
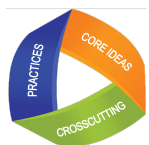


Activity 1: Summary Table Example

Keeping a public record of science activities is crucial for helping students link evidence with claims as they build their scientific explanations. The public record does not have to look like a summary table, it could take another form, but it does need to be publically accessible and contain the same parts: naming the activity (for easy reference), recording observations and patterns from the data, space for generalizable learning about the main ideas, and how this activity helps to explain a part of the whole science explanation of the phenomenon.

Fill in the summary table during an activity, as you complete each step of the lesson plan, or at the end of the lesson to reflect back. Use pre-planned back pocket questions to ask students in small groups about their observations, patterns in data, what they're learning about, and how this might connect to help us explain the phenomenon as student are working in small groups during the activity. Back-pocket questions help students think about these categories before having this discussion as a whole class.

Activity	Observations & Patterns	What did we learn?	Connection to Singer?
Humans Voices: Vibrations & Sounds when whispering, humming, talking, yelling 	<ul style="list-style-type: none"> We felt vibrations in our throat as we made different sounds. The vibrations were stronger if we were louder. (Yelling vibrations were stronger than whispering) 	<ul style="list-style-type: none"> There are parts inside our body that help us talk. Vocal cords vibrate the air as we breathe out to make sounds. To make a sound louder we use more force with the diaphragm muscle which is below the lungs and push on the lungs to move air out. 	<ul style="list-style-type: none"> The singer uses his diaphragm, lungs, and vocal cords to sing. To make a louder sound, he uses more force and pushes harder with his diaphragm. His vocal cords vibrate the air so we hear him sing.
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 10px; text-align: center;"> Step 2. Patterns <i>Identify Observations & Patterns in the Data</i> </div> <div style="border: 1px solid black; padding: 10px; text-align: center;"> Step 3. Learning <i>What did we learn from the activity and/or reading?</i> </div> <div style="border: 1px solid black; padding: 10px; text-align: center;"> Step 4. Connection <i>Connecting back to Explain the Phenomenon</i> </div> </div>			



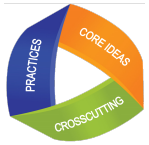
Storyline for the Unit on Sound

Anchor Phenomena: *Singer shattering glass with his voice*

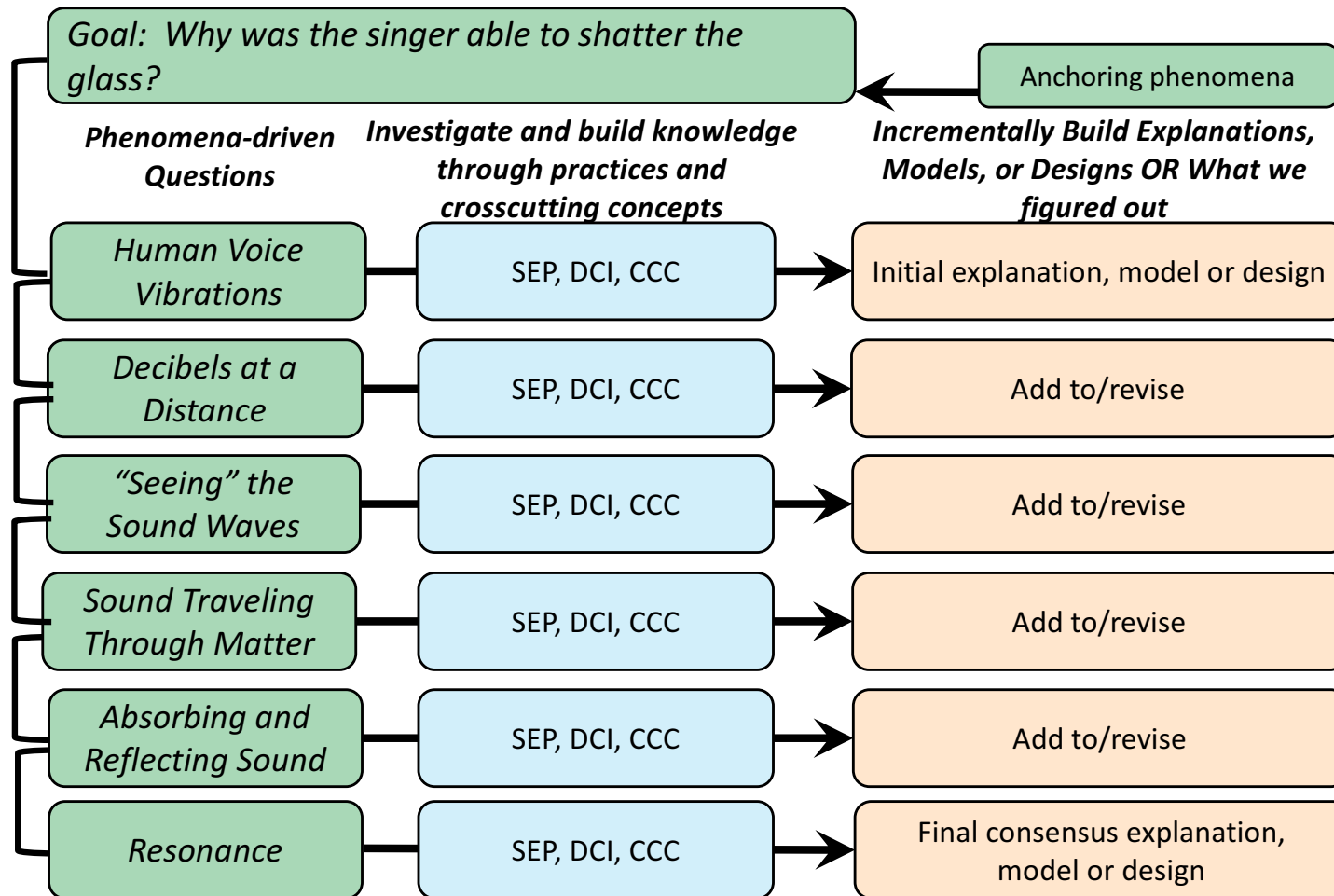


Driving Question: *Why was the singer able to shatter the glass?*




Question	Phenomena	Science & Engineering Practices	The Science Ideas & Questions We Figured Out
How do we make different sounds with our voices?	Vibrations when whispering, humming, talking, and yelling	Plan and carry out an investigation Analyzing data Obtaining and communicating information	Vibrations can travel through the air from the source of the sound to another object and effect that object. Vibrations diminish over a distance.
What happens to the volume of a sound as we increase our distance?	Sounds from an horn have a lower decibel reading the further away from the source	Plan and carry out an investigation Analyze and interpret data	Vibrations diminish over a distance. Loudness diminishes over a distance.
How does the force of vibrations affect the volume of the sound?	Hitting and tapping a tuning fork and putting it in water.	Plan and carry out investigations	Vibrations “cause” sound that we can hear. The harder the force to begin the vibration, the louder the sound and the more energy it has. (wave amplitude represents volume)
How do you think the sound from my mouth gets to your ears so you can hear me?	Sounds made by listening to sounds through a table and through the air by soft and hard knocking.	Plan and carry out an investigation Develop and use a models Analyze and interpret data	Matter is made up of particles. Particles in gases are farther apart than particles in solids. Sound energy transfers through matter by bumping particles.
Why can we hear outside noises when we are inside the classroom?	Variation in decibels in closed and open boxes.	Plan and carry out an investigation Analyze and interpret data Obtain, evaluate and communicate information	As it moves through matter, sound energy can be reflected (echo) or absorbed (muffled). The material/matter causes one of the other to happen.
How can one object make another object vibrate without touching it?	Humming bowl and “twin” tuning forks	Plan and carry out and investigation Analyze and interpret data Develop and use models	Vibrating things make sounds and also sounds can make things vibrate if they are “twins.” (Also sound energy does not blow air but moves through it by bumping)






A Graphic Representation of Coherence



INITIAL MODELS

Before singing	During singing	After singing
<p>Oliver</p> 		
<p>First, I observed that</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Next, when the singer was singing I</p> <p>observed that <u>you have</u></p> <p><u>to be at the right</u></p> <p><u>pitch.</u></p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Finally, when the singer stopped</p> <p>singing I observed that <u>I</u></p> <p><u>noticed that the</u></p> <p><u>glass vibrated more</u></p> <p><u>with no singer</u></p> <p><u>than with singer.</u></p> <p>Oliver noticed the glass kept humming even after the singer stopped singing.</p>

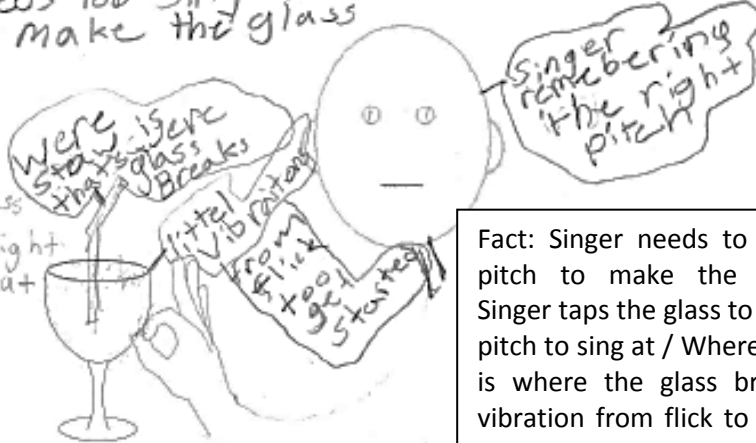
Before singing	During singing	After singing
<p>Mariana</p> 		
<p>First, I observed that <u>the glass</u></p> <p><u>is still</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Next, when the singer was singing I</p> <p>observed that <u>the glass</u></p> <p><u>is wigilin. like gelb</u></p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Finally, when the singer stopped</p> <p>singing I observed that <u>the</u></p> <p><u>glas brokt because the</u></p> <p><u>gite was singin-</u></p> <p><u>lowd.</u></p>

Why does the glass shatter?

Singer taps the glass and listens.

fact: singer needs to sing at right pitch too make the glass break.

Singer taps glass too find the right pitch too sing at.



Fact: Singer needs to sing at right pitch to make the glass break. Singer taps the glass to find the right pitch to sing at / Where straw is that is where the glass breaks / Little vibration from flick to get started / Singer remembering the right pitch

Singer sings near glass.

fact: when singer sings he makes a weird shape with his mouth.

fact: his tongue kind of comes out of his mouth a little.



Fact: When singer sings he makes a weird shape with his mouth. Fact: His tongue kind of comes out of his mouth a little./higher vibrations/sound waves/glass cracking/ Most vibration goes to a spot where the glass breaks/makes sound through vocal cords

Glass shatters. Singer stops singing.



Little sound waves goes all directions / brain

Why does the glass shatter?

Singer taps the glass and listens.



I think he flicked it so he can hear the tone.

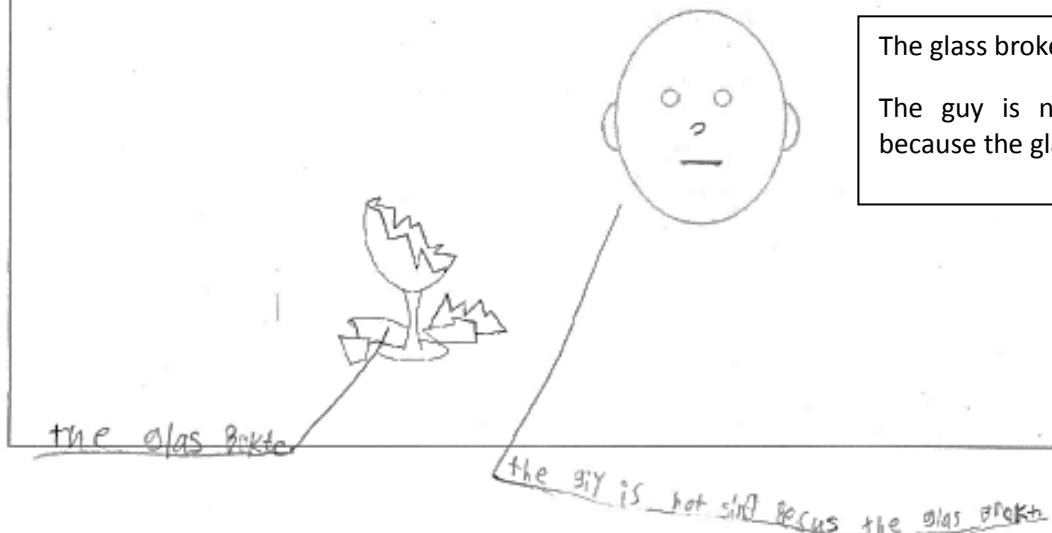
Singer sings near glass.



He is singing so that makes the glass break. It is moving. And it is moving like jello.

If you didn't have a nose you can't break glass because there is air comes out of you the air makes the glass wiggle and break.

Glass shatters. Singer stops singing.



The glass broke.

The guy is not singing because the glass broke.