**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_**

**Physical Science**

**Motion Guided Notes**

**Textbook Pages: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Motion***

* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ point from which motion is measured
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in relation to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Problem: you are a passenger in a car stopped at a stop sign. Out of the corner of your eye, you notice a tree on the side the road begin to move forward. You have mistakenly set \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as the reference point

***Displacement***

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(location) of an object
* Differences between distance and displacement:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**t**

**v**

**d**

***Speed and Velocity:***

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(v)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: speed at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Average Speed:



* Problem: A storm is 10 km away and is moving at a speed of 60 km/h. Should you be worried?
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Speed in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Can change even when the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + If you run around a circular track and end up in the same position you started, your displacement is \_\_\_\_\_\_\_\_\_\_\_\_
  + So is your \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: v = \_\_\_\_\_\_\_\_\_\_\_\_\_\_, so v = \_\_\_\_\_\_\_\_\_\_\_

***Acceleration***

**v**

**t**

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Vf-Vi**

****** a:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Vf:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Vi:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

t:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* SI Unit: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Positive acceleration: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Negative acceleration: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Calculation Examples***

1. **Your neighbor skates at a speed of 4 m/s. You can skate 100 m in 20 seconds. Who skates faster?**
2. **A roller coaster starts down a hill at 10 m/s. Three seconds later, its speed is 32 m/s. What is the roller coasters acceleration?**
3. **Sound travels 330 m/s. If a lightning bolt strikes the ground 1 km away from you, how long will it take for you to hear it?**
4. **How long will it take a car traveling 30 m/s to come to a stop if its acceleration is -3 m/s2?**

***Graphing Motion***

***Graphing Speed***

***Distance vs Time Graphs***

***Slope=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***Steeper slope=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***Straight line=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***Flat line= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***Who started out faster?***

***Who had a constant speed?***

***Describe B from 10-20 min.***

***Find their average speeds:***

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*** is indicated by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ graph

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***Graphing Acceleration***

***Speed vs Time Graphs***

Slope=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Straight line=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Flat line=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

Specify the time period when the object was:

Slowing down:

Speeding up:

Moving at a constant speed:

Not moving:

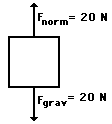
***Force***

* \_\_\_\_\_\_\_\_\_\_: a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that one body exerts on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* What forces are being exerted on the football?

* Net force
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The net force on an object is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of all the forces on the object:
    - Net force = F1 + F2 + F3 + …..
  + When gravity acts on an object, but the object doesn’t fall, there is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force pushing \_\_\_\_\_\_\_\_\_\_ on the object.
* Balanced forces:
  + Forces acting on an object that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Problem #1:* True or False: The object shown in the diagram must be at rest since there is no net force acting on it.**

***A NET FORCE MEANS IT CHANGES VELOCITY! THERE CAN BE BALANCED FORCES AND AN OBJECT KEEP A CONSTANT SPEED!!!!!***

* Force Diagrams…..(DRAW EXAMPLES BELOW)

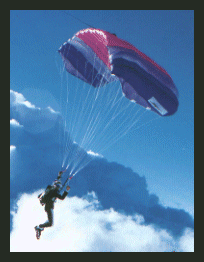
***Friction***

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion between 2 surfaces
* Depends on the:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Friction is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Where there is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(e.g. more weight)

***Static vs Kinetic Friction***

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Friction
  + The force that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the initiation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion between \_\_\_\_\_\_\_\_ surfaces that are in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Friction between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The force that prevents a car wheel from slipping as it rolls on the ground. Even though the wheel is in motion, the patch of the tire in contact with the ground is stationary relative to the ground
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Friction
  + The force that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of two surfaces that are in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over each other.
  + Friction between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Types of Kinetic Friction
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Friction
    - When objects \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_each other
    - Ex:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Friction
    - If a \_\_\_\_\_\_\_\_\_\_\_\_ object \_\_\_\_\_\_\_\_\_\_\_\_ over a \_\_\_\_\_\_\_\_\_ surface
    - Usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than sliding friction
    - Ex:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Friction
    - Any object moving through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Ex; when air slides past a car, can minimized by smooth surfaces
    - Air resistance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion
    - Air resistance to the car’s motion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as the car travels \_\_\_\_\_\_\_\_\_\_\_\_\_ because more air must be moved each second
* Ways to Reduce Harmful/Unwanted Friction
  + Use of lubricants (oil, wax, grease)-motor oil on engine parts
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ways to Increase Helpful Friction
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Air Resistance***

* Aka \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Force that \_\_\_\_\_\_\_ exerts on a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ object to \_\_\_\_\_\_\_\_\_\_\_\_ its motion
* Depends on:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Velocity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ velocity reached by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ object
  + Reached when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + No \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Falling with air resistance:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ objects fall \_\_\_\_\_\_\_\_\_\_\_\_\_ because they accelerate to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ speeds \_\_\_\_\_\_\_\_\_\_\_\_ reaching terminal velocity

Fgrav = Fair

* + Without air resistance, everything would fall at the same speed. (elephant would hit same time as a feather)