

# SOAP SURPRISES

*AN ACTIVITY TO EXPLORE  
THE SCIENCE OF SOAP  
AND HAND WASHING*

WE ENGAGE 4 HEALTH IS FUNDED BY A GRANT FROM THE NATIONAL  
INSTITUTES OF HEALTH SCIENCE EDUCATION PARTNERSHIP AWARDS.





Well, Mom, I had a good telemedicine visit with Dr. Breeze! She just said what you've been saying too...

That washing your hands with soap and water is the best way to fight germs, including the coronavirus!

And to rub hands with the soapy water for 20 seconds!







But I wonder  
if washing with  
soap is really so  
important?

Maybe rinsing  
with water is just  
as good.

Why don't we  
find out by doing  
some tests!

Well, we sure  
can't do tests on the  
actual virus! That's too  
dangerous!



True,  
we can't do  
tests on the virus  
itself but maybe we  
can test a model.

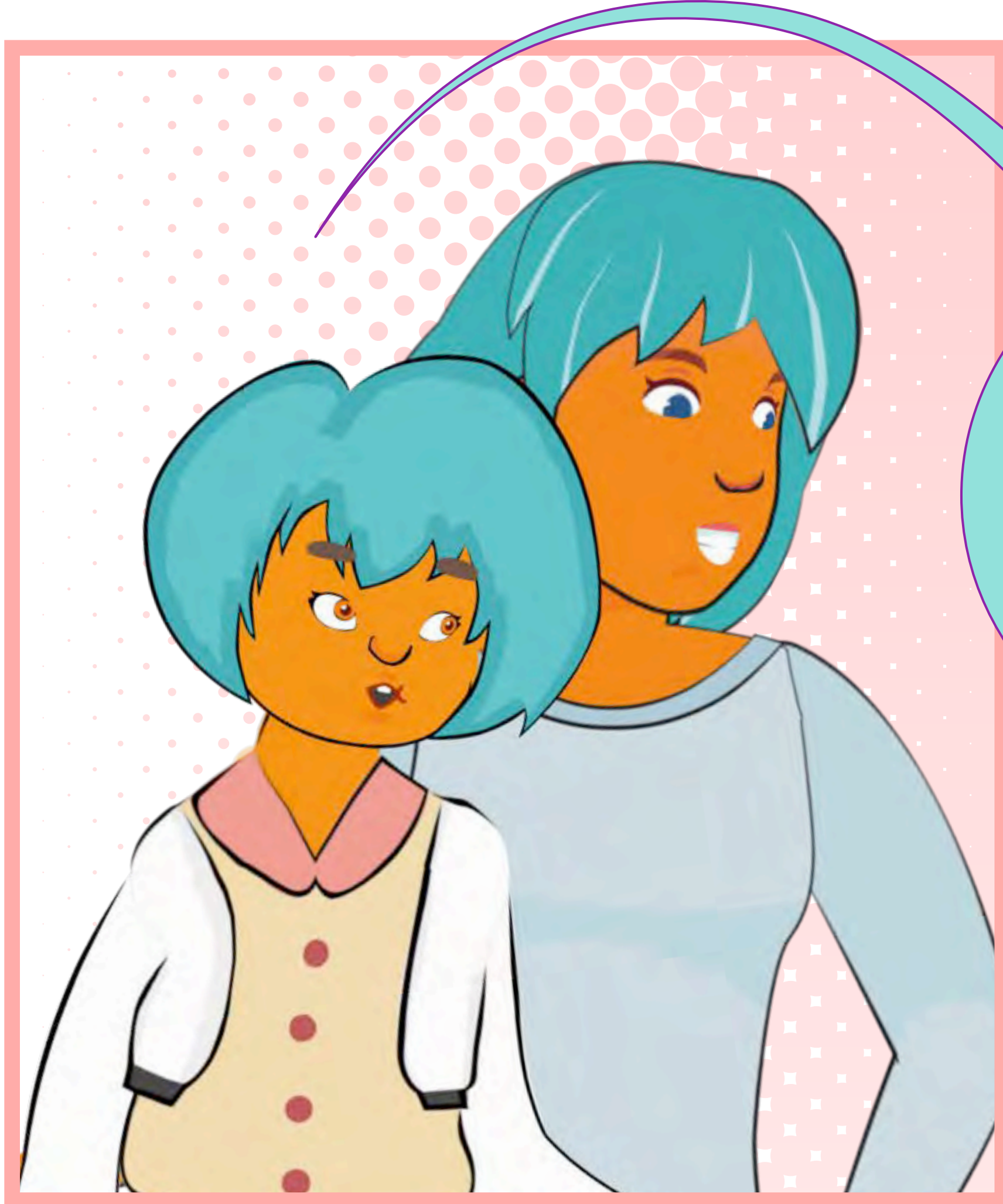
A model? I'm  
confused. A model  
car? A fashion  
model?

Ha ha! No, a different  
kind of model!  
This kind of model is a stand-in  
for something else. A model has  
some characteristics in  
common with the real  
thing.

What do we  
know about the  
virus to help us  
make a good  
model?



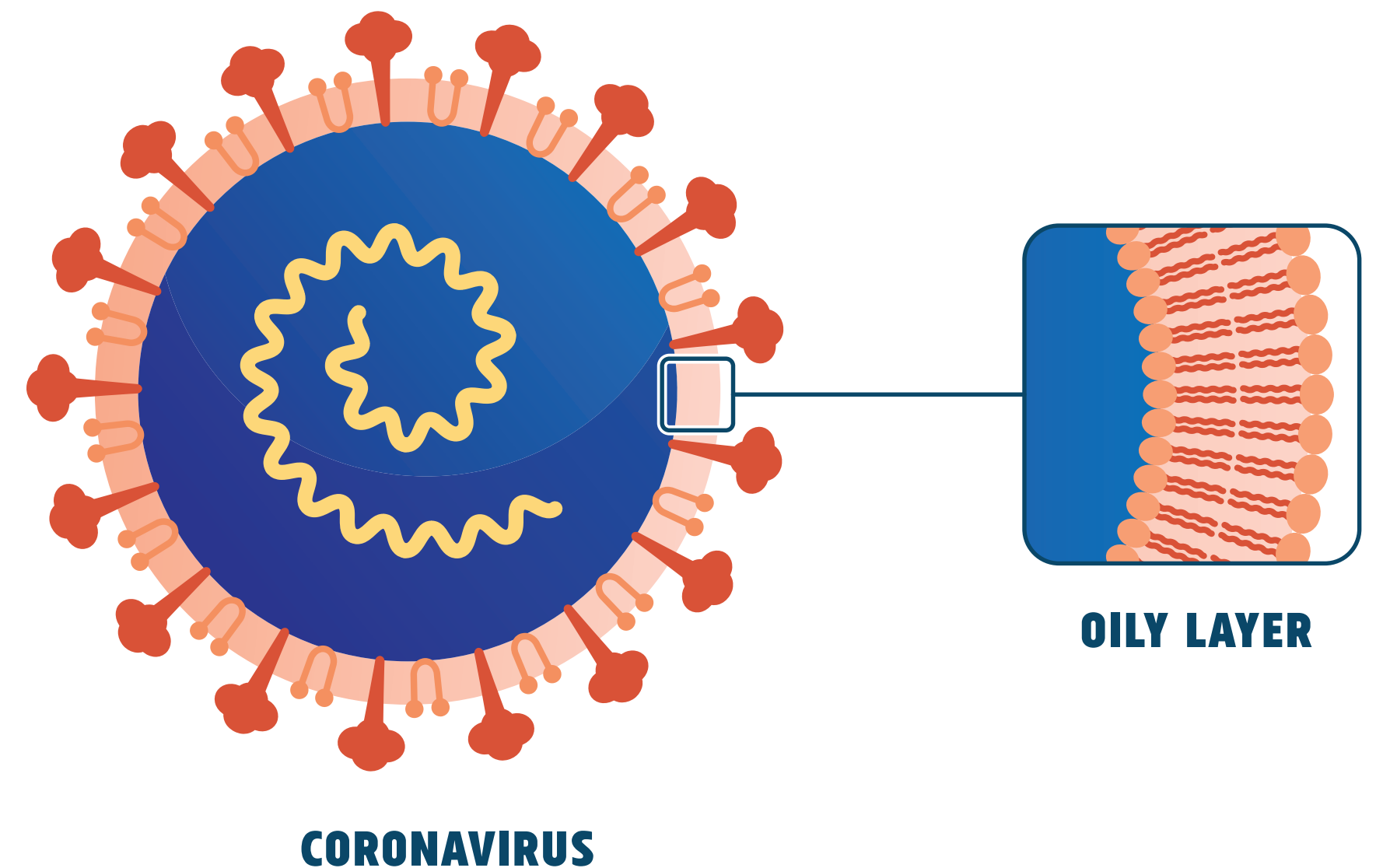




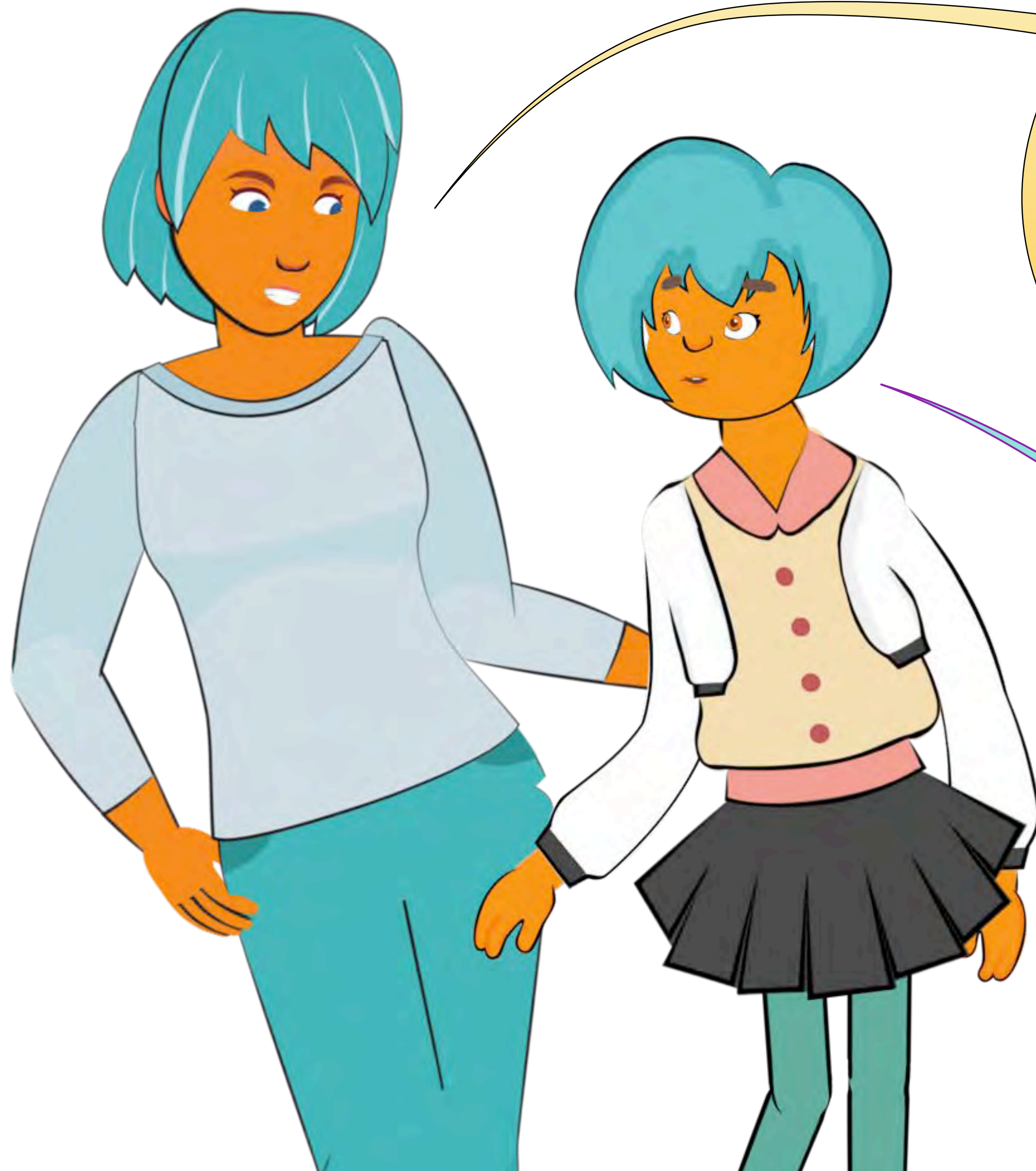
Let's look  
online and see  
what we find.

CORONAVIRUS HAS A ROUND  
SHAPE AND AN **OILY OUTER  
LAYER** THAT HELPS IT STICK  
TO OUR SKIN.

THE CORONAVIRUS ALSO HAS  
PROTEIN SPIKES. THE SPIKES  
GIVE IT THE NAME "CORONA."  
CORONA MEANS CROWN.







So, for our model, the oily layer on the virus sounds like the important part. We could coat some kind of small particles with oil.

Of course, we can't use anything as small as a real virus or we wouldn't be able to see it!

Spices like cinnamon are made of small particles, right? We could mix cinnamon with oil.





Good idea! Then we can test what's best to clean the oily particles off a surface.

I'd like to test water alone and water with soap.

Remember about rubbing the soapy water all over our hands for 20 seconds? I'd like to test water with soap and plenty of rubbing.

### experiment plan

1. water alone
2. water + soap
3. water + soap + rubbing





We have a great plan!

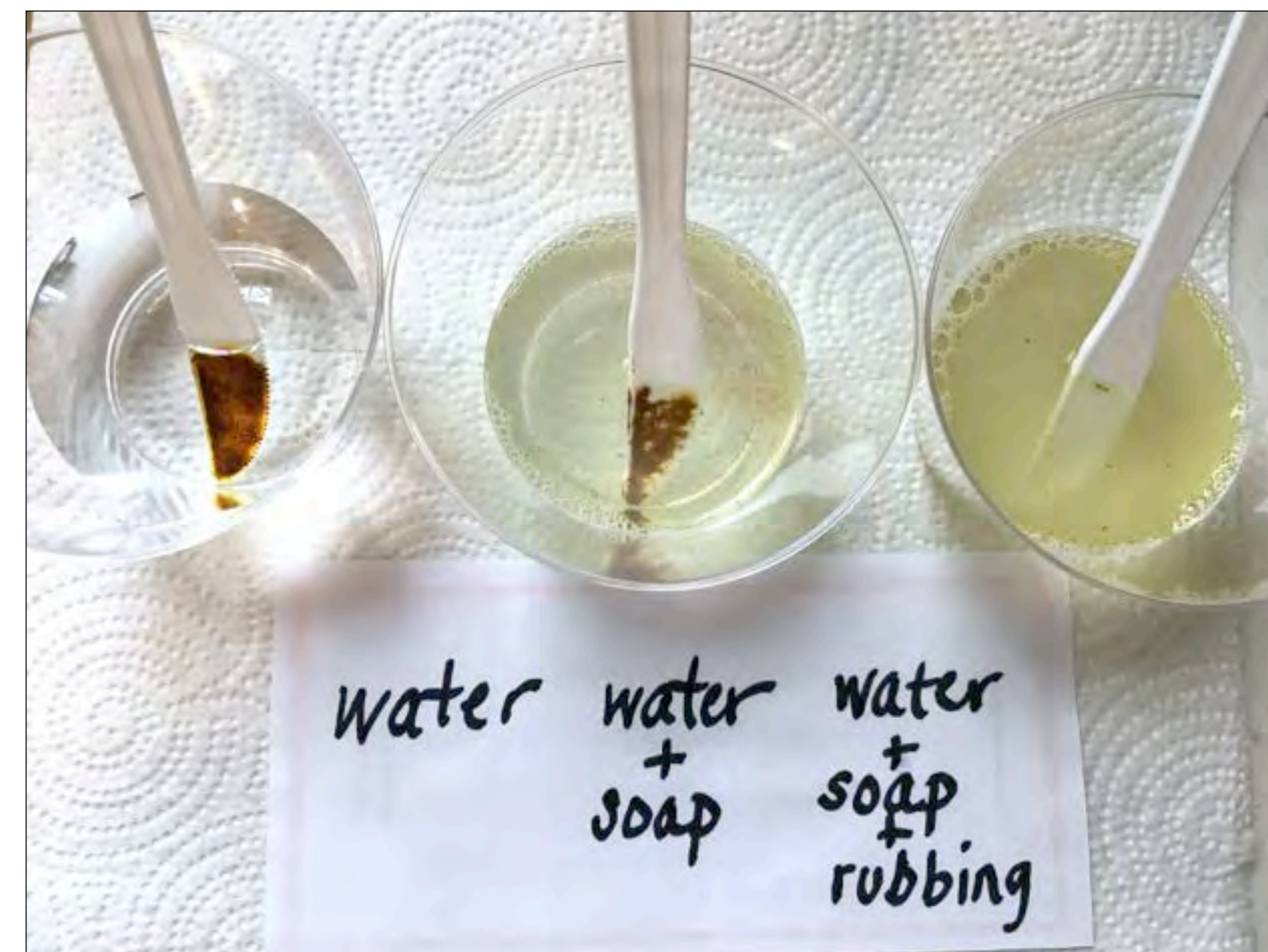
We can test which of the three conditions does the best job of removing oily particles from a surface.

I'll take pictures of our experiment with my phone.

PUT OILY CINNAMON ON PLASTIC KNIVES



OBSERVE RESULTS OF THREE TEST CONDITIONS





Wow, the soap and water plus rubbing did the very best job of removing the oily particles!

A dip in soap and water was the next best.

But plain water did not remove very many oily particles on the surface at all.

So our experiment supported our claim that soap, water, and rubbing is best!



experiment results

**poor** water alone

**so-so** water + soap

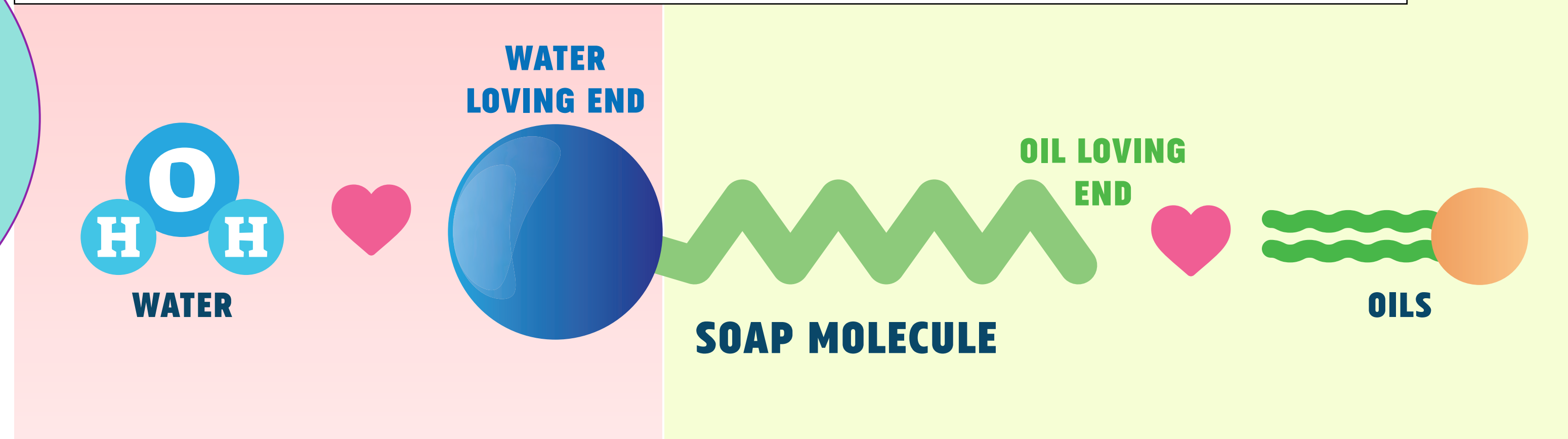
**best** water + soap + rubbing



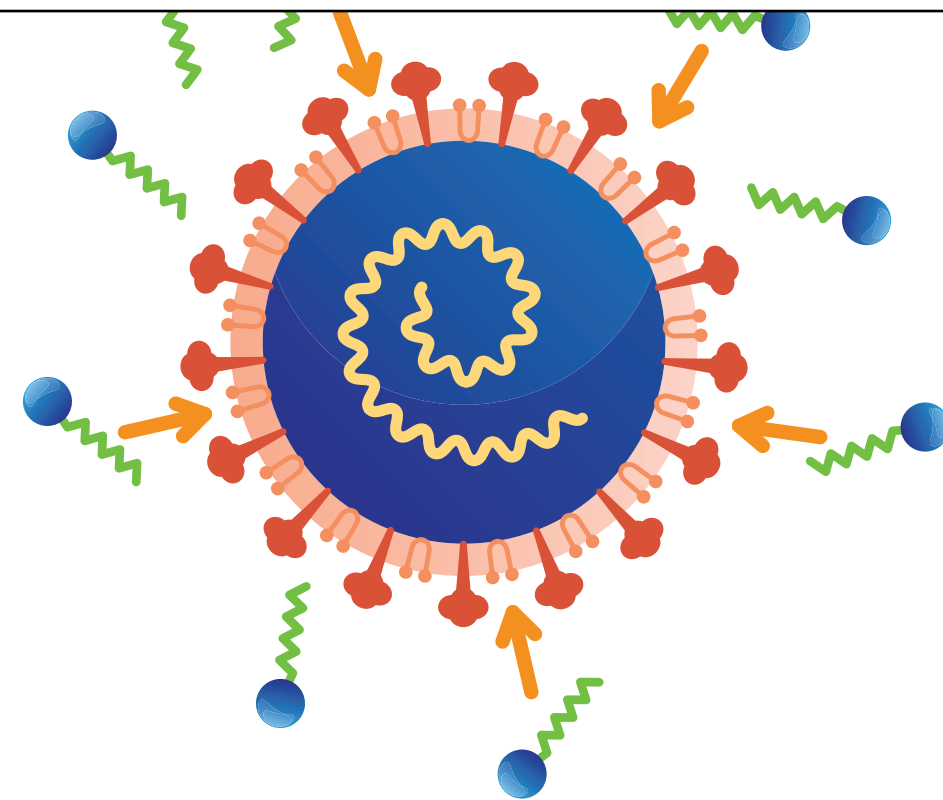


Let's try to find something online about why the soap worked so well.

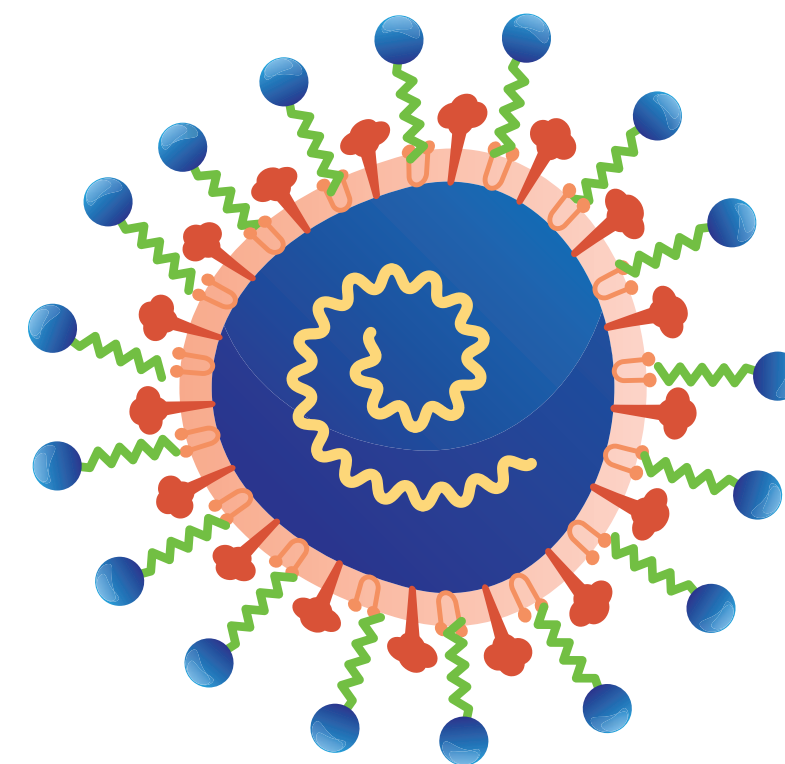
SOAP HAS A SPLIT PERSONALITY.  
ONE END LOVES WATER. ONE END LOVES OIL.



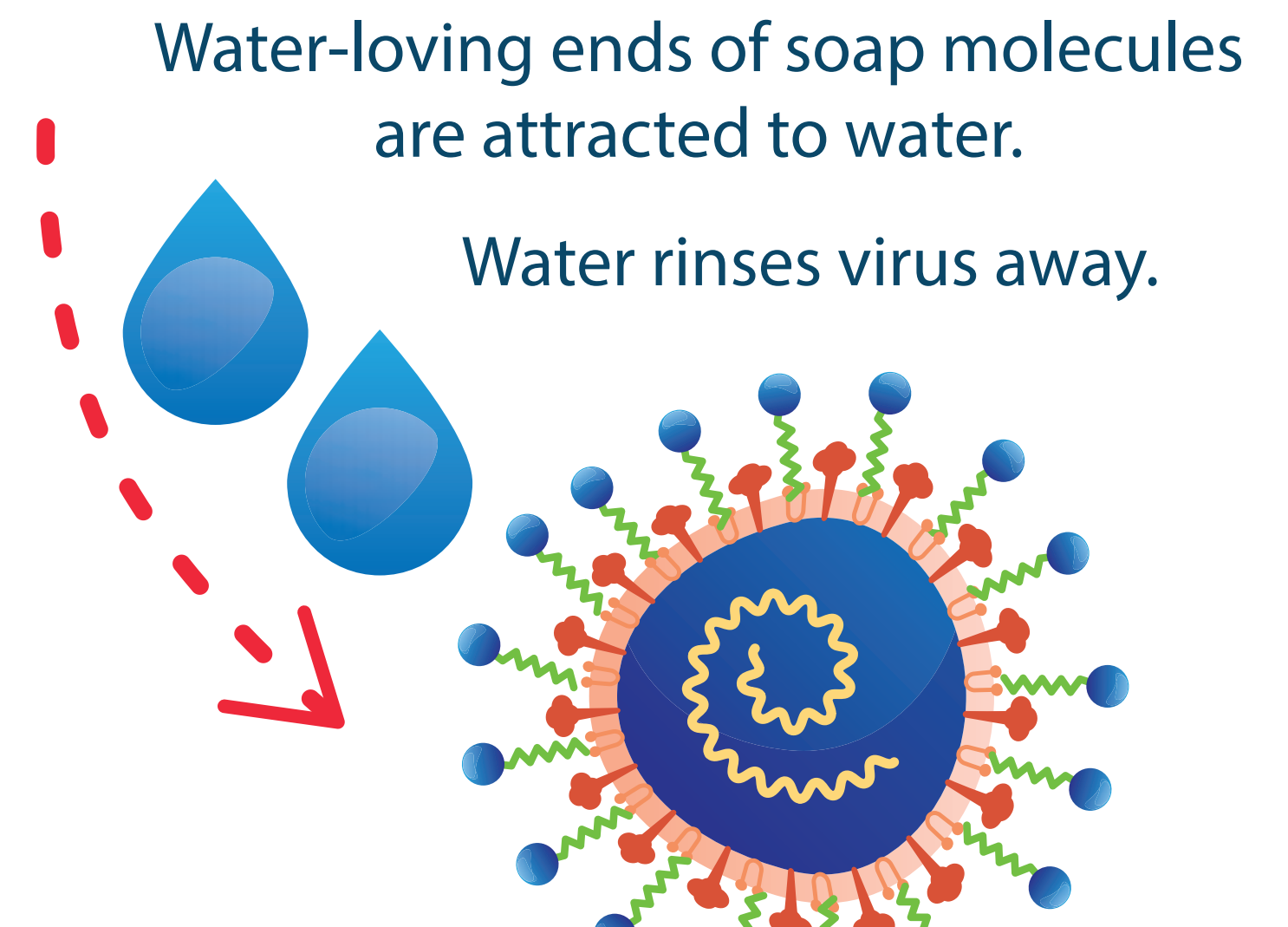
SOAP + RUBBING UNSTICKS VIRUS FROM SKIN. WATER RINSES VIRUS AWAY.



Oil-loving ends of soap molecules attach to oily layer of virus and form a soapy layer.



Soapy layer around virus + rubbing hands together unsticks virus from skin.



Water-loving ends of soap molecules are attracted to water.

Water rinses virus away.





NOW I know why soap is  
so important!

AND rubbing hands  
together!

To unstick  
those pesky  
viruses!

Plus water!

To rinse  
the soapy viruses  
away!



A comic panel featuring two young girls with short, wavy blue hair. The girl on the left is wearing a white lab coat over a tan dress with a pink collar and red buttons. She has a surprised expression. The girl on the right is wearing a light blue t-shirt and has a friendly, smiling expression. The background is split: pink with white polka dots on the left and yellow with white polka dots on the right. Three speech bubbles are present: two light blue ones on the left and one yellow one on the right.

Wow, our  
experiment was so  
much fun!

And I found out that  
the way soap works is  
really amazing!

We hope you'll try this  
soap experiment yourself!  
And maybe you'll have some new  
ideas about things to try!





WE ENGAGE 4 HEALTH IS SUPPORTED BY THE SCIENCE EDUCATION PARTNERSHIP AWARD (SEPA) PROGRAM OF THE NATIONAL INSTITUTES OF HEALTH (NIH) AWARD NUMBER R25GM129808. CONTENTS ARE SOLELY THE RESPONSIBILITY OF THE AUTHORS AND DO NOT NECESSARILY REPRESENT THE OFFICIAL VIEWS OF THE NIH.

FOR MORE INFORMATION ABOUT WE ENGAGE 4 HEALTH, VISIT OUR WEBSITE AT [WE4H.LIFE](http://WE4H.LIFE). FOR MORE INFORMATION ABOUT THE SEPA PROGRAM, VISIT [NIHSEPA.ORG](http://NIHSEPA.ORG).

*CONTENT IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY, IS BELIEVED TO BE CURRENT AND ACCURATE AT THE TIME OF POSTING, AND IS NOT INTENDED AS, AND SHOULD NOT BE CONSTRUED TO BE, MEDICAL OR CONSULTING ADVICE.*