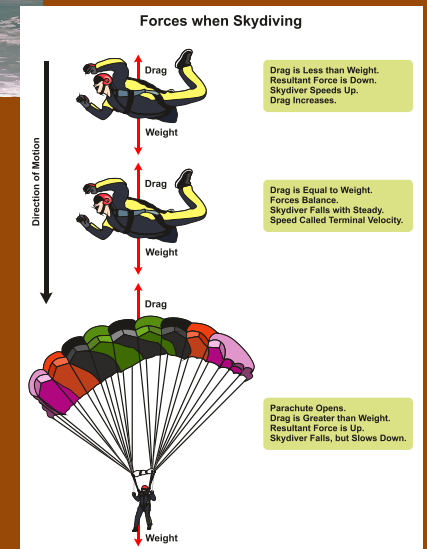
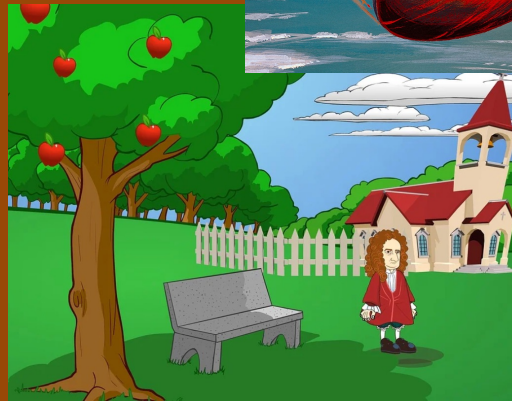
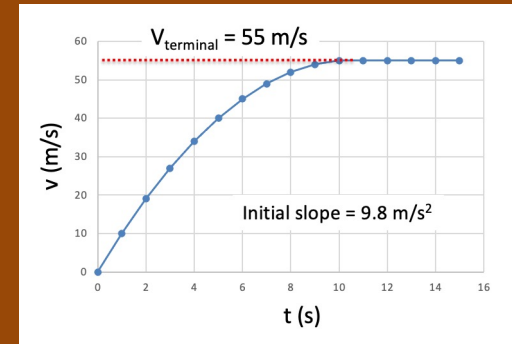


Acceleration due to Gravity

- Inquiry questions
- Assigning a “+” direction
- Examples
- Air Resistance
- Does m affect g ?
- Terminal Speed
- Practice



Preview File

Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

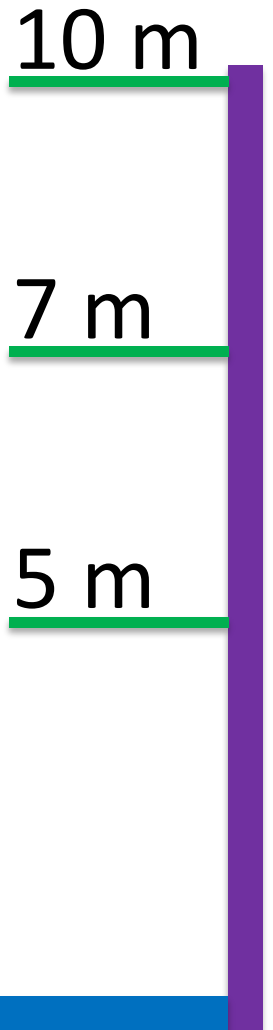
- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready



Which height will produce the greatest speed upon impact? Why?

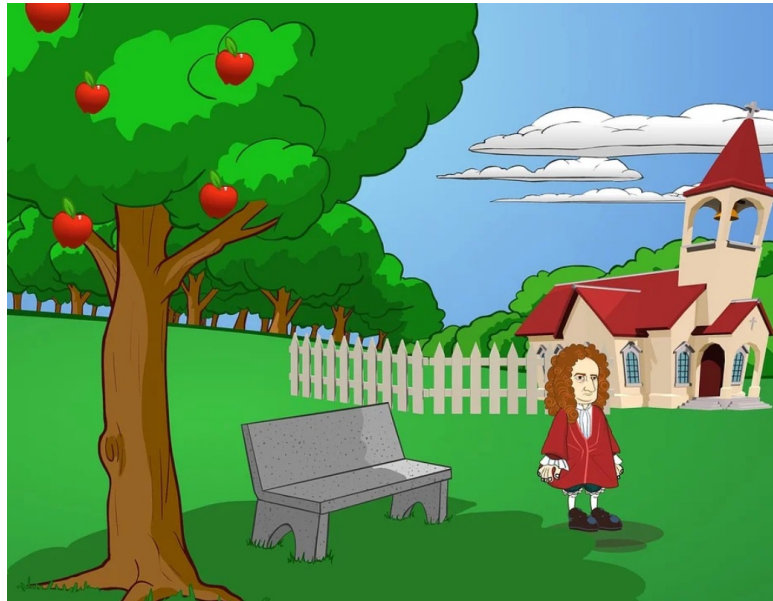
The _____ diving board will produce the greatest speed for the diver upon impact because _____



Acceleration due to Gravity

The acceleration due to gravity (g) of any falling object is approximately 9.8 m/s^2 [downward].

1. True or False, g is dependent on where you are on Earth.
2. True or False, g changes as you move to different planets.



Check Your Understanding

Olympic events have been held at locations with very different altitudes. Should Olympic records for events, such as the shot put, be adjusted for this?

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Check Your Understanding

The table to the bottom-right gives position-time data for a ball dropped vertically from rest.

- Use the final data pair and the appropriate equation for constant acceleration to determine the acceleration.
- If the value of the acceleration due to gravity in the place where the ball was dropped is 9.81 m/s^2 [down], what is the percentage error of the experimental value?



t (s)	d (m [down])
0	0
0.200	0.172
0.400	0.688
0.600	1.55

Assign a positive direction

- It is important to use consistent directions with any single
- If an object is thrown upward or if it bounces upward after falling downward, either upward or downward can be called positive
- The important thing is to define your choice for the

Check Your Understanding

A ball is thrown with an initial velocity of 8.3 m/s [up]. Ignore air resistance.

- a) What maximum height will the ball reach?
- b) After what time interval will the ball return to its initial position?

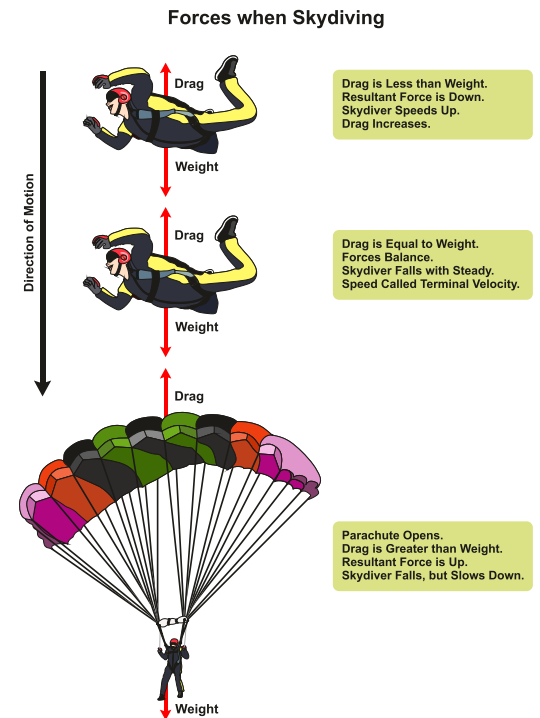
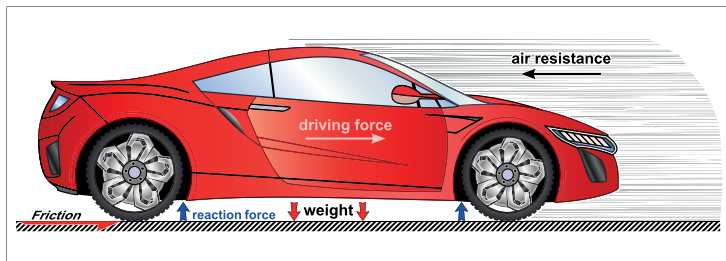
Max Height



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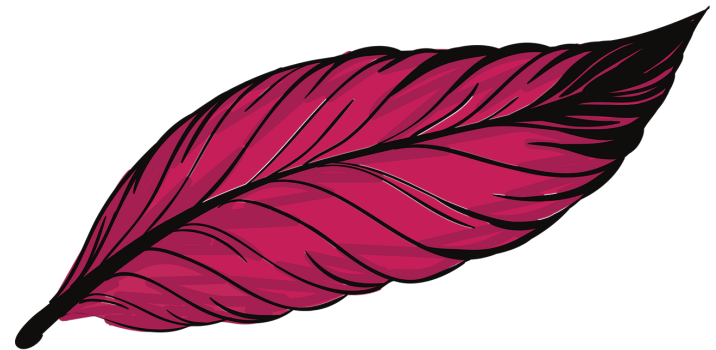
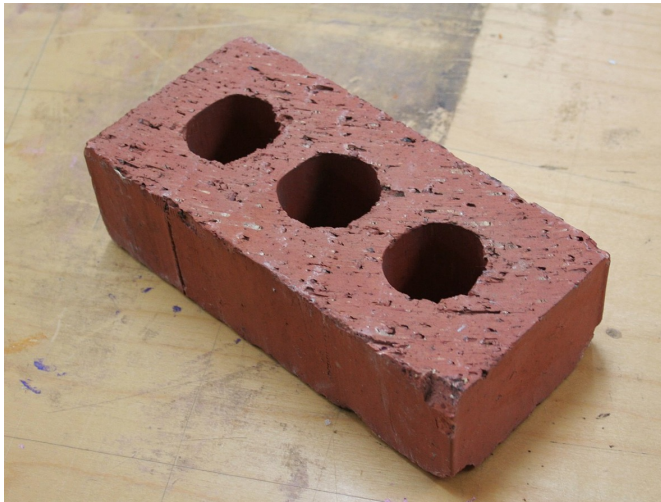
Air Resistance

- _____
- Air resistance is also known as drag and acts to slow objects down



Does shape/density matter?

What falls faster? Let's try it.



Air Resistance

An object that is falling through the atmosphere is subjected to two external forces.

- 1) The first force is the gravitational force (F_{grav} or F_g), expressed as the weight of the object.
- 2) The second force

Which will fall faster, a crumpled or uncrumpled tissue?

Air Resistance

Which diagram shows the greatest acceleration?

A



$$F_g = 931 \text{ N}$$

B



$$F_g = 931 \text{ N}$$

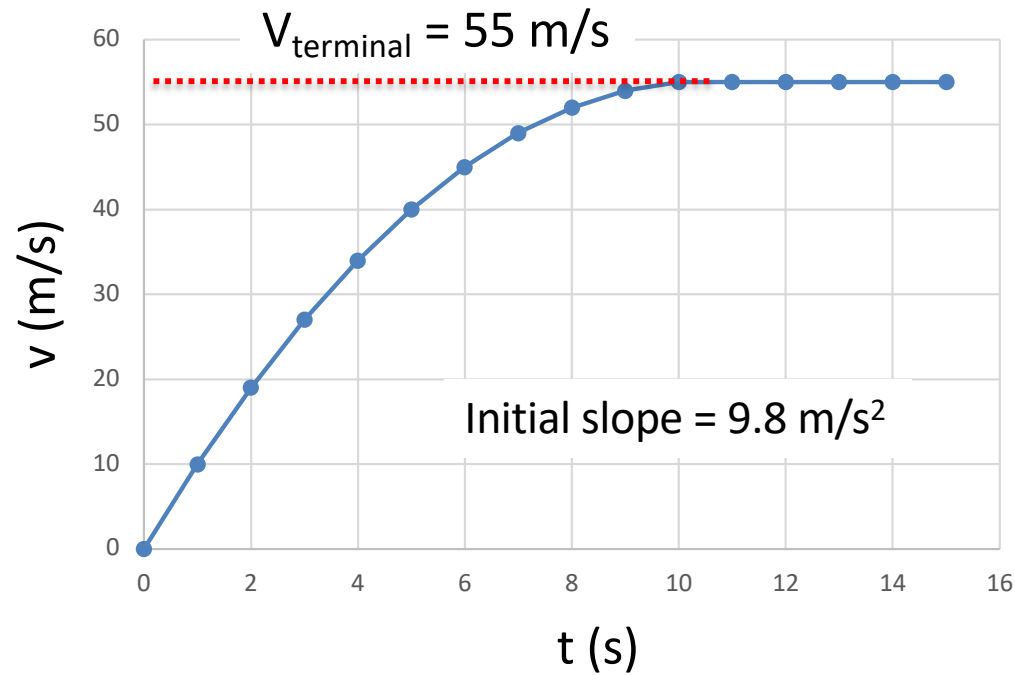
C



$$F_g = 931 \text{ N}$$

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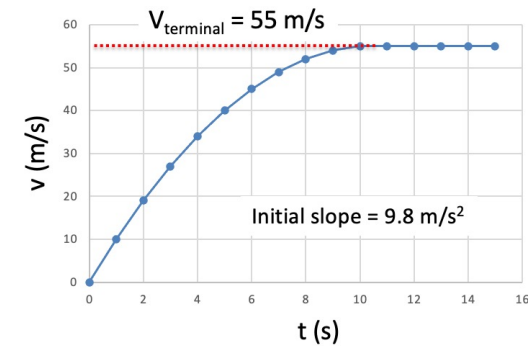
Terminal Velocity



The general shape of a speed-time graph for a falling object that reaches terminal velocity.

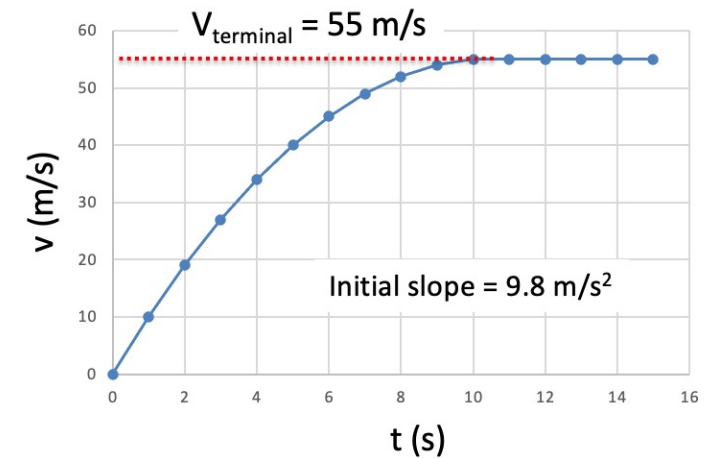
Terminal Velocity

1. Why does acceleration decrease (v doesn't increase as fast) as you fall?
2. F_{down} is constant while F_{up} increases until they equal. Why?



Terminal Velocity

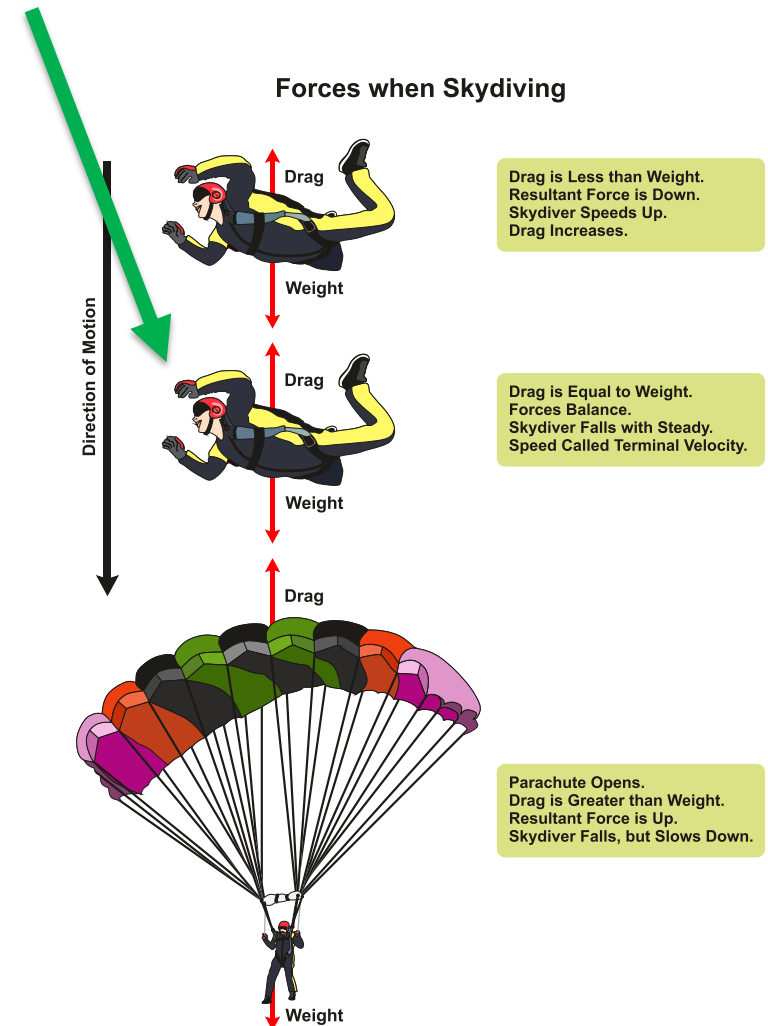
1. Why does acceleration decrease (v doesn't increase as fast) as you fall?



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Terminal Velocity

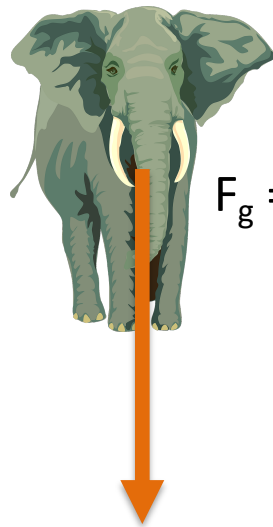
- This person in the middle diagram
.....
- The Terminal Speed for an average skydiver with their parachute closed is ~ 190 km/h
- _____



Does that mean that mass impacts g ?

Does that mean that mass impacts g?

$$m = 5000 \text{ kg}$$



$$F_g = 49,000 \text{ N}$$

$$a = F_{\text{net}}/m = 49,000 \text{ N}/5000 \text{ kg} \\ = 9.8 \text{ m/s}^2$$

$$m = 100 \text{ kg}$$



$$F_g = 980 \text{ N}$$

$$a = F_{\text{net}}/m = 980 \text{ N}/100 \text{ kg} \\ = 9.8 \text{ m/s}^2$$



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Check Your Understanding

Sam is skating down a slope experiencing a force due to gravity of 700 N. He experiences a force due to air resistance of 50 N in the opposite direction of his motion. What is his acceleration if his mass is 70 kg?