



BIOACOUSTICS LAB

Teacher Manual

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Goals/Objectives

English Language Arts Standard(s)

Phonological Awareness: students will demonstrate understanding of spoken words, syllables, and sounds (phonemes)

Language/ Reading Skills

Students will be able to...

- recognize and manipulate units of sound in spoken language such as words, syllables, onset and rime, and phonemes (phonological/phonemic awareness)
- correctly identify sounds and sound sequences (listening accuracy)

Cognitive Skills

Students will be able to...

- hold a target phoneme in working memory while comparing it to two alternate phonemes to find the matching one (memory)
- focus on specific information, to sustain that focus, and to ignore distractions, while carrying out a task (attention)
- rapidly interpret and integrate auditory information to identify phonemes (processing)

Social-Emotional/ Executive Function Skills

Students will be able to...

- selectively focus and sustain attention on a lesson or an activity
- inhibit impulsive responses
- build phonological working memory skills
- build confidence in listening and phonological awareness skills
- manage ability to process rapid, complex information

Icon Key



Audio



Download



English Learner



Quick Check

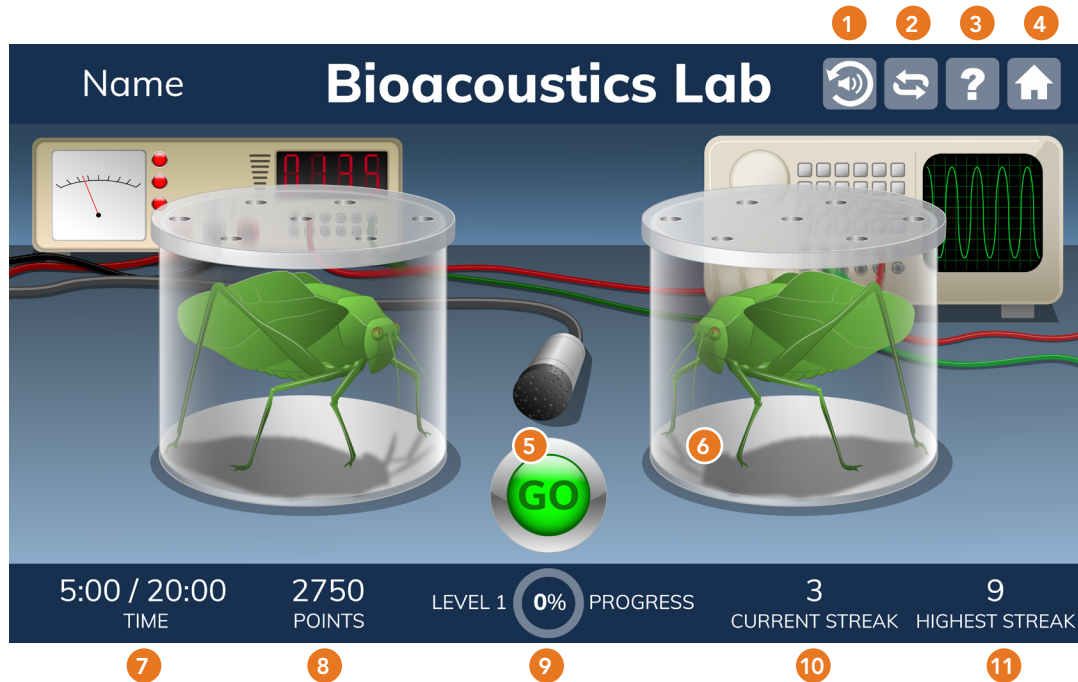


Settings



Video

Exercise Screen



1 Replay

Repeats the sound or sequence of sounds.

2 Autoplay

Turns Autoplay on or off; when "on" each click of the Go button presents a series of three or more questions.

3 Help

Provides access to Help options:

- **How to** replays initial instructions and provides a model exercise question.
- **Practice** allows students to listen closely to sample questions and take practice attempts without affecting their progress.

4 Home

Returns the student to their assignments screen.

5 Go

Presents a question or a series of Autoplay questions. When an Autoplay sequence is in progress, this counter shows how many questions remain in the sequence.

6 Answer Buttons

A pair of insects in observation containers. Each of the insects produces a different syllable. The student must click on the insect that produces the target syllable.

7 Time

Shows Time Worked / Time Scheduled for the exercise.

8 Points

- Shows total points awarded across all of a day's sessions.
- Correct answers: 2 points for each correct answer; 4 points for each correct answer on a wacky question.
 - Autoplay bonus: double the usual points if all answers in a set are completed correctly.

9 Level Progress

Displays the current level and percent complete of the level.

10 Current Streak

Shows the number of consecutive correct answers in the session. Resets to zero after an incorrect answer.

11 Highest Streak

Shows the highest number of consecutive correct answers in the session.

Exercise Overview

Task

When the student clicks the Go button, Bioacoustics Lab first presents a target syllable, such as /ba/. Next, the insect on the left moves and produces a syllable. Finally, the insect on the right moves and produces a syllable. One of the insects produces the target syllable and the other produces the alternate syllable for the current phoneme pair. The student must click on the insect that produced the target syllable.

Content

In Bioacoustics Lab, students progress through 5 phoneme pairs. Each pair presents 2 syllables that differ by a single phoneme:

Phoneme Pair	Target Syllable	Alternate Syllable
/aba/ /ada/	/aba/	/ada/
/ba/ /da/	/ba/	/da/
/be/ /de/	/be/	/de/
/bi/ /di/	/bi/	/di/
/va/ /fa/	/va/	/fa/

This exercise provides students with practice differentiating each consonant sound when it is used in combination with a vowel sound.

Did you know?

In Bioacoustics Lab students are asked to choose between 2 syllables that sound very similar, such as /ba/ and /da/. These types of syllables are called “confusable” pairs. They contain sounds that can be difficult to tell apart when the language is unfamiliar, the speaker is unclear, or when listening in a noisy environment.

Bioacoustics Lab improves students’ ability to rapidly and accurately recognize confusable sounds. It trains the brain to act quickly so these sounds aren’t blurred together, which often results in a listener having to ask someone to repeat what they said. Our brains must be able to identify these sounds to understand what someone is saying. If a sound is perceived clearly in the first place, it’s easier to recall it clearly later. Bioacoustics Lab helps students to clearly perceive and represent these easily confusable consonant sounds.

Exercise Overview

Progression

Bioacoustics Lab uses synthesized speech with enhanced phonetic features. Initially, the consonant sound in each syllable is highly enhanced, making it easier to perceive the difference between the phonemes. As the student progresses through the exercise, the enhancements are reduced and eventually the syllables are presented in a more natural form. Additionally, the length of time between the target and alternative syllables decreases. This pushes the brain to make increasingly fine distinctions between sounds, and to speed up.

Within each phoneme pair, students progress through 26 stages. Bioacoustics Lab adapts to the student's performance and will provide targeted interventions if the student is continuously moving among the same few stages.

- To advance to the next stage, the student must answer 3 consecutive questions correctly. If the student answers a question incorrectly, the student moves back one stage. When progressing well, the student may be allowed to skip some stages. When struggling, the student may need to work on more of the stages.

To complete Bioacoustics Lab, the student must pass all phoneme pairs at the highest stage.

Wacky Questions

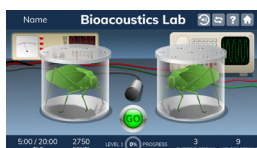
To keep the student engaged and attentive, Bioacoustics Lab occasionally presents “wacky” questions—easy-to-answer questions that provide a fun, unexpected break in the exercise. It includes the following wacky question pairs, with one syllable/word randomly chosen as the target syllable/word:

- cluck/quack (animal sounds)
- banana/waffle (spoken words)
- doorbell/horn (environmental sounds)
- meow/bark (animal sounds)
- baa/neigh (animal sounds)

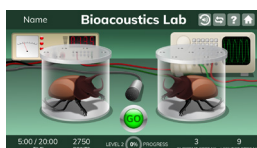
Wacky questions do not count toward exercise progression, so the student will not be penalized for incorrect answers.

Motivational Levels

Each time a student progresses through 20% of an exercise, they “level up” and the screen changes slightly. These motivational levels are not connected to specific processing levels or content.



Level 1



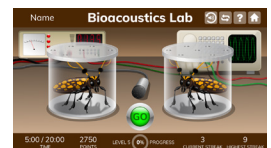
Level 2



Level 3



Level 4



Level 5

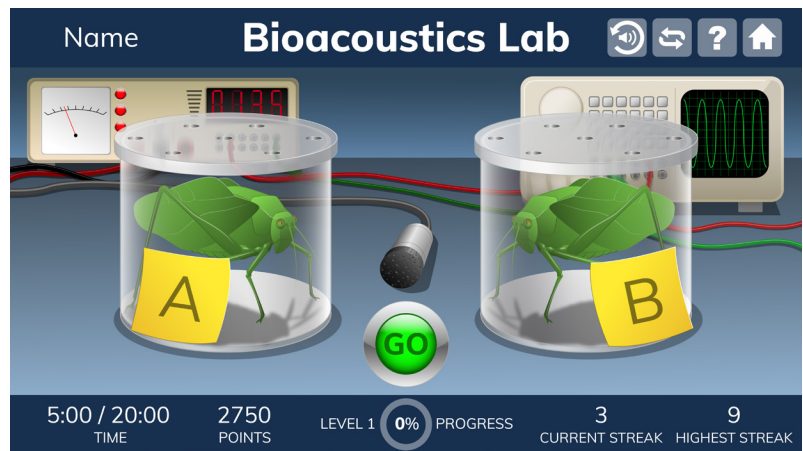
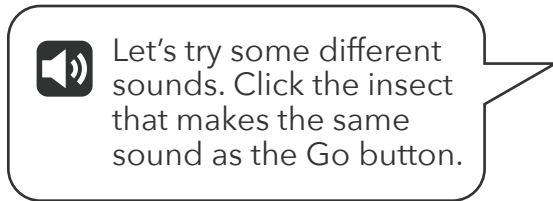
Exercise Overview

Targeted Practice

This exercise uses built-in, responsive technology to detect when a student is struggling and administer targeted, inline instruction—right when the student needs it—without any external resources or assistance required. This helps reduce frustration as it quickly gets the student back on track so they can continue making progress.

Bioacoustics Lab provides a variety of in-line interventions, such as modeling, alternative instructions, and practice opportunities.

The Easy Alternatives intervention uses the same interaction used in the exercise, but with alternative instructions and extra feedback. The letters “A” and “B” are superimposed on the answer buttons. This allows students to learn the task with extra support provided by familiar words that are easy to tell apart (“A” and “B”) and by visual cues on the insect observation containers.



Students get immediate feedback on correct or incorrect answers.

Students temporarily stop progressing in the exercise while working through an intervention, then resume when they return to the regular exercise content.

Exercise Overview

Acoustically Modified Speech

Have you ever worked with a student who had modifications for additional think time, extra wait time, or for teachers to speak more slowly? All of these modifications provide the student with extra time to make sense of information, also known as processing time. For students who struggle with processing speed, and for those learning a new language, slowing down the rate of speech and emphasizing specific sounds can be very beneficial to develop accurate phonological representations, while increasing comprehension.


Fast ForWord's acoustically modified speech technology (sometimes referred to as "glasses for the ears") slows and emphasizes speech sounds so that students can hear all sounds in a word. This technology can even stretch out sounds that are physically impossible for human speakers to stretch on their own.

Some speech sounds, such as the /b/ sound in the word "bat," have very fast transitional elements. When we say them aloud, these elements are easy to miss, but slowing them and emphasizing them (by presenting them at a higher volume) helps the brain to hear and respond to them more quickly.

"Why does everything sound so strange?"

The modified words and syllables in the Fast ForWord exercises may sound strange or mechanical to those who process sounds quickly. But for students who need a little extra time, the modified sounds and words will be easier to hear than natural speech. As students progress, the stretching and emphasis are reduced, pushing the brain to process at faster and faster rates until it can process natural speech.

 Why Does Everything Sound So Strange? (Student) in [Student & Teacher Resources](#)

 Why Fast ForWord Sounds the Way it Does (Teacher) in [Student & Teacher Resources](#)

Facilitate and Encourage

Introduce

Engage

To introduce the exercise to your students, start by saying: *Maybe you have noticed that there are some words in English that can be difficult or confusing because they sound so much alike, such as **bad** and **dad** or **bid** and **did**. What are some words that differ by a single consonant that might be hard for you to pronounce or understand if someone spoke them unclearly or if you were listening in a noisy environment? For example: **bad, dad, fad, had, lad, mad**, and so on.*

Play a “Word Grab” game:

1. Write a few words that differ by a single consonant on slips of paper (one word per paper) and give a set to a student or group of students. For example: *bid, did, hid, kid, lid, mid, rid*.
2. Put your hand in front of your mouth and call out a word.
3. Have students grab the correct word. Keep calling until there are none left.

Explain to students that in this exercise they will be listening to pairs of sounds that differ by just one sound (a consonant). Say: *The human auditory system can do amazing things when it is well-tuned. It has to be well-tuned to understand speech sounds because it has to process more than 700 sounds per minute in typical spoken language! This exercise helps tune your auditory system to quickly distinguish an important component of many speech sounds: words that differ by just one sound. The sounds presented are actually phoneme pairs that cover some highly confusable consonant sounds. The object is to listen carefully and determine which of the two sounds you hear matches the first sound presented to you.*

Demo

1. Say: *Today, we’re going to practice identifying the syllable that matches a target syllable. Together, we’ll work on an exercise called Bioacoustics Lab. I’ll get us started, then I’d like for you to try.*
2. Project the “Introduction – English or Spanish demo” for Bioacoustics Lab.
3. Follow along with the demo, which explains how the exercise works.
 - One way to help students identify the different syllables is to have them close their eyes while they listen. Have them say, “First” or “Second” each time they hear first or second syllables.
 - Choose an answer
 - Correct answer: a “ding” sound effect plays and the bug hops up and down
 - Incorrect answer: a “thunk” sound plays
4. Demo the keyboard shortcuts:
 - Go button = Space bar
 - Left answer = Left arrow
 - Right answer = Right arrow

Direct students to log in and work individually on the Bioacoustics Lab Demo for approximately 10 minutes. This time period mimics the timing of the exercise once it’s assigned. Debrief with students to ensure they understand the task and objective of the exercise. Ask, *what did you notice?* Have students share anything that they have questions about.



Bioacoustics Lab includes instructional audio for the exercise introduction and instructions.

By default, these are presented in English. You can, however, select Spanish instructions for all, some, or individual students on the Manage page in mySciLEARN.

Facilitate and Encourage

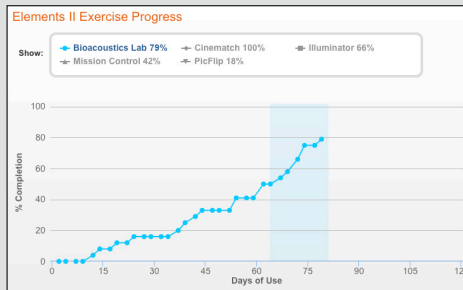
Monitor Student Progress

Review Bioacoustics Lab reports regularly to monitor student progress. Use the data to determine which students are succeeding and which students might be struggling to make progress.

Where to look...

PROGRESS: Elements II Exercise Progress - Bioacoustics Lab

The colored line shows student progress and their percent complete. Each dot indicates a day the student worked on the exercise.



What to look for... what it means

Is the line going up?

The student is completing content accurately and making progress.

Is the line flat across several dots?

The student may be struggling and you need to find out why.

Are there long lapses between dots?

The student may be skipping this exercise.

USAGE: Usage Details - Schedule

Usage Details		Schedule	Minutes/Questions	Start Time		
Days of Use	Date	Bioacoustics Lab	Cinematch	Illuminator	Mission Control	PicFlip
19	04/07/2020	○	○	○	○	
18	04/06/2020				○	
17	04/03/2020	○	○		○	
16	03/23/2020			○	○	
15	03/01/2020	●				
14	02/24/2020	●	○		○	○

Schedule

See if the student has met their daily schedule, and check what's planned for the next few days:

- Time completed
- Time not completed
- Exercise Skipped
- Planned for day

Do you see half-filled gray circles?

The student is working on this exercise, but not meeting the scheduled time. Make sure that they have time to complete their daily schedule. If fatigue is an issue, taking breaks is okay.

Do you see red circles?

The student is skipping this exercise. Provide support to help them re-engage.

USAGE: Usage Details - Minutes/Questions

Usage Details		Schedule	Minutes/Questions	Start Time					
Days of Use	Date	Bioacoustics Lab	Cinematch	Illuminator	Mission Control	PicFlip			
		Min	Ques	Min	Ques	Min	Ques	Min	Ques
18	04/06/2020	-	-	-	-	0	-	0	-
17	04/03/2020	6	57	0	-	-	-	0	-
16	03/23/2020	-	-	-	-	0	-	0	-
15	03/01/2020	12	101	-	-	-	-	0	-
14	02/24/2020	9	64	0	-	0	-	0	-
13	01/03/2020	-	-	-	-	0	-	-	-

Are many days highlighted in red?

The student is not meeting their daily schedule. Check the Schedule tab in this report to investigate further.

Is the student answering fewer questions than usual?

They may be distracted or losing focus. In comparison to their previous activity, a low number of trials to minutes may indicate the student is not applying themselves to the task.

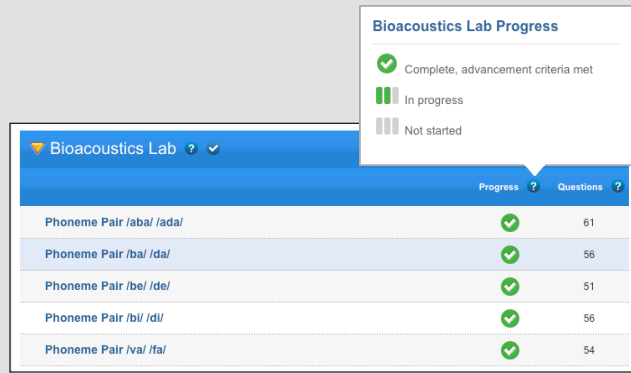
Is the student answering more questions than usual?

They may be rushing. In comparison to their previous activity, a high number of trials to minutes may indicate the student is trying to amass points, or to progress more quickly, but rushing can result in mistakes. Ask them to turn Autoplay off. Remind them that making progress depends on accuracy, not speed.

Facilitate and Encourage

Where to look...

PROGRESS: Progress Details - Bioacoustics Lab Progress



Questions

Typical range for students making good progress:

- Phoneme Pair /aba/ /ada/: 50 - 100
- Phoneme Pair /ba/ /da/: 50 - 100
- Phoneme Pair /be/ /de/: 50 - 100
- Phoneme Pair /bi/ /di/: 50 - 100
- Phoneme Pair /va/ /fa/: 50 - 100

What to look for... what it means

Has the student answered too many questions without passing a level?

While the minimum number of questions required to complete a level is 48, most students should be able to complete a level in under 100. A student who is still working on a level after more than 125-150 questions may be struggling. If a student has answered more than 150 questions, it is important to make sure the student is applying themselves, and maintaining their motivation and attention. Any increase in a student's progress chart shows that the student is making progress and should be celebrated.

The "Adjust Instruction/Intervene" section in this teacher manual provides suggestions for how to support students who might be struggling with Bioacoustics Lab.



Elements II Progress Monitoring Chart in [Student & Teacher Resources](#)

Facilitate and Encourage

Adjust Instruction/Intervene

Differentiation Activities

Differentiating instruction requires continually striving to know and to respond to each student's needs in order to maximize learning. Use the data in Bioacoustics Lab reports to adjust instruction to meet each student's needs and respond to variance among learners. The activities below are suggestions to support students who might be struggling with their progress in Bioacoustics Lab.



Does the student understand the exercise goal/task?

Observe the student as they work through the exercise demo to determine where their understanding may be breaking down. If necessary, demonstrate how the exercise works by using your hands to simulate the insects on the screen.

1. Hold up your closed hands with your palms facing the student.
2. Say /bah/ without opening either hand.
3. Next, say /dah/ while briefly opening then closing your right hand.
4. Finally, say /bah/ while briefly opening then closing your left hand.
5. Ask the student to point to the hand that opened when you repeated /bah/.
6. Try this a few times, changing which hand you open when you repeat the target syllable. Have the student explain back to you what they need to do to get a correct answer.



Can the student hear the syllables clearly?

Check the headset, volume controls, and background noise level.



Is the student staying focused on the task?

Discuss the importance of not making errors. Provide a challenge to pique interest, or strategies to support attention.

This task puts heavy demands on sustained attention, so students may benefit from taking periodic brain-breaks or turning off Autoplay.

Facilitate and Encourage



Does the student struggle to stay engaged?

Emphasize the importance of streaks—the highest number of correct responses in a row. Have the student use the Elements II Streaks and Completion Chart to track their highest streaks and review to see which days were higher or lower. Encourage the student to self-monitor and improve their accuracy. The sooner they complete the exercise the sooner they can move forward to something new.



Is the student aware that this exercise uses the 3-Forward/1-Back Rule to make forward progress?

Explain that accuracy is the key to moving through the content in this exercise. Students make progress based on the 3-Forward/1-Back Rule: they move forward when they get 3 answers in a row correct, but they move back when they get 1 answer incorrect. Because streaks record the number of correct answers in a row, charting this can help the student self-monitor by providing visual feedback of their number of correct answers in a row. Use the Three-in-a-Row Worksheet.



Can the student hear the difference between the syllables?

Hold your hand over your mouth to slightly muffle the sound and have the student identify whether you are saying /ba/ or /da/, /be/ or /de/, /va/ or /fa/. If the student is having problems, continuing on with this exercise will help them. Their struggle now will pay off later!



Does the student hear something different than what is shown on the screen?

At early speech processing levels, what the student hears may seem different from what they see on the screen (the syllables written near the Go button). For example, they may see “ba da” but hear something that sounds like /ra/ /ya/. This is OK. Reassure the student that the exercise is working correctly. Have the student focus on listening to and remembering the first syllable they hear, and then identifying its match in the next two syllables they hear.

Facilitate and Encourage

Adjust Instruction/Intervene

Student Resources

You may decide to use any or all of these monitoring sheets with your students:



Three-in-a-Row Worksheet in [Student & Teacher Resources](#)

Explain to students that accuracy is the key to moving through the content in this exercise. Students make progress based on the 3-Forward/1-Back Rule: they move forward when they get 3 answers in a row correct, but, they move backward when they get 1 answer incorrect. Because streaks record the number of correct answers in a row, this sheet can help students self-monitor for correct answers by providing the visual feedback that some students need to register their number of correct answers in a row. This sheet is useful for daily monitoring. Students will likely need one copy per day.



Elements II Streaks & Completion Chart in [Student & Teacher Resources](#)

Explain to students that accuracy is the key to moving through the content in Fast ForWord. Students can self-monitor their accuracy through streaks because they record correct answers in a row. After they complete their exercises for each day, have students record their highest streaks and percent complete in each exercise, then challenge them to exceed those numbers tomorrow. Students will need one copy every 5 days.



Elements II Completion Chart in [Student & Teacher Resources](#)

Students can self-monitor their progress in each Elements II exercise by filling in the bar each day with their actual completed percentage. This provides students with an overall view of how much content they've completed compared to how much they have left to do. Students will need one copy.