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An activity to explore the science of soap and hand washing.

Soap Surprises
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?
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.

Let’s look online and see what we find.
Spices like cinnamon are made of small particles, right? We could mix cinnamon with oil.

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!
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**

- Cinnamon
- Olive oil

- Water
- Water + Soap
- Water + Soft Rubbing
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!
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!
We hope you'll try this soap experiment yourself! And maybe you'll have some new ideas about things to try!

Wow, our experiment was so much fun!

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