

## Introduction:

This task is Lesson 7 from the Storylines Middle School Unit [How Can We Sense So Many Different Sounds from a Distance?](#) This lesson is intended as a review of the big ideas learned in the previous six lessons, and it prepares students for a formal assessment that they will take individually after Lesson 7. This lesson spans 3 40-minute periods during which students are engaging in activities to help them answer the Lesson Question: **How can so many different sounds be coming from the needle and the record when you spin it?** Students discuss their ideas about investigating how the different sounds are made, conduct investigations about the effect on sound from changing frequency and amplitude of a vibrating object, and work with partners to make sense of how the needle on a record makes different sounds. At the end of the lesson students identify evidence on a record of what is causing the needle to vibrate in different ways to make different sounds, add this information to an Incremental Model Tracker, and use these ideas to make predictions about varying the speed of the record, which will be addressed in the next lesson.

## STANDARDS:

This task is intended to assess progress toward part of the NGSS Performance Expectation Bundle:

**1-PS4-1.** Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

**4-PS4-1.** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

**MS-PS4-1.** Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

## ANNOTATION KEY

EQUITY	SCENARIOS	SEPs	DCIs	CCCs	SENSE-MAKING	ASSESSMENT PURPOSE
Supporting a wide range of diverse students.	Information provided to elicit performances.	Opportunities to demonstrate science and engineering practices.	Opportunities to demonstrate understanding of disciplinary core ideas.	Opportunities to demonstrate understanding of crosscutting concepts.	Opportunities for reasoning about phenomena and problems.	Highlights how the task features connect to intended assessment use.

## STRENGTHS

The task poses a question and student engagement with it is scaffolded such that they are shown **why it might be surprising and interesting.**

Students' **sense-making through the task is supported through extensive discourse;** students consider questions in pairs and in whole-class discussions.

The task places **heavy emphasis on having students identify evidence based on observations about a phenomenon** (a record and needle playing music). The ability to cite relevant evidence is vital to many of the science practices, and giving students the opportunity to explore what it means to identify evidence, discuss patterns in the evidence, and to do so in a classroom discussion gives substantial attention to a critical piece of science reasoning that will be valuable in helping students progress toward argumentation and other SEPs.

## ! OPPORTUNITIES FOR IMPROVEMENT

Although the teacher's guide shows teachers how to help students come up with the driving question for the scenario themselves which is likely to help with engagement, it **isn't clear what teachers should do if students come up with a different question. This could have a negative effect on engagement.**

The lesson claims numerous SEP and CCC targets as well as one DCI. The task **provides evidence of students' ideas about the DCI described in the target, but it doesn't elicit explicitly evidence of the other dimensions.**

It is possible that students will use all three dimensions together to make sense of the phenomenon (Q8), but the **prompt does not indicate to students that anything other than identifying evidence is required of them, and similarly, it isn't made clear to the teachers what is intended to be evaluated.**

The prompts provide sample proficient responses, but they **do not provide insight to the teacher as to what to do when students are not providing these same responses, or what the qualities of a proficient response (that might be different from the sample) might be.**

## ✓ STRENGTHS

The task offers a **variety of scaffolds to bring students' attention to the critical elements of the sense-making task**, including guiding questions, short investigations, and discussions that provide a review to students what they learned in Bend 1 that they can use to draw on to find evidence of how the record causes the needle to vibrate in ways that will make different sounds. ■

## ! OPPORTUNITIES FOR IMPROVEMENT

To ensure that students **are making substantive connections between the patterns in the structure of the record, changes in vibrations of the needle, and sounds, it would be ideal if they didn't just represent their ideas in words, but also drew models of their ideas**. The modeling task at the end of the lesson could provide this opportunity, but does not give clear guidance to students or teachers what is being modeled and what evidence of students' progress with the dimensions would look like in their models. ■ ■ ■

## How does this task support all students?

✓ This task makes ample use of student discourse; students might record their ideas from their discussions in pairs, but they present them orally, and the teacher's guide recommends supporting students in building off of each other's claims and provides video-based resources to help support a productive atmosphere. Through this type of discussion students can provide evidence of their progress without relying on their writing skills, can learn from their peers, and are encouraged to add to their ideas using an additional representation (meter stick). Students will have the opportunity to record their ideas individually through a written assessment after this task. Valuing evidence of students' progress with the learning goals through whole-class discourse and giving students an opportunity to solidify their reasoning through discourse is an excellent way to support the learning of all students.

## What are the major takeaways?



### SUMMARY POINTS:

This task provides a useful model of how to support students in pulling all of the ideas that they learned over the course of six lessons together to make sense of a phenomenon. In this case, students do a few very short investigations and use guided questions to point their attention to each of the critical pieces of the DCI needed to explain the phenomenon.



### SUGGESTED IMPROVEMENTS

For this task to serve the purpose of an informal formative assessment that can help teachers attend to areas of need before they take a formal assessment, it would be helpful if the task provided more information about what dimensions the prompts are intended to elicit, how to use responses to identify students' needs, and what instructional moves to support student learning in response to the assessment could look like.

## How should this task be used?

The task should be used as an instructional tool; providing the instructional space for students to just focus on sense-making with the ideas they have already learned instead of continually moving onto new ones is crucial for deep learning. The task assesses parts of the learning target, but to be used effectively as an assessment of the learning target it would need additional items to elicit the many dimensions that are not yet explicitly assessed, as well as guidance about what is being assessed and how to make sense of student responses to inform instructional decisions.