

WOOD BUFFALO REGIONAL SCIENCE FAIR

Science Fair Project Logbook

Name(s): Ms. Barrington

School: Timberlea Public School

Grade: Grade 5

Project Title: Hearing and Sound

Brainstorming Possible Topics

What? Why? How?

What: Recent research has suggested that the left ear and the right ear process sound differently. During experiments, it seems that our left ears are better able to detect musical sounds while our right ears are better able to detect speech.

Why: This can be explained in the following way. Our right ear sends information to the left side of our brain and our left ear sends information to the right side of our brain.

How: Our left and right brains process sound information differently, so that is why our ears are better at detecting different types of sound.

Question

The question I am trying to answer is: (be specific)

Can individuals recognize and repeat the musical notes that they hear more accurately using both of their ears, their left ear, or their right ear?

Background Research

Collect information about your topic from books, magazines, TV programs, the Internet (with supervision), people and companies. Keep a record about where you gathered your information for your bibliography.

I will research information from these books, magazine or the Internet:

I could use www.wbrsf.ca to find ideas for my project, and to get more information about the Regional Science Fair.

I will talk to these people:

I could ask my teacher or Ms. Barrington for help if I am having trouble understanding my project or this logbook.

I will visit these places:

I could visit the school or the public library to help me to research my project.

My Research

Source: "Left ear vs. right ear" -
<http://soundmedicine.iu.edu/segment/939/Left-Ear-vs--Right-Ear>

What I learned:

This is where I got the information about my what, why, and how (see brainstorming above).

Source: "Music to my Ears" -
http://www.all-science-fair-projects.com/project1170_143_1.html

What I learned:

This is where I got the information to create this exemplar for student use, including my data, graphs, etc.

Source:

What I learned:

Source:

What I learned:

Source:

What I learned:

Hypothesis

Try to answer your question based on what you know about your topic.

This is what I think will happen (If..., then...):

If you are using only your left ear, then you will be able to recognize the music notes better because your left ear is better at detecting musical sounds.

Variables:

Manipulated	Responding	Controlled
Whether we are using the left ear, the right ear, or both ears.	The number of correct notes each person recognizes.	The number of notes tested, the music used, the volume of the music.



Have you read over the safety and ethics forms from the Wood Buffalo Regional Science Fair to make sure your project is SAFE?

Yes, I believe my project is safe.

Are you interviewing human subjects?

Will you be using organisms?

Were you planning on having test subjects?

I am going to test on subjects. I need to read the guidelines and complete the application. I need to get approval before continuing.

Procedure:

List the steps needed to do your experiment. Be very descriptive.

This is how I will conduct my experiment:

1.	Choose ten people to take part in this experiment, and get them to sign the consent form.
2.	Number the keys on the keyboard with the white labels and the marker. Write down which key goes with which note on the CD in my logbook, but don't show the people I am testing.
3.	Get the person in my experiment to wear an earplug in their right ear. Play them the 10 musical notes recorded on the CD. They should only be able to listen to the music using their left ear. After each note is played, ask them to pick the key on the keyboard that matches the musical note that I just played. Write down the total number of correct keys that each person got.
4.	Repeat step 4, but have the person listen to the CD with the earplug in their left ear, and then with no earplugs in so that they can hear out of both ears. Write my results in my table (below).
5.	
6.	
7.	
8.	
9.	
10.	

Materials

List everything that you will need to do your experiment. Be very precise about everything, especially what you are measuring, such as time, distance and amount of ingredients used.

These are the materials I need to use in my experiment:

- A CD player
- A CD containing recordings of random musical notes
- A musical keyboard, organ, or piano
- A pair of earphones
- 1 sheet of small white labels
- 1 black marker
- 5 pairs of earplugs

Data Collection

What numbers will be collected?

How will I keep track of the data?

What will the chart/table look like?

What do I need to organize before I get started?

How many times am I conducting each trial? (Minimum of 5)

SAMPLE

Manipulated Variable	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average

Date	Activity	Outcome/Observation
Feb. 21	Experiment Person #1	Left ear – 7 right Right ear – 6 right Both ears – 4 right
	Experiment Person #2	Left ear – 10 right Right ear – 10 right Both ears – 10 right
	Experiment Person #3	Left ear – 4 right Right ear – 3 right Both ears – 2 right
	Experiment Person #4	Left ear – 8 right Right ear – 6 right Both ears – 5 right
	Experiment Person #5	Left ear – 10 right Right ear – 10 right Both ears – 10 right
	Experiment Person #6	Left ear – 9 right Right ear – 8 right Both ears – 6 right
	Experiment Person #7	Left ear – 6 right Right ear – 4 right Both ears – 3 right
	Experiment Person #8	Left ear – 10 right Right ear – 10 right Both ears – 10 right
	Experiment Person #9	Left ear – 7 right Right ear – 6 right Both ears – 6 right
	Experiment Person #10	Left ear – 8 right Right ear – 7 right Both ears – 5 right

Data Analysis

Record what happened in your experiment. Be very descriptive. Use charts, graphs, tables and/or pictures to explain what happened.

This is what happened during my testing:

The results are about what I was expecting, most people were better at using their left ears only. It was interesting to me that 3 people were able to get all 10 notes right using their left, right, and both of their ears!

These are the problems that I encountered during my testing:

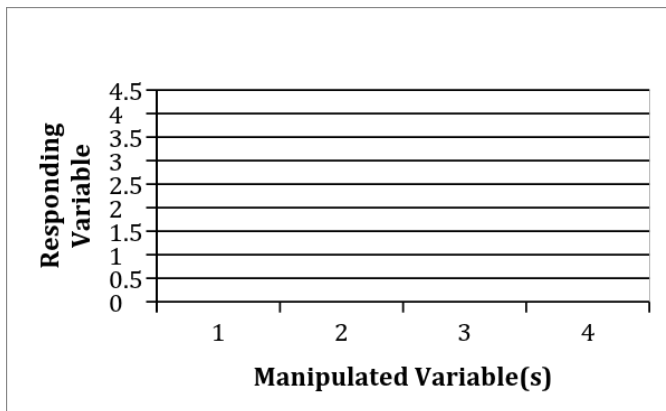
Some of my volunteers had never played a keyboard/piano before. They had to test out all the keys and forgot what sound they heard on the CD while they were testing.

These are the changes in my original plan that I had to make:

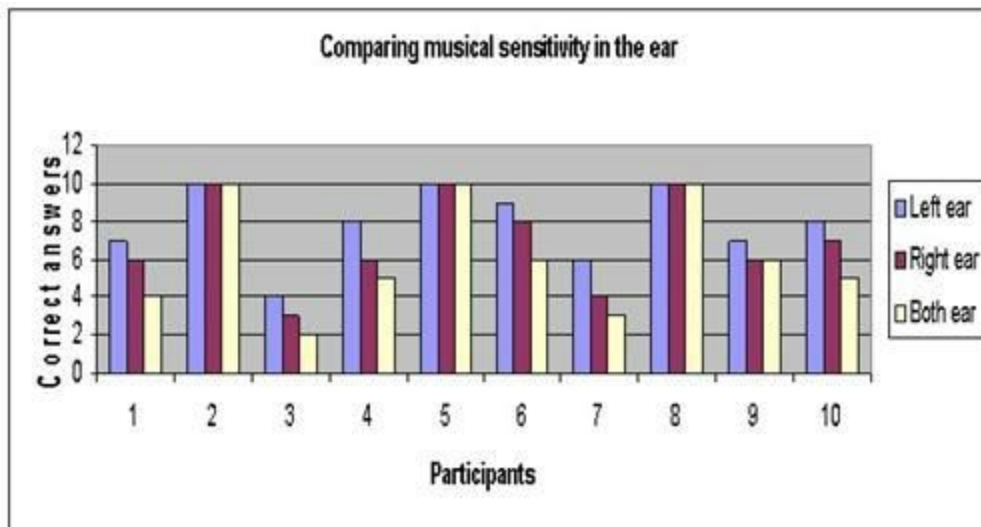
I had to play each sound more than once for the volunteers, but I made sure each volunteer still only heard each sound the same number of times (3).

These are my final results:

SAMPLE



My results:



Conclusion

Remember your experiment is still successful even if you did not prove your hypothesis!

My research did or did not support my hypothesis (Why or why not?)

My hypothesis that they would recognize the notes better when using only their left ears was true.

Analysis	
Mean	Left Ear - $7+10+4+8+10+9+6+10+7+8 = 79 / 10 = 7.9$ Right Ear - $6+10+3+6+10+8+4+10+6+7 = 70 / 10 = 7$ Both Ears - $4+10+2+5+10+6+3+10+6+5 = 61 / 10 = 6.1$
Median	Left Ear - 4, 6, 7, 7, 8, 8, 9, 10, 10, 10 middle # is 8 Right Ear - 3, 4, 6, 6, 6, 7, 8, 10, 10, 10 middle # is 6.5 Both Ears - 2, 3, 4, 5, 5, 6, 6, 10, 10, 10 middle # is 5.5
Mode	Left Ear - 10 is most common Right Ear - 6 and 10 are most common Both Ears - 10 is most common
Range	Left Ear: 4-10 Right Ear: 3-10 Both Ears: 2-10
Outliers	There isn't a number that is much smaller or larger than the others
Trends	If the person got all 10 correct with their left ear, they also got all 10 correct with their right ear or using both ears.

These are the conclusions I obtained from my experiment:

I think that this proves that research is right. Our left ears and our right ears do interpret sounds differently, and the left ear seems to be able to hear musical sounds better than the right ear.

My research is important to society because:

Knowing that our left ears can hear musical sounds better while our right ears can hear human speech better might be important for speech and hearing rehabilitation. Doctors could use this information to improve speech and hearing in children born with hearing disabilities. It might also help people suffering from hearing loss.

This is what I would change if I did my experiment again:

Next time I would conduct multiple trials for each of my volunteers, to further substantiate my research.

This is what I recommend for future or different experiments:

Next time I could compare whether boys or girls have a better ability to hear musical notes, or I could test people who are different ages.

ACTIVITY LOG PAGES

Date: February 21st	Time: 10:00 am - 12:00 pm	Location: My house
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Today I worked on:	My experiment
Something I noticed or wondered about today:	If boys or girls are better at detecting musical notes
I am pleased with:	My results matched my research
My work ethic today:	I was focused. I stayed on task
Where I need to go from here:	I need to assembly my display
Message to my science teacher:	I need help creating my display board. Is the information supposed to go anyway in particular?

Date	Time	Location
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Today I worked on:	
Something I noticed or wondered about today:	
I am pleased with:	
My work ethic today:	
Where I need to go from here:	
Message to my science teacher:	

Date	Time	Location
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Today I worked on:	
Something I noticed or wondered about today:	
I am pleased with:	
My work ethic today:	
Where I need to go from here:	
Message to my science teacher:	

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