

## Public Invention's Stay-at-Home STEM Project Instructions

Your kit will include the following:

- (2) Pairs of gloves
- (3) Pipettes
- (3) Petrifilms
- (2) 5mL Sample Vials
- (1) Pre-addressed gray envelope

You will also need:

- (1) Permanent marker
- (1) Camera for documentation (can use phone camera)
- (1) Notepad to write down where you collected the water samples A and B

This project can be broken down into 3 main steps:

1. Water sample collection
2. Pipette water samples onto the Petrifilm
3. Bacterial growth and results capture

### Step 1: Water sample collection

For this step you will need:

- (2) 5mL sample vials
- (1) Pair of gloves
- (1) Permanent marker
- (1) Camera (optional)

Instructions:

1. Identify a local body of water you would like to use for your test. This can be a nearby pond or slow flowing river. Make sure it is easily accessible.
2. Take a picture of the water source to share with us (optional).
3. Put on one pair of gloves. Take your vials and fill each with water from your chosen body of water. Remove the gloves and be sure to wash your hands.
4. Write down where you took sample "A" and sample "B" such as "East side of Bullfrog Creek below the city falls".
5. Return home and be sure to wash your hands.
6. Label the top of one of your filled vials with an "A" and the other with a "B" to keep them distinguished for later steps.

## Step 2: Pipette water samples onto Petrifilms

For this step you will need:

- (3) Petrifilms
- (3) Pipettes
- (1) Pair of gloves
- (2) Your filled and labeled sample and control vials

Instructions:

1. Label your Petrifilms using a permanent marker. Have a control film (labelled "C"), and two samples (labelled "A" and "B"). Your control will be tap water from your sink. You can use a clean cup to collect some water to pipette.
2. Using gloves once again, prepare to add your samples as soon as possible after collecting. You can practice using a pipette a few times beforehand with regular water and a bowl. Squeeze the pipette, lower into the water, and release. The goal is to get the water level to the 1mL mark (near the top of the tube). This may take a few tries at first! You can draw a 3 inch circle on a paper towel, and squeeze the pipette onto the center of the circle. It should fill out the circle.
3. When you are ready, use a pipette to drop 1mL of your control water onto a Petrifilm. More instructions can be found at the instructions link at the bottom of this document. Be sure to match your sample with the correctly labelled Petrifilm.
  - a. Lay the films on a flat surface, with the flaps opening towards you.
  - b. Fill a 1mL pipette with the water to be tested.
  - c. Lift the flap on the first film, and use the pipette to gently spread the solution on the film. Ensure that the pipette does not scratch the film surface, and that the water does not overflow the film's circular area.
  - d. Gently roll down the clear sheet on the surface of the film. Make sure there are not significant air bubbles between the clear sheet and the film's surface.
  - e. Repeat steps 2 - 4 for the two samples from your sample vial.
4. Discard your vials and used gloves. Wash your hands.

## Step 3: Bacterial growth and capturing the results!

You will need:

- (1) Camera
- (3) Your incubated Petrifilms
- (1) The pre-addressed gray envelope

Instructions:

1. Take a picture of each of your Petrifilms. These initial pictures will be used as a baseline for visualizing bacterial growth after 48 hours.
2. Move your Petrifilms to a safe place, leave them lying flat in a room temperature spot. They can be safely stacked together.
  - a. Ensure that it is out of reach of pets and younger children.

- b. Make sure that it is not in the path of direct sunlight or exposed to high heat, as this could sterilize the sample and cause no results. A dark place such as a cabinet or box would be ideal.
3. Don't forget about your Petrifilms! Set a reminder if needed. Take a picture at the 24 hour mark, then at 48 hours to see if there are any blue spots. Blue spots with little bubbles under the film indicate the presence of E. coli.
  - a. E. Coli produces CO<sub>2</sub> as it eats and grows. CO<sub>2</sub> is a gas that will be trapped under the film. A blue dot without a bubble will be some kind of bacteria that is not E. coli.
4. Email us pictures of your petrifilms with timestamps as well as the picture of your water source (if you took one) to [wetpoo@pubinv.org](mailto:wetpoo@pubinv.org).
5. Using the gray envelope provided, place the Petrifilms and pipettes inside. Ensure that the caps are tightly screwed on to the vials and place them inside as well. Take off your gloves, then seal the envelope, and drop off at the post office.
6. Congrats your finished the project! Thank you so much for joining us in this fun activity. We'll let you know when the project map is available.

References:

<http://jhe.ewb.org.au/index.php/jhe/article/view/127>

Instructions for Petrifilms:

<https://www.instructables.com/id/Portable-Petrifilm-Incubator-for-Inexpensive-In-Fi/>