

## **Lesson Plan 2: ABR Lab Setup and Computational Thinking Intro**

**Time: 90 min**

### **Goals for the lesson:**

- Students begin developing an understanding of bacteria and how antibiotics work.
- Students learn and practice sterile lab technique.
- Students learn basic computational thinking ideas and practice applying them to a familiar process.

### **Lesson assessments:**

- Students' algorithms can be assessed for initial computational thinking understanding.
- Worksheets included in the lesson can be used to assess bacteria and antibiotic basics.

### **Resources/Materials:**

- Computational Thinking Power Point
- Antibiotics Power Point
- Lab Guide for Instructors
- Lab Packet
- Bacteria and antibiotics handout
- Lightbot: <https://lightbot.com/hour-of-code.html> Can be downloaded as an app on phones and tablets or accessed via the web.
- Video of CT implementation Example
  - Projector view: <https://youtu.be/S9wvZkCSAU8>
  - Whiteboard view: <https://youtu.be/trvum57HALQ>
  - Video Transcript is also posted in the unit Instructional Sequence.
- Example Getting Ready Algorithms
- American Biology Teacher articles:  
<https://abt.ucpress.edu/content/80/1/21.abstract>  
Peel, A., & Friedrichsen, P. (2018). Algorithms, abstractions, and iterations: Teaching computational thinking using protein synthesis translation. *The American Biology Teacher*, 80(1), 21-28.  
  
<https://abt.ucpress.edu/content/80/3/214.abstract>  
Williams, M. A., Friedrichsen, P. J., Sadler, T. D., & Brown, P. J. Modeling the Emergence of Antibiotic Resistance in Bacterial Populations. *The American Biology Teacher* 80, no. 3, (2018): 214-220.

### Instructional sequence

Learning Activity	Materials/Supplies
Prior to class, use the lab guide for instructors to set up the lab.	See lab guide for full materials.
Conduct Day 1 Procedures with students. It can be helpful to go over the procedures as a class once before carrying out the procedures. Often students mess up the disks and forget to clean their forceps in between. Pay close attention to sterilization technique. Clean lab work space after procedures are complete.	Lab Packet for students
Students play Lightbot to explore computational thinking. Make sure students play at least two puzzles within each level: basics, Loops, and Procedures. Go through the CT intro Power Point and discuss examples of algorithms, loops, methods, branching, and variables. See video for an example of how to teach this lesson, and reference the American Biology Teacher article above for more details.	Lightbot, tablets/phones/computers
Students work in groups to create an algorithm for their process of getting ready in the morning. This can be done on whiteboards to make editing the steps easier. As students work, the teacher can walk around the classroom and check for the usage of CT concepts (loops, branching, variables, methods).	CT Power Point Whiteboards & Markers
Show the class the example getting ready algorithms and talk through the similarities and differences between the algorithms. Be sure to discuss each of the CT principles: branching, iteration, methods, and variables.	Example Getting Ready Algorithms