

Name: \_\_\_\_\_

**UNIT 2: Natural Laws**

Chapter 5: Natural Laws & Car Control

Gravity- The force that pulls all objects to the Earth's center

- a. When a car goes uphill.....\_\_\_\_\_.
- b. When a car goes downhill.....\_\_\_\_\_.

Center of Gravity- The point around which all of the objects weight is evenly balanced.

- a. \_\_\_\_\_ - easier to turn and maneuver.
- b. \_\_\_\_\_ - hard to turn or maneuver  
(easier to flip: SUV, Trucks, Trailers)

- What are the effects of putting oversized tires on your vehicle?
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**Energy of Motion**- increase as weight and speed increase

- 1. \_\_\_\_\_ - Energy that is Stored in parked car, Gas Tank, Battery.
- 2. \_\_\_\_\_ - Energy while Moving
  - a. The faster a car goes, the longer it will take to stop (example: when a cars speed doubles it needs four times the distance to stop...speed triples=9 times the distance to stop)
  - b. The heavier a car is longer it takes to stop.  
(example: when a cars weight doubles it needs twice the distance to stop)
  - c. The faster and heavier a car is, the harder it will hit an object. (Speed and Weight are a dangerous combo in an accident)

**Energy Of Motion**- (Rear Wheel Skid)

- Steering straight and your vehicle starts to move off to the left.
- This can be caused by using too much power or braking on slick surfaces.
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As your speed drops, your control will increase.

### Friction and Traction-

- \_\_\_\_\_ - the force that keeps each tire from sliding on the road.  
(2 objects rubbing against each other)
- \_\_\_\_\_ - is the friction created by the tires on the road, this allows your car to grip the road more firmly
- \_\_\_\_\_ - Tires ride on a surface of water rather than gripping the roadway. In an instant steering and braking control can be lost. Hydroplaning is caused by a combination of things:
  - a.
  - b.
  - c.

### Tires-

- \_\_\_\_\_ - The grooved surface of a tire that grips the road. The tread allows water to flow through, and away from the tire. This should allow you to keep *Traction* with the roadway. (Check tread visual and with a COIN)
- \_\_\_\_\_ - A tire works best within a range of pressures (32-44 Psi of air pressure) When a tire is inflated properly , it grips the road evenly. When it does this the tires will keep good *Traction* with the roadway.
  - When checking pressure, be sure to check a cold tire. As the temperature of the tire increase, it may give you a false reading of how much pressure is in the tire. You can buy a tire gauge at your local hardware store.

### Factors that Reduce Traction-

- \_\_\_\_\_ - If tires, shock absorbers, or steering systems are worn, traction and control will be reduced.
- \_\_\_\_\_ - Rain and snow or a muddy, sandy, gravel road will reduce traction immediately.

### Dealing with Curves-

1. Two forces act upon your car through curves; energy of motion and traction.
  - a. Your cars \_\_\_\_\_ will increase as your speed increase.  
This force will try to keep your car going in a straight line.
  - b. If you are going to fast and your cars tires can't keep \_\_\_\_\_, you may skid straight off the road.
2. To control your car through a curve you must think about a few things:
  - a. \_\_\_\_\_ - Slow down before you get to the curve
  - b. \_\_\_\_\_ **of Curve-** The sharper the curve the more traction you need so the slower you must go.

c. \_\_\_\_\_ - the heavier the car is the harder for you to overcome Inertia when turning through the curve.

\* *Banked Curve- A curve that is higher on the outside than the inside. This will help to overcome your car's tendency to move to the outside.*

### **Total Stopping Distance-**

- \_\_\_\_\_ - The time it takes for you to use the IPDE process. *Perception distance* is the distance your car travels while you are perceiving
- \_\_\_\_\_ - Once you know a hazard will be a problem, the length of time you take to execute your action. *Reaction Distance* is the distance your car travels while you react.
- \_\_\_\_\_ - the distance your car travels from the time you apply the brakes until you car stops completely.

**\*\*All of these affect the total stopping distance of a car.**

### **Factors which Effect Braking-**

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### **Forces in an Impact**

- Force of Impact- The force of which a moving object hits another object.
- Factors that effect the Force of Impact-

A.

B.

C.

\*Whatever stops YOU the driver is called the **Secondary Crash**

### **Equipment to help Passenger-**

- Passive Restraints- Restraints that do not need the driver to operate. (airbags)
- Active Restraints- The driver must engage this for it to work. (seatbelts)

1. Airbags
2. Seatbelts
3. Child restraints
4. Head Restraints
5. Child Locks
6. Window Locks
7. Padded Dashboard
8. Energy Absorbing Windshield