

Sound Lab

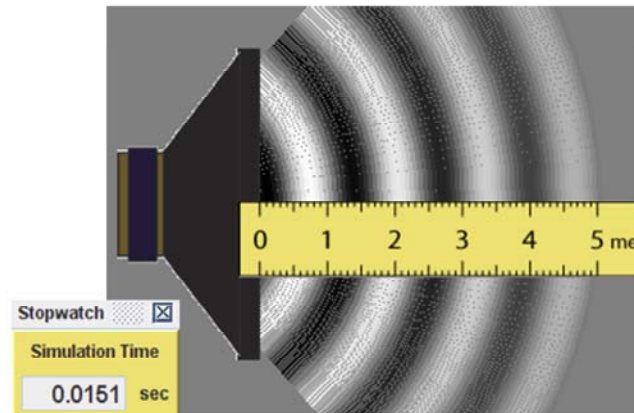
Learning Goals: Students will be able to

- **Explain how different sounds are modeled, described, and produced.**

Design ways to determine the speed, frequency, period and wavelength of a sound wave model.

1. A student started the speaker by clicking on the stopwatch. How many sound waves are there in this trial?

- A. 3
- B. 5
- C. 4
- D. 8



A. Because there are 3 dark areas

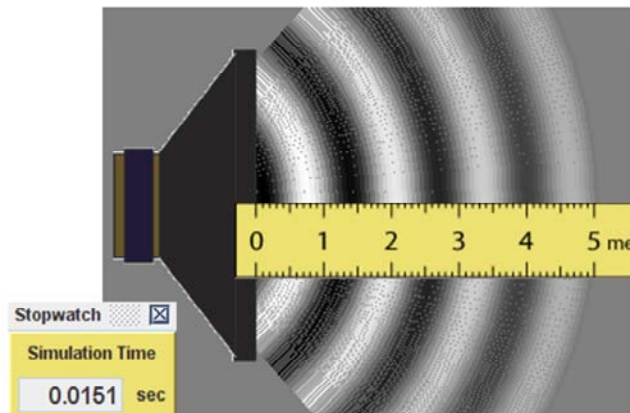
B. A lot of students confuse the ruler reading with other things

C is correct. Although you may get some argument about more exact numbers. I used 4 for all the following questions about this trial.

D. I count 8 light and dark areas total

2. What is the speed of the sound waves shown here?

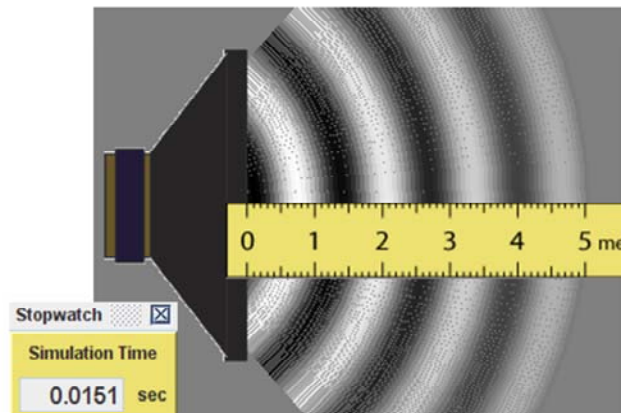
- A. 300 m/s
- B. 330 m/s
- C. 0.0030 m/s
- D. 66 m/s



- A. This is the number that our text uses for speed of sound in all problems
- B. The correct answer is $5/0.0151=331$**
- C. This is $.0151/5$
- D. This is $1/0.0151$

3. What is the frequency of the sound waves shown here?

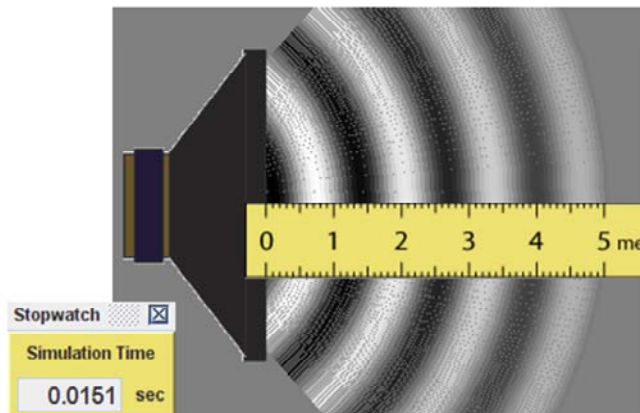
- A. 0.0037 hz
- B. 66 hz
- C. 260 hz
- D. 300 hz
- E. 330 hz



- A. This is $.0151/4$ waves
- B. This is $1/.0151$
- C. This is correct, $4/.0151=260$. The sim actually said 228 but I count 4 waves**
- D. This is the number that our text uses for speed of sound in all problems
- E. 330 is speed

4. What is the period of the sound waves shown here?

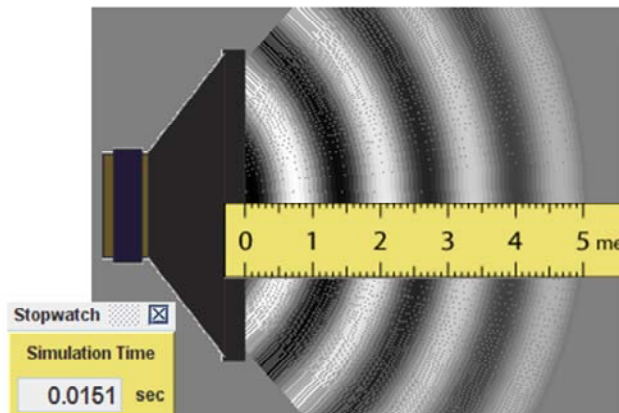
- A. 0.0151 s
- B. 0.0037 s
- C. 260 s
- D. 300 s
- E. 330 s



- A. This is $.0151/4$ waves
- B. This is $1/.0151$
- C. This is correct, $4/.0151=260$. The sim actually said 228 but I count 4 waves**
- D. This is the number that our text uses for speed of sound in all problems
- E. 330 is speed

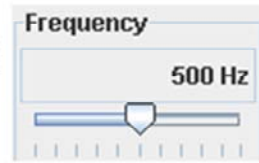
5. What is the wavelength of the sound waves shown here?

- A. 5 m
- B. 1.3 m
- C. 1 m
- D. 0.71 m
- E. 300 m



- A. The distance of first wavefront
- B. This is correct: $5/4$
- C. $5/5$ incase can't count waves
- D. $5/7$ count dark and light areas
- E. This is the number that our text uses for speed of sound in all problems

6. If your lab partner moved the frequency slider to the left so that it changed from 500 to 250, the period would be...



- A. twice as big
- B. 1/2 as big
- C. Stays the same
- D. 1/4 times as big
- E. Not enough information to decide

A.

Adapted From Pollock at CU 1240 course

7. If you moved the slider to the far right, doubling the amplitude, the period would be...

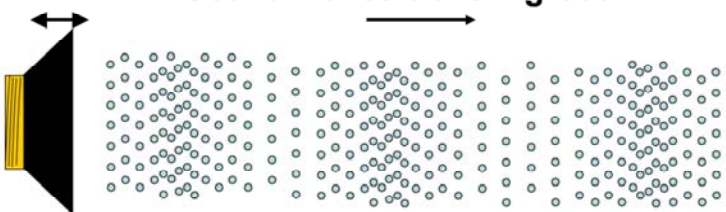


- A. twice as big
- B. $1/2$ as big
- C. Stays the same
- D. $1/4$ times as big
- E. Not enough information to decide

C they are independent

From Pollock:

Sound waves traveling out



8. If the speaker vibrates back and forth at 200 Hz how much time passes between each time it produces a maximum in pressure?

- a. 0.2 seconds
- b. 0.200 seconds
- c. 0.005 seconds
- d. 0.02 seconds
- e. 0.05 seconds

From Pollock at CU 1240 course

Answer is c. 0.005 seconds.

Period = 1 second/ 200 cycles

= 0.005 seconds/cycle

His notes follow:

I skipped this one.

Kathy and Carl got...

A:1

B:0

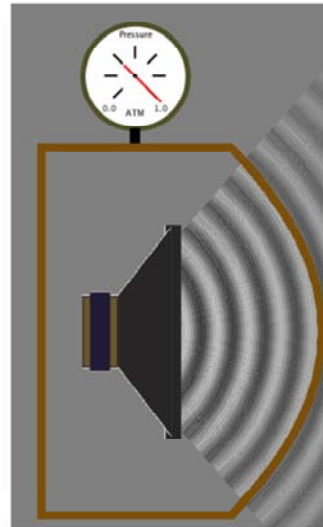
C:78

D:20

E:2

9. A speaker is playing a constant note. What happens to the sound when you
1) put a solid, thick glass jar over it and
2) pump the air out from the jar.

- A) 1 => hardly any difference
2 => hardly any difference
- B) 1 => hardly any difference
2 => much quieter
- C) 1 => noticeably quieter
2 => hardly any MORE quiet
- D) 1 => noticeably quieter
2 => much quieter still (near silence)
- E) None of these/something else/??



D.

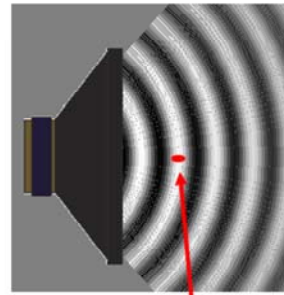
I would show just the question before clicking to show the answers

Adapted from From Pollock at CU 1240 course





His notes follow:

86% correct. (I think B should be ok too, how could they know if glass makes noticeable diff or not?)

10. If you could put a dust particle in front of the speaker, which choice below would show the *motion* of the dust particle?



dust

- A)  (up and down)
- B)  (steadily to the right)
- C)  (left and right)
- D) (no motion)
- E)  (circular path)

C

Adapted From Pollock at CU 1240 course

His notes follow:

62% correct. It's a subtle question for them! Good discussion starter?