



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Benny Siam; Benjamin Zdasiuk	Project Number J2216
Project Title How Does Sound Affect Goldfish Feeding Habits?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To find how underwater sound affects fish feeding habits. Our hypotheses were for the single frequency sound tests, we thought that the higher frequency sounds would affect the fish more than the lower frequency sounds because the former seem to be more irritating to the human ear. For the swept frequency tests our hypothesis was similar; the higher frequencies would have a greater effect than the lower. For the real world sound tests we thought that the motorboat sound would affect them the most because it is the least natural.</p> <p>Methods/Materials The materials for this project were a fully-equipped household aquarium, four goldfish, a Daravoc™ Underwater Speaker, a LG Sweep/Function Signal Generator, a Tektronix Oscilloscope to check signal generator and attenuator, an iPod to play real world sounds, a Realistic® sound level meter, an a stereo 20W amplifier. The sound source was a signal generator or an iPod. We measured the time it took for the fish to start eating after the food was released into the tank. We ran three different types of tests: single frequency tests, swept frequency (chirp) tests, and real world sound tests. Single frequency tests used frequencies of 250, 500, 1000, and 2000 Hz. Chirp tests used 500, 1000, and 2000 Hz lowest frequencies, and real world sound tests used sounds of a pond, a motorboat, and rain.</p> <p>Results We found that certain single frequency sounds, chirps, and real world sounds slow down fish's feeding. 500 Hz had the longest of the single frequency sound delays with a total of 11.5 seconds, then came 2000 Hz, then 1000 Hz, and lastly 250 Hz with a time shorter than the control. For swept frequencies the frequency that seemed to affect the fish the most was the frequency chirp that was in between the others. This frequency was between 1000 to 2000 Hz. In our real world sound tests the rain sound affected the fish the most.</p> <p>Conclusions/Discussion During the frequency tests we made some interesting observations. We noticed that the fish's feeding delay shortened over time and repeated tests; therefore we controlled for this effect. This led us to believe that the fish had learned to associate sound with feeding. For our real world sound tests the rain affected the fish the most, probably because it was a strange and different sound to the fish. We thought that the motor boat sound was going to affect them the most but ended up being close to the sound of aquarium pumps.</p>	
Summary Statement We tested how various sounds affected how fish fed by measuring feeding delay.	
Help Received Parents helped with experimental set-up, write-up, and board design.	