

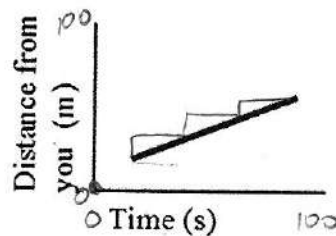
FORCE AND MOTION QUIZ REVIEW

Quiz Date: Oct. 3rd

This quiz will cover some of the information that we talked about from our Force & Motion unit so far. It will consist of some multiple choice, fill-in-the-blank, and short answer questions (including drawing free body diagrams). To prepare you should review DQs, handouts, your Mind Map, and concepts from labs we've done. Make sure you can successfully hit these learning targets:

- I can define motion and describe the difference between speed, velocity, and acceleration.
- I can interpret a scenario to calculate the speed, velocity, and acceleration using the correct units of measure.
- I can define force, give examples of forces, and interpret how forces impact motion.
- I can draw and interpret free body diagrams.

- Which of the following is an example of acceleration?
A. a boat speeding up
B. a wind turbine spinning at a constant speed
C. a jogger slowing down
D. all of the above
- If one person pulls a heavy couch to the left and another person pushes it in the same direction, then:
A. the couch will not move
B. the couch will split in two pieces
C. the net force will be greater than the force exerted by one person
D. the net force will be less than the force exerted by one person
- A car traveling at 80 km/h north is an example of:
A. speed
B. velocity
C. acceleration
D. all of the above
- Friction will _____ the amount of movement between two objects.
A. increase
B. decrease
C. have no effect on
D. speed up
- The graph at right shows an object:
A. moving towards you
B. maintaining constant speed
C. with negative acceleration
D. with zero speed
- A race car driving experiences _____ friction with the road.
A. rolling
B. static
C. fluid
D. sliding
- The support force of a table holding up a book is called _____.
A. applied force
B. gravitational force
C. normal force
D. friction
- A force is a push or a pull. The unit used to measure force are Newtons.
- Air resistance is a type of friction. How is air resistance helpful?



↳ air resistance slows down a sky diver
↳ keeps hail and rain from hitting too hard

10. An object's motion will change if the forces acting on it are unbalanced.

11. A lion runs 400 meters in 20 seconds. What is the lion's average speed? Show the formula you used, your work, and be sure your answer has the correct units.

$$s = \frac{d}{t} \quad s = \frac{400 \text{ m}}{20 \text{ s}} = 20 \text{ m/s}$$

12. A helicopter is traveling at a velocity of 500 km/h over Seattle headed south. It flies over Portland 2 hours later at a velocity of 400 km/h south. What is the helicopter's acceleration? Show the formula you used, show your work and be sure your answer has the correct units.

$$a = \frac{V_{\text{end}} - V_{\text{start}}}{t} \quad a = \frac{400 - 500 \text{ km/h south}}{2 \text{ h}} = \frac{-100 \text{ km/h south}}{2 \text{ h}} = -50 \text{ km/h/h south}$$

13. James Bond is running inside a train. The train is traveling 30 m/s east. Bond is running 3 m/s west. What is James Bond's overall velocity? Show the formula you used, show your work, and be sure your answer has the correct units.

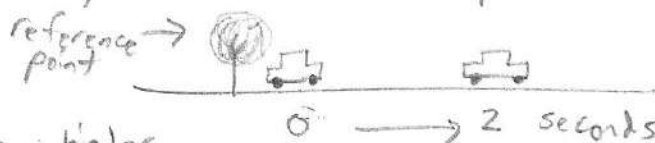
$$V_{\text{train}} - V_{\text{Bond}} = V_{\text{overall}} \quad 30 \text{ m/s} - 3 \text{ m/s} = 27 \text{ m/s east}$$

14. A monkey is sitting in a tree when suddenly he gets dizzy and falls. Right before landing on his feet 5 seconds later, his velocity is 49 m/s. What is his acceleration? Show the formula you used, show your work and be sure your answer has the correct units.

$$a = \frac{V_{\text{end}} - V_{\text{start}}}{t} \quad a = \frac{49 \text{ m/s} - 0 \text{ m/s down}}{5 \text{ s}} = 9.8 \text{ m/s/s down}$$

15. Use an example to show why a reference point is necessary to detect motion.

I know a car is moving when I see its position compared to a stationary tree (reference point).

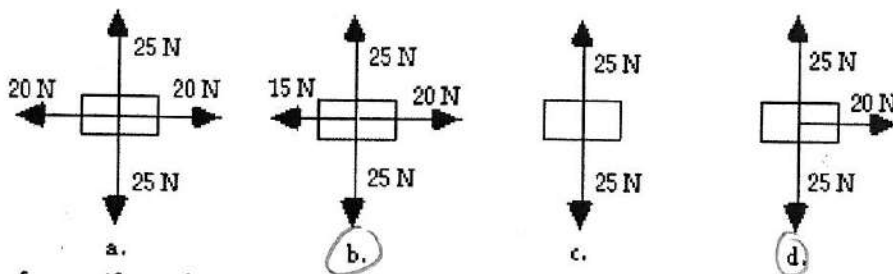


16. Give a specific example of a force that:

- Starts an object moving: I push a binder.
- Stops an object's motion: Friction slows the binder from moving across the floor.
- Causes an object to change direction:

A ball falling hits the floor and bounces up.

17. Which one(s) of the following free body diagrams depict an object accelerating to the right? Circle all that apply. *b d*



18. In the diagram above, which of the objects would be at rest? List all that apply.

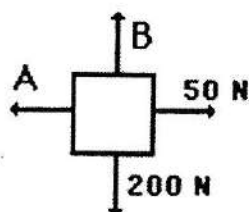
What must be true about the forces if an object is at rest?

a and c The forces must be balanced.

19. In the diagram above, which of the objects would be accelerating the fastest? List all that apply.

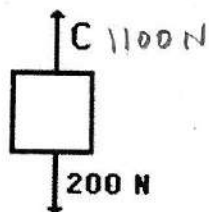
d would accelerate the fastest since it has the greatest force pushing to the right (20N compared to 5N in b)

20. Each diagram below shows the forces acting on an object and states the net force (F_{net}). List what the forces must be in order to create the net force listed.



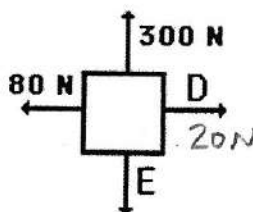
$F_{net} = 0 \text{ N}$

Force A: 50 N
Force B: 200 N



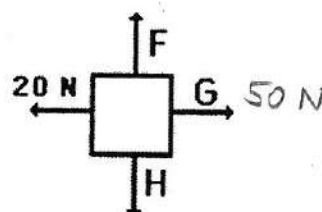
$F_{net} = 900 \text{ N, up}$

Force C: 1100 N



$F_{net} = 60 \text{ N, left}$

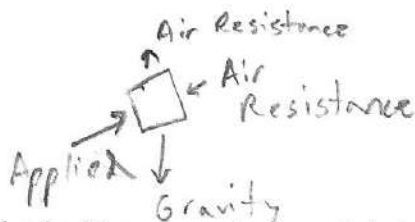
Force D: 20 N
Force E: 300 N



$F_{net} = 30 \text{ N, right}$

Force F: 10 N Force H: 10 N
Force G: 50 N

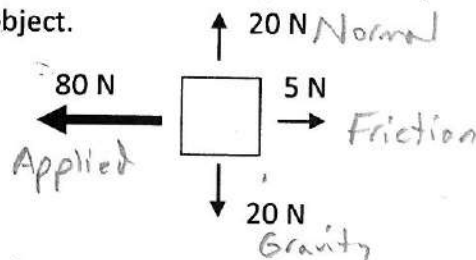
21. A circus monkey is about to be shot from a cannon as part of his thrilling circus act. Draw a free body diagram labeling the forces (name them but don't worry about the strength) acting on him at the moment he is launched from the cannon.



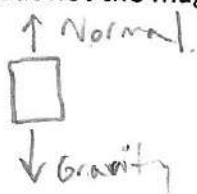
22. Look at the following free body diagram and write a brief scenario of what could be represented by this diagram. Label the forces and determine the net force acting on the object.

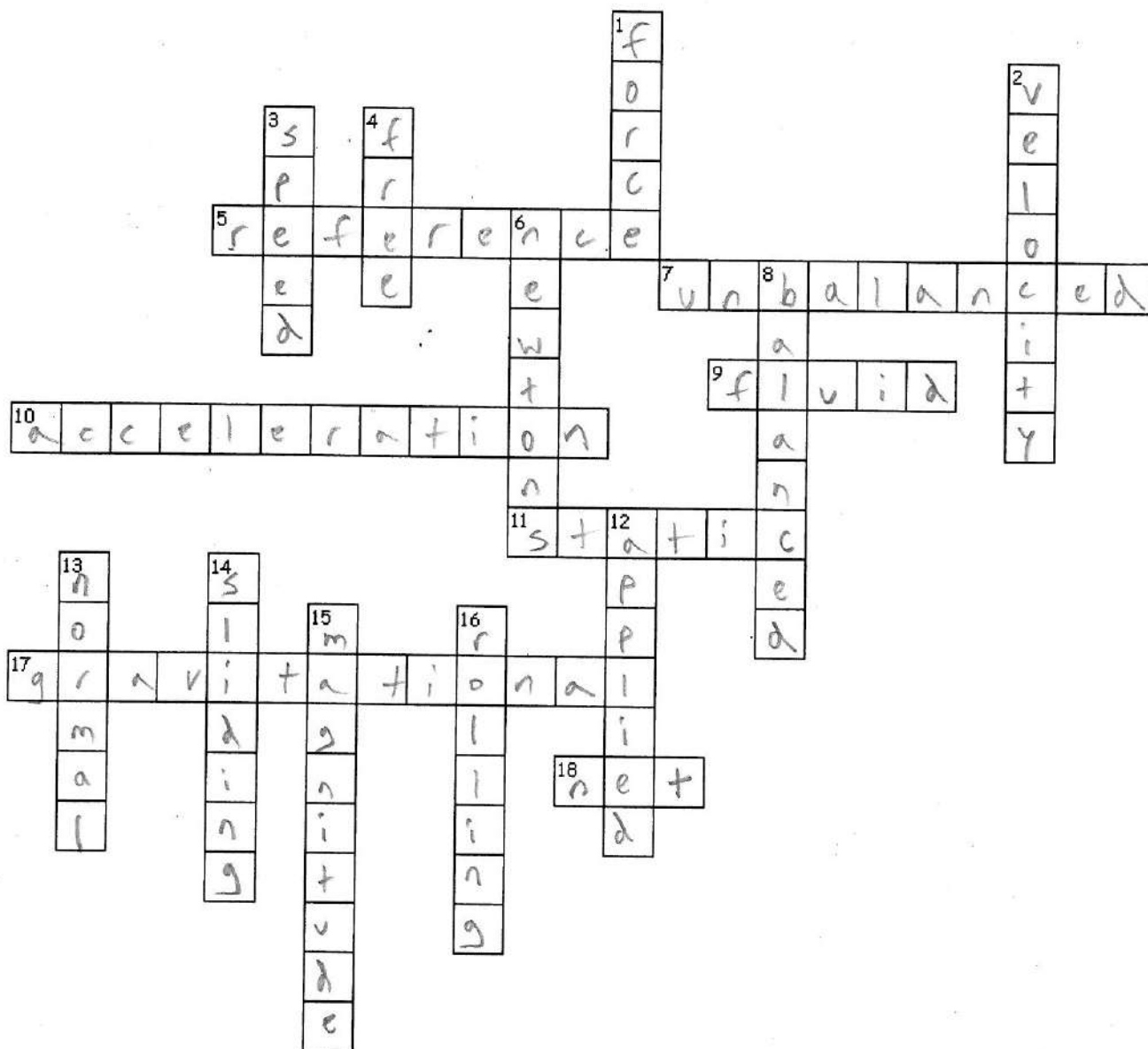
Net Force = 75 N left

Pushing a book across a table towards the left



23. Draw a free body diagram showing the forces acting on a paper rocket sitting on the launch pad (label the names and direction of the forces, but not the magnitude).





Across

5. a _____ point is needed to determine if something is in motion
7. a change in motion will occur if the forces are _____
9. the type of friction encountered while moving through water or air
10. the change of velocity over time
11. the friction that must be overcome in order to get something moving
17. the force of attraction that results because of the masses of objects
18. the overall force acting on an object

Down

1. a push or a pull
2. the speed of an object in a direction
3. the distance traveled in a certain amount of time
4. a _____ body diagram is used to show all the forces acting on an object
6. the units used to measure force
8. no change in motion will occur if the forces are _____
12. the force a person or object applies to another object
13. the support force that opposes gravity
14. the friction that occurs when your foot moves across the ground
15. the scientific word for the strength of a force
16. the type of friction that occurs between wheels and the ground