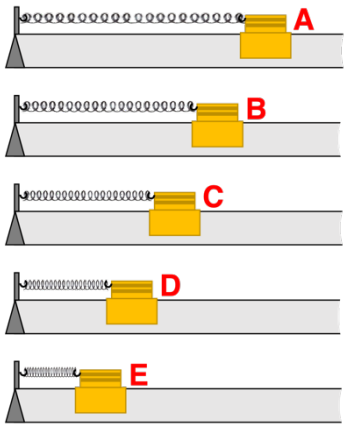
Horizontal Springs: v and F

Activity 1: Speed Analysis
Question Group 1
Question 1

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is its speed the greatest?

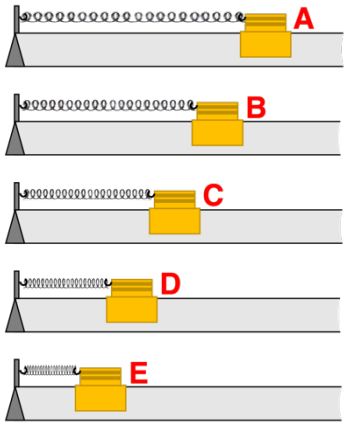
a. Position A and E
b. Positions B and D
c. Position C
d. Position A only
e. Position E only



Question 2

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is its speed the greatest?

a. Position A only
b. Position E only
c. Position A and E
d. Positions B and D
e. Position C



Question 3

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is its speed the greatest?

a. Position A only
b. Position C
c. Position E only
d. Position A and E
e. Positions B and D

Question 4
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is its speed the greatest?
a. Position A only
b. Position A and E
c. Positions B and D
d. Position C
e. Position E only

Question Group 2
Question 5
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it have a speed of 0 m/s?
a. Position A and E
b. Positions B and D
c. Position C
d. Position A only
e. Position E only

Question 6
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it have a speed of 0 m/s?
a. Position A only
b. Position E only
c. Position A and E
d. Positions B and D
e. Position C

Question 7
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it have a speed of 0 m/s?

a. Position A only
b. Position C
c. Position E only
d. Position A and E
e. Positions B and D

Question 8

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it have a speed of 0 m/s?

a. Position A only
b. Position A and E
c. Positions B and D
d. Position C
e. Position E only

Question Group 3

Question 9

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from A to C?

a. Speed increases.
b. Speed decreases.
c. Speed remains unchanged.
d. Speed first increases and then decreases.
e. Speed first decreases and then increases.

Question 10

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from A to C?

a. Speed remains unchanged.
b. Speed increases.
c. Speed first increases and then decreases.
d. Speed decreases.

e. Speed first decreases and then increases.

Question 11

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from E to C?

a. Speed increases.
b. Speed decreases.
c. Speed remains unchanged.
d. Speed first increases and then decreases.
e. Speed first decreases and then increases.

Question 12

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from E to C?

a. Speed remains unchanged.
b. Speed increases.
c. Speed first increases and then decreases.
d. Speed decreases.
e. Speed first decreases and then increases.

Question Group 4

Question 13

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from C to A?

a. Speed increases.
b. Speed decreases.
c. Speed remains unchanged.
d. Speed first increases and then decreases.
e. Speed first decreases and then increases.

Question 14
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from C to A?
a. Speed remains unchanged.
b. Speed increases.
c. Speed first increases and then decreases.
d. Speed decreases.
e. Speed first decreases and then increases.

Question 15
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from C to E?
a. Speed increases.
b. Speed decreases.
c. Speed remains unchanged.
d. Speed first increases and then decreases.
e. Speed first decreases and then increases.

Question 16
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the speed change as the glider moves from C to E?
a. Speed remains unchanged.
b. Speed increases.
c. Speed first increases and then decreases.
d. Speed decreases.
e. Speed first decreases and then increases.

Activity 2: Force Analysis
Question Group 5
Question 17
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is the net force the greatest?
a. Position A and E
b. Positions B and D
c. Position C
d. Position A only
e. Position E only

Question 18
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is the net force the greatest?
a. Position A only
b. Position E only
c. Position A and E
d. Positions B and D
e. Position C

Question 19
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is the net force the greatest?
a. Position A only
b. Position C
c. Position E only
d. Position A and E
e. Positions B and D

Question 20
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) is the net force the greatest?
a. Position A only
b. Position A and E

c. Positions B and D
d. Position C
e. Position E only

Question Group 6
Question 21
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it experience a net force of 0 N?
a. Position A and E
b. Positions B and D
c. Position C
d. Position A only
e. Position E only

Question 22
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it experience a net force of 0 N?
a. Position A only
b. Position E only
c. Position A and E
d. Positions B and D
e. Position C

Question 23
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it experience a net force of 0 N?
a. Position A only
b. Position C
c. Position E only
d. Position A and E
e. Positions B and D

Question 24
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. At what position(s) does it experience a net force of 0 N?
a. Position A only
b. Position A and E
c. Positions B and D
d. Position C
e. Position E only

Question Group 7
Question 25
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from A to C?
a. Net force increases.
b. Net force decreases.
c. Net force remains unchanged.
d. Net force first increases and then decreases.
e. Net force first decreases and then increases.

Question 26
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from A to C?
a. Net force remains unchanged.
b. Net force increases.
c. Net force first increases and then decreases.
d. Net force decreases.
e. Net force first decreases and then increases.

Question 27

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from E to C?

a. Net force increases.
b. Net force decreases.
c. Net force remains unchanged.
d. Net force first increases and then decreases.
e. Net force first decreases and then increases.

Question 28

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from E to C?

a. Net force remains unchanged.
b. Net force increases.
c. Net force first increases and then decreases.
d. Net force decreases.
e. Net force first decreases and then increases.

Question Group 8

Question 29

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from C to A?

a. Net force increases.
b. Net force decreases.
c. Net force remains unchanged.
d. Net force first increases and then decreases.
e. Net force first decreases and then increases.

Question 30

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from C to A?

a. Net force remains unchanged.
b. Net force increases.
c. Net force first increases and then decreases.
d. Net force decreases.
e. Net force first decreases and then increases.

Question 31

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from C to E?

a. Net force increases.
b. Net force decreases.
c. Net force remains unchanged.
d. Net force first increases and then decreases.
e. Net force first decreases and then increases.

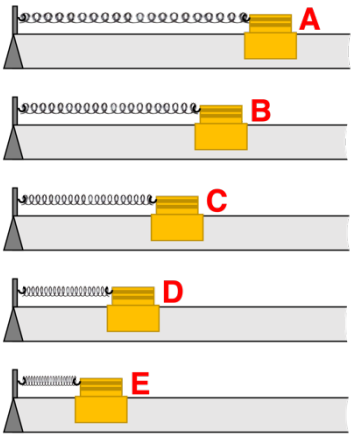
Question 32

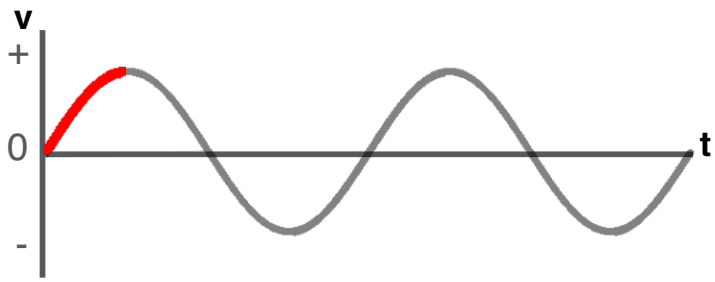
An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. In what manner does the net force change as the glider moves from C to E?

a. Net force remains unchanged.
b. Net force increases.
c. Net force first increases and then decreases.
d. Net force decreases.
e. Net force first decreases and then increases.

Activity 3: Graphical Analysis
Question Group 9
Question 33

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



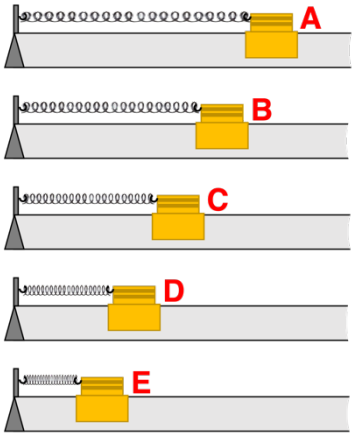


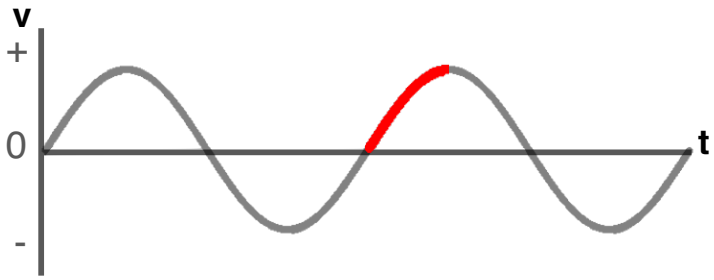
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 34

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



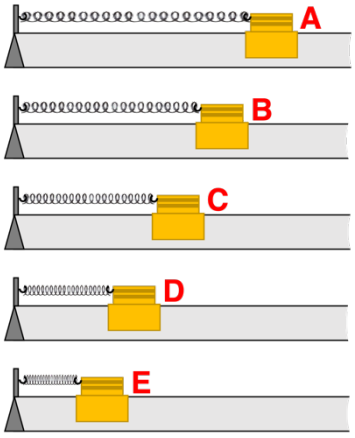


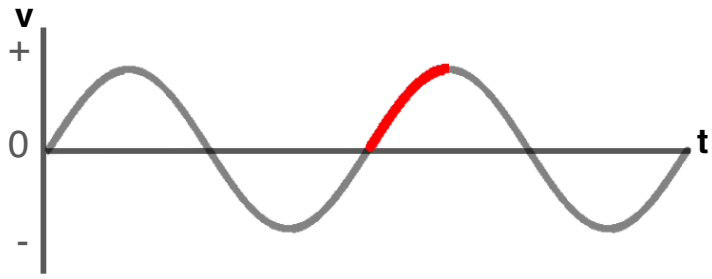
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question 35

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



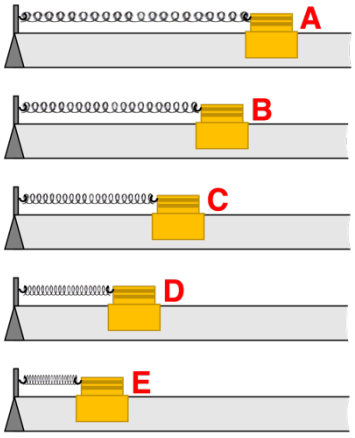


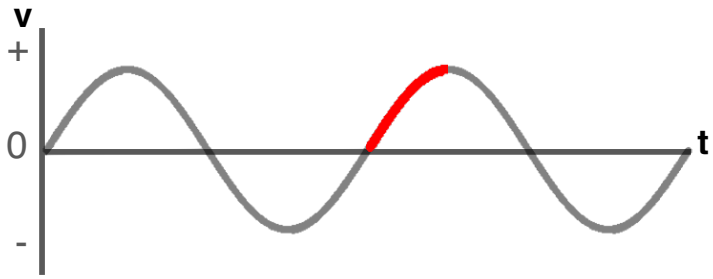
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 36

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



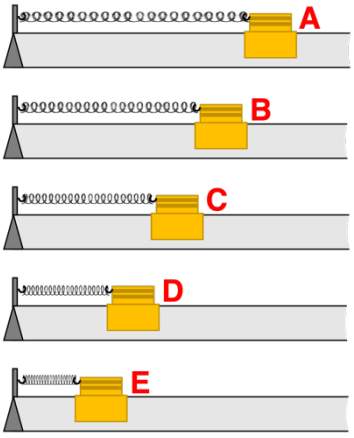


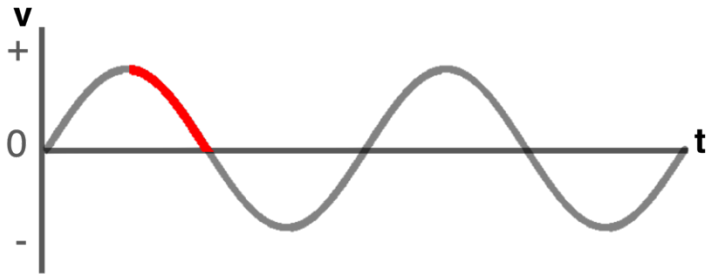
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question Group 10
Question 37

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



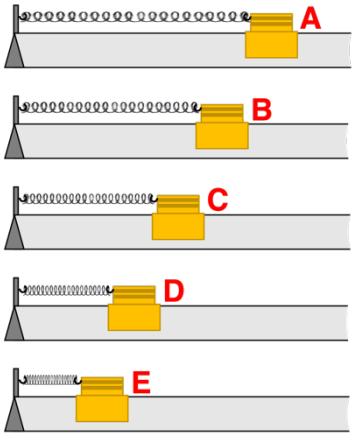


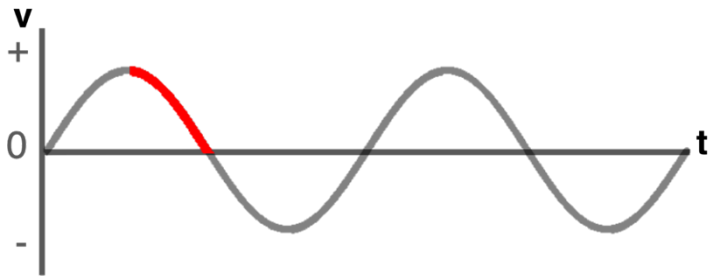
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 38

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



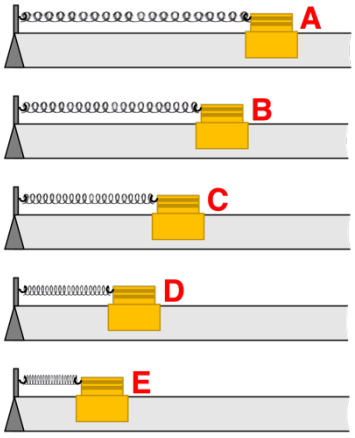


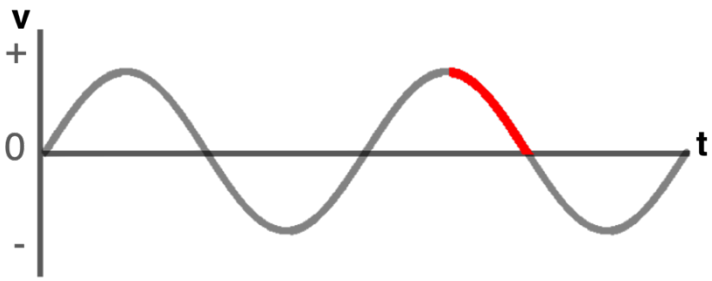
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question 39

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



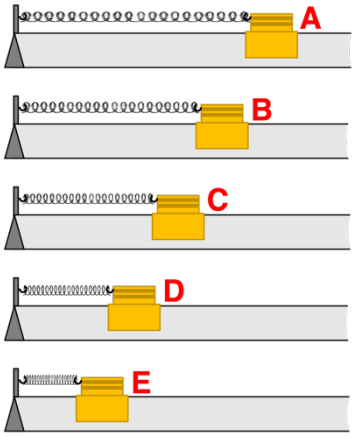


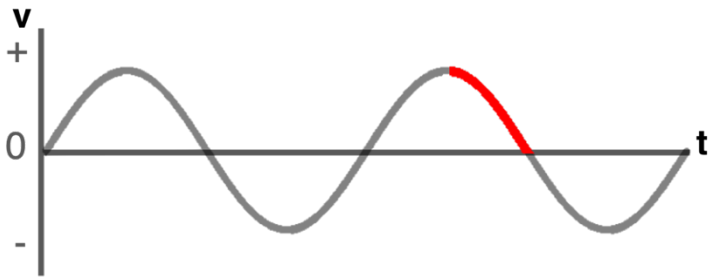
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 40

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



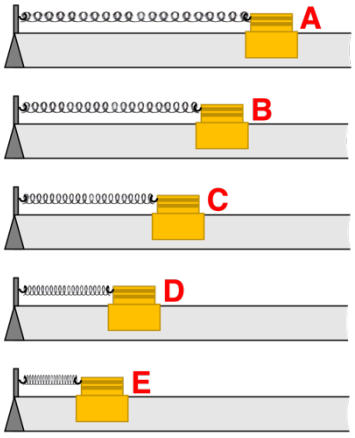


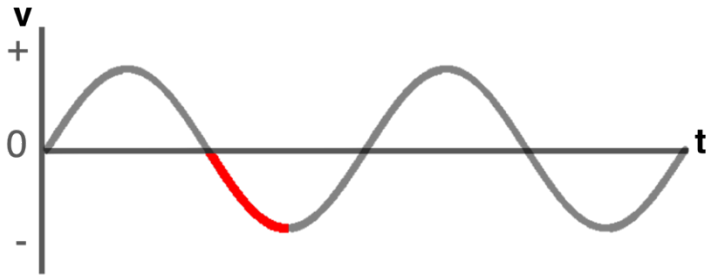
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question Group 11
Question 41

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



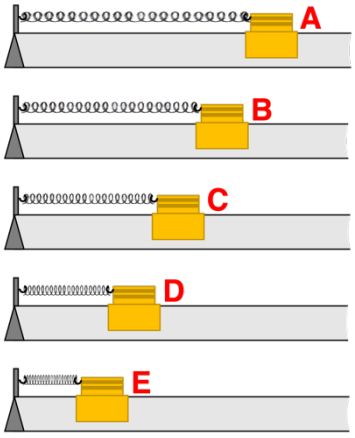


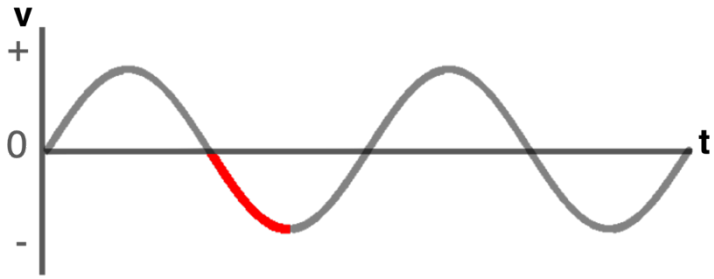
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 42

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



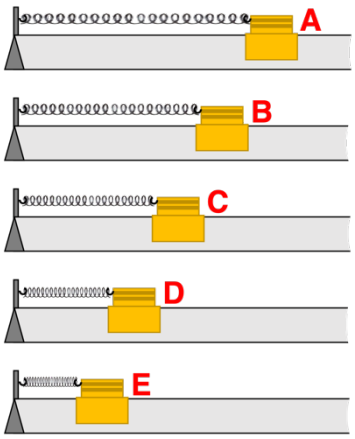


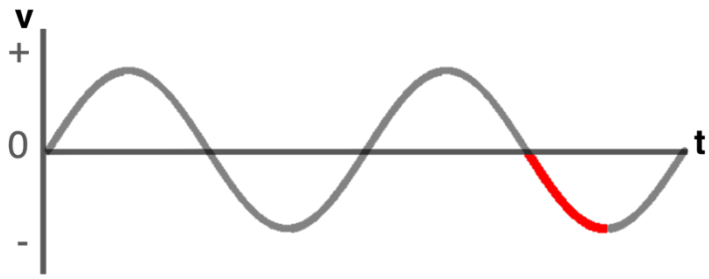
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question 43

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



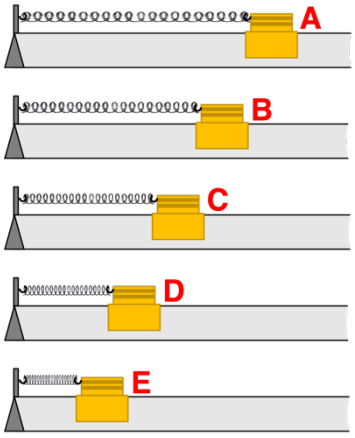


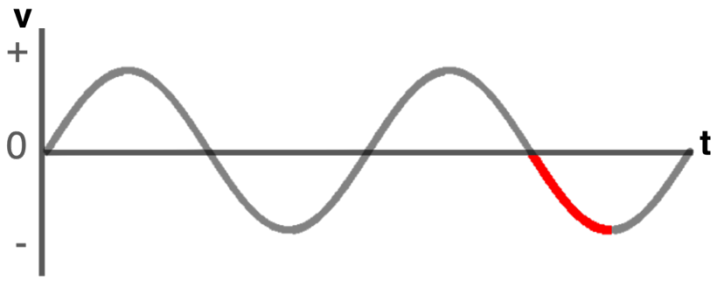
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 44

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



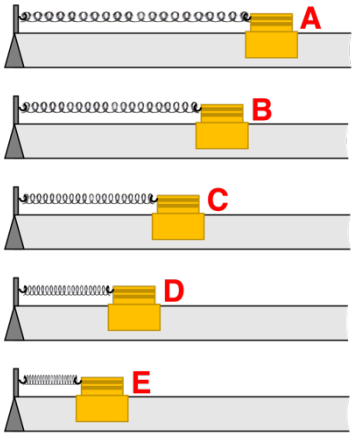


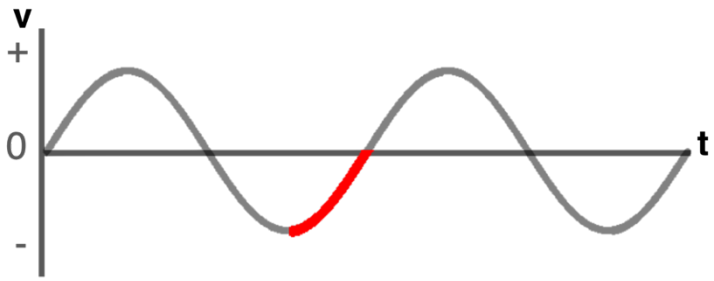
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question Group 12
Question 45

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



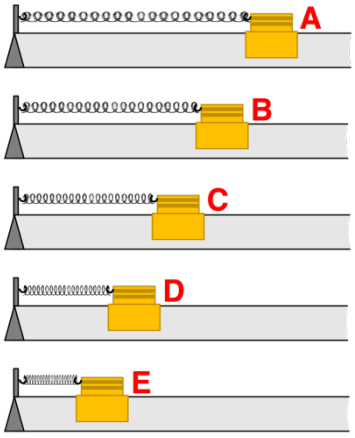


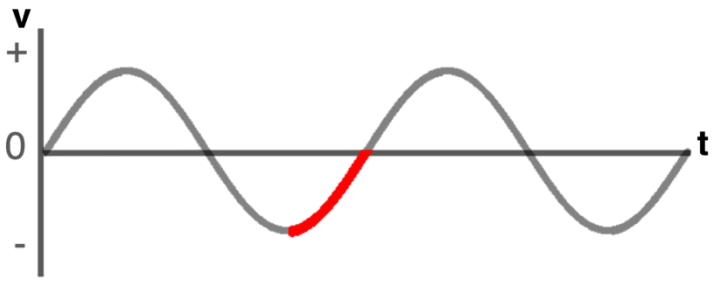
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 46

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



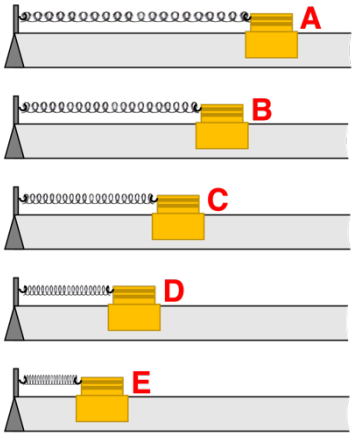


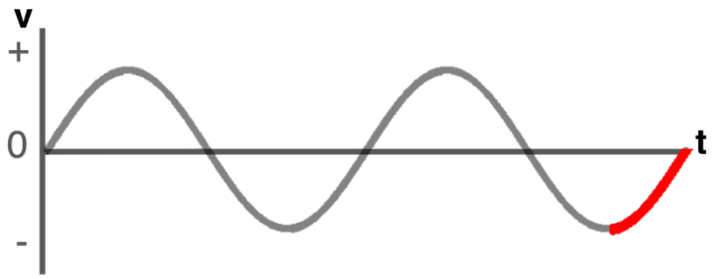
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question 47

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



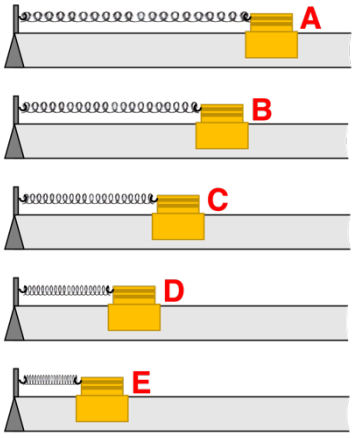


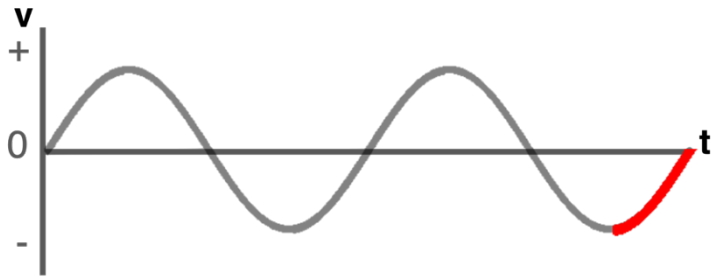
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 48

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



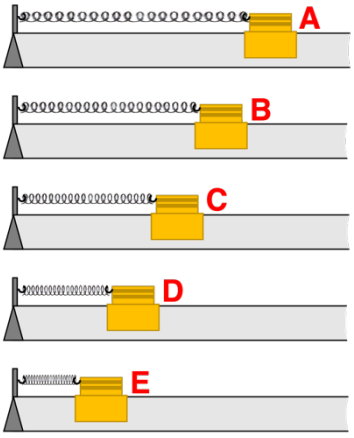


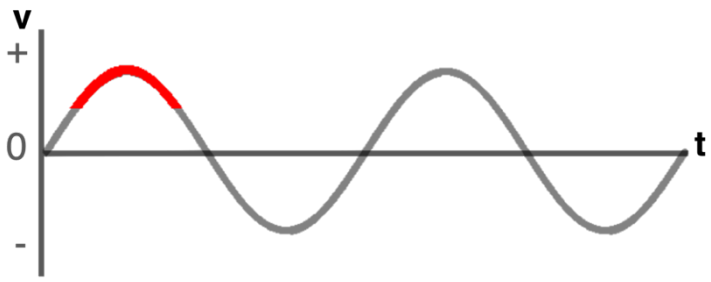
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question Group 13
Question 49

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



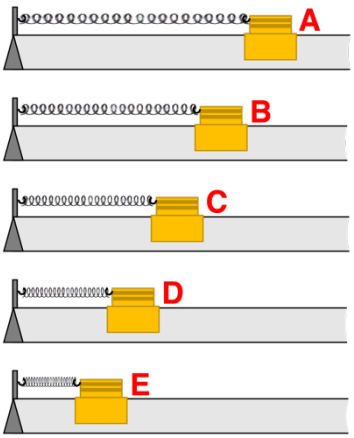


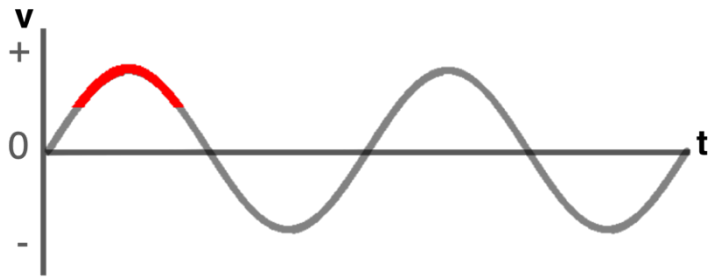
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 50

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



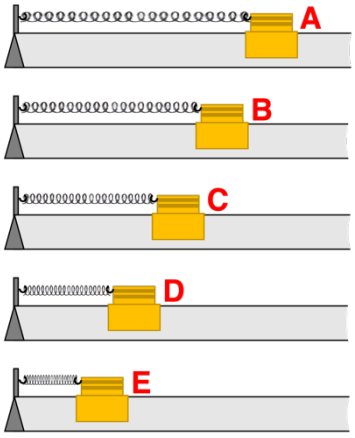


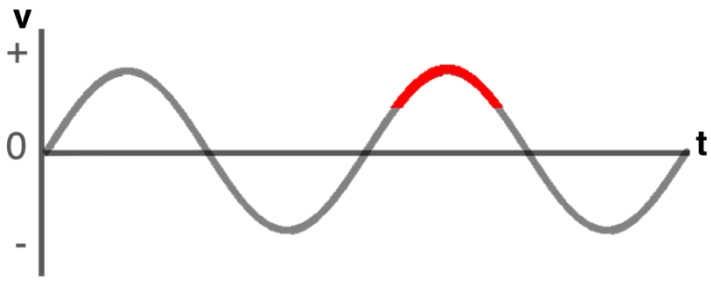
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question 51

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



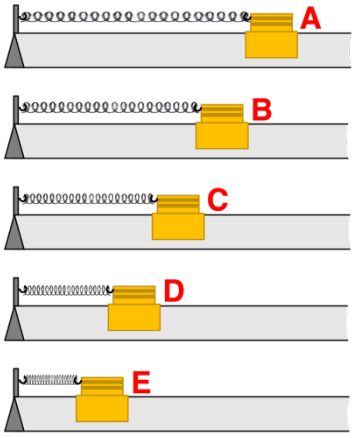


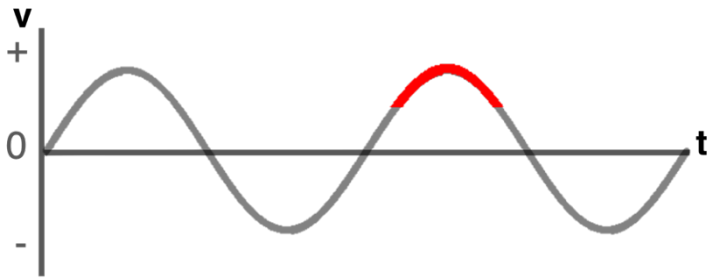
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 52

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



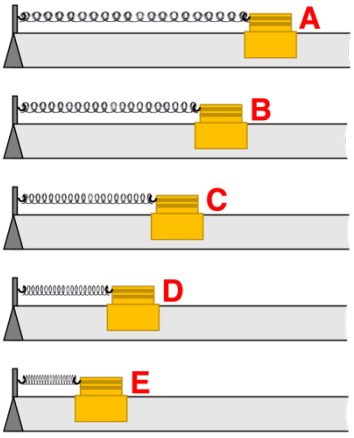


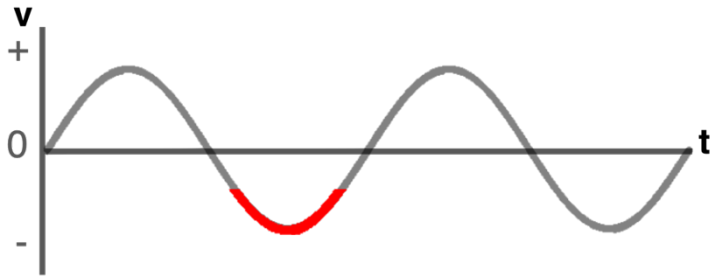
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question Group 14
Question 53

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



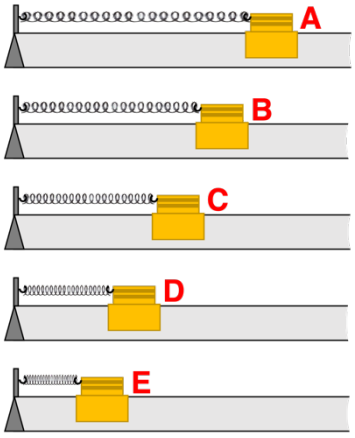


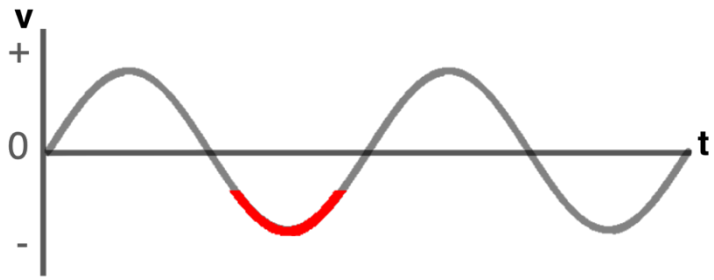
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 54

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



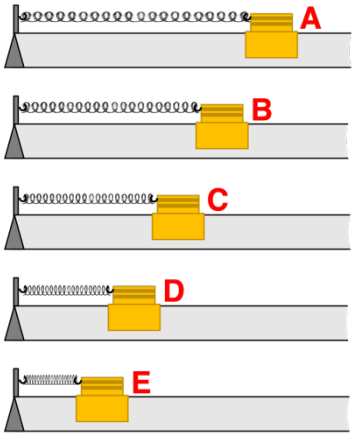


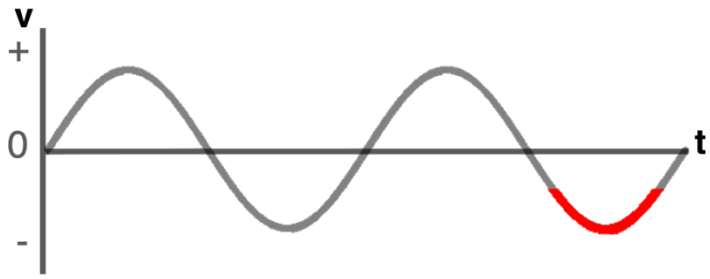
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A

Question 55

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.



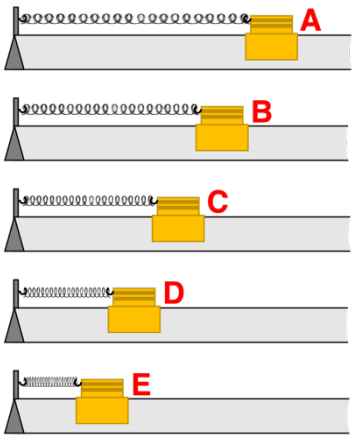


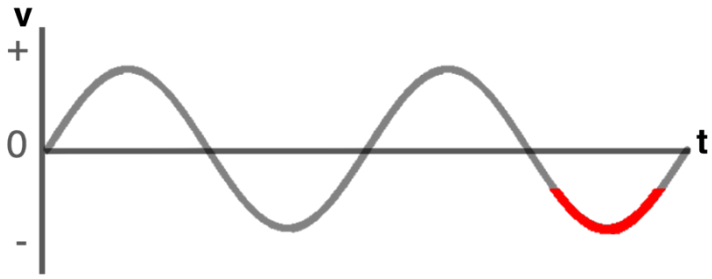
Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	C to B to A	C to D to E
E to D to C	B to C to D	D to C to B

Question 56

An air track glider is attached to a spring. It is pulled back to position A and released from rest. It vibrates back and forth between positions A and E. Position C is the equilibrium position. A portion of a plot of its velocity as a function of time is shown. A positive velocity represents the glider moving to the right; a negative velocity represents a leftward motion.





Consider the section of the plot that is shaded red. This section represents the glider moving from position …

A to B to C	B to C to D	C to D to E
E to D to C	D to C to B	C to B to A