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Biomedical Research Camp

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## 2020 Biomedical Research Camp

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**2020 BIOMEDICAL RESEARCH CAMP**  
**Booklet of Experiments**



**Discover Your Opportunities Unleashed**

**The content of the science kit are non-toxic and if used properly will not induce harm. Please follow instructions carefully. By reception of the science kit you agree to assume all risks incident to the described activities (including the risk of personal injury and/or property damage) and agree to release and hold harmless the University of Arkansas and any of its trustees, officers, employees, or agents from any liability for any injuries to your person or property that you might sustain while participating in the described activity. The release and assumption of risk shall bind myself, my heirs, my assigns, and my personal representatives.**

## DIRECTIONS

### Experiment 1:

#### Part 1: How do germs spread?

#### Part 2: How long does it take to wash germs off of your hands?

#### What's in the bag?

lab coat

goggles

small box with white germ powder (fake germs but do not eat, smell or blow)

brush

black light

pencil

journal

You will need a timer or a clock.

What is a germ? Germs are disease causing objects such as bacteria and viruses. Normally you cannot see germs with your naked eyes. You can use a microscope to see germs!

What will you learn from the experiment? You will learn how germs are passed from person to person. This will help you to understand how easy viruses such as coronaviruses are spread. After you observe how easy it is for germs to spread you will understand why it is very important to practice social distancing and why the Centers for Disease Control (CDC) recommends that you wash your hands regularly and wear masks when in public.

### BEFORE YOU START

1. Always ask your parents or guardians for permission to do the experiment and for their help!
2. Ask your parents or guardians to read the instructions (below) with you BEFORE you start the experiment. This experiment can be completed in various parts of your home except the kitchen.

3. Wear your personal protective equipment (PPE) including the lab coat and goggles to protect your body and eyes from harm. You will not use your gloves for this experiment.
4. DO NOT eat, taste, drink or blow the white germ powder. Do not lick your fingers or bite your nails. Do not put any of the items used in the experiment in your eyes, ears or other parts body. Wash your hands before and after the experiment!
5. It may be best to do the experiment when the house is dark so that you can see the glowing germs!
6. Take pictures and record a video of your experiment.
7. Write down what you did during your experiment in your journal. Write down what you learned from your experiment in your lab journal.

### INSTRUCTIONS – Part 1: How do germs spread?

1. Set your timer on your phone for 1 hour or 60 minutes
2. Open the white germ powder box. And use the brush to put the powder on both of your hands.

Remember: DO NOT eat, taste, drink or blow the white germ powder. Do not lick your fingers or bite your nails. Do not put any of the items used in the experiment in your eyes, ears or other parts body.

3. Press start on your timer. For 1 hour or 60 minutes go play, do homework or any other activity that you'd normally do. Remember: DO NOT eat, taste, drink or blow the white germ powder. Do not lick your fingers or bite your nails. Do not put any of the items used in the experiment in your eyes, ears or other parts body.
4. At the end of one hour or 60 seconds your timer will beep. When you hear the beep turn the timer off.
5. Turn off all of the lights in your house. Close your windows. It should be dark.
6. Turn on your black light.
7. Shine the light on the things or people that you touched during the 1 hour that you had the germs on your hands. If the light glows then you spread pretend germs there!
8. In the journal, please write down where you went and what you touched in the 1 hour. Also write down if you put germs on the things that you touched.
9. Go to the bathroom and turn off the lights. Stand in front of the mirror. Shine the black light on your face, hands and lab coat. Did you touch your face? Did you touch your lab coat? Write down your observations in your journal.

10. Turn on the lights. Wash your hands for 20 seconds with warm soap and water. Turn off the lights. Shine the black light on your hand. Are your hands still glowing? If yes, then wash your hands until they no longer glow in the black light.

## **INSTRUCTIONS**

### **Part 2: How long does it take to wash germs off of your hands?**

1. In the bathroom set the timer on your phone for 20 seconds.
2. Open the white germ powder box. And use the brush to put the powder on both of your hands.

Remember: DO NOT eat, taste, drink or blow the white germ powder. Do not lick your fingers or bite your nails. Do not put any of the items used in the experiment in your eyes, ears or other parts body.

3. Press start on your timer and wash your hands for 20 seconds with warm soap and water. When the timer beeps turn it off and stop washing your hands. Turn off the lights. Shine the black light on your hands. Do not wet your black light. Please keep the light away from the sink or running water. Are your hands still glowing? Write down your observation in your lab journal.

If your hands were still glowing after 20 seconds, then wash your hands until they no longer glow in the black light.

4. Set your timer for 5 seconds.

5. Open the white germ powder box. And use the brush to put the powder on both of your hands.

Remember: DO NOT eat, taste, drink or blow the white germ powder. Do not lick your fingers or bite your nails. Do not put any of the items used in the experiment in your eyes, ears or other parts body.

6. Press start on your timer and wash your hands for 5 seconds with warm soap and water. When the timer beeps turn it off and stop washing your hands. Turn off the lights. Shine the black light on your hands. Are your hands still glowing? Write down your observation in your lab journal.

If your hands were still glowing after 5 seconds, then wash your hands until they no longer glow in the black light.

7. Were your hands cleaner after washing your hands for 5 seconds or 20 seconds?

8. After you have recorded your observations in your journal, taken pictures and recorded videos with your phone please clean your work space. Please wipe down contaminated surfaces with warm soap and water and rinse well with water. Dispose of solid waste in your trash can. Ask your parents about recycling the plastic.

## Experiment 2:

### How do doctors test if a patient has been infected with the coronavirus?

In experiment 2 we will pretend to do a serological test. A doctor can use a serological test to determine if a patient has had an infection. For example doctors can use a serological test to determine if a patient has been infected with the coronavirus. If the serological test is positive or the patient has been infected with the coronavirus then doctors can use that patient's antibodies to treat other patients that are sick due to an infection with the coronavirus.

A serological test measures whether an antibody [an ti bā dē] binds to an antigen [an ti jen].

### What is an antibody?

An antibody [an ti bā dē] is a protein that is produced by the human body to protect a person from an infection. When a germ like a virus infects the human body then the human body will make antibodies to protect the infected person. An antibody binds to an antigen [an ti jen] made a germ such as a virus. In this experiment we will pretend to use antibodies from three patients. We will pretend to do a serological test to determine if those three patients have been infected by the coronavirus.

### What is an antigen?

An antigen is a protein that binds to an antibody. It is foreign to the human body. In this experiment we will use pretend to use antigens from the coronavirus.

**What is a positive control?** A positive control is a sample in an experiment that has a known result. In this experiment the positive control is a patient sample that has coronavirus antibodies.

**What is a negative control?** A negative control is a sample in an experiment that has a known result. In this experiment the negative control is a patient sample that does not have coronavirus antibodies.

### What's in the bag?

lab coat

gloves

goggles

tube with color tablet labeled virus antigen (It is fake. We will pretend).

tube with color tablet labeled negative control (It is fake. We will pretend).

tube with color tablet labeled positive control (It is fake. We will pretend).

tube with color tablet labeled patient 1 antibodies (It is fake. We will pretend).

tube with color tablet labeled patient 2 antibodies (It is fake. We will pretend).

tube with color tablet labeled patient 3 antibodies (It is fake. We will pretend).

tube rack

pipettes

pencil

marker

journal

You will also need water to complete the experiment.

### **What will you learn from the experiment?**

You will learn how doctors do a serological test. A serological test tells the doctor if a person has had an infection.

### **BEFORE YOU START**

1. Always ask your parents or guardians for permission to do the experiment and for their help!
2. Ask your parents or guardian to read the instructions (below) with you BEFORE you start the experiment.
3. Wear your personal protective equipment (PPE) including the lab coat, gloves and goggles to protect your body, hands and eyes from harm. Wash your hands before and after the experiment! This experiment should be complete on a hard surface such as a desk or table.
4. DO NOT eat, taste, drink or blow any of the things in the bag. Do not lick your fingers or bite your nails. Do not put any of the items used in the experiment in your eyes, ears or other parts body.
5. Take pictures and record video of your experiment.
6. Write down what you did during your experiment in your journal. Write down what you learned from your experiment in your lab journal.



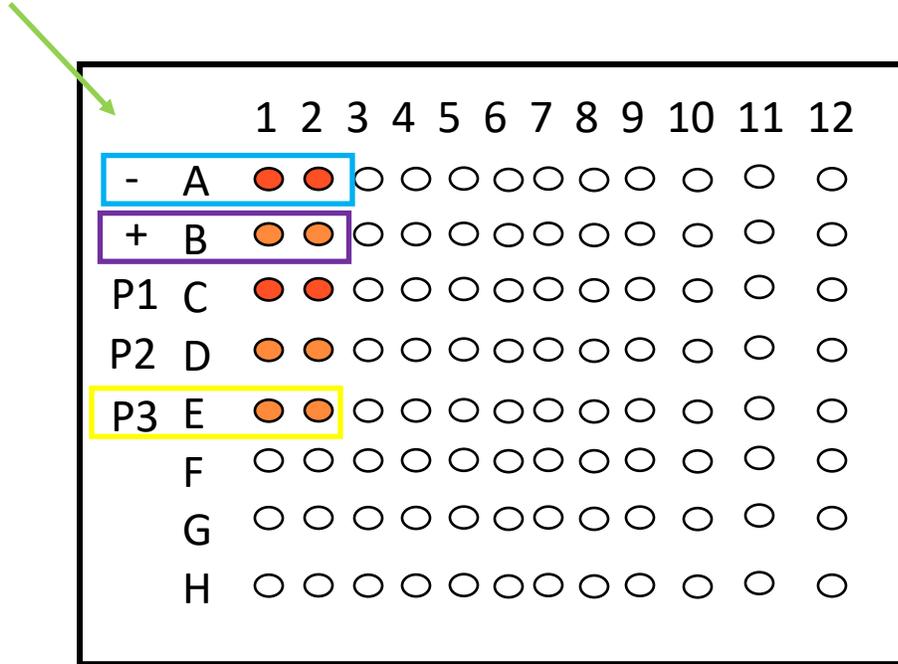








12. Observe the color of the wells. Compare the color of the wells for patient 3 with the colors of the wells for the – control and the + positive control. Does patient 3 have antibodies specific to the coronavirus? Write down your observation in your journal.



13. After you have recorded your observations in your journal, taken pictures and recorded videos with your phone please clean your work space. Please dump the contents of plate in a sink with running water. Be sure to rinse the sink until the water runs clear. If your household recycles then please recycle the plastic. If not please discard all plastic in the trash can.