PHYSICS IN MOTION
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# Unit 2E
# Free Fall
## *Note-Taking Guide and Questions to Consider TEACHER*

### Main Ideas, Key Points, Questions:

*After watching the video segment, write down key points, main ideas, and big questions.*

### Objective(s):

- *Analyze the motion of objects, both with and without an initial velocity, that experience free-fall acceleration.*
- *Use constant acceleration kinematics equations to make calculations for objects that experience free-fall acceleration.*

### Notes:

*During the video segment, use words, phrases, or drawings to take notes.*

### Summary:

*After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"*

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**Answer the following.**

1. **When an object is experiencing "free fall," what is the only force acting upon it?**

*the force of gravity*

2. **Does the acceleration of a falling object depend on its mass? Explain.**

*No, the acceleration due to gravity does not depend on its mass, as shown by Galileo.*

3. **What is the rate of acceleration due to gravity on the earth?**

*Near the surface of the earth, the acceleration due to gravity is 9.8 m/s$^2$.*

4. **In what direction does gravity always cause objects to accelerate?**

*down, toward the center of the earth*

5. **If the initial velocity of an object is upward in the positive direction, what must the sign of the acceleration due to gravity be in a calculation?**

*The acceleration due to gravity is downward, so the sign must be opposite the sign of the initial velocity, which would be negative.*

6. **A ball is thrown straight up in the air.**

   a. **At the peak of its ascent, what is it doing?**

   *stopping and changing direction*

   b. **What is the ball's velocity at this point?**

   *The velocity is 0 m/s.*

   c. **What is the ball's acceleration at this point?**

   *The acceleration is 9.8 m/s$^2$ downward.*

**questions continued on next page**

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**Answer the following.**

7. **If a ball is accelerated downward at 9.8 m/s², by how many meters per second does the object's velocity change every second?**

*The ball's velocity is changing by 9.8 m/s every second in the downward direction.*

*So, if it is moving upward, it slows down by 9.8 m/s every second,*

*and if it is moving downward, it speeds up by 9.8 m/s every second.*