How does the amount of PSI inside a bottle determine how many decibels it explodes at?

Name: Monish Krishnakumar Date: 5/28/20

Introduction: Today I will be conducting 5 tests to see how the amount of PSI inside a bottle determines how many decibels it explodes at. I will increase the pressure every test and record the decibels after every explosion.

Prediction: The more PSI inside the bottle, the louder it explodes. This works because all of the air is trapped inside the bottle in a very cramped space. This is known as pressure. When some projectile hits the bottle at a very high velocity it makes a small hole in the bottle. The air inside the bottle is not at a low pressure. Since the pressure is high, all of the air is trying to escape the bottle at the same time using the same hole. The hole will expand and the bottle will explode in an instant. All of this happens in a matter of milliseconds. If there is more pressure inside the bottle, it means that more air is trying to escape at the same time, meaning the hole expands faster and the bottle explodes with a louder sound.

Materials:

- 5 plastic water bottles
- Schrader valve
- Bicycle pump
- Pressure gauge (PSI)
- Drill
- 5/16 drill bit
- Decibel meter

Procedure:

- Drill a 5/16 hole in the middle of the bottle cap
- Insert the Schrader valve into the bottle cap
- Screw cap onto the bottle
- Attach bicycle pump to Schrader valve
- Pump up the bottle until pressure gauge reads around 40-60 PSI
- Place bottle in a safe spot (gravel or dirt preferred)

- Place decibel meter next to the bottle
- Throw a rock or use a slingshot to hit the bottle at a high speed
- Read the decibel meter and record
- Repeat the process 4 more times

Trial number	PSI Inserted	Decibels (After explosion)
1	40	94.5
2	45	117.3
3	50	150.4
4	55	107.1
5	60	200.4

Conclusion: Through my testing procedure, my experiment proved that the more PSI inside a bottle the more decibels it explodes at. Every time I went up some PSI it showed a higher decibel after explosion. The bottles that did explode, always maintained the principle of the more PSI the higher the sound. So, my prediction was correct.