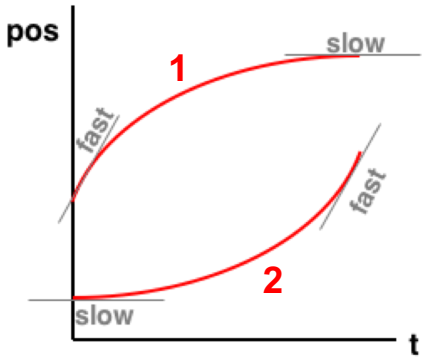
Position-Time Graphs: Changing Speed Motion

Lesson Notes

General Conclusions Regarding Position-Time Graphs for Changing Speed Motion

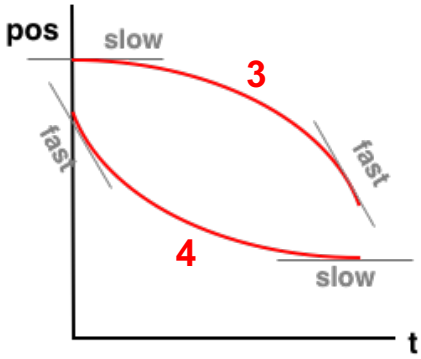
- Objects moving with a **changing velocity** are represented by lines on p-t graphs with a **changing slope** - i.e., the lines are curved.
- The **slope** reveals information about the **velocity** of the object.
- **Speeding up** (slow to fast) is represented by **a line that becomes steeper** over time.
- **Slowing down** or getting slower (fast to slow) is represented by **a line that become less steep** over time.

Four Changing Speed Graphs:



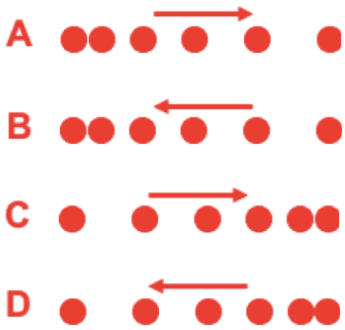
Slowing Down:
1, 4

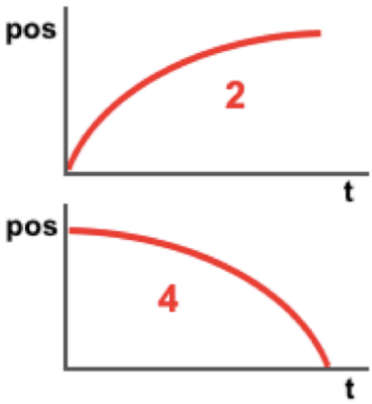
Speeding Up:
2, 3



Your Turn to Practice

Here are four dot diagrams and four p-t graphs. Match the diagrams to the corresponding graphs. Arrows represent the direction the object is moving.

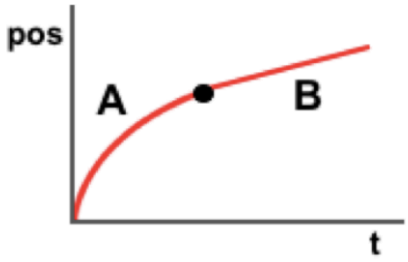




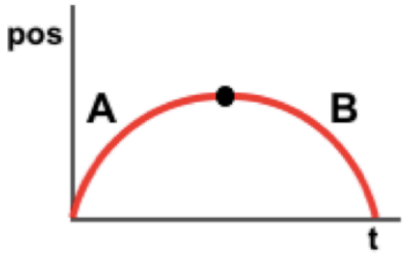
Your Turn to Practice

Describe the two-stage motion of these two objects.

Example A



Example B



Example A: _____

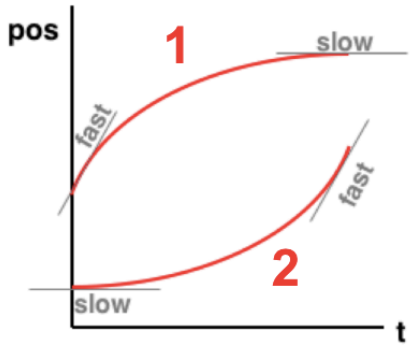
Example B: _____

Recognizing Direction of Velocity and Acceleration from a Position-Time Graph

Velocity Rule: The **velocity** direction is in the direction the object moves.
In Graphs below, Objects 1 and 2 have positive velocity and Objects 3 and 4 have negative velocity.

Acceleration Rule: For speeding up: **acceleration** is in the direction object moves.
For slowing down: **acceleration** is in the opposite the direction object moves.
In Graphs below, Objects 2 and 4 have positive acceleration and Objects 1 and 3 have negative acceleration.

Moving in + Dir'n



Positive Accel'n: 2, 4

Negative Accel'n: 1, 3

Moving in - Dir'n