Up and Down

Activity 1: Magnitude and Direction Question Group 1: Question 1:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Identify the direction of the vertical velocity and acceleration vectors at the indicated locations.

	Velocity	Accel'n
В		
D		
Ε		



A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Identify the direction of the vertical velocity and acceleration vectors at the indicated locations.

	Velocity	Accel'n
С		
D		
F		



Question 3:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Identify the direction of the vertical velocity and acceleration vectors at the indicated locations.

	Velocity	Accel'n
A		
D		
Ε		

Question Group 2: Question 4:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Identify the direction of the vertical velocity and acceleration vectors at the indicated locations.

	Velocity	Accel'n
В		
Ε		
F		

Question 5:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Identify the direction of the vertical velocity and acceleration vectors at the indicated locations.

	Velocity	Accel'n
С		
Ε		
Η		

Question 6:

A ball is thrown upward from the ground. The diagram shows the location of the ball at 1-second intervals. Identify the direction of the vertical velocity and acceleration vectors at the indicated locations.

	Velocity	Accel'n
D		
Ε		
G		



Question Group 3: Question 7:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Rank the three indicated locations based on increasing ball speed and acceleration (magnitude only), beginning with the smallest.

Ball Speed – Magnitude Only

Rank locations A, C, and F.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Ball Acceleration – Magnitude Only

Rank locations A, C, and F.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Question 8:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Rank the three indicated locations based on increasing ball speed and acceleration (magnitude only), beginning with the smallest.

Ball Speed – Magnitude Only

Rank locations B, E, and G.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Ball Acceleration – Magnitude Only Rank locations B, E, and G.

Smallest	Middle	Greatest	
or Tap Here for all the same.			



Question 9:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Rank the three indicated locations based on increasing ball speed and acceleration (magnitude only), beginning with the smallest.

Ball Speed – Magnitude Only

Rank locations C, D, and F.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Ball Acceleration – Magnitude Only

Rank locations C, D, and F.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Question Group 4: Question 10:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Rank the three indicated locations based on increasing ball speed and acceleration (magnitude only), beginning with the smallest.

Ball Speed – Magnitude Only

Rank locations A, D, and G.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Ball Acceleration – Magnitude Only

Rank locations A, D, and G.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Question 11:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Rank the three indicated locations based on increasing ball speed and acceleration (magnitude only), beginning with the smallest.

Ball Speed – Magnitude Only

Rank locations B, F, and I.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Ball Acceleration – Magnitude Only

Rank locations B, F, and I.

Smallest	Middle	Greatest
or Tap Here for all the same.		



Question 12:

A ball is launched upward from the ground. The diagram shows the location of the ball at 1-second intervals. Rank the three indicated locations based on increasing ball speed and acceleration (magnitude only), beginning with the smallest.

Ball Speed – Magnitude Only

Rank locations C, D, and H.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Ball Acceleration – Magnitude Only

Rank locations C, D, and H.

Smallest	Middle	Greatest
or Tap Here for all the same.		

Activity 2 – Vector Diagrams

Question Group 5 (uses 7-point trajectory) Question 13

A ball is launched upward from the ground. Its location at 1second intervals is shown. A set of velocity and acceleration vectors is shown for location A. Match three of the six provided vector combinations to locations B, C, and G.

(Images are selected at random from the selection shown after **Question 18**.)

Question 14

A ball is launched upward from the ground. Its location at 1second intervals is shown. A set of velocity and acceleration vectors is shown for location C. Match three of the six provided vector combinations to locations A, E, and F.

(Images are selected at random from the selection shown after **Question 18**.)

Question 15

A ball is launched upward from the ground. Its location at 1second intervals is shown. A set of velocity and acceleration vectors is shown for location E. Match three of the six provided vector combinations to locations B, C, and G.

(Images are selected at random from the selection shown after **Question 18**.)



Question Group 6 (uses 9-point trajectory) Question 16

A ball is launched upward from the ground. Its location at 1second intervals is shown. A set of velocity and acceleration vectors is shown for location E. Match three of the six provided vector combinations to locations B, C, and G.

(Images are selected at random from the selection shown after **Question 18**.)

Question 17

A ball is launched upward from the ground. Its location at 1second intervals is shown. A set of velocity and acceleration vectors is shown for location E. Match three of the six provided vector combinations to locations B, C, and G.

(Images are selected at random from the selection shown after **Question 18**.)

Question 18

A ball is launched upward from the ground. Its location at 1second intervals is shown. A set of velocity and acceleration vectors is shown for location E. Match three of the six provided vector combinations to locations B, C, and G.

(Images are selected at random from the selection shown after **Question 18**.)





Activity 3 – Velocity Components

Question Group 7 (Uses the 7-point trajectory) Question 19

A ball is launched upward from the ground at 29.4 m/s (or 30 m/s if student picks g = 10m/s/s as the preferred g value). Its location at 1-second intervals is shown. Determine the vertical velocity and acceleration; enter values in the table. Enter negative values for any downward-directed vector.

Time (s)	Velocity (m/s)	Acceleration (m/s/s)
0.0		
1.0		
2.0		
3.0		
4.0		
5.0		
6.0		



Question Group 8 (Uses the 9-point trajectory) Question 20

A ball is launched upward from the ground at 39.2 m/s (or 40 m/s if student picks g = 10m/s/s as the preferred g value). Its location at 1-second intervals is shown. Determine the vertical velocity and acceleration; enter values in the table. Enter negative values for any downward-directed vector.

Time (s)	Velocity (m/s)	Acceleration (m/s/s)
0.0		
1.0		
2.0		
3.0		
4.0		
5.0		
6.0		
7.0		
8.0		

