1. Explain how you could tune a bottle to play the note F above middle C on a piano (F_4 in the table preceding Exercise 10 in Lesson 13.2).

2. A group wanted to use a bottle to produce a tone with a frequency of 300 Hz. They collected data from a CBL and used the TRACE feature of a calculator to find the two sets of coordinates shown below.

MICROPHONE   P1
TIME(S)
X=.00919999   Y=2.81525

MICROPHONE   P1
TIME(S)
X=.0128   .   Y=2.81525
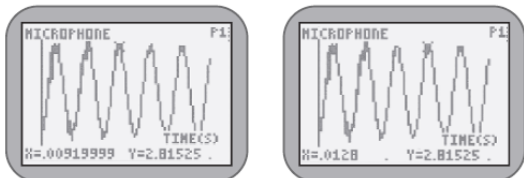
Should they add or remove water to get closer to the desired frequency?

3. Another group wanted to use a bottle to produce a tone with a frequency of 400 Hz. They collected data from a CBL and used the TRACE feature of a calculator to find the two sets of coordinates shown below.

MICROPHONE   P1
TIME(S)
X=.00879999   Y=2.81525

MICROPHONE   P1
TIME(S)
X=.0106   .   Y=2.81525
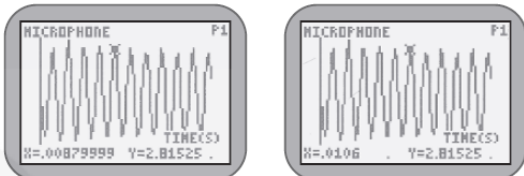
Should they add or remove water to get closer to the desired frequency?

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① Put some water in a bottle. Use a CBL to measure the wave pattern as you blow across the bottle. Find the frequency of the wave by measuring the period and computing the reciprocal of the period. If the frequency is less than 349 gradually add more water until the frequency is produced.

② Period = .0128 − .0092

Period = .0036 sec

Frequency = $\frac{1}{.0036}$

Frequency = 278 Hz

Since the frequency is smaller than their desired amount, they should add a little water to get closer to the desired frequency.

③ Period = .0106 − .0088

Period = .0018 sec

Frequency = $\frac{1}{.0018}$

Frequency = 556 Hz

Since the frequency is greater than the desired amount, they should remove water to get closer to the desired frequency.