Describing Motion with Data Tables

MOP Connection: Kinematic Concepts: Mission KC8

Motion can be described with words, diagrams, data tables, equations, and graphs. Using data tables to describe the motion of objects involves showing how the position and/or the velocity changes with regular intervals of time change.

1. What is the speed of the following objects? Record below the table.

Object A

Time (s)	Pos'n (m)
0.0	0.0
1.0	5.0
2.0	10.0
3.0	15.0
4.0	20.0
5.0	25.0

Speed = _____ m/s

Object B

Time (s)	Pos'n (m)
0.0	6.0
1.0	10.0
2.0	14.0
3.0	18.0
4.0	22.0
5.0	26.0

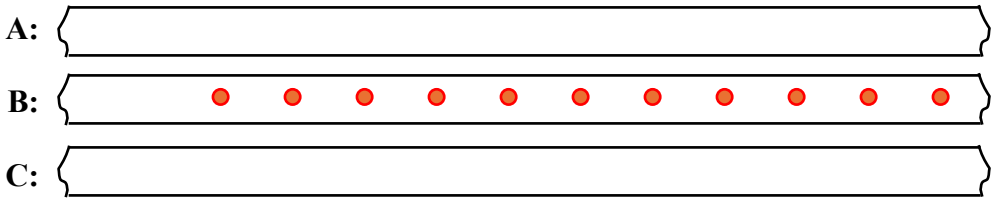
Speed = _____ m/s

Object C

Time (s)	Pos'n (m)
0.0	2.0
0.5	6.0
1.0	10.0
1.5	14.0
2.0	18.0
2.5	22.0

Speed = _____ m/s

2. The dot diagram for **Object B** is shown below. Draw the dot diagram for objects **A** and **C**.



3. What is the acceleration of the following objects? Record below the table.

Object D

Time (s)	Vel. (m/s)
0.0	4.0
1.0	8.0
2.0	12.0
3.0	16.0
4.0	20.0
5.0	24.0

Accel'n = _____ m/s/s

Object E

Time (s)	Vel. (m/s)
0.0	18.0
0.5	15.0
1.0	12.0
1.5	9.0
2.0	6.0
2.5	3.0

Accel'n = _____ m/s/s

Object F

Time (s)	Pos'n (m)
0.0	4.0
0.5	6.0
1.0	8.0
1.5	10.0
2.0	12.0
2.5	14.0

Accel'n = _____ m/s/s

4. Explain your answer for **Object F**:

5. Draw the dot diagram for objects **D**, **E**, and **F**.

D:

E:

F:

6. The data at the right represent the motion of a car.
   a. Determine the acceleration for the car. Include units.

   b. Is the velocity of this car constant? _____
   Explain how you know.

Time (s)	Velocity (m/s)
0.0	0.0
1.0	5.0
2.0	10.0
3.0	15.0
4.0	20.0

   c. Is the acceleration of this car constant? _____ Explain how you know.

   d. How fast would this car be moving at 8.0 seconds? _____

7. Can an accelerating object have a constant acceleration and a changing velocity?_____ Explain.

8. Can an accelerating object have a constant velocity and a changing acceleration? _____ Explain.

9. **Object G** is moving at 20.0 m/s and then accelerates at 6.0 m/s/s for 2.0 seconds. **Object H** is moving at 24.0 m/s and accelerates at -6.0 m/s/s for 4.0 seconds. **Object I** has a non-uniform acceleration. Fill in the tables for objects **G**, **H**, and **I**.

Object G

Time (s)	Vel. (m/s)
0.0	
0.5	
1.0	
1.5	
2.0	

Object H

Time (s)	Vel. (m/s)
0.0	
1.0	
2.0	
3.0	
4.0	

Object I

Time (s)	Vel. (m/s)
0.0	12.0
1.0	
2.0	
3.0	
4.0	