

TEACHER DIRECTIONS - CONSTRUCTING EXPLANATIONS

4th Grade Sound Energy

After students have engaged with several investigations, students have gathered evidence from observations about how sound energy is produced (or transformed from other energy), how volume is related to force, how sound energy travels through different materials, and what is going on inside us so we can make sounds. The lessons were chosen from the kit, and some lessons were added, specifically for how their conclusions about properties of sound energy can help explain how the singer was able to shatter the glass with his voice. Students are asked in this lesson to coordinate what they have learned from the different car investigations to apply it back to the singer scenario and explain why the singer was able to shatter the glass.

TIP #1: Divide the Task.

Writing a complete explanation of the singer phenomenon is a huge undertaking for individual students. Let students work in small groups (recommending no more than 3 per group). Talk about group-work norms - sharing talking and writing responsibilities. Check-in with groups on their explanations but also about group work norms.

TIP #2: Watch for vocabulary.

Students may still use a mix of science language and everyday language. If students use words like 'pitch' or 'volume' ask them to add in a sentence to their explanation saying more about what that means and particularly why that affects the singers' ability to break the glass so they don't hide behind science vocabulary.

TIP #3: Sentence Strips: Helpful or not?

Students don't have to use the strips if they feel confused or confined by the phrasing. They can rewrite them in their own words and add in extra sentences about ideas that are important that may not be included. They are a guide to help with writing, but should not impede progress if students can be more productive without them.

TIP #4: Remind Students to Look at the Summary Charts

After each activity, students provided input to create or add-on to a public chart about observations, new learning, and connections. There is a summary chart for each activity. Students can refer to those charts if they read an evidence sentence starter such as, "At recess, we observed..." and can go to the "Recess Activity" chart to remind themselves what evidence they collected during that activity.

Sound Energy Kit – Claim & Evidence Sentence Starter Activity for Constructing an Explanation

EXAMPLE OF STUDENT GROUP EXPLANATION

Claim = Pink

Evidence= Green

the noise

Sound travels away from the singer's mouth because
Vibrates through the air.

At recess, we observed... that we
could here the ball
bouncing from across
the Play ground.

the glass

The singer taps the glass first in order to
find the pitch he has to
sing at.

We saw a video about
a fine
With tuning forks and we
learned that when one thing
vibrates, another thing
of the same will pick up
the noise.

Sound travels away from the singer's mouth because it
vibrates through the air.

At recess, we observed... that we
could here the ball
bouncing from across
the Play ground.

The glass flexes back and forth because
of the sound waves hitting
it.

When we hum near
the glass the
salt on top shakers
and we think it's because
of the sound waves.

The glass finally breaks because
it can't take the
force of the sound
waves.

The closer you
are to things the louder
you are.

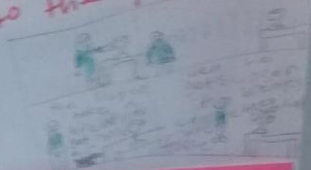
The singer can make sound because
of his
vocal cords.

We read about
his/her vocal cords
and how they work.

The singer has to be close to the glass because
if the singer is far away
he ~~can't~~ have enough
force to break it!
take longer to break
if he wasn't close
to the glass.

The singer has to use a loud volume because
the louder he is the
easier it is to break
the glass.

The ~~activity~~ showed that...



CLAIMS - Copy on colored paper (different color than evidence). Cut apart, provide strips to groups or pairs of students. Students can also add their own sentences, too.

The singer taps the glass first in order to...

Sound travels away from the singers' mouth because...

The glass finally breaks because...

The singer can make sound because...

The singer has to be close to the glass because...

The singer has to use a loud volume because ...

The glass flexes back and forth because...

Sound energy travels away from the singer's mouth because...

EVIDENCE - Copy on colored paper (different color than evidence). Cut apart, provide strips to groups or pairs of students. Students may use observations from one activity as evidence for two different claims.

We read about...

We saw a video about ...

When we did partner whispers in the hall, we observed...

At recess, we observed...

When we knocked on the table...

The _____ activity showed that ...

From the _____ activity we learned that...

From the _____ activity we learned that...

Sound Energy Kit – Claim & Evidence Sentence Starter Activity for Constructing an Explanation

OPTIONAL Reasoning *Copy on colored paper (different color than evidence). Cut apart, provide strips to groups or pairs of students. Students may use observations from one activity as evidence for two different claims.*

Based on this evidence, we know ...

This evidence shows...

This evidence helps us better understand _____
_____ because...

This result can be explained by...

Because of the data from this experiment, we know that...

This evidence supports our claim because...

This evidence supports our claim because...

This evidence supports our claim because...
