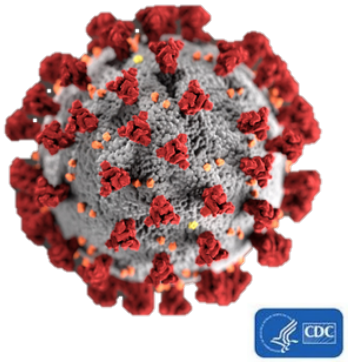
What Are Viruses and How Do They Spread?

Materials

Playdough or clay or foam ball or soft ball (foam ball works best)
Toothpicks or q-tips
Toilet paper
Finger paint or acrylic paint
Paintbrush
Cheerios or cut ~100 small (~1x1cm each) pieces of paper
Pin or needle
Small box
Very large box (at least 6-10 times larger then the small box)
Balloon or plastic bag (without holes that you could blow up)

What Are Viruses and How Do They Spread?

- Virus is a tiny particle that can NOT live on its own
- Viruses have high **symmetry**
- Viruses are **contagious**, they can spread from person to person while coughing, sneezing (or via other bodily fluids)
- Scientists measure how harmful virus is by measuring its **virulency**
- Common outcome of viral infection is **cell lysis** or cell death which activates our immune system



Virus structure

Aim: to learn how a virus looks like

Note: if siblings are participating, each sibling could make a separate virus model (can make as many models as desired)

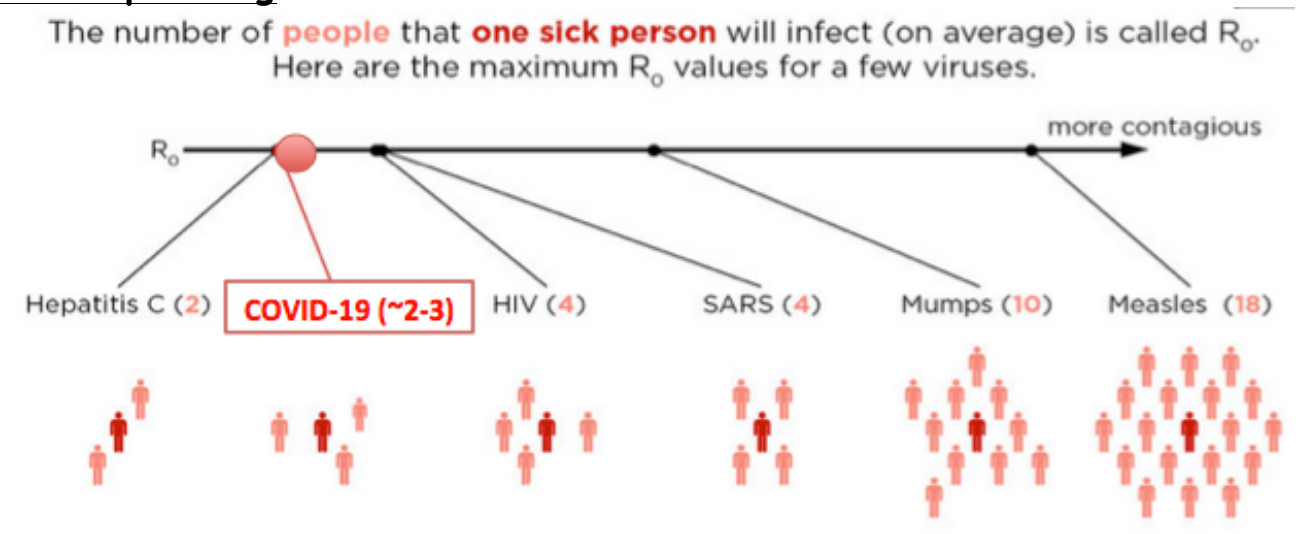
Methods:

1. Build a model of the virus out of playdough or clay
   - can use a soft ball or foam ball instead
2. Stick toothpicks or q-tips into the ball

Does a virus have high or low symmetry?

What about humans? How many lines of symmetry do humans have?

Virus spreading



Aim: to test how easily a virus can spread with and without "social" distancing

Methods:

1. Make 10 pretend "people" by taking one sheet of toilet paper and making it into a ball
2. Put all 10 pretend "people" into a small box
3. Paint the virus model you made in first activity, use bright color and ensure proper paint coverage
4. Put the painted virus model into the small box with "people"
5. Shake the small box for 20 seconds

How many pretend "people" got infected? How great is the extent of the infection (how much paint is on the "people"?)

Poll: Will the number of infected "people" change if virus is placed in a large box, similar to "social distancing"?

- Stay the same
- Increase
- Decrease

6. Make 10 pretend "people" out of toilet paper again and put them into the large box
7. Put painted virus model (re-paint if desired) into the large box and shake the large box for 20 seconds

	Number of "people" infected	Extent of infection
Small box		
Large box		
2/3 viruses in a large box		

Life cycle of the virus

Aim: to demonstrate the effect of viral replication on human cells

Methods:

1. Place cheerios in a balloon or plastic bag.

Cheerios or little pieces of paper will serve as a virus in this activity, while balloon or plastic bag will represent a human cell. This step models a virus infecting a cell.

2. Add many more (50-100) cheerios into the balloon.
Inside the cell, the virus will replicate.

3. Blow up the balloon with cheerios in it and tie the knot to make it shut.
This models the cell infected with the virus.

4. Pop the balloon using a pin.
Once the virus has replicated and new virus particles form, they will lyse and destroy the human cell while disseminating the new viral particles everywhere.