Tuning Forks

The tines of a tuning fork oscillate at a very precise frequency. That's why musicians use them to tune instruments.

Materials: tuning forks, 400 mL beaker, stopwatch, strobe light (optional)

Procedure:

1. Strike the tuning fork with a rubber mallet or the heel of your shoe. Does it appear to move?
2. You must watch very ***closely*** to see these results. Fill the beaker with water, strike the tuning fork, and immerse the tip of these tines just below the surface of the water. What do you observe?
3. Touch the base of the tuning fork to the bone behind your ear.
    a. What do you observe?
    b. Repeat touching the end of the tines to your nose. What do you observe?
    c. Do the ends of the tines move? Why?
    d. What happens to the air next to the tines as they oscillate?
4. Obtain a low and high frequency tuning fork. Strike the tuning forks and see how long each of them vibrates.
    a. Which one vibrates longer? Explain why that is.
    b. Repeat placing the handle against the top of the lab bench.
        i. What happens to the amplitude or loudness? Explain why that is.
        ii. What happens to the length of time each vibrated? Explain why that is.
5. Imagine repeating each of these in outer space. What would happen and why?
6. *Optional:* Obtain a low and high frequency tuning fork. Turn on the strobe light and illuminate the tuning fork. Adjust the frequency of the strobe light so that the tines appear to be stationary.
    a. Why does this occur?
    b. What is the difference in frequency of the strobe for the two tuning forks?
    c. How does this relate to the frequency of the forks?
    d. Which tuning fork has a higher frequency, the short of long one? Explain why that is.