We Engage 4 Health is funded by a grant from the National Institutes of Health Science Education Partnership Awards.
Yo, I'm Vito!

Pops here!

I'm Big Sam!

I'm Dr. Cook!

I give expert tips throughout the story.

Read them if you'd like some extra info!
Hey Big Sam, Hi Vito!

Hey!

Hey!
I'm so glad the community center is hosting this picnic with bagged lunches. Since COVID-19 started, I've missed seeing everyone.

Me too.
I wish everything would go back to normal.

Right... to protect yourself ... AND other people in case you have the virus and don't know it!

Me too, Vito. That's why I'm doing everything I can to stop the spread of COVID-19, like wearing this mask.

You got it! Anyway, let's eat!
This is definitely more than six feet apart. Can you hear me over there?

Yes, haha.

I guess we can take our masks off now!
Speaking of things getting back to normal...

I heard on the news that scientists everywhere are working on a vaccine to protect people from getting COVID-19.

That’s great and all, but I’m not really sure how vaccines work.
Yeah, I've taken vaccines for school, but I'm not sure why I needed them.
I'm a retired science teacher, so I think I can help you understand vaccines!

Washing your hands and wearing a mask protect you from the outside. They stop the virus from getting into your body and making you sick.

Vaccines protect you from the inside, after the virus gets into your body.
How do vaccines protect you? What’s in them?

Most vaccines use a dead or weakened version of the virus or bacteria that causes the disease. It is put into your body with an injection... a shot.

I don’t know, Pops, it doesn’t seem smart to put a virus into your body as a way to not get that virus.
Actually, dead or weakened viruses and bacteria can’t hurt you, but your body doesn’t know that! So, your immune system starts fighting them to protect you. This process trains your immune system.

The immune system is the body’s defense against infection, disease, and other things that attack the body.

We better learn to fight you!

We’re ready!

Weak virus
When the same kind of virus or bacteria enters your body at another time, your immune system recognizes it and responds quickly!

WE ALREADY KNOW YOU!

FULL STRENGTH VIRUS
Dr. Cook’s Expert Tip

Special cells called memory B cells remember specific viruses and bacteria that your immune system has seen before — whether from a vaccine or environmental exposure.

Because of memory B cells, your immune system can respond faster to defeat the virus, so you might not even feel sick. This process is called adaptive immunity.

I remember measles.

I remember polio.

Memory B cells.
That's cool! It's like how we run different plays at football practice. We're training so when we have a game, we all know what to do to win.

If we know how another team usually attacks, we can even practice special plays just to defeat that team!

That's right! Vaccines train your immune system to defeat specific bacteria and viruses!
I see what you mean. So why do we have to get a new vaccine every year for some things, like the flu?

Good question! The virus that causes flu is a type of virus that changes a lot.
The flu vaccine you get this year targets the current form of the flu virus. By next year, the flu virus will be different. 

Next year, your immune system might not recognize the new version of flu virus that shows up.

Some years, flu virus has small changes. 

Some years, flu virus has big changes.

I know you!

You seem a bit familiar!

I don’t know you at all!
I see, so you need to get a new flu vaccine every year to train your immune system to fight the new version of the flu virus.

That's right!

Now I know you!
The chemical names of preservatives in vaccines might sound scary to some people. But the same stuff is in products people safely use every day.

Some vaccines are made using eggs and contain a tiny amount of egg protein.

Other substances, like oils, are added to help vaccines work better.

Dr. Cook’s Expert Tip

Vaccines have a tiny amount of other stuff in them too. Vaccines have preservatives like “phenol” for the same reason preservatives are put in food: to keep them fresh longer!
Vaccines don't just keep YOU safe. My doctor told me getting vaccinated keeps OTHER PEOPLE safe too. After all, if you aren't sick, you can't spread it to other people.

Good point, Sam. We call this “herd immunity.”
I've heard of herds of cows, but herds of people?

Ha, it is a funny term. It means if enough people in a given area are immune to a disease, it’s hard for the disease to spread.
Herd immunity protects vulnerable people who can't get vaccinated for some reason.

When no one gets vaccinated — the disease can spread easily.

When some people get vaccinated — the disease spreads a little slower.

When most people get vaccinated — even people without vaccine are protected.

**HERD IMMUNITY**

Vaccinated  Not vaccinated  Sick
By vulnerable people, do you mean they can get sick easily? Like babies?

I remember when my baby cousin was born, my parents told me to wash my hands a lot and be careful with her, so she wouldn't get sick.

I'm born with some immunity to diseases, but I need vaccines for full protection!
Yes, Vito, babies are a great example of people we protect with herd immunity! Other examples are older folk like me and people who are immunocompromised.

Immunocompromised people have weakened immune systems for various reasons. For example, cancer treatments can weaken people’s immune systems.

Thank you for getting vaccines to protect me!
A doctor talking about vaccines on the news said 95 percent of people need to get the measles vaccine to have herd immunity for measles.

95 out of 100 = 95 percent

Measles Vaccine

No Vaccine

In some places, not enough people are getting the measles vaccine, and outbreaks have happened.

I wish I had gotten a measles vaccine!
Yeah, I heard about a lot of measles at one school nearby. A kid even died! It's kinda scary.

It is scary, Vito. That's why it's important to get vaccinated, so we can protect ourselves and others from dangerous diseases like measles.
So making a vaccine doesn't sound that hard.

Why did it take so long to get COVID-19 vaccine made?
Vaccine development takes time. First, scientists have to make sure the vaccine acts like a real infection to train the immune system...

To train the immune system to attack fast and prevent the disease!

Exactly! This early stage of vaccine development usually uses cells in test tubes.

I know you!
Next, scientists have to make sure the vaccine actually works and is safe, which involves many rounds of testing. This phase of testing usually starts with lab animals like mice. If the vaccine works and is safe for lab animals, testing on people begins.

We call vaccine testing on people “clinical trials.” Clinical trials begin with very small groups and continue with larger and larger groups.
STAGES OF VACCINE TESTING

1. IN CELLS IN TEST TUBES
2. IN LAB ANIMALS
3. IN SMALL GROUPS OF PEOPLE
4. IN BIGGER GROUPS OF PEOPLE
Scientists have been developing vaccines since 1796, when Edward Jenner created the first vaccine for a disease called smallpox. Vaccines have saved millions of lives since then.

That's a lot of testing. But are we really sure that vaccines work well and are safe?
These are some examples of vaccine power!

<table>
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<tr>
<th>USA PRE-VACCINE YEARLY ILLNESS</th>
<th>PERCENT REDUCTION</th>
<th>USA RECENT YEARLY ILLNESS</th>
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<tbody>
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<td>DIPHTHERIA</td>
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</tr>
<tr>
<td>INFLUENZA</td>
<td>99%</td>
<td>243</td>
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<tr>
<td>MEASLES</td>
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<td>61</td>
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<td>WHOOPING COUGH</td>
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<tr>
<td>POLIO</td>
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<td>0</td>
</tr>
<tr>
<td>SMALLPOX</td>
<td>100%</td>
<td>0</td>
</tr>
</tbody>
</table>
Wow! Vaccines have done a lot of good.

My friend says he’s scared to take vaccines because some people have a bad reaction to them. I’m going to tell him about how many lives vaccines have saved.

Also, I’m going to tell him what you said about how vaccines work, Pops. Maybe once he knows how vaccines train your immune system, it’ll seem less scary.
Maybe talk to him about risk and benefit. Nothing in life has zero risk! The chance of being hit by lighting is 1 in 700,000. But we still go outside because the risk is tiny and the benefits are big!

The chance of a bad reaction to a vaccine also tiny.

For example, only about 1 in a million people have a severe reaction to the measles vaccine. But, the benefit is huge!
If 100 people without a vaccine get exposed to measles, almost all of them will come down with the disease.

If 100 people have the measles vaccine, almost no exposed people will get measles!
OK! I'll tell my friend!

Speaking of clinical trials, my doctor—Dr. Cook—actually asked me if I'd want to be part of a COVID-19 vaccine trial happening at the hospital. I haven't decided yet.

We need you...
I wouldn't want to sign up for that.

That's okay, Vito, you don't have to participate in a vaccine trial if you don't want to.

It's great you're considering it though, Sam.
Testing on people of different ages and backgrounds is very important to make sure the vaccine works well for everyone.

If the vaccine was only tested on younger people with really strong immune systems like you, Vito, it might not work as well on older folks like me.

And we wouldn't know until after the vaccine was given to everyone.
Human subjects protections apply to everyone involved in research. Researchers have to balance the risks with the benefits for participants. And all participants have to consent.

Consent = agree
Dr. Cook’s Expert Tip

Rules and Regulations for Human Subjects Research

Any research involving people is human subjects research. Researchers must follow three main rules:

Respect for People: Everyone has to give “informed consent,” meaning you know all about the research and voluntarily agree to participate.

Beneficence: Risks to participants must be low and benefits to participants and society must be high.

Justice: The benefits and risks of research have to be shared fairly.
That's great, Sam! You're going to help test a vaccine that will train our bodies to recognize and stop the coronavirus that causes COVID-19!

You know what, I AM going to participate in this vaccine trial! I feel like this way I can do my part to fight COVID-19.
And then, we can all go out and get the vaccine to protect ourselves...

...And also protect other people through herd immunity.

Right! And life can get more normal again!
Even though things are strange right now, I’m glad I got to spend the afternoon with you and talk about vaccines.

And eat!

Ha, me too. See you soon!
THIS WE ENGAGE 4 HEALTH (WE4H) STORY WAS DEVELOPED AS A COLLABORATION OF COMMUNITY REPRESENTATIVES OF THE WEST END NEIGHBORHOOD IN CINCINNATI, OHIO AND WE4H PROGRAM STAFF.


FOR MORE INFORMATION ABOUT WE ENGAGE 4 HEALTH, VISIT OUR WEBSITE AT WE4H.LIFE. FOR MORE INFORMATION ABOUT THE SEPA PROGRAM, VISIT NIHSEPA.ORG.

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