Frequency and Period

Activity 1 Two Truths and a Lie

Question Group 1

Question 1

Identify the two truths and the one lie from among the following statements:
The frequency of a vibrating object refers to the number of complete cycles of vibrations made per unit of time.
The frequency of a vibrating object refers to the average speed with which the object moves over the course of a vibration.
The frequency of a vibrating object refers to how often a vibrating object repeats its vibration.

Question Group 2

Question 2

Identify the two truths and the one lie from among the following statements:
A vibrating object with a high frequency would be described as having a low period.
A vibrating object with a high frequency is an object that moves a large distance in a short amount of time.
A vibrating object with a high frequency is an object that undergoes a relatively large number of vibrations in a short period of time.

Question Group 3

Question 3

Identify the two truths and the one lie from among the following statements:
Period and frequency are reciprocals of each other.
Period and frequency are inversely proportional to one another.
Vibrating objects making many vibrations in a short amount of time have a large period.

Question Group 4

Question 4

Identify the two truths and the one lie from among the following statements:
A unit of frequency is the Hertz.
A unit of frequency is cycles/second.
A unit of frequency is meters/second.

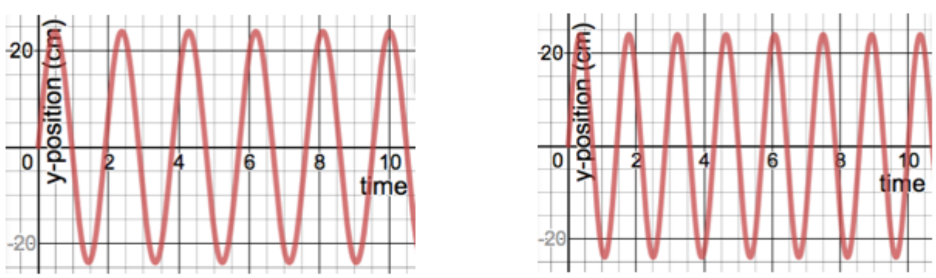
Question Group 5

Question 5
Identify the two truths and the one lie from among the following statements:
A unit of period for a vibrating object is the Hertz.
A unit of period for a vibrating object is the second.
A unit of period for a vibrating object is minutes/cycle.

Question Group 6
Question 6
Identify the two truths and the one lie from among the following statements:
The period refers to the amount of time it takes an object to complete one cycle of vibration.
A vibrating object with a large period takes a relatively large amount of time to complete a vibration.
The period of a vibrating object refers to the distance between the two extreme locations of along its vibrational path.

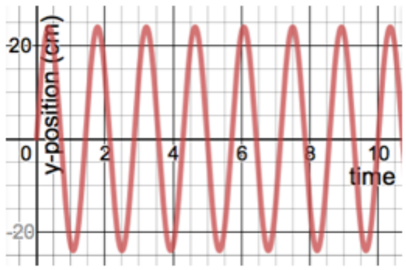
Activity 2 Case Studies
Question Group 7
Question 7
A mass on a spring is undergoing vibrations. A computer-interfaced motion detector placed below the mass detects its position as a function of time. Consider the two cases below. In which case does the mass have the greatest frequency?

Case A   Case B

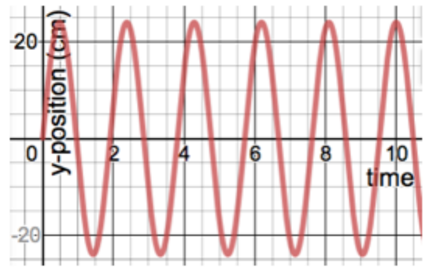


Question 8
A mass on a spring is undergoing vibrations. A computer-interfaced motion detector placed below the mass detects its position as a function of time. Consider the two cases below. In which case does the mass have the greatest frequency?

Case A

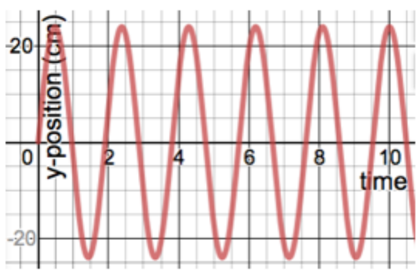


Case B

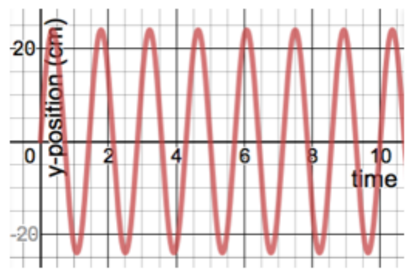


Question Group 8
Question 9
A mass on a spring is undergoing vibrations. A computer-interfaced motion detector placed below the mass detects its position as a function of time. Consider the two cases below. In which case does the mass have the greatest period?

Case A

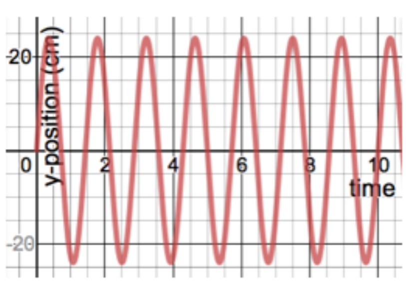


Case B

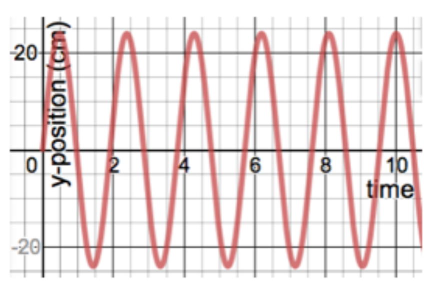


Question 10
A mass on a spring is undergoing vibrations. A computer-interfaced motion detector placed below the mass detects its position as a function of time. Consider the two cases below. In which case does the mass have the greatest period?

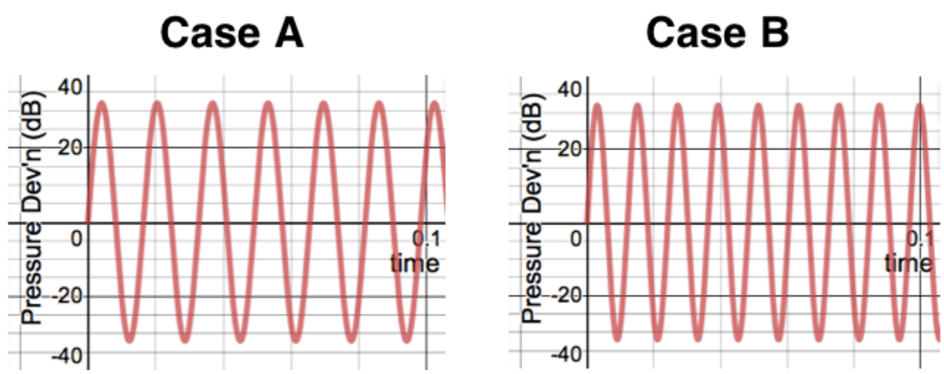
Case A



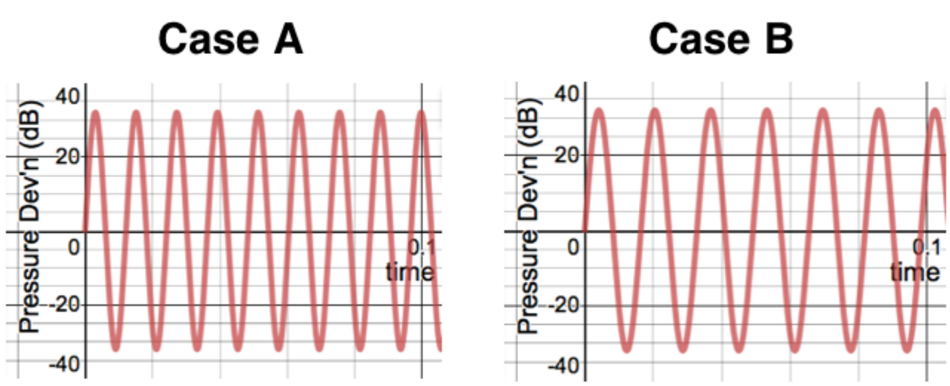
Case B



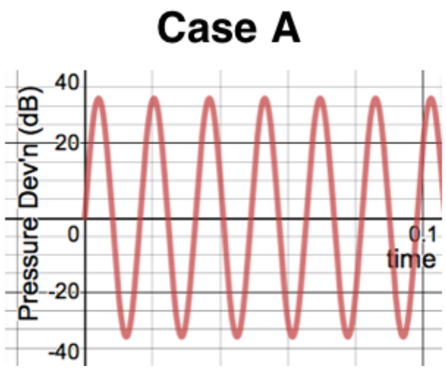
Question Group 9
Question 11
Once tapped with a rubber hammer, the tines of a tuning fork begin vibrating. A computer-interfaced microphone detects the resulting vibrations of the surrounding air, providing the plot of pressure as a function of time. Consider the two cases below. In which case does the tuning fork have the greatest frequency?

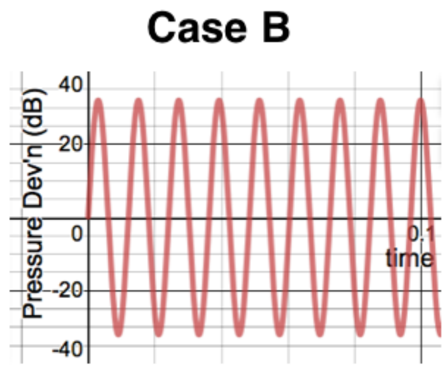


Question 12
Once tapped with a rubber hammer, the tines of a tuning fork begin vibrating. A computer-interfaced microphone detects the resulting vibrations of the surrounding air, providing the plot of pressure as a function of time. Consider the two cases below. In which case does the tuning fork have the greatest frequency?



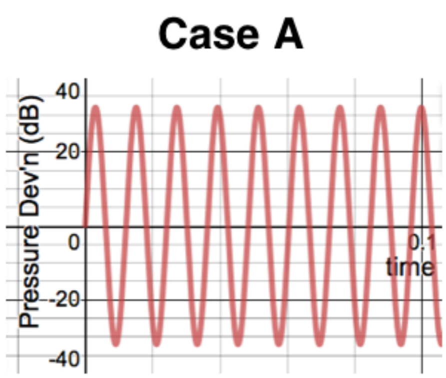
Question Group 10
Question 13
Once tapped with a rubber hammer, the tines of a tuning fork begin vibrating. A computer-interfaced microphone detects the resulting vibrations of the surrounding air, providing a plot of pressure deviations (from normal pressure) as a function of time. Consider the two cases below. In which case does the tuning fork have the greatest period?

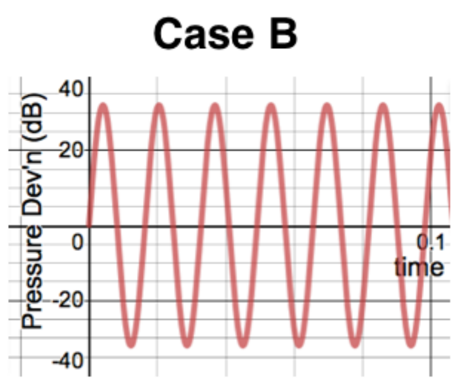




Question 14

Once tapped with a rubber hammer, the tines of a tuning fork begin vibrating. A computer-interfaced microphone detects the resulting vibrations of the surrounding air, providing a plot of pressure deviations (from normal pressure) as a function of time. Consider the two cases below. In which case does the tuning fork have the greatest period?





Question Group 11

Question 15

Anna Litical and Noah Formula are conducting an experiment with a Slinky. They are making measurements and determining the frequency and period. Consider two of the cases below. In which case did they vibrate the Slinky with the greatest frequency?

Case A

# of Vibrations	10
Time (seconds)	13.8

Case B

# of Vibrations	10
Time (seconds)	16.2

Question 16
Anna Litical and Noah Formula are conducting an experiment with a Slinky. They are making measurements and determining the frequency and period. Consider two of the cases below. In which case did they vibrate the Slinky with the greatest frequency?

Case A

# of Vibrations	10
Time (seconds)	16.2

Case B

# of Vibrations	10
Time (seconds)	13.8

Question Group 12
Question 17
Anna Litical and Noah Formula are conducting an experiment with a Slinky. They are making measurements and determining the frequency and period. Consider two of the cases below. In which case did they vibrate the Slinky with the greatest period?

Case A

# of Vibrations	10
Time (seconds)	13.8

Case B

# of Vibrations	10
Time (seconds)	16.2

Question 18
Anna Litical and Noah Formula are conducting an experiment with a Slinky. They are making measurements and determining the frequency and period. Consider two of the cases below. In which case did they vibrate the Slinky with the greatest period?

Case A

# of Vibrations	10
Time (seconds)	16.2

Case B

# of Vibrations	10
Time (seconds)	13.8

Activity 3 Do the Math
Question Group 13
Question 19
A student shakes a rope such that 36 complete vibrations are made in 12.0 seconds. Determine the vibrational frequency of the rope, along with the corresponding unit.

Question 20
A student shakes a rope such that 36 complete vibrations are made in 9.00 seconds. Determine the vibrational frequency of the rope, along with the corresponding unit.

Question 21
A student shakes a rope such that 20 complete vibrations are made in 4.00 seconds. Determine the vibrational frequency of the rope, along with the corresponding unit.

Question Group 14
Question 22
A student shakes a rope such that 36 complete vibrations are made in 12.0 seconds. Determine the vibrational period of the rope, along with the corresponding unit.

Question 23
A student shakes a rope such that 36 complete vibrations are made in 9.00 seconds. Determine the vibrational period of the rope, along with the corresponding unit.

Question 24
A student shakes a rope such that 20 complete vibrations are made in 4.00 seconds. Determine the vibrational period of the rope, along with the corresponding unit.

Question Group 15
Question 25
A vibrating pendulum makes 20 complete vibrations in 12.2 seconds. Determine the vibrational frequency of the pendulum, along with the corresponding unit.

Question 26
A vibrating pendulum makes 10 complete vibrations in 17.6 seconds. Determine the vibrational frequency of the pendulum, along with the corresponding unit.

Question 27
A vibrating pendulum makes 5 complete vibrations in 6.35 seconds. Determine the vibrational frequency of the pendulum, along with the corresponding unit.

Question Group 16
Question 28

A vibrating pendulum makes 20 complete vibrations in 12.2 seconds. Determine the vibrational period of the pendulum, along with the corresponding unit.

Question 29
A vibrating pendulum makes 10 complete vibrations in 17.6 seconds. Determine the vibrational period of the pendulum, along with the corresponding unit.

Question 30
A vibrating pendulum makes 5 complete vibrations in 6.35 seconds. Determine the vibrational period of the pendulum, along with the corresponding unit.

Question Group 17
Question 31
A child in a swing makes 5 complete back and forth vibrations in 13.5 seconds. Determine the vibrational frequency of the child, along with the corresponding unit.

Question 32
A child in a swing makes 5 complete back and forth vibrations in 18.5 seconds. Determine the vibrational frequency of the child, along with the corresponding unit.

Question 33
A child in a swing makes 5 complete back and forth vibrations in 21.8 seconds. Determine the vibrational frequency of the child, along with the corresponding unit.

Question Group 18
Question 34
A child in a swing makes 5 complete back and forth vibrations in 13.5 seconds. Determine the vibrational period of the child, along with the corresponding unit.

Question 35
A child in a swing makes 5 complete back and forth vibrations in 18.5 seconds. Determine the vibrational period of the child, along with the corresponding unit.

Question 36
A child in a swing makes 5 complete back and forth vibrations in 21.8 seconds. Determine the vibrational period of the child, along with the corresponding unit.