

Sound Waves Review

MCAS Questions

Intro to Physics

Mr. Cusack

What you are expected to know:

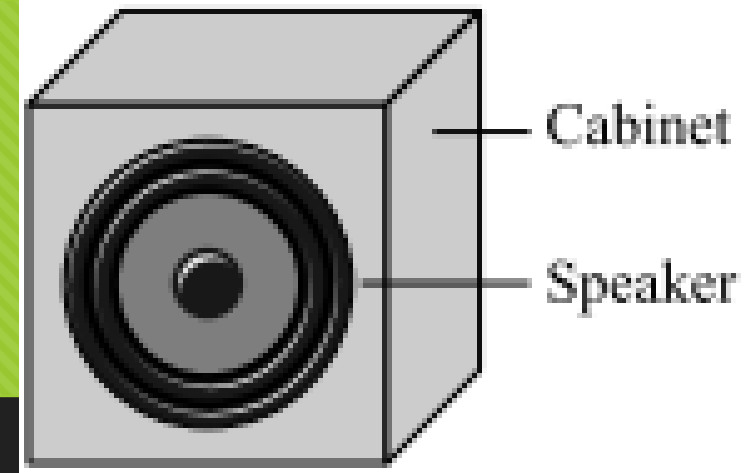
Sound Waves Related MA Standards

- *Standard: 4.3 - Distinguish between the two types of mechanical waves, transverse and longitudinal.*
- *Standard: 4.5 - Recognize that mechanical waves generally move faster through a solid than through a liquid and faster through a liquid than through a gas.*
- *Standard: 4.6 - Describe the apparent change in frequency of waves due to the motion of a source or a receiver (the Doppler effect).*

QUESTIONS

- 10 MCAS Questions from 2010-2012.
- Take out a piece of paper. Clear all items from your desk.
- **REWARDOPOLY QUIZ: 80% or better earns a dice roll.**

MCAS Question 1 2012



The picture above shows a sound speaker in a cabinet with its front panel removed. When music plays through the speaker, the speaker rapidly moves back and forth in the cabinet. Which of the following conclusions is **best** supported by this observation?

- A. Sound travels only in air.
- B. Sound is a transverse wave.
- C. Sound is a longitudinal wave.
- D. Sound travels at the speed of light.

MCAS Question 2

2012

The siren of a fire truck emits a certain pitch, which is heard by a nearby observer. In which of the following situations would the observer perceive the lowest frequency of sound?

- A. The observer and fire truck are both stationary.
- B. The observer walks at 3 m/s toward the stationary fire truck.
- C. The observer is stationary while the fire truck drives toward the observer at 15 m/s.
- D. The observer is stationary while the fire truck drives away from the observer at 15 m/s.

MCAS Question 3

2012

Student X and student Y are receiving sound waves from a stationary source. The sound waves have a frequency of 10 kHz. Student X is stationary and student Y is traveling toward the source of the sound waves.

Which of the following statements describes what will happen as student Y moves?

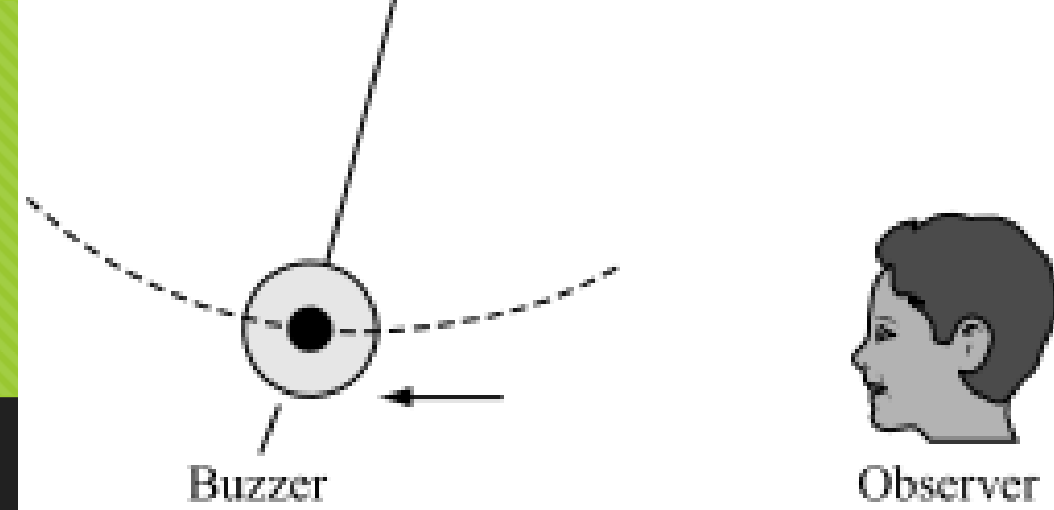
- A. Student X will receive sound waves with a frequency higher than 10 kHz.
- B. Student X will receive sound waves with a frequency lower than 10 kHz.
- C. Student Y will receive sound waves with a frequency higher than 10 kHz.
- D. Student Y will receive sound waves with a frequency lower than 10 kHz.

MCAS Question 4 2012

In which of the following media do sound waves **most likely** travel the fastest?

- A. Crude oil
- B. Distilled water
- C. Solid Steel
- D. Warm air

MCAS Question 5 2011



A loud buzzer is swinging like a pendulum. An observer is near one end of the buzzer's path, as shown above. Which of the following describes and explains what the observer hears as the buzzer moves away from him?

- A. a lower-pitched buzz than the buzzer's normal sound because the sound waves are arriving less frequently
- B. a higher-pitched buzz than the buzzer's normal sound because the sound waves are arriving more frequently
- C. a lower-pitched buzz than the buzzer's normal sound because the velocity of the sound waves is reduced by the velocity of the swinging buzzer
- D. a higher-pitched buzz than the buzzer's normal sound because the velocity of the sound waves is increased by the velocity of the swinging buzzer

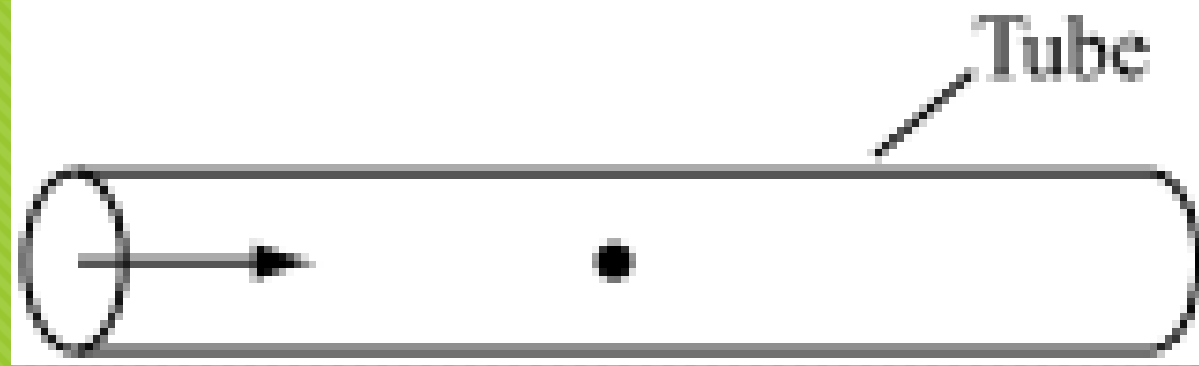
MCAS Question 6

2011

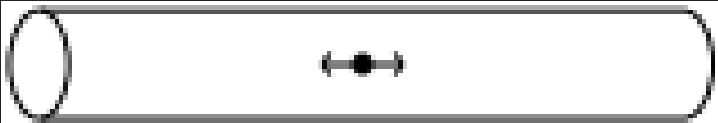
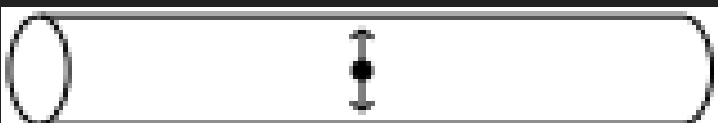


A car with its horn sounding approaches a group of students. Assume the car's horn produces sound waves with a constant frequency. Which of the following statements **best** explains why the students hear a higher pitch as the car approaches than when it is stopped?

- A. The sound waves increase in speed as the car approaches the students.
- B. The sound waves decrease in speed as the car approaches the students.
- C. The sound waves are heard at a lower frequency as the car approaches the students.
- D. The sound waves are heard at a higher frequency as the car approaches the students.

MCAS Question 7 2011



A person creates a longitudinal wave by shouting into a tube in the direction indicated by the arrow on the diagram below. The dot inside the tube represents an air particle in the tube before the wave reaches it. Which of the following diagrams **best** represents the motion of the air particle when the wave travels through the tube?

- A. 
- B. 
- C. 
- D. 

MCAS Question 8

2010

The source of a sound is moving away from an observer who is standing still. How do the sound waves received by the observer compare with those emitted by the source?

- A. They are heard as having a greater velocity.
- B. They are heard as having a higher frequency.
- C. They are heard as having a lower frequency.
- D. They are heard as having a smaller wavelength.

MCAS Question 9

2010

When a student listens to music, sound waves propagate from the speaker to her ear. Which of the following is a physical description of this process?

- A. Particles produced at the speaker move to the student's ear.
- B. Energy is transported from the speaker to the student's ear.
- C. Material is transferred from the speaker to the student's ear.
- D. Clusters of air molecules are sent from the speaker to the student's ear.

MCAS Question 10

2010

Which of the following would cause a change in the speed of a mechanical wave?

- A. the wave moving through a liquid
- B. the wave moving from a solid to a gas
- C. the wave being made by a larger vibration
- D. the wave being made by a smaller vibration

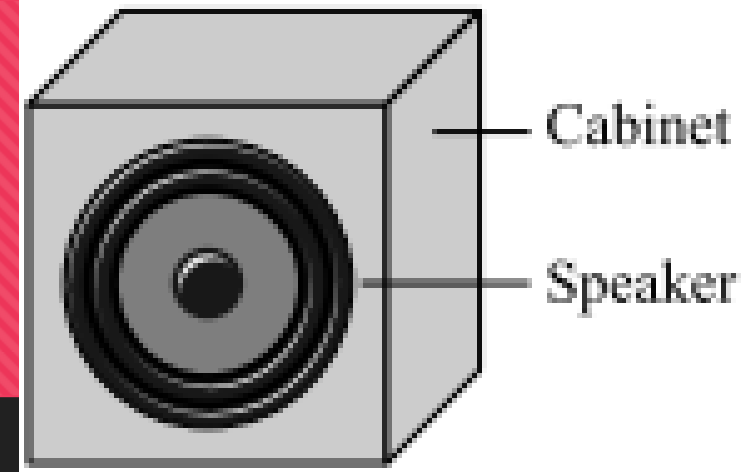
TURN IN YOUR ANSWER SHEETS

- All answer sheets must be turned in...

ANSWERS

- The answers to the MCAS questions from before.
- Be prepared to write down notes.

MCAS Question 1 2012



The picture above shows a sound speaker in a cabinet with its front panel removed. When music plays through the speaker, the speaker rapidly moves back and forth in the cabinet. Which of the following conclusions is **best** supported by this observation?

- A. Sound travels only in air.
- B. Sound is a transverse wave. ← Correct
- C. Sound is a longitudinal wave.
- D. Sound travels at the speed of light.

MCAS Question 2

2012

The siren of a fire truck emits a certain pitch, which is heard by a nearby observer. In which of the following situations would the observer perceive the lowest frequency of sound?

- A. The observer and fire truck are both stationary.
- B. The observer walks at 3 m/s toward the stationary fire truck.
- C. The observer is stationary while the fire truck drives toward the observer at 15 m/s.
- D. The observer is stationary while the fire truck drives away from the observer at 15 m/s.



Correct

MCAS Question 3

2012

Student X and student Y are receiving sound waves from a stationary source. The sound waves have a frequency of 10 kHz. Student X is stationary and student Y is traveling toward the source of the sound waves.

Which of the following statements describes what will happen as student Y moves?

- A. Student X will receive sound waves with a frequency higher than 10 kHz.
- B. Student X will receive sound waves with a frequency lower than 10 kHz.
- C. Student Y will receive sound waves with a frequency higher than 10 kHz.
- D. Student Y will receive sound waves with a frequency lower than 10 kHz.



Correct

MCAS Question 4 2012

In which of the following media do sound waves **most likely** travel the fastest?

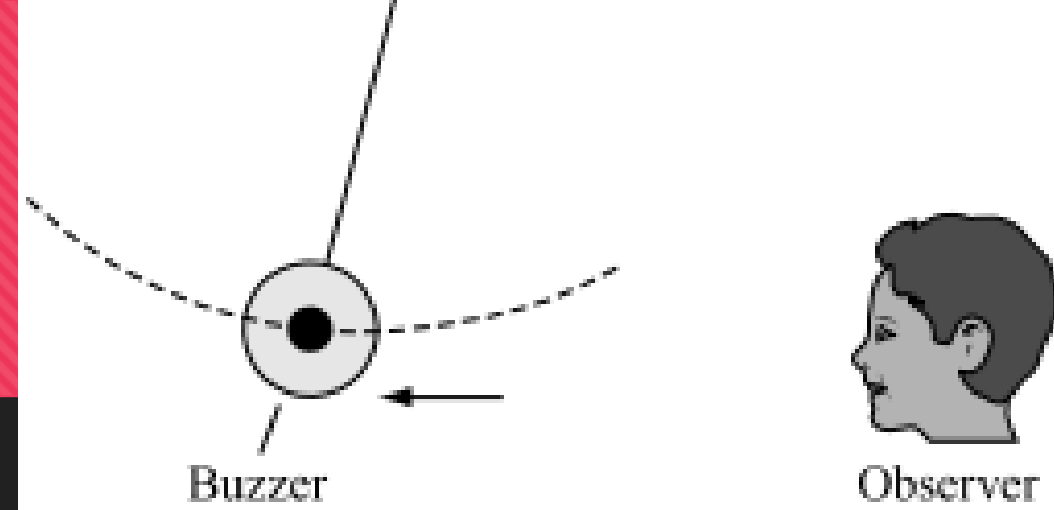
A. Crude oil

B. Distilled water 

C. Solid Steel

D. Warm air

MCAS Question 5 2011



A loud buzzer is swinging like a pendulum. An observer is near one end of the buzzer's path, as shown above. Which of the following describes and explains what the observer hears as the buzzer moves away from him?

- A. a lower-pitched buzz than the buzzer's normal sound because the sound waves are arriving less frequently
- B. a higher-pitched buzz than the buzzer's normal sound because the sound waves are arriving more frequently
- C. a lower-pitched buzz than the buzzer's normal sound because the velocity of the sound waves is reduced by the velocity of the swinging buzzer
- D. a higher-pitched buzz than the buzzer's normal sound because the velocity of the sound waves is increased by the velocity of the swinging buzzer

Correct

MCAS Question 6 2011

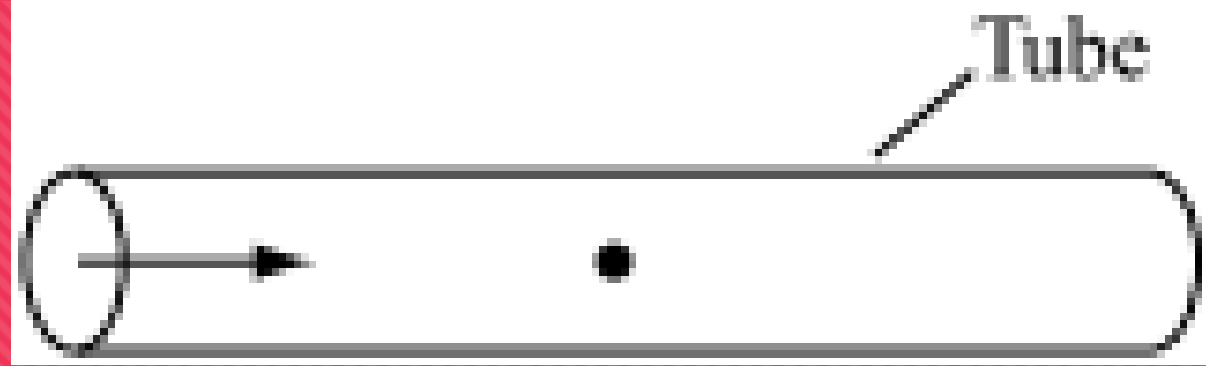
A car with its horn sounding approaches a group of students. Assume the car's horn produces sound waves with a constant frequency. Which of the following statements **best** explains why the students hear a higher pitch as the car approaches than when it is stopped?

- A. The sound waves increase in speed as the car approaches the students.
- B. The sound waves decrease in speed as the car approaches the students.
- C. The sound waves are heard at a lower frequency as the car approaches the students.
- D. The sound waves are heard at a higher frequency as the car approaches the students.

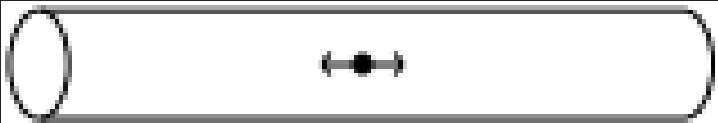
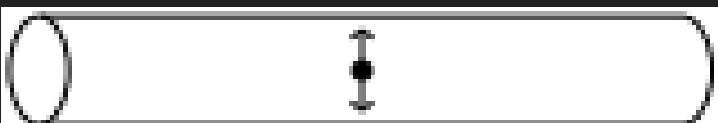




Correct

MCAS Question 7 2011



A person creates a longitudinal wave by shouting into a tube in the direction indicated by the arrow on the diagram below. The dot inside the tube represents an air particle in the tube before the wave reaches it. Which of the following diagrams **best** represents the motion of the air particle when the wave travels through the tube?

- A. 
- B. 
- C. 
- D. 

Correct

MCAS Question 8

2010

The source of a sound is moving away from an observer who is standing still. How do the sound waves received by the observer compare with those emitted by the source?

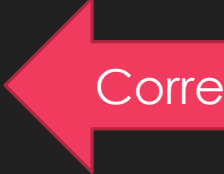
- A. They are heard as having a greater velocity.
- B. They are heard as having a higher frequency.
- C. They are heard as having a lower frequency.
- D. They are heard as having a smaller wavelength.



Correct

MCAS Question 9 2010

When a student listens to music, sound waves propagate from the speaker to her ear. Which of the following is a physical description of this process?

- A. Particles produced at the speaker move to the student's ear.
- B. Energy is transported from the speaker to the student's ear. 
- C. Material is transferred from the speaker to the student's ear.
- D. Clusters of air molecules are sent from the speaker to the student's ear.

MCAS Question 10 2010

Which of the following would cause a change in the speed of a mechanical wave?

- A. the wave moving through a liquid
- B. the wave moving from a solid to a gas
- C. the wave being made by a larger vibration
- D. the wave being made by a smaller vibration

