



Antibiotic Mobile Discovery Kit

The human race has been waging a war with bacteria since the dawn of time, but the development of antibiotics in the 1930-60s gave us the upper hand in fighting this war. Antibiotics have allowed us to do things no one could dream about before – perform complex surgeries, transplant organs, undergo chemotherapy, and cure dangerous diseases.

Today, antibiotics still work – but our last precious antibiotics have begun to surrender to microbe superbugs that have evolved and developed resistance to current drugs. This has created a critical and urgent need to discover and develop new antibiotics.

This kit will empower you to learn the process of antibiotic discovery and allow you to contribute to global health research by discovering new sources of antibiotics and sharing your results with scientists.

Visual Guide

1-2



3-4



5-8



9-10



Step-by-Step Protocol

1. Determine where you will collect samples and complete **Section A** of the report card to the best of your knowledge.

2. Collect, number, and photograph up to **22 samples** in sufficient detail to identify them later.

Common mistake: poor or missing pictures that do not allow for later identification of the samples.

3. Using a small kitchen pot or a microwave, bring **2-3 cups** of water to boiling. ☒ **Hot! Use gloves!**

4. Fill **Large Tube** with tap water to the **45 ml** mark. Close and shake vigorously. Place the tube into boiling water in an upright or angled position for **15 min** until the gel powder is fully dissolved and liquid is not cloudy. ☒ **Hot! Use gloves!**

Common mistake: gel powder is not fully dissolved.

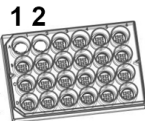
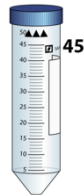
5. While waiting for **Large Tube** to boil, use scissors to cut test samples into small **3 mm** pieces in an amount sufficient to cover the bottom of one well.

6. Leave control **wells 1 and 2** empty for now. Load cut samples into **wells 3-24** of the plate in the order of collection. Do not cover the plate with the lid at this step.

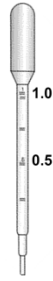
Common mistake: too much test sample is loaded in the well. Use just enough material to cover the well bottom.

7. Complete **Section B** of the report card by entering the number and name (if known) of each sample according to the way you loaded them on the plate. Mark the **sample part** only if multiple parts of the same sample will be tested (i.e. stem, leaf, bark, root, flower, fruit, seed, or cap).

8. Remove the kitchen pot from the heat source and keep **Large Tube** inside the hot water to prevent gel from solidifying. Repeat boiling steps if undesired gelling occurs. ☒ **Hot! Use gloves!**



11-12

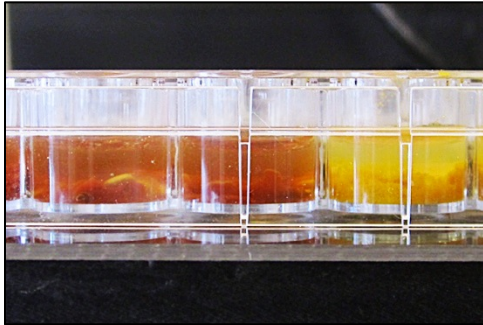


9. Using the pipet, transfer **0.5 ml** of gel liquid from **Large Tube** to each well of the plate, thus covering the test samples with gel. Allow gel to solidify for **5 min**.

10. Using the pipet, transfer **additional 1 ml** of gel liquid from **Large Tube** to each well of the plate to cover the test samples with a second layer of gel. Allow gel to solidify for **10 min**.

Common mistake: gel is not solid enough. Make sure that the gel solidified by gently tilting the plate.

13

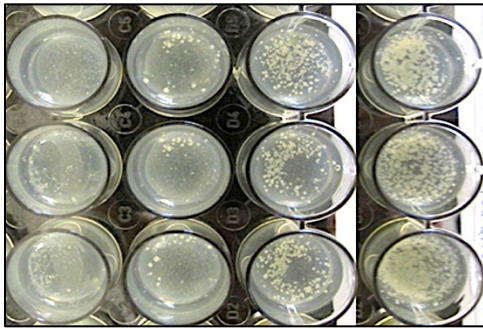


11. Fill **Small Tube** with your saliva to the **2 ml** mark. Add tap water to the **4 ml** mark to obtain a diluted saliva solution that contains your mouth bacteria. Close the tube with cap, shake vigorously, and set aside in the upright position.

12. **Do not add saliva to well 1.** Using the pipet, transfer **1 drop** of your saliva solution to **wells 2-24**. Allow saliva in the wells to air dry for **30-40 min** before covering the plate.

Common mistake: too much saliva is loaded. Make sure that only 1 drop is placed on the gel surface in each well, and that gel surface is dry before closing the lid of the plate.

14-15



13. Store the plate in a warm dark place for **24 hours**.

In cold settings, pour the remaining warm water from the pot into a ziplock bag and place it on the plate to keep it warm.

14. Observe bacterial colonies on the gel surface after 24 hours and compare it to the negative control (**well 1**) and the saliva control (**well 2**). Expect no bacterial colonies growing on the gel surface in well 1 and many bacterial colonies in well 2.

If no bacterial colonies are observed in well 2, keep the plate in a warm dark place for another day.

16-18



15. Estimate and mark bacterial growth score in **Section B** of the report card according to the following rules:

- 0** (no bacterial colonies, similar to well 1);
- 1** (few bacterial colonies);
- 2** (some bacterial colonies);
- 3** (many bacterial colonies, similar to well 2).

16. Fill in **Section C** of the report card to rate your experience.

17. To make a **Digital Report Card**, place the assay plate without the lid inside the shaded box of the report card and take a single picture of the entire card.

18. Visit <http://MobileDiscovery.org> and choose "Mobile Discovery Kit" from a menu on the right. Use the upload form at the top of the page to send the **Digital Report Card** and **the pictures** of the test samples to our lab.



Section A. Record kit number, date, and sample collection site. Leave blank if unknown.

Report Card for Antibiotic Mobile Discovery Kit # _____ (copy kit number from the plate sticker)

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 • **Month** 1 2 3 4 5 6 7 8 9 10 11 12

Year 14 15 16 17 • **Collection time** Morning Afternoon Evening Night • **Weather** Sunny Cloudy Dew Fog Rain Ice Snow

Temperature -40 -30 -20 -10 0 10 20 30 40 50 °Celsius • **Elevation** -50 0 50 100 200 400 800 1K 2K 3K 5K 8K Meters
 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 °Fahrenheit -100 0 100 200 400 800 1K 2K 3K 5K 10K 15K Feet

Location name if any _____ (Backyard, park, lake, mountain, or other environment)

Street address if any _____ (Road, highway, trail, or other marker)

Nearest city and state _____ • **GPS** _ _ . _ _ _ _ _ / _ _ . _ _ _ _ _

Section B. Record sample number, name (if known), and circle the part of the sample tested in each well. After 1-2 days, observe and score the bacterial growth in each well as 0 (none), 1 (few), 2 (some), or 3 (many).

A	Negative control well Add gel only Well 1 Bacterial score 0 1 2 3	Saliva control well Add gel and saliva Well 2 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 3 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 4 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 5 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 6 Bacterial score 0 1 2 3
	Stem Leaf Bark Root Flower Fruit Seed Cap Well 7 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 8 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 9 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 10 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 11 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 12 Bacterial score 0 1 2 3
B	Stem Leaf Bark Root Flower Fruit Seed Cap Well 13 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 14 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 15 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 16 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 17 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 18 Bacterial score 0 1 2 3
	Stem Leaf Bark Root Flower Fruit Seed Cap Well 19 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 20 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 21 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 22 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 23 Bacterial score 0 1 2 3	Stem Leaf Bark Root Flower Fruit Seed Cap Well 24 Bacterial score 0 1 2 3
C						
D						

Section C. Rate your experience on scale of 1 (worst) to 5 (best).

Place the plate without the lid inside the shaded box before taking a picture.

1. This is a well organized, thought-provoking exercise 1 2 3 4 5

2. It was easy to understand and perform the assay 1 2 3 4 5

3. Overall, this exercise was an effective learning experience 1 2 3 4 5

Name _____
(Optional, for future contact)

Email _____
(Optional, for future contact)

