

JACK

Name

Date:

3/23/09

Period:

4

Investigating Pitch and Volume

Purpose: You will use Garage Band® and your laptop as a tool to see how the pitch and volume of a tuning fork behave over the time and space that the tuning fork is sounding.

Directions:

To start *Garage Band*®:

1. Click on *Garage Band*® icon.
2. Select "Create New Music Project", leave settings as is and click "Create"
3. Once you are in *Garage Band*®, close out of "Grand Piano" instrument
4. Go to "Track" menu, choose "New Track"
4. Now select "Real Instrument Track", then click "Create"
5. On right hand side of screen in "Track Info" section, select "Basic Track" as the instrument
6. Go to "Control" menu and deselect "Metronome" and select "Show Tuner in LCD"
7. Now to measure/record, click the red circle button.

*If Tuner disappears from LCD display, you must go back to the "Control" menu and select it again

Now, to collect the data for this investigation, you will use the following directions:

1. After pressing the "Record" button, ring the tuning fork once loudly, and hold the tuning fork one hand width from the microphone, write down the strength of the sound (high, medium and low strength) shown in the "Track Information" display and the pitch (key) that appears in the "LCD Tuner" display, this data goes in the row labeled "Volume- loud" row of the data table.
2. Repeat step 1, but this time ring the fork quietly and write the strength of the sound and the pitch/key detected by the computer in the row labeled "Volume - quiet".
3. Next strike the tuning fork, and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that the computer detects, this data goes in the row labeled "Distance-close"
4. Repeat step 3, ringing the fork the same as you did before, but now hold it one cubit away from the microphone and write the strength of the sound and pitch/key in the row labeled "Distance - far".
5. Now strike the tuning fork and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that is detected within the first couple of seconds of ringing the fork, write this data in the row labeled "Time - at beginning"
6. Repeat step 5, but this time wait for about 5 seconds after ringing the fork and write down the strength of sound and the pitch/key that the computer detects, this data goes in the row labeled "Time-after 5 seconds".
7. Now repeat steps 1-6 with a different tuning fork that you first tried.


Data:

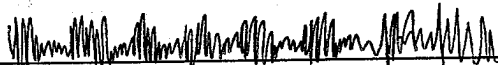
	Fork #1		Fork #2	
	Strength of Sound (high, med, low)	Key (shown in Tuner)	Strength of Sound (high, med, low)	Key (shown in Tuner)
<i>Volume - loud</i>	high	E	high	C
<i>Volume - quiet</i>	low	F ₂	med	C
<i>Distance-close</i>	high	E	high	C
<i>Distance-far</i>	med	F	low	C
<i>Time - at beginning</i>	med	F	high	C
<i>Time - after 5 seconds</i>	med	F	med	C

Reflection Questions:


Section I: Pitch


1. Thinking about your low and high pitch tuning fork, what would the sound energy look like if it was moving through a Slinkie? (draw in boxes below)

Low Pitch:  - larger wave lengths

High Pitch:  - shorter wave lengths


2. What would the sound energy look like if it were moving through air? (draw in boxes below)


Low Pitch:  - larger wave lengths

High Pitch:  - shorter wave lengths


Section II: Volume


3. When you made the tuning fork ring loudly and when you rang it quietly, what would the sound energy look like if it was moving through a Slinkie? (draw in boxes below)

Low Volume: 

High Volume: 

4. What would they look like if the sound energy were moving through a air? (draw in boxes below)

Low Volume: 

High Volume: 

JACK

Stop for Check-In: Check in with Mr. Coffey before answering the last questions.

Section III: Volume and Time

5. What happens to the volume of the tuning fork over time?

The volume decreases overtime.

Section IV: Pitch and Time

6. If a person were to strike a tuning fork with the pitch of C, would the pitch of the tone change over time?

yes it would not right away but maybe after 10 seconds.

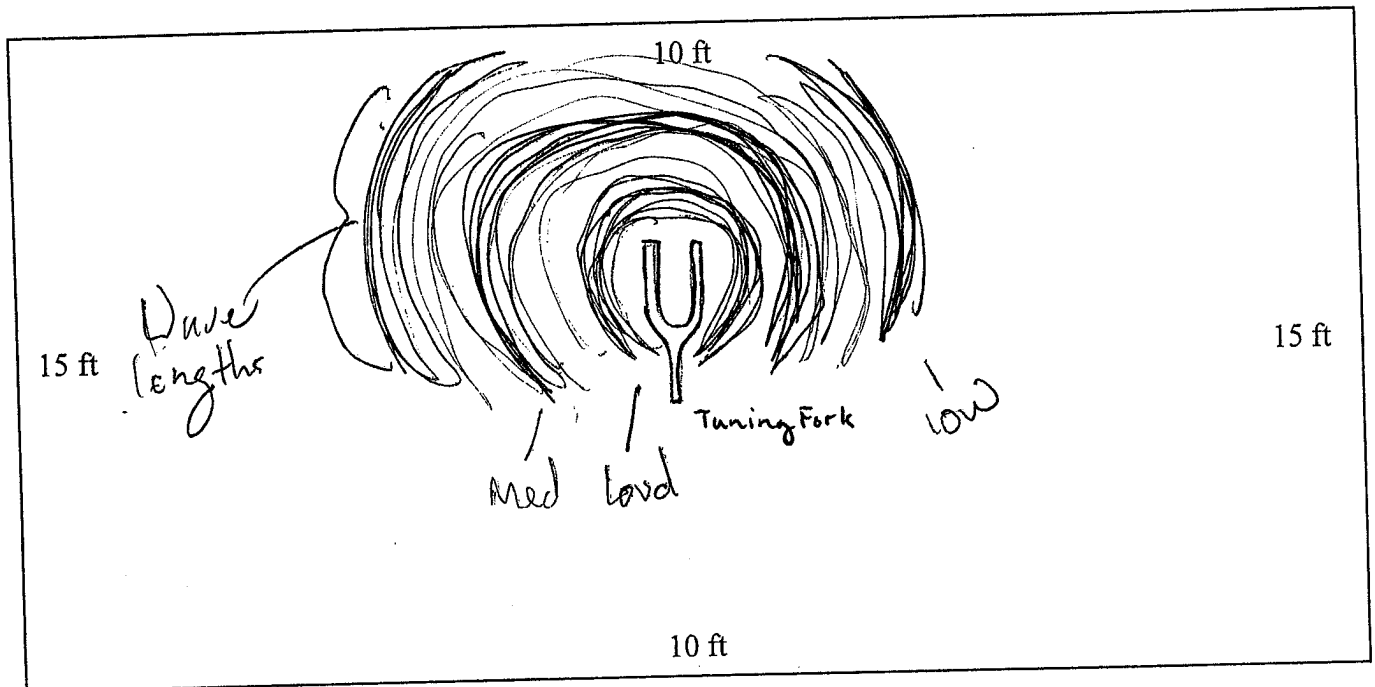
What is your evidence/example from this investigation that shows this?

When we tested our fork the pitch changed.

Section V: Volume and Space

7. In the space below, show:

- How the air particles are arranged
- How the volume/loudness changes with distance (label where it is louder and quieter)



Section VI: Pitch and Space

8. If I were to ring a tuning fork with the pitch of C, would it sound the same if you were close as it would if you were 10 ft away?

yes because pitch changes over time not distance.

9. What is your evidence/example from this investigation that shows this?

For our results the distance didnt affect the pitch but the time did.

Investigating Pitch and Volume

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1. After pressing the "Record" button, ring the tuning fork once loudly, and hold the tuning fork one hand width from the microphone, write down the strength of the sound (high, medium and low strength) shown in the "Track Information" display and the pitch (key) that appears in the "LCD Tuner" display, this data goes in the row labeled "Volume- loud" row of the data table.
2. Repeat step 1, but this time ring the fork quietly and write the strength of the sound and the pitch/key detected by the computer in the row labeled "Volume - quiet".
3. Next strike the tuning fork, and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that the computer detects, this data goes in the row labeled "Distance-close"
4. Repeat step 3, ringing the fork the same as you did before, but now hold it one cubit away from the microphone and write the strength of the sound and pitch/key in the row labeled "Distance - far".
5. Now strike the tuning fork and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that is detected within the first couple of seconds of ringing the fork, write this data in the row labeled "Time - at beginning"
6. Repeat step 5, but this time wait for about 5 seconds after ringing the fork and write down the strength of sound and the pitch/key that the computer detects, this data goes in the row labeled "Time-after 5 seconds".
7. Now repeat steps 1-6 with a different tuning fork that you first tried.

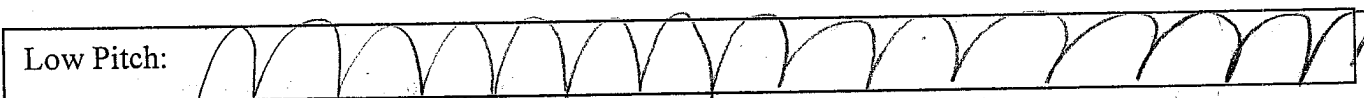
Data:

	Fork #1		Fork #2	
	Strength of Sound (high, med, low)	Key (shown in Tuner)	Strength of Sound (high, med, low)	Key (shown in Tuner)
Volume - loud	medium	B	High	C
Volume - quiet	low	B	low	C
Distance - close	low	B	High	C
Distance - far	medium	B	low	C
Time - at beginning	High	B	High	C
Time - after 5 seconds	medium	B	low	C

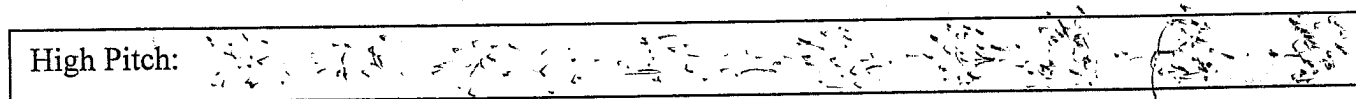
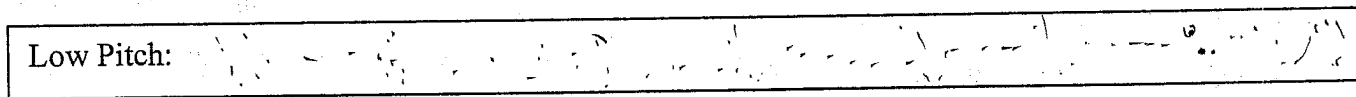
Reflection Questions:

Section I: Pitch

1. Thinking about your low and high pitch tuning fork, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)

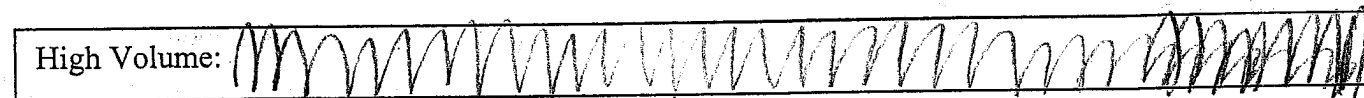
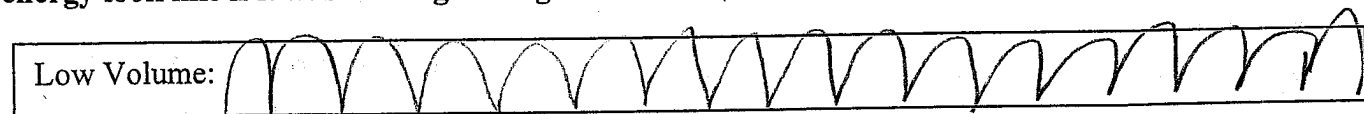


2. What would the sound energy look like if it were moving through air? (draw in boxes below)

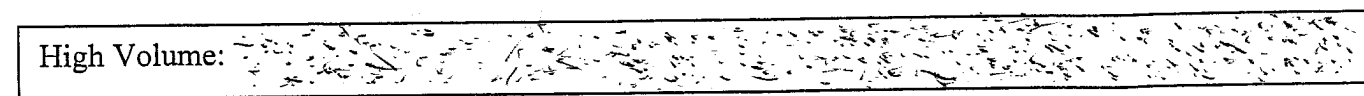
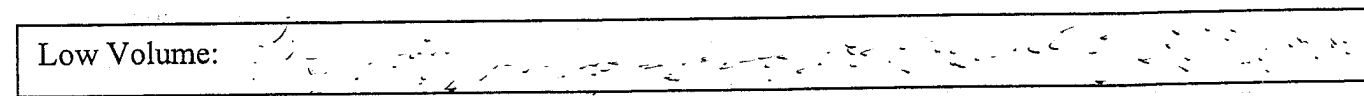


Section II: Volume

3. When you made the tuning fork ring loudly and when you rang it quietly, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)



4. What would they look like if the sound energy were moving through a air? (draw in boxes below)



Stop for Check-In: Check in with Mr. Coffey before answering the last questions.

Section III: Volume and Time

5. What happens to the volume of the tuning fork over time?

It is high in the beginning, but then it just fades at the end.

Section IV: Pitch and Time

6. If a person were to strike a tuning fork with the pitch of C, would the pitch of the tone change over time?

No, because it would stay the same.

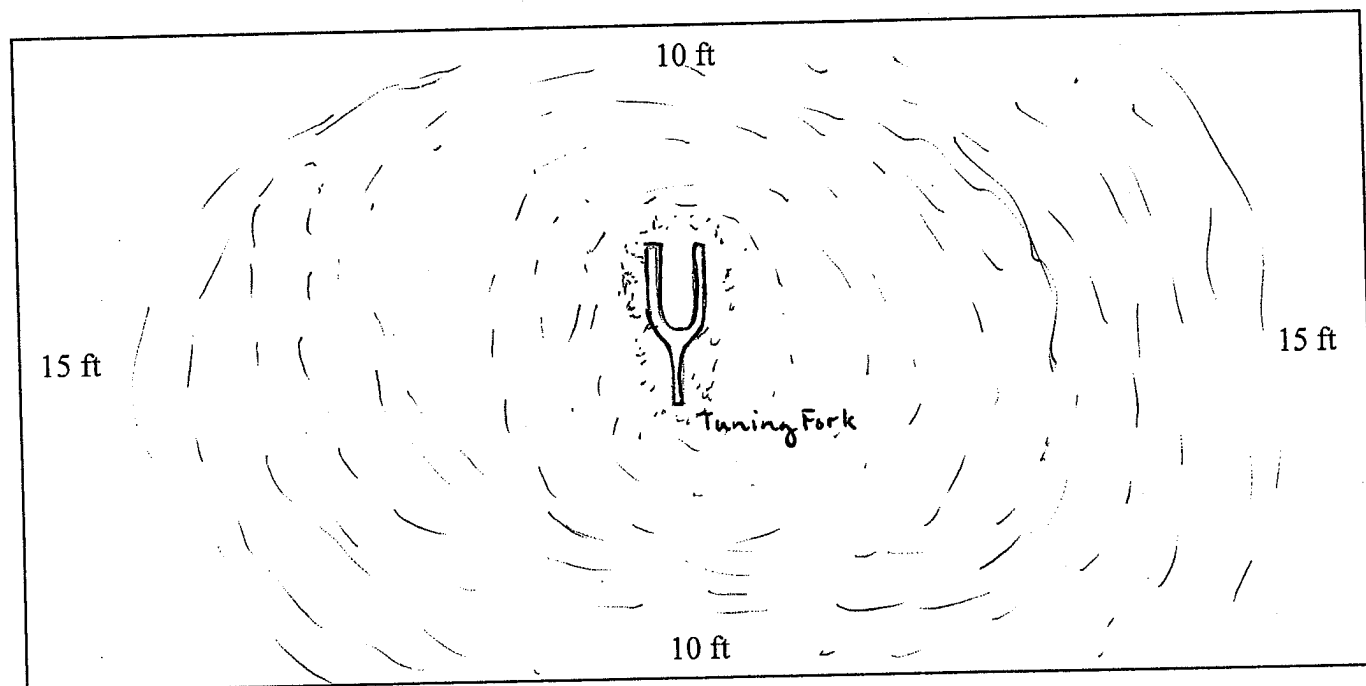
What is your evidence/example from this investigation that shows this?

The key stayed the same pitch.

Section V: Volume and Space

7. In the space below, show:

- How the air particles are arranged
- How the volume/loudness changes with distance (label where it is louder and quieter)



Section VI: Pitch and Space

8. If I were to ring a tuning fork with the pitch of C, would it sound the same if you were close as it would if you were 10 ft away?

It would sound the same but it is not going to sound like a ~~high~~ pitch C.

9. What is your evidence/example from this investigation that shows this?

Since the garage band. It showed how high or how low it was.

JOE & KEITH

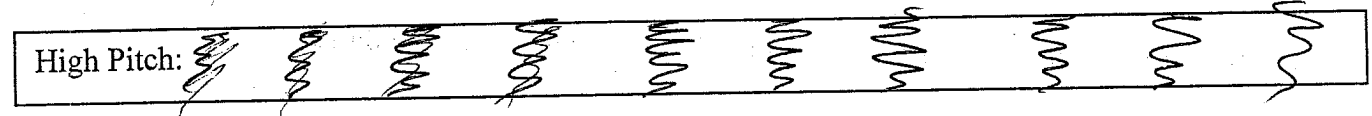
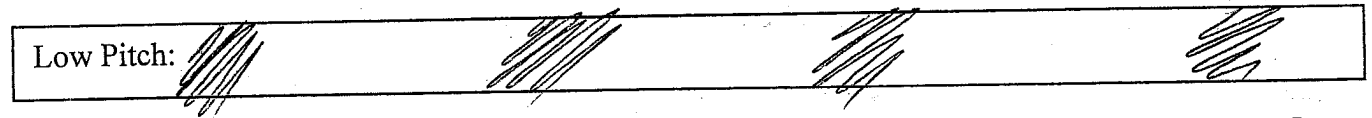
Data:

	Fork #1		Fork #2	
	Strength of Sound (high, med, low)	Key (shown in Tuner)	Strength of Sound (high, med, low)	Key (shown in Tuner)
Volume - loud	high	D	high	G
Volume - quiet	Medium	D A	low	C
Distance - close	High / D	D	high	G
Distance - far	low / A	A	Medium	G
Time - at beginning	High / D	D	high	G
Time - after 5 seconds	low / A	A	low	C/B

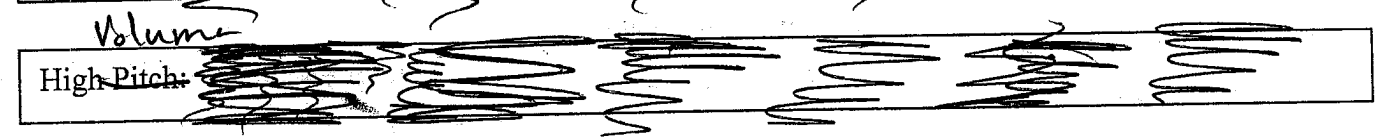
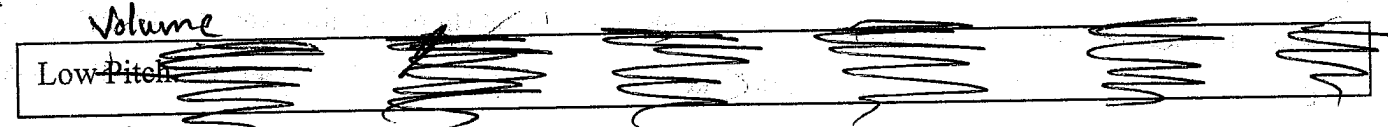
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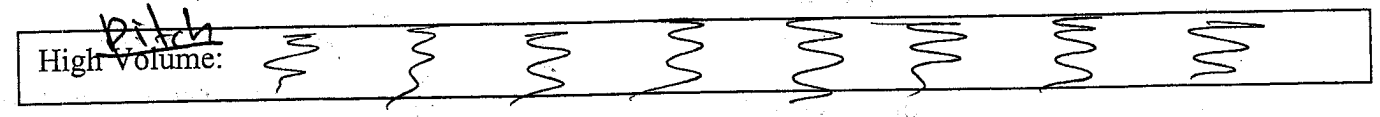
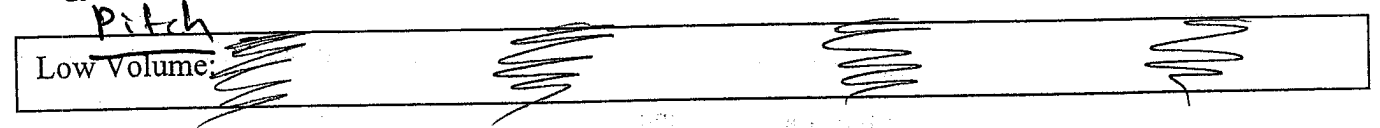


2. What would the sound energy look like if it were moving through air? (draw in boxes below)

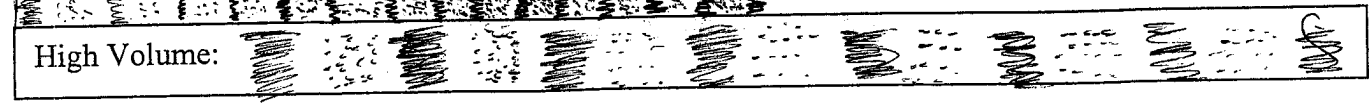
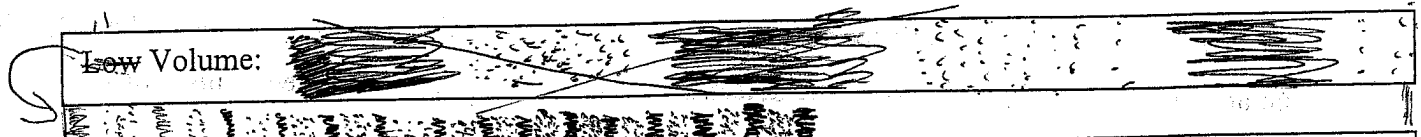


Section II: Volume

3. When you made the tuning fork ring loudly and when you rang it quietly, what would the sound energy look like if it was moving through a Slinkie? (draw in boxes below)



4. What would they look like if the sound energy were moving through a air? (draw in boxes below)



Investigating Pitch and Volume

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2. Repeat step 1, but this time ring the fork quietly and write the strength of the sound and the pitch/key detected by the computer in the row labeled "Volume - quiet".
3. Next strike the tuning fork, and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that the computer detects, this data goes in the row labeled "Distance-close"
4. Repeat step 3, ringing the fork the same as you did before, but now hold it one cubit away from the microphone and write the strength of the sound and pitch/key in the row labeled "Distance - far".
5. Now strike the tuning fork and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that is detected within the first couple of seconds of ringing the fork, write this data in the row labeled "Time - at beginning"
6. Repeat step 5, but this time wait for about 5 seconds after ringing the fork and write down the strength of sound and the pitch/key that the computer detects, this data goes in the row labeled "Time-after 5 seconds".
7. Now repeat steps 1-6 with a different tuning fork that you first tried.

Stop for Check-In: Check in with Mr. Coffey before answering the last questions.

Section III: Volume and Time

5. What happens to the volume of the tuning fork over time?

It decreases

Section IV: Pitch and Time

6. If a person were to strike a tuning fork with the pitch of C, would the pitch of the tone change over time?

No it would because the tuning fork would not ~~change~~ ^{change} would always have the same frequency

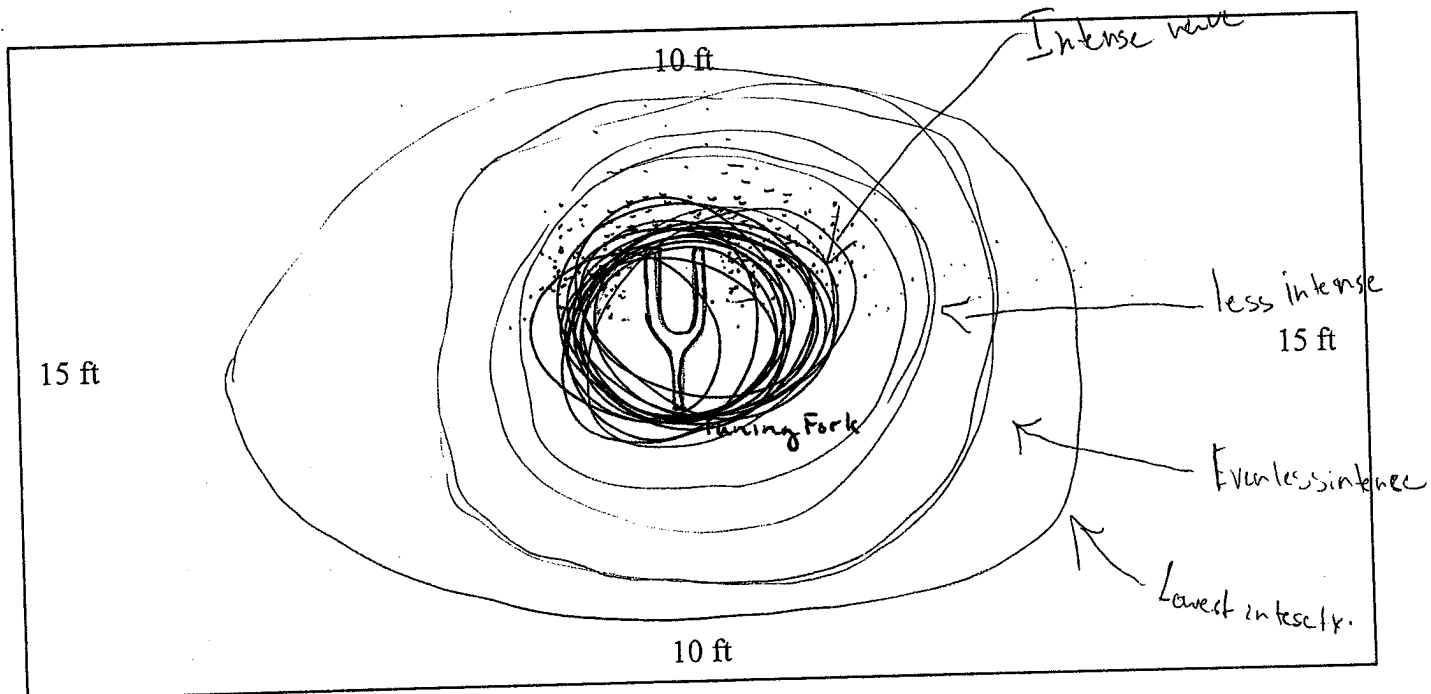
What is your evidence/example from this investigation that shows this?

Even though the sound of my ^{fork} is getting quieter it still has the same frequency when I rub it ~~off~~ on paper.

Section V: Volume and Space

7. In the space below, show:

- How the air particles are arranged
- How the volume/loudness changes with distance (label where it is louder and quieter)



Section VI: Pitch and Space

8. If I were to ring a tuning fork with the pitch of C, would it sound the same if you were close as it would if you were 10 ft away?

~~No~~ I would really change because it would just get louder, not higher

9. What is your evidence/example from this investigation that shows this?

When I hit a high pitch tuning fork soft it was pretty high, but when I hit harder the pitch never change.

Investigating Pitch and Volume

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2. Repeat step 1, but this time ring the fork quietly and write the strength of the sound and the pitch/key detected by the computer in the row labeled "Volume - quiet".
3. Next strike the tuning fork, and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that the computer detects, this data goes in the row labeled "Distance-close"
4. Repeat step 3, ringing the fork the same as you did before, but now hold it one cubit away from the microphone and write the strength of the sound and pitch/key in the row labeled "Distance - far".
5. Now strike the tuning fork and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that is detected within the first couple of seconds of ringing the fork, write this data in the row labeled "Time - at beginning"
6. Repeat step 5, but this time wait for about 5 seconds after ringing the fork and write down the strength of sound and the pitch/key that the computer detects, this data goes in the row labeled "Time-after 5 seconds".
7. Now repeat steps 1-6 with a different tuning fork that you first tried.

Data:


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Volume - loud	high med	G ⁺	high low	B ⁺
Volume - quiet	low	G	low	B ⁺
Distance - close	high	B ^b	high	B ⁺
Distance - far	med	B ⁺	low	G ^b
Time - at beginning	med to low	G ⁺ C	high	G ^b
Time - after 5 seconds	high to low	C to B ^b	high to low	G ^b to G ^b

Reflection Questions:

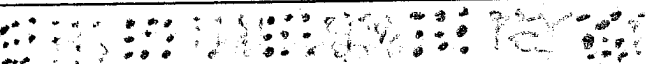
Section I: Pitch

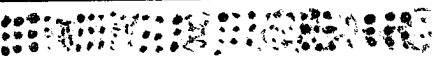
1. Thinking about your low and high pitch tuning fork, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)

Low Pitch:  far

High Pitch:  close

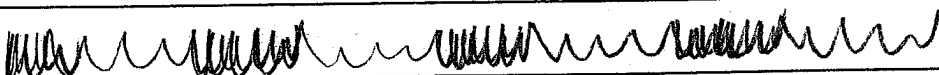
2. What would the sound energy look like if it were moving through air? (draw in boxes below)


Low Pitch: 

High Pitch: 


Section II: Volume


3. When you made the tuning fork ring loudly and when you rang it quietly, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)

Low Volume:  harder

High Volume: 

4. What would they look like if the sound energy were moving through a air? (draw in boxes below)

Low Volume:  far apart

High Volume: 

DANIEL

Stop for Check-In: Check in with Mr. Coffey before answering the last questions.

Section III: Volume and Time

5. What happens to the volume of the tuning fork over time?

It gets quieter and alot softer of a loud volume.

Section IV: Pitch and Time

6. If a person were to strike a tuning fork with the pitch of C, would the pitch of the tone change over time?

Yes, because the volume changes causing the tone to change.

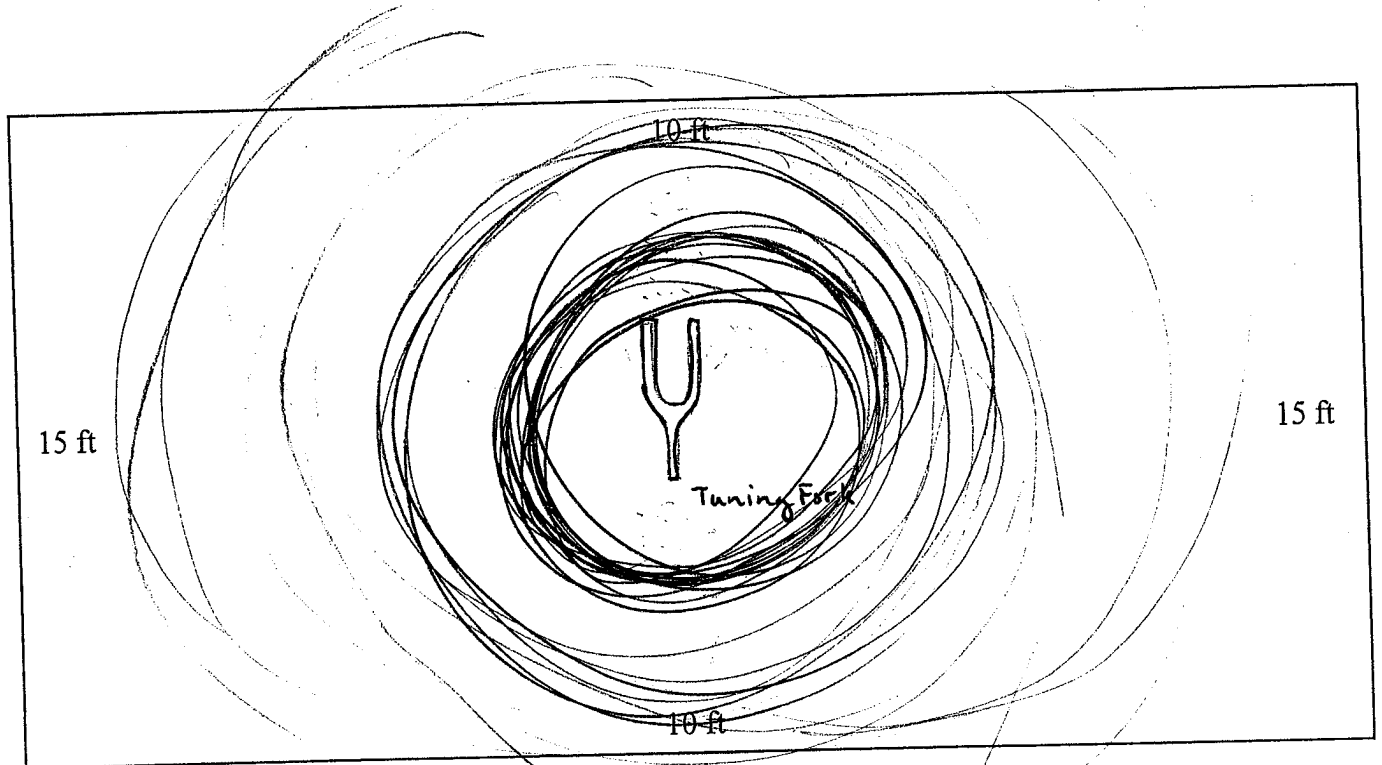
What is your evidence/example from this investigation that shows this?

The computer kept a note off of the fork and then suddenly caught a different note later on.

Section V: Volume and Space

7. In the space below, show:

- How the air particles are arranged
- How the volume/loudness changes with distance (label where it is louder and quieter)



Section VI: Pitch and Space

8. If I were to ring a tuning fork with the pitch of C, would it sound the same if you were close as it would if you were 10 ft away?

The pitch would probably stay the same.

9. What is your evidence/example from this investigation that shows this?

The Garage band shows that either close or far the pitch stays the same.

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4. Repeat step 3, ringing the fork the same as you did before, but now hold it one cubit away from the microphone and write the strength of the sound and pitch/key in the row labeled "Distance - far".
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6. Repeat step 5, but this time wait for about 5 seconds after ringing the fork and write down the strength of sound and the pitch/key that the computer detects, this data goes in the row labeled "Time-after 5 seconds".
7. Now repeat steps 1-6 with a different tuning fork that you first tried.

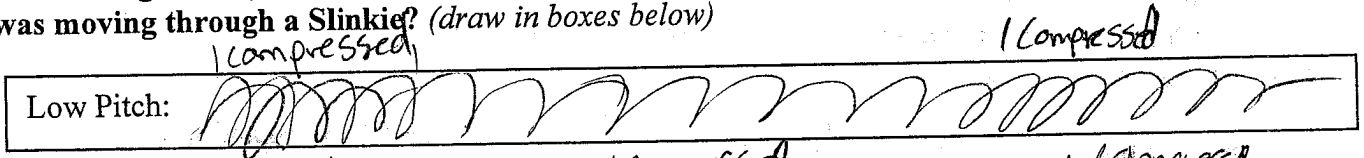
Data:

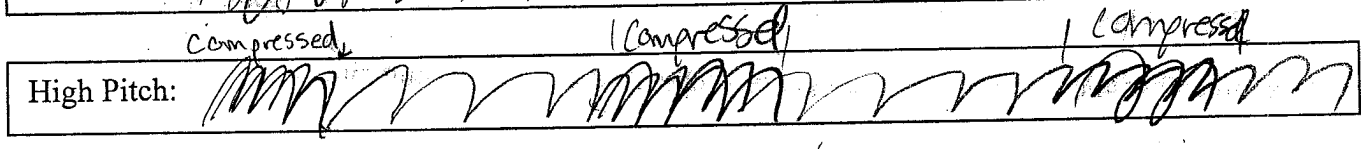
	Fork #1 B		Fork #2 C	
	Strength of Sound (high, med, low)	Key (shown in Tuner)	Strength of Sound (high, med, low)	Key (shown in Tuner)
Volume - loud	Medium	B	High	C
Volume - quiet	low	B	low	C
Distance-close	low	B	high	C
Distance-far	Medium	B	low	C
Time - at beginning	High	B	High	C
Time - after 5 seconds	Medium	B	low	C

Reflection Questions:

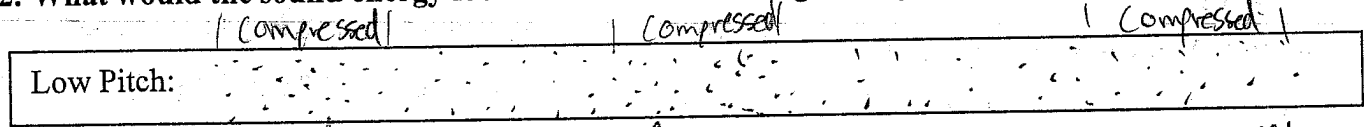
Section I: Pitch

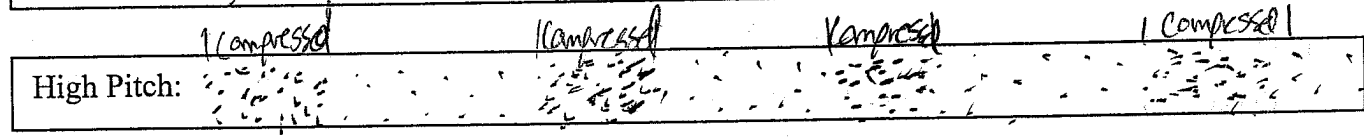
1. Thinking about your low and high pitch tuning fork, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)

Low Pitch: 

High Pitch: 

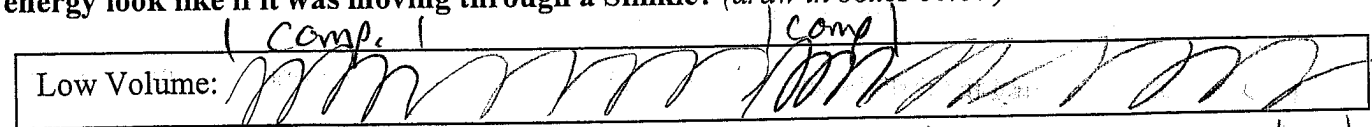
2. What would the sound energy look like if it were moving through air? (draw in boxes below)

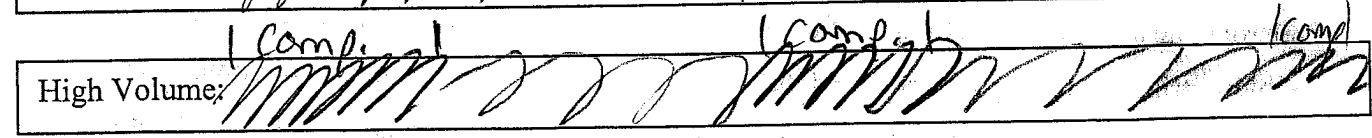
Low Pitch: 

High Pitch: 

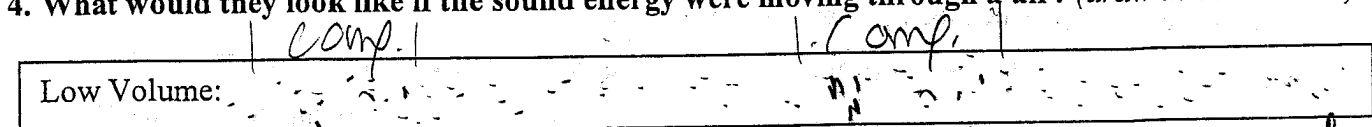
Section II: Volume

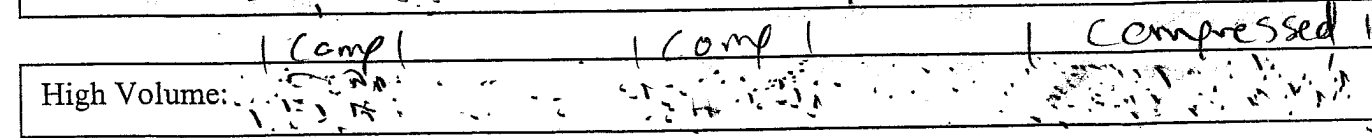
3. When you made the tuning fork ring loudly and when you rang it quietly, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)

Low Volume: 

High Volume: 

4. What would they look like if the sound energy were moving through a air? (draw in boxes below)

Low Volume: 

High Volume: 

SERENA

Stop for Check-In: Check in with Mr. Coffey before answering the last questions.

Section III: Volume and Time

5. What happens to the volume of the tuning fork over time?

It will fade away.

Section IV: Pitch and Time

6. If a person were to strike a tuning fork with the pitch of C, would the pitch of the tone change over time?

No it will stay the same

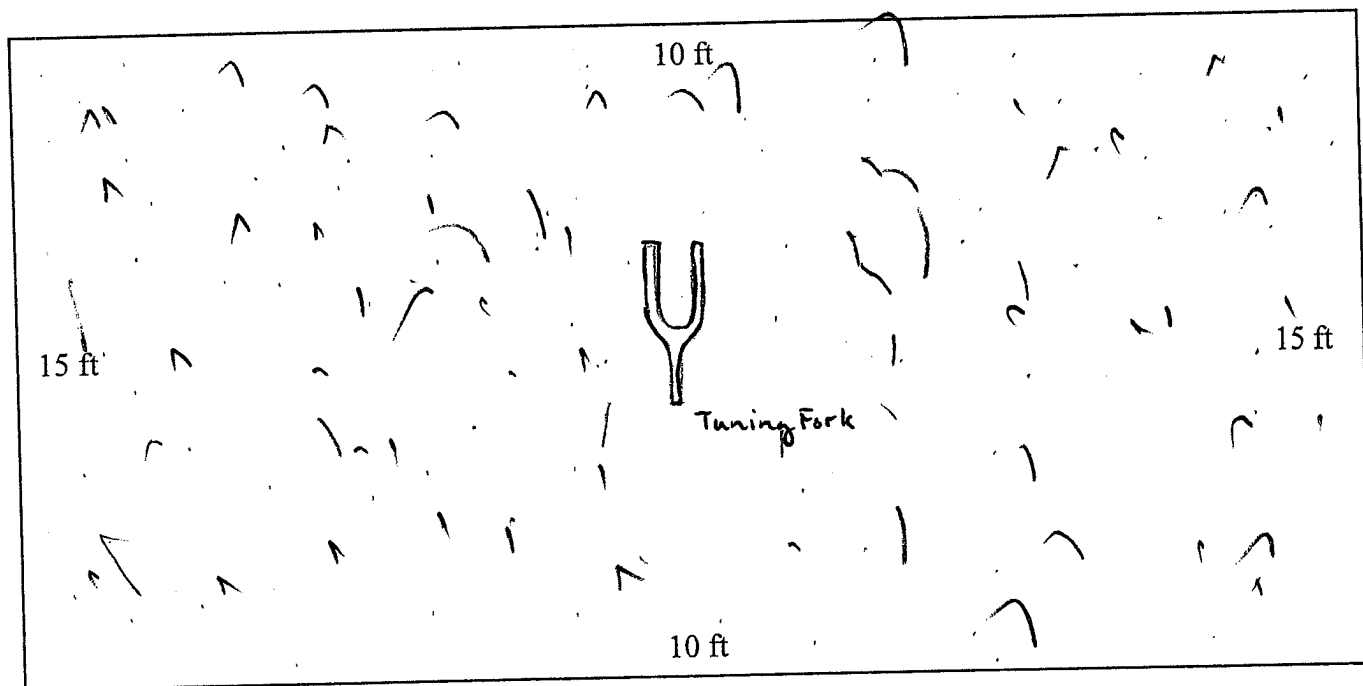
What is your evidence/example from this investigation that shows this?

The key stayed the same pitch

Section V: Volume and Space

7. In the space below, show:

- How the air particles are arranged
- How the volume/loudness changes with distance (label where it is louder and quieter)



Section VI: Pitch and Space

8. If I were to ring a tuning fork with the pitch of C, would it sound the same if you were close as it would if you were 10 ft away?

Yes it would just be a softer sound in the mic.

9. What is your evidence/example from this investigation that shows this?

In garage band we used a C.

Investigating Pitch and Volume

Purpose: You will use Garage Band® and your laptop as a tool to see how the pitch and volume of a tuning fork behave over the time and space that the tuning fork is sounding.

Directions:

To start *Garage Band*®:

1. Click on *Garage Band*® icon.
2. Select "Create New Music Project", leave settings as is and click "Create"
3. Once you are in *Garage Band*®, close out of "Grand Piano" instrument
4. Go to "Track" menu, choose "New Track"
4. Now select "Real Instrument Track", then click "Create"
5. On right hand side of screen in "Track Info" section, select "Basic Track" as the instrument
6. Go to "Control" menu and deselect "Metronome" and select "Show Tuner in LCD"
7. Now to measure/record, click the red circle button.

*If Tuner disappears from LCD display, you must go back to the "Control" menu and select it again

Now, to collect the data for this investigation, you will use the following directions:

1. After pressing the "Record" button, ring the tuning fork once loudly, and hold the tuning fork one hand width from the microphone, write down the strength of the sound (high, medium and low strength) shown in the "Track Information" display and the pitch (key) that appears in the "LCD Tuner" display, this data goes in the row labeled "Volume- loud" row of the data table.
2. Repeat step 1, but this time ring the fork quietly and write the strength of the sound and the pitch/key detected by the computer in the row labeled "Volume - quiet".
3. Next strike the tuning fork, and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that the computer detects, this data goes in the row labeled "Distance-close"
4. Repeat step 3, ringing the fork the same as you did before, but now hold it one cubit away from the microphone and write the strength of the sound and pitch/key in the row labeled "Distance - far".
5. Now strike the tuning fork and hold the tuning fork 1 hand width from the microphone and write the strength of the sound and the pitch/key that is detected within the first couple of seconds of ringing the fork, write this data in the row labeled "Time - at beginning"
6. Repeat step 5, but this time wait for about 5 seconds after ringing the fork and write down the strength of sound and the pitch/key that the computer detects, this data goes in the row labeled "Time-after 5 seconds".
7. Now repeat steps 1-6 with a different tuning fork that you first tried.

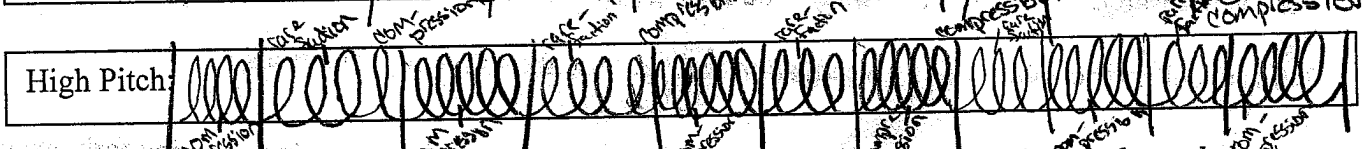
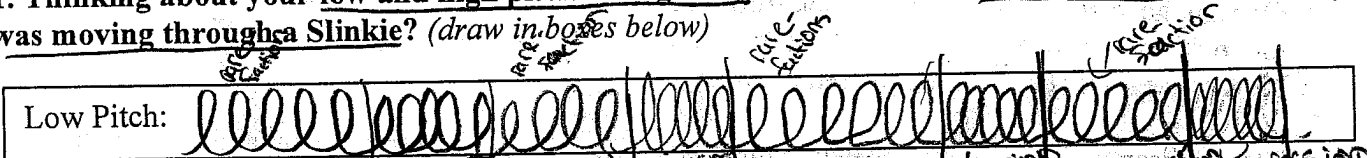
Data:

	Fork #1 B^b		Fork #2 C	
	Strength of Sound (high, med, low)	Key (shown in Tuner)	Strength of Sound (high, med, low)	Key (shown in Tuner)
Volume - loud	High	B^b	High	C
Volume - quiet	Low	B^b	Medium	C
Distance-close	Medium	B^b	High	C
Distance-far	Low	B^b	Low	C
Time - at beginning	High	B^b	High	C
Time - after 5 seconds	Low	B^b	Low	C

Reflection Questions:

Section I: Pitch

1. Thinking about your low and high pitch tuning fork, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)

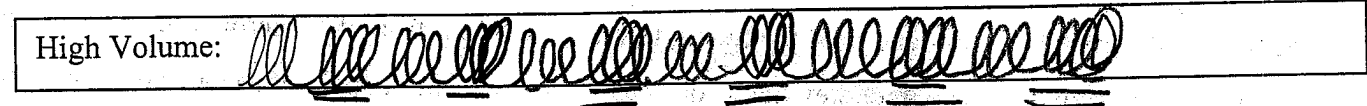
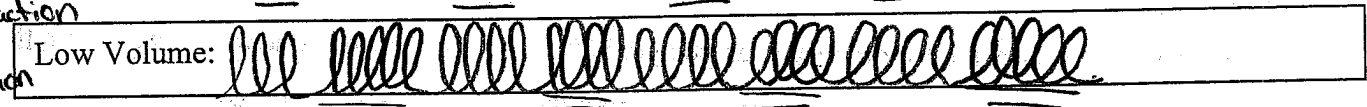


2. What would the sound energy look like if it were moving through air? (draw in boxes below)

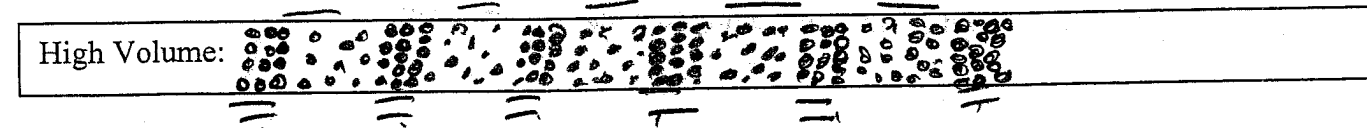


Section II: Volume

3. When you made the tuning fork ring loudly and when you rang it quietly, what would the sound energy look like if it was moving through a Slinky? (draw in boxes below)



4. What would they look like if the sound energy were moving through air? (draw in boxes below)



Stop for Check-In: Check in with Mr. Coffey before answering the last questions.

Section III: Volume and Time

5. What happens to the volume of the tuning fork over time?

The volume of the tuning fork decreases over time. An example of this would be when you are doing the last part of the experiment you look at it at the beginning and after 5 seconds and you notice that the strength has reduced.

Section IV: Pitch and Time

6. If a person were to strike a tuning fork with the pitch of C, would the pitch of the tone change over time?

No, the pitch of the tuning fork would not change over time.

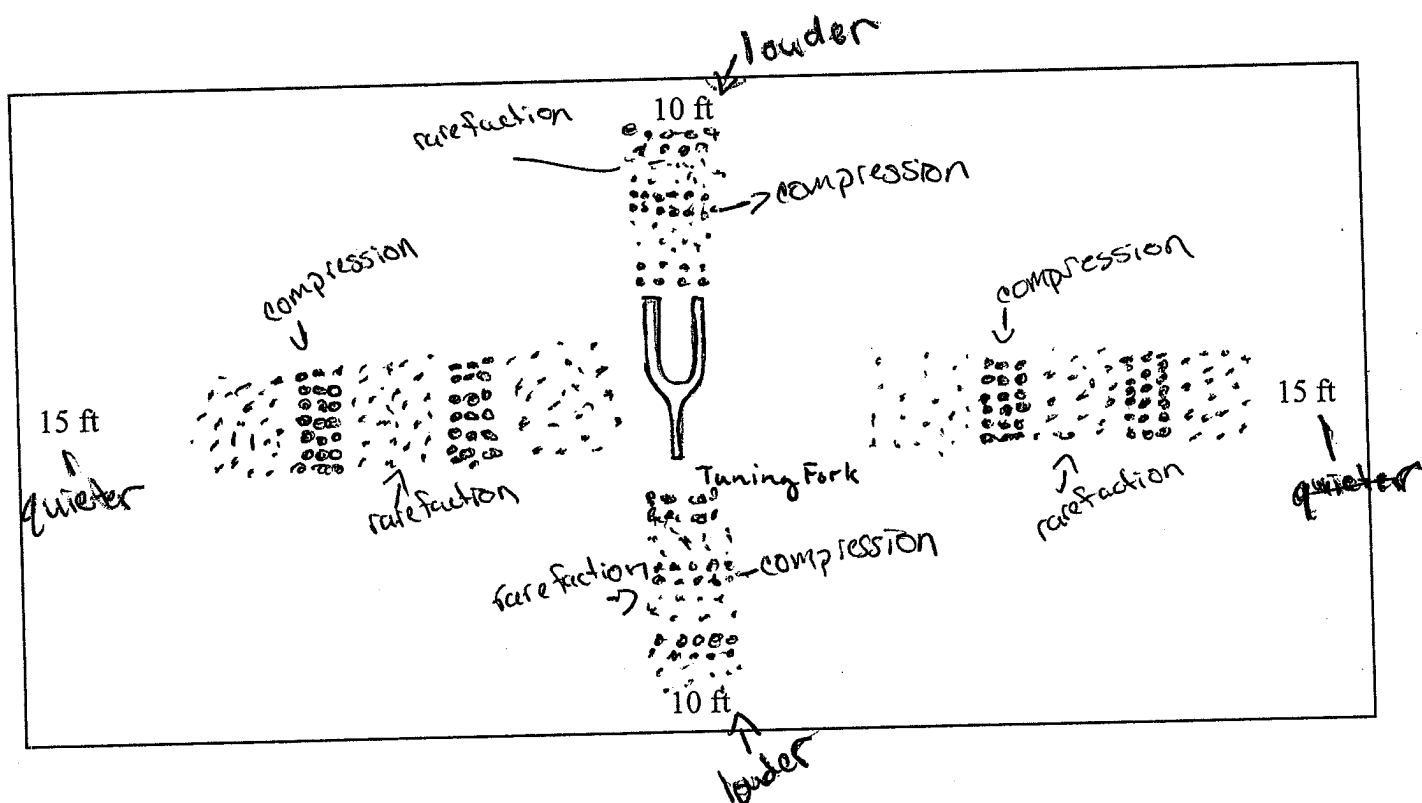
What is your evidence/example from this investigation that shows this?

If you look at the chart the volume of the pitch changes but the sound of the pitch itself does not.

Section V: Volume and Space

7. In the space below, show:

- How the air particles are arranged
- How the volume/loudness changes with distance (label where it is louder and quieter)



Section VI: Pitch and Space

8. If I were to ring a tuning fork with the pitch of C, would it sound the same if you were close as it would if you were 10 ft away?

Yes, the pitch would stay the same no matter where the tuning fork was.

9. What is your evidence/example from this investigation that shows this?

If you look at the chart the "Distance-close" and "Distance-far" are in the same key. I used the tuner at both distances to make sure it was the same key.