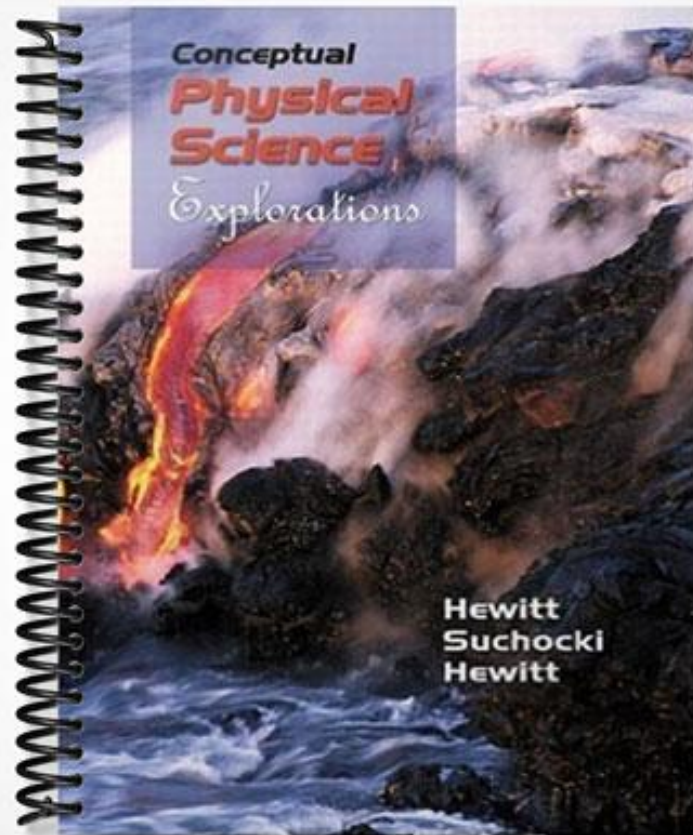


SOLUTIONS MANUAL



Conceptual
**Physical
Science**
Explorations

Hewitt
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Hewitt

MEDIA WORKBOOK

Conceptual Physical Science Explorations

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Cover Photo: Courtesy Michael Stewart/Lava Images

ISBN: 0-13-173462-8

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Physics Media Workbook

for Conceptual Physical Science—Explorations,
Media Update

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Acknowledgments

We want to thank the creators of The Physics Place for creating a wonderful multi-media learning tool that allows students to explore physics concepts based on where their inquisitive minds take them. Hopefully, this workbook will complement your inspiration and dedication to physics education.

We want to extend our deepest thanks to the following people who have influenced our physics career:

- Brad Orr, University of Michigan – for encouraging us to apply for a National Science Foundation fellowship. Without your continual support we would not have been as successful as we have been.
- Mahta Mogdaham, University of Michigan – for your inspiration and guidance in research and in understanding the unique struggles women and mothers face as scientists. Thank you.
- The National Science Foundation – for providing us recognition and support through our award.

Metric System

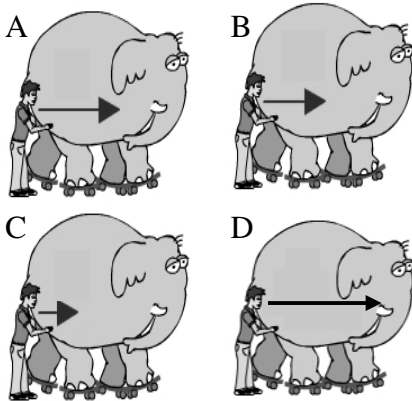
Multiple Choice

- The mks system is an abbreviation for:
 - metric-kilopounds-seconds
 - meter-pound-second
 - meter-kilogram-second
- 1000 meters equals _____ kilometers.
 - 10
 - 1
 - 100
 - 2
- 1000 millimeters equals _____ meters.
 - 100
 - 2
 - 1
 - 10
- Microbiologists use the _____ (μm , also called the micron) as their standard unit of length.
 - centimeter
 - micrometer
 - millimeter
- Since the diameter of the smallest atom (hydrogen) is just 10^{-10} m, many chemists use the _____ (nm) to record molecular and atomic sizes.
 - tetrameter
 - millimeter
 - megameter
 - nanometer
- Metric system is sometimes called SI unit. Why?
 - Because the metric system is part of the International System of Units.
 - Metric system is not convenient for scientific measurement.
 - Because the metric system is used by scientific institutes, it is therefore called SI.
 - All of the above are true.
- The major features of the metric system are
 - the use of decimals.
 - standards defined in terms of basic, unchanging physical properties.
 - a system of prefixes.
 - All of the above are true.
- Metric units can be used to measure which of the following?
 - length
 - mass
 - time
 - All of the above are true.
- The system of measure used in the United States, based on inches, feet, miles, etc., is not convenient for scientific use. The metric system is used because
 - of its difficulty.
 - of its orderliness.
 - it is a measure of length only.
- To measure objects that are larger or smaller than a meter, you can
 - add or subtract the meter.
 - multiply or divide the meter to form larger or smaller units.
 - You cannot have units smaller or larger than a meter.
- The meter is the standard unit of
 - time.
 - length.
 - resistance.
 - force.
- One meter is equal to
 - 39.3701 inches.
 - a little more than a yard.
 - answers a and b.
 - none of the above

Vectors Lessons 1–3

Ranking Tasks

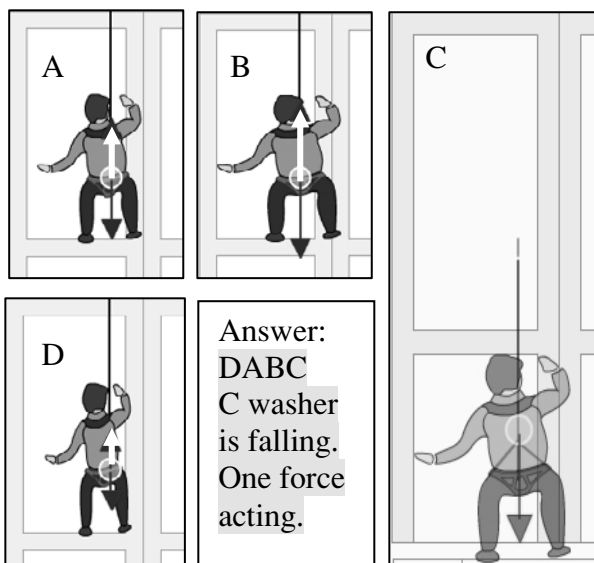
Rank the forces acting on the elephant by the person. Rank them in order from least to greatest.



Answer: **CBAD**

Ranking Tasks

Rank the weights of the window washers. Rank them in order from least to greatest. Assume the ropes used by the window washers are the same. What is different about window washer C?



Multiple Choice

1. Which of the following statements are true?
 - a. When two equal and opposite force vectors act on the same object, equilibrium results.
 - b. When unbalanced force vectors act on an object, the object accelerates.
 - c. When two equal and opposite force vectors act on the same object, equilibrium results and an object cannot be moving.
 - d. A and B are true.

2. When two anchor (support) ropes hang straight down to support a load,
 - a. the tension in each rope equals the window washer's weight.
 - b. the tension in each rope equals half the window washer's weight.
 - c. the tension in each rope equals twice the window washer's weight.

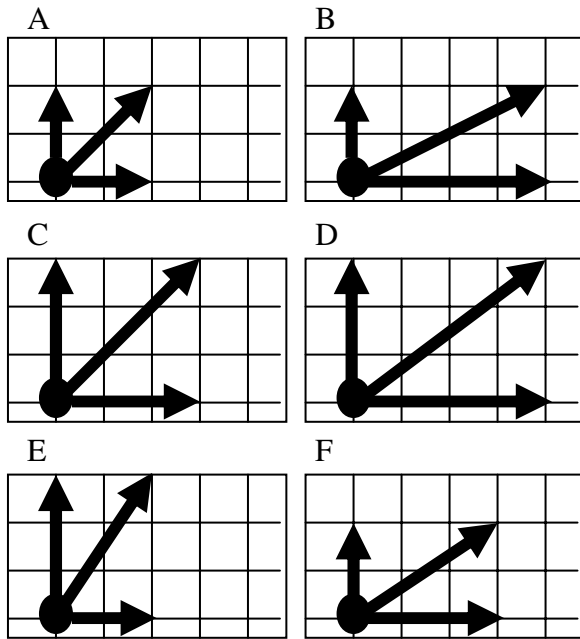
3. The length of a force vector indicates the
 - a. magnitude of force.
 - b. direction of force.
 - c. both of the above

4. An object with only one force vector represents an object
 - a. at rest.
 - b. in a state of uniform motion.
 - c. undergoing acceleration.

Vectors Lessons 1–3

Matching

Examine all the pictures representing the resultant vectors with different vertical and horizontal components acting on a bowling ball. Match the picture to the correct statement.



E The diagram with the greatest vertical component and least horizontal component.

B The diagram with the greatest horizontal component and least vertical component.

D The diagram with the greatest resultant vector.

A The diagram with the least resultant vector.

F The diagram with the least vertical component and middle horizontal component.

C The diagram with the greatest vertical component and middle horizontal component.

Multiple Choice

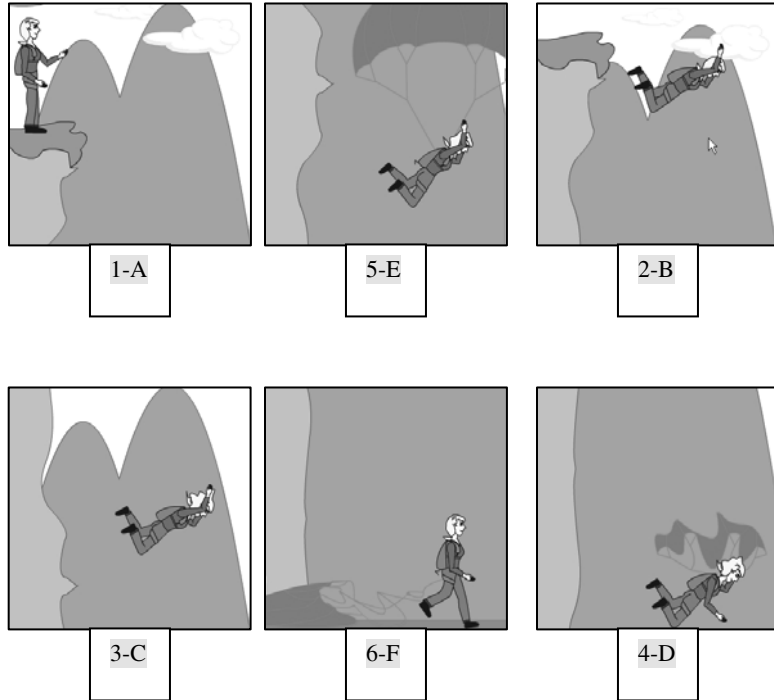
- When both left and right support ropes make different angles with the vertical, the support rope with a larger angle (i.e., is less steep) has _____ than the support rope with a smaller angle (i.e., is more steep).
 - a greater tension
 - a smaller tension
 - no difference in tension
- When both left and right support ropes make the same angle with the vertical, their tensions are the same. Which of the following is true?
 - Decreasing steepness decreases rope tension.
 - Increasing steepness decreases rope tension.
 - Rope angle has no effect on rope tension.
- To find the resultant of two vectors,
 - add the two lengths together.
 - find the diagonal of the parallelogram the vectors make.
 - add the two lengths together and find the average of the two distances.
 - find the average of the two directions.
- It is safest to hang from a rope that is
 - at 45 degrees to the vertical.
 - vertical.

Parachuting and Newton's Second Law

Lessons 1-3

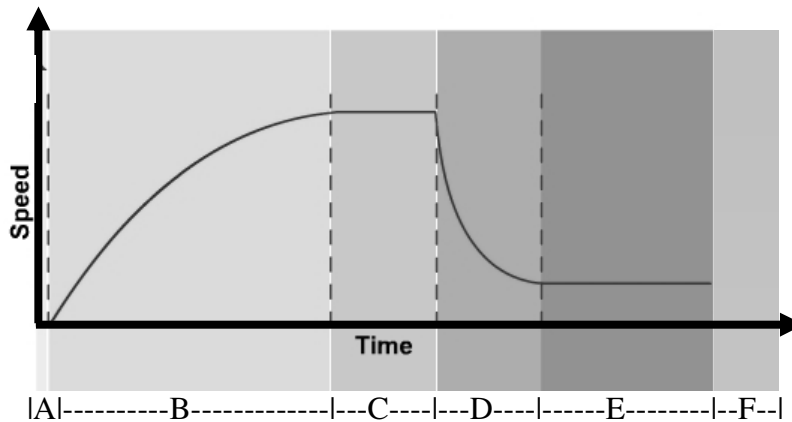
Logical Order

Examine all the pictures. First number the pictures in sequential order from beginning to end. Second, match the graph interval in the matching section to the correct picture. Each picture should be labeled with a number (order of events) and a letter (approximate match to graph): e.g., 1-A.



Matching

Examine all the pictures showing a parachutist falling from a cliff. Then examine the graph charting the speed of the parachutist. Match the parts of the curve to the statements. Include *all* the correct intervals for each statement.



1. Interval where the parachutist's speed is increasing.
2. Interval where the parachutist's speed is decreasing.
3. Interval where the parachutist's speed is constant.
4. Interval where the parachutist is accelerating.
5. Interval where the parachutist is decelerating.
6. Interval where the parachutist is not accelerating or decelerating.

B
D
A-C-E-F
B
D
A-C-E-F