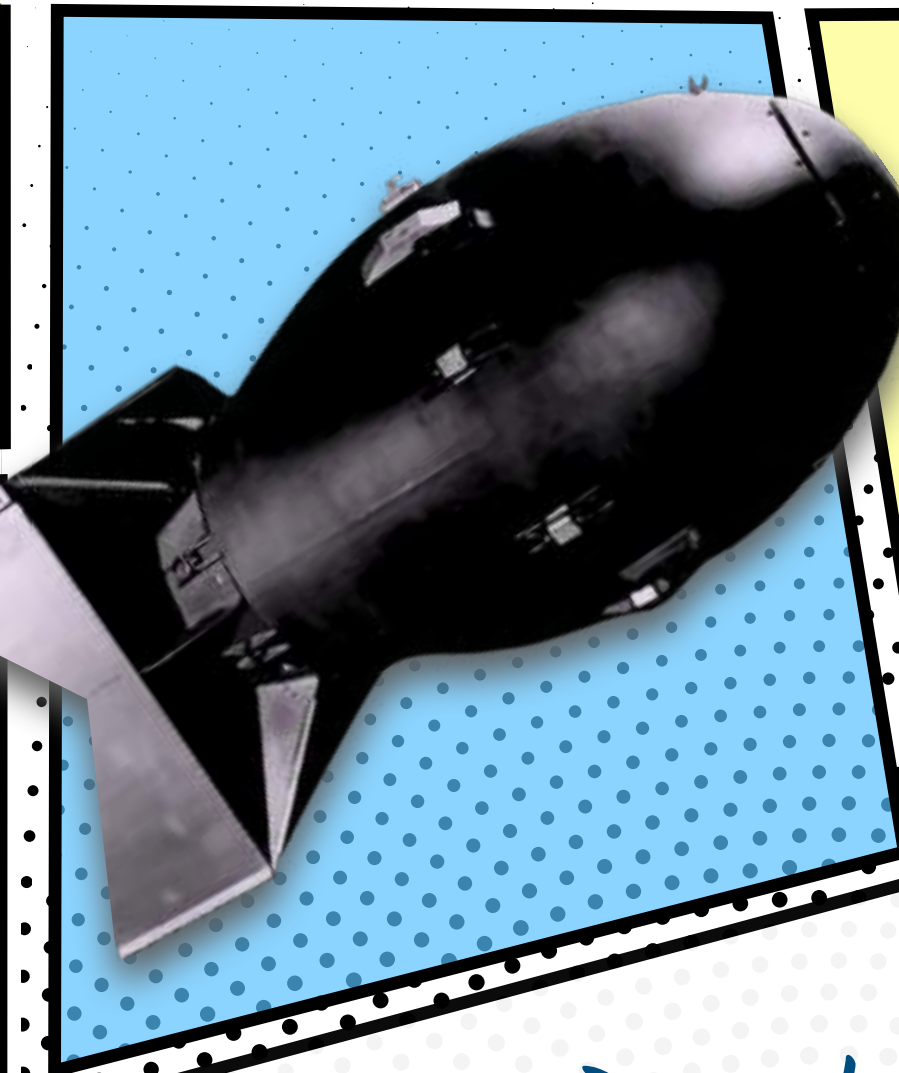
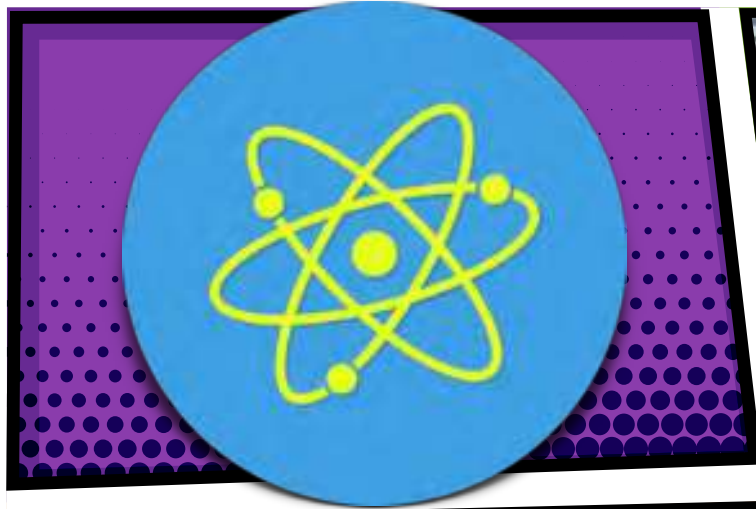


Matter is all the things that take up space, which includes everything from water to air to animals. Energy is things that can be transferred between matter.



Do you think that heat is matter or energy?

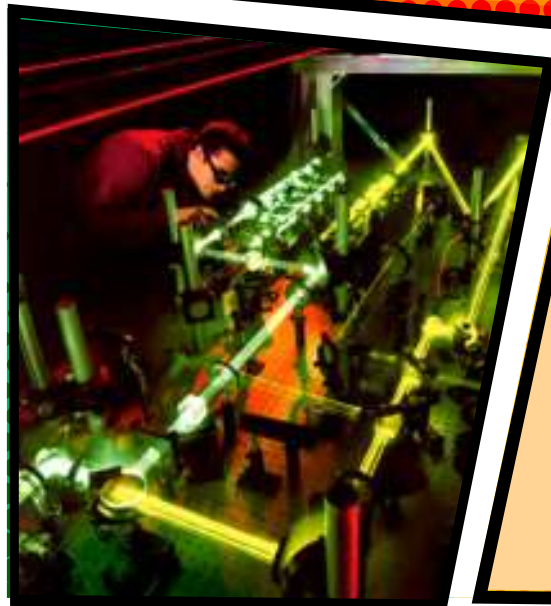
Heat is a form of energy.



Physics has led to destructive things at times, but physics can also help us to do and understand amazing things.

What is an atom?

It is a unit of matter.



Understanding the makeup of atoms has helped us to advance technology.



Do you have atoms inside of you?

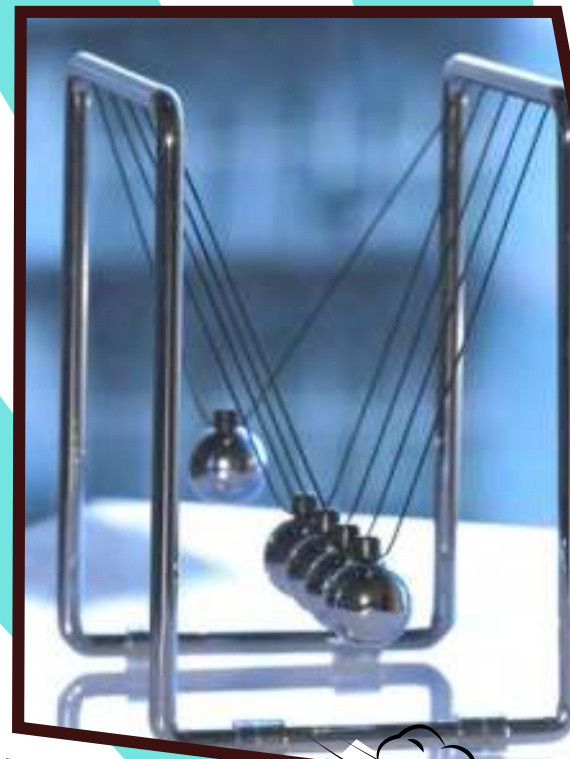
Yes! You are made of atoms.



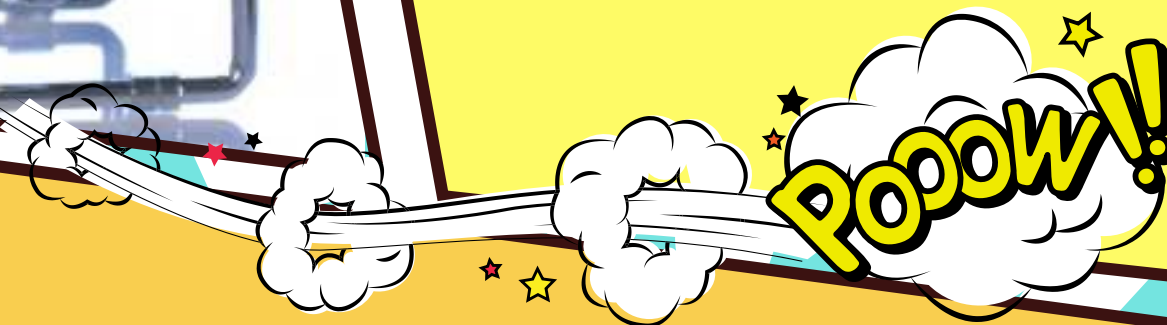


Why are time, mass, and distance important in physics?

We can record time, mass, and distance.



By observing time, mass, and distance in physics experiments, we can calculate the work that is done and the energy that is transferred.



What happens if you lift the first ball in Newton's cradle?

The first ball falls, transfers its energy, and makes the end ball go up.

What are heat and work in physics?

Heat is transferred between matter.

It flows from the hotter system to the matter that is colder.

Work is all about when an object is moved by force. An example is moving bike pedals.



Is pressing a button heat or work?

Pressing a button is work.



What are forces?



They affect objects in different ways, depending on things like mass. The power of that force also changes what happens. A very important force is gravity.

Gravity keeps us on Earth.

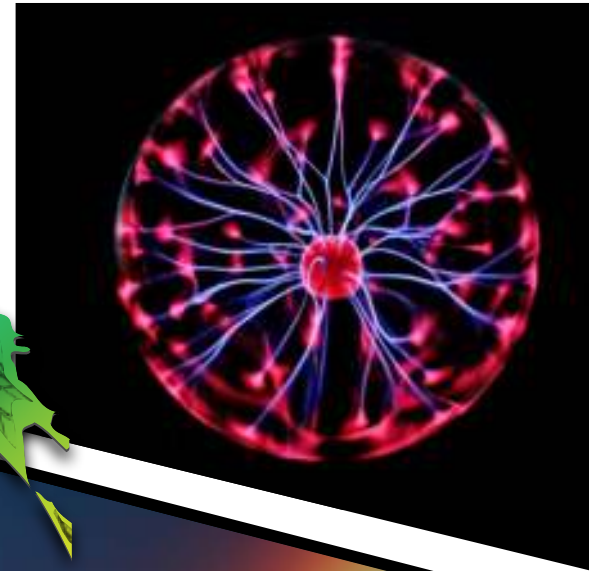
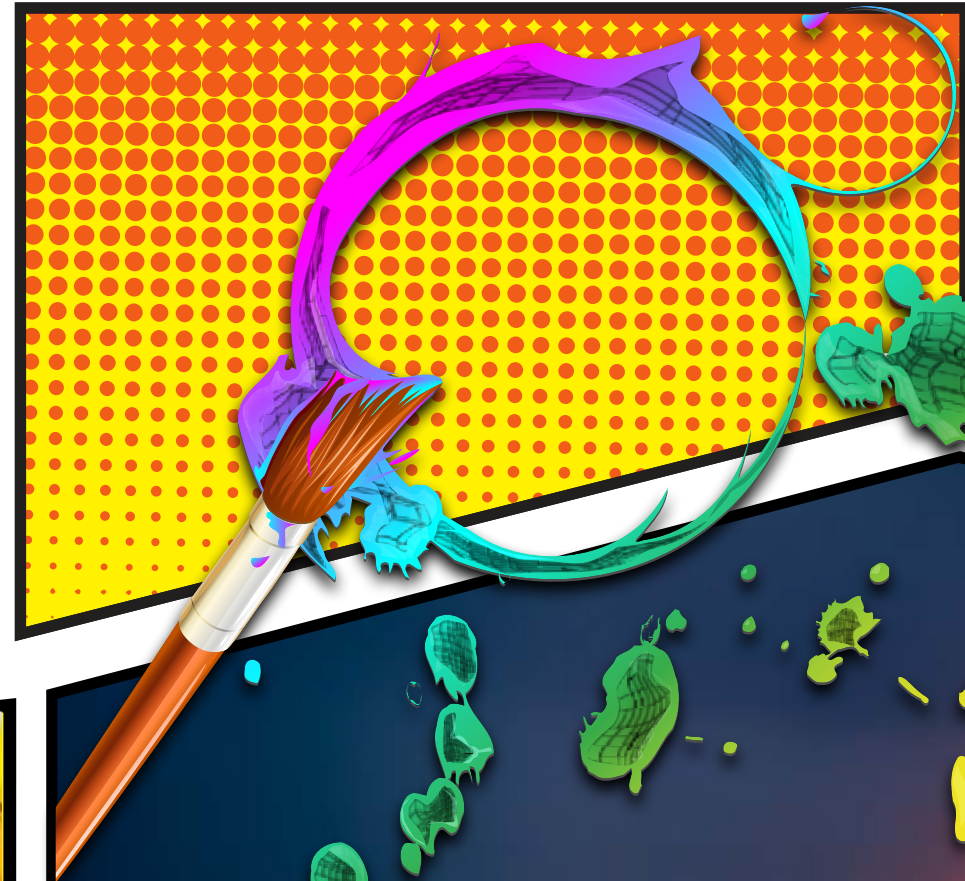


Why does our moon stay in orbit around us?

Gravity keeps it in orbit.



How do we see light and color?



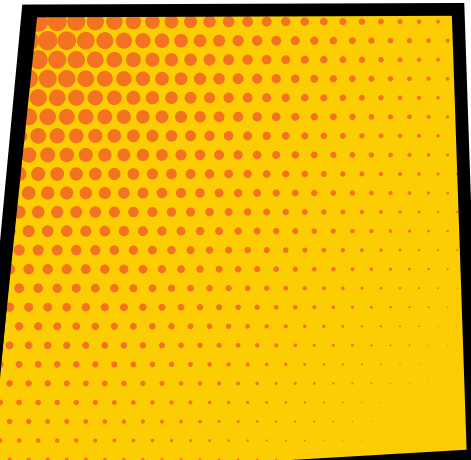
Physics also helps us to understand how light works, including how we see colors. Our eyes see wavelengths of light that reflect off objects. Depending on how long the wavelength is, we see different colors.



Do animals see color the same way as us?

Different animals see color in different ways.

How do we hear sound?



Understanding this helped us to improve instruments.

Just as our eyes pick up waves of light, our ears pick up waves of sound.

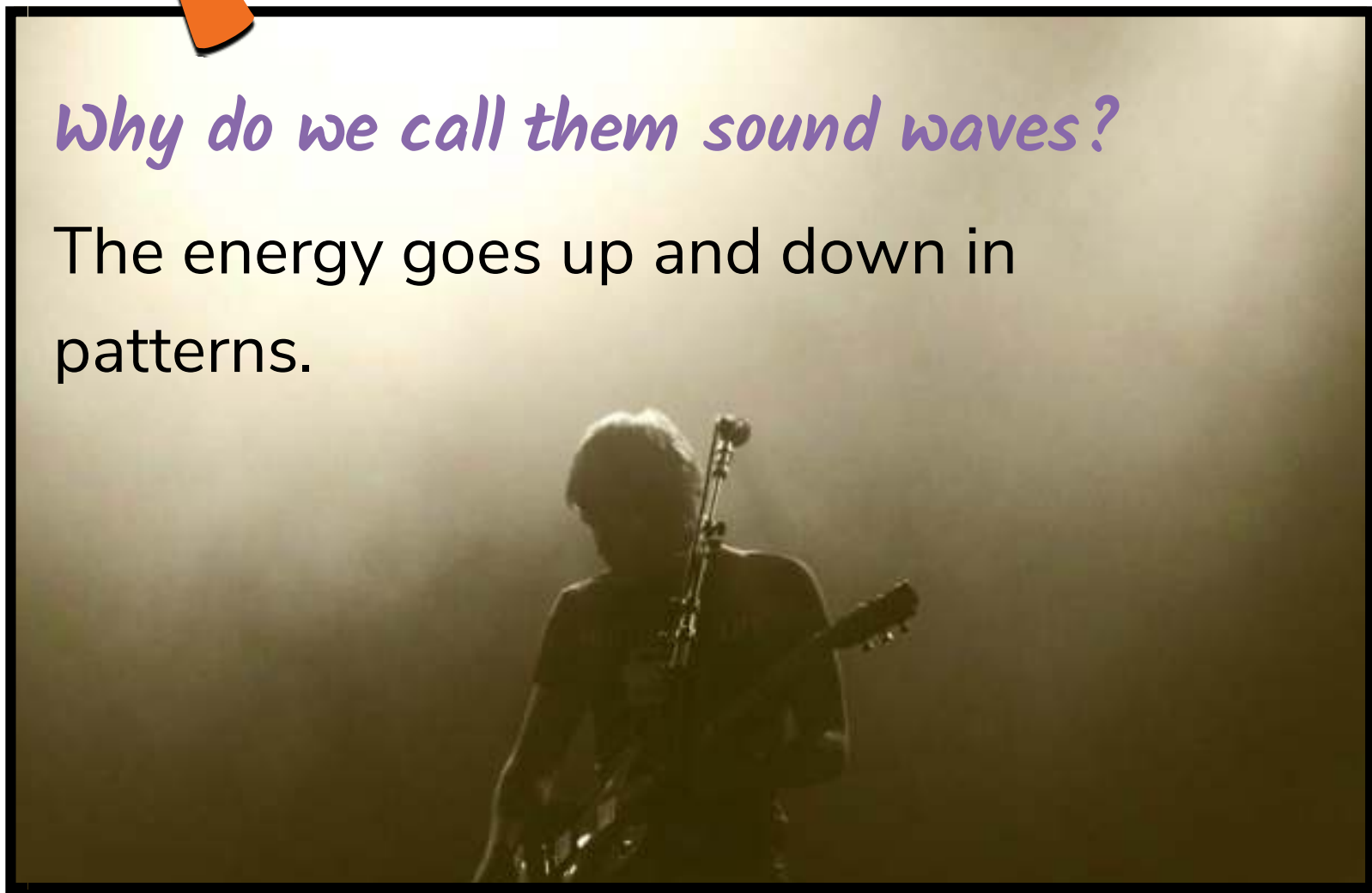


It travels as vibrations that go from an object to our ears.



Why do we call them sound waves?

The energy goes up and down in patterns.

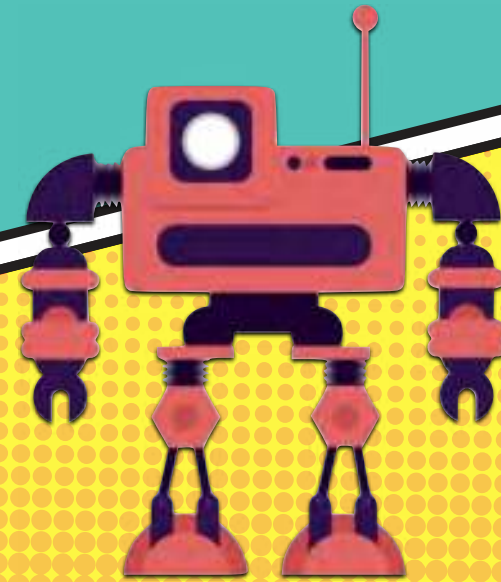




What does physics have to do with computers and machines?



We also need physics to understand how to make computers, video games, and robots. Over time, physics has helped us make them better and faster.

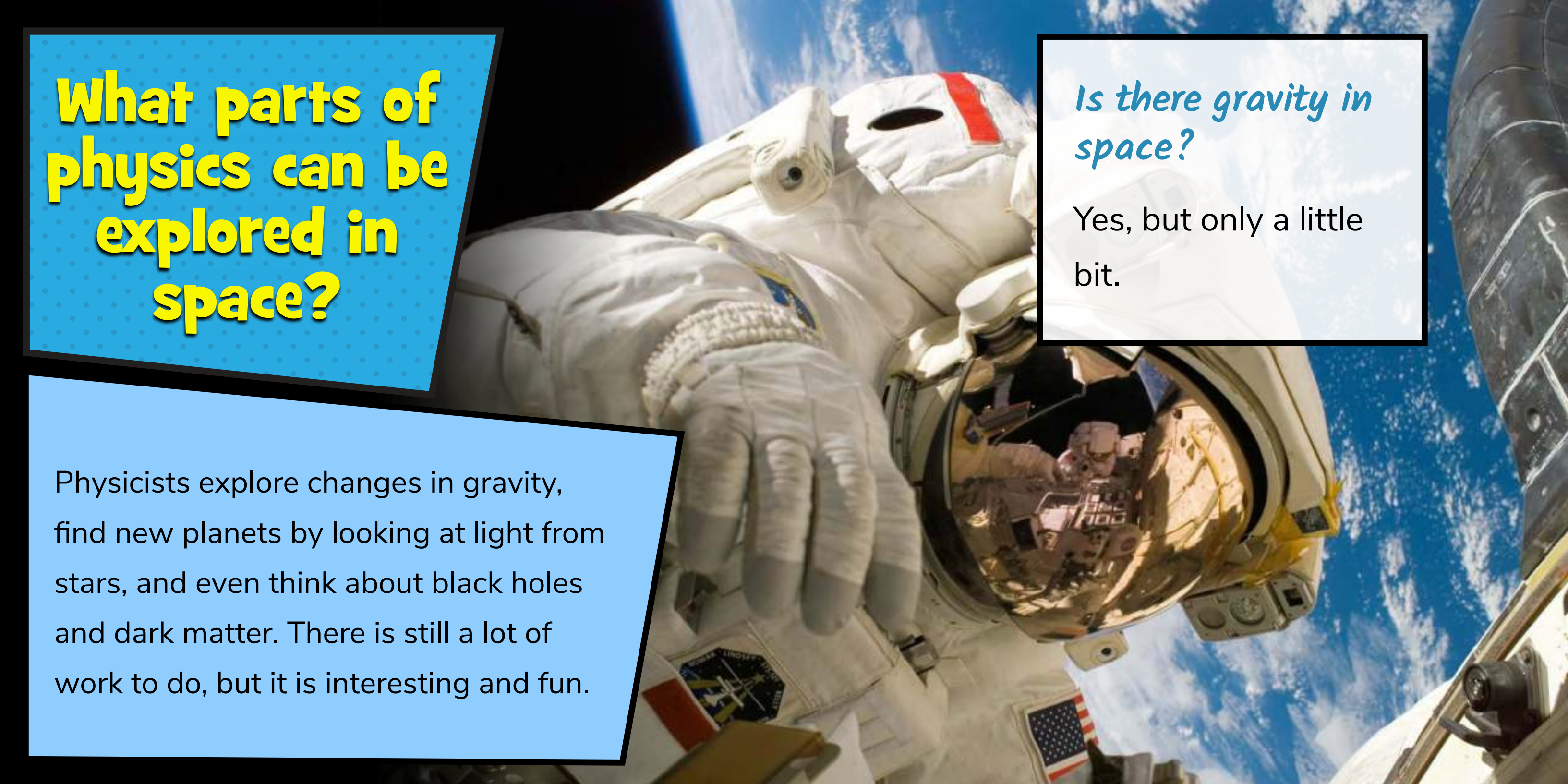


Not only does physics power technology, it also lets us keep improving on it.



How do drones fly?

The machine does work that resists gravity.

A close-up photograph of an astronaut in a white space suit floating in space. The astronaut's gloved hand is visible, and the Earth's blue and white clouds are in the background. The astronaut's helmet is reflective, showing a distorted view of the surroundings. A small American flag patch is visible on the suit.

What parts of physics can be explored in space?

Is there gravity in space?

Yes, but only a little bit.

Physicists explore changes in gravity, find new planets by looking at light from stars, and even think about black holes and dark matter. There is still a lot of work to do, but it is interesting and fun.



How can physics help us with power and energy?

Now that we are running out of fossil fuels to make electricity, physics is helping us to find new ways of making power.



Physics also helps us understand how we can turn things into energy for power.



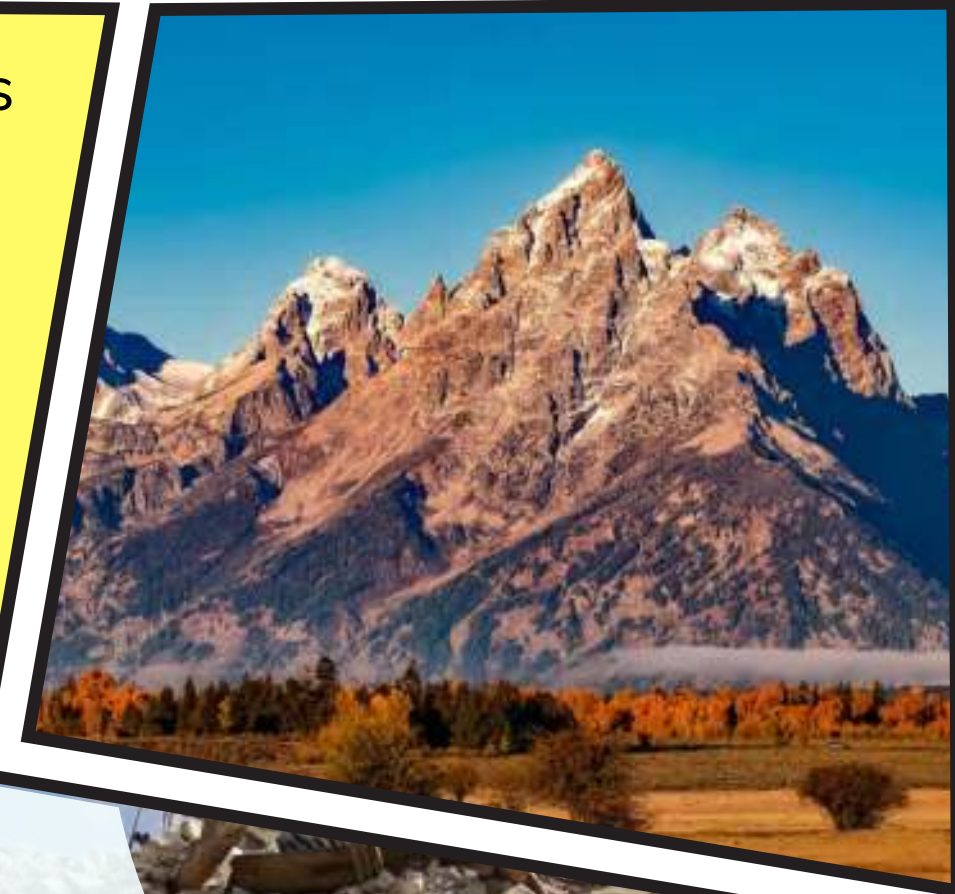
What do solar panels get energy from?

Solar panels get energy from the sun.

What about things in nature?



Physics can help us to understand how our landscapes were made and how they might change.



We can also understand natural disasters like earthquakes and tropical storms with physics.

Can we predict earthquakes?

Yes, we have made machines that record tremors that we cannot feel.



**What will
physics do
next?**

Just imagine
all of the
things that
you might get
to see over a
lifetime.

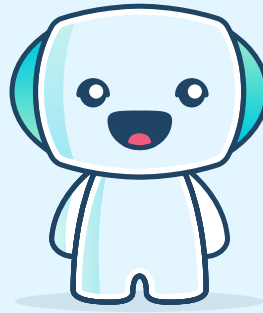


From towers and engines
to advances in medical
science, we can make
new and amazing things
a reality.

*How does our technology get
better?*

We try new things and
test them again and
again.





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I'M FREE! HERE'S HOW...

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