***Ch. 7 L.2 Notes Part I:*** *5-5.1 Illustrate the effects of force (including magnetism, gravity, and friction) on motion. 5-5.4 Explain ways to change the effect that friction has on the motion of objects (including changing the texture of the surface, changing the amount of surface area involved, and adding lubrication).*

A **force** is any push or \_\_\_\_\_ from one object to another. Force can make things move faster, slower, stop, or change direction. Magnetism, gravity, and friction are 3 forces that can affect \_\_\_\_\_\_\_.

***1. Magnetism****:* A force that acts at a \_\_\_\_\_\_\_\_ and cannot be seen.

The \_\_\_\_\_\_\_\_\_ needle moves because of Earth’s *magnetism*.

 Like poles (S-S or N-N) \_\_\_\_\_\_\_\_\_\_. Opposite poles attract.

The closer the objects, the \_\_\_\_\_\_\_\_\_\_\_\_ the magnetic force.

The magnetic force is greatest at the \_\_\_\_\_\_\_\_\_\_\_.

***2. Gravity****:* A \_\_\_\_\_\_\_\_\_\_\_ that attracts objects to each other.

 noticeable only if one of the objects is very \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The force of gravity between Earth and anything on it is extremely noticeable because the mass of Earth is so \_\_\_\_\_\_\_. The pull of Earth’s gravity makes any object fall to the ground.

The Moon’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pulls on Earth, causing water in the oceans to move toward the Moon (tides).

Earth’s gravity also pulls on the Moon. This force of gravity keeps the Moon moving around \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The Sun’s gravity keeps \_\_\_\_\_\_\_\_\_\_\_ in orbit around the Sun.

***3. Friction:*** The force that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion between two surfaces that are touching. Friction is produced when objects \_\_\_\_\_\_ each other. Friction acts against \_\_\_\_\_\_\_\_\_\_\_\_\_\_.You can see the effect of friction as an object slides across a surface and \_\_\_\_\_\_\_\_\_ down. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the surfaces are, and the \_\_\_\_\_\_\_\_ the surfaces press together, the more friction there will be.

* ***Three variables that influence friction:***

1. ***Texture of the surface****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ surfaces* create more friction; *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ surfaces* create less friction.
2. ***Amount of surface area:*** The more surface area, the more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between objects in liquids and gases (but not between 2 solids). Examples of this include air \_\_\_\_\_\_\_\_\_\_\_\_\_ (such as the size of a parachute) or the resistance of an object as it glides through water (a boat).
3. ***Lubrication:*** *Lubrication* such as oil or grease \_\_\_\_\_\_\_\_\_\_\_\_\_ friction. Without lubrication, moving parts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ would slow down or stop very quickly.

***Ch. 7 L.2 Notes Part I:*** *5-5.3 Explain how unbalanced forces affect the rate and direction of motion in objects.*

**Unbalanced forces** change the rate and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

of the motion of objects.

Several forces can act on an object at the \_\_\_\_\_\_ time.

Sometimes forces are balanced which means that they are equal in strength but opposite in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Balanced forces do not change the motion of objects; only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forces cause changes in motion.

An unbalanced force is one that does not have another force of equal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (strength) and opposite direction.

***Rate of motion***is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the object or how fast or slow the object is moving.

Unbalanced forces can change the rate or direction of motion of an object in different ways:

***1. Object at rest***

If an unbalanced force acts on an object at rest the object will move in the direction of the \_\_\_\_\_\_\_\_\_\_\_\_\_.

A stronger force (push or pull) will make it move \_\_\_\_\_\_\_\_\_\_\_.

***2. Object in motion***

If an object is moving, an unbalanced force will change the motion of the object, either by \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the object up, slowing it down, or making it \_\_\_\_\_\_\_\_\_\_\_\_ directions.

* If the force is applied in the \_\_\_\_\_\_\_ direction as the object is moving, the object will speed it up.
* If the force is applied in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction as the object is moving, the object will slow it down or stop it.
* If the force is applied to the side of the moving object, the object will \_\_\_\_\_\_\_\_\_\_\_.

***Ch. 7 L.2 Notes Part I:*** *5-5.1 Illustrate the effects of force (including magnetism, gravity, and friction) on motion. 5-5.4 Explain ways to change the effect that friction has on the motion of objects (including changing the texture of the surface, changing the amount of surface area involved, and adding lubrication).*

A **force** is any push or pull from one object to another. Force can make things move faster, slower, stop, or change direction. Magnetism, gravity, and friction are 3 forces that can affect motion.

***1. Magnetism****:* A force that acts at a distance and cannot be seen.

The compass needle moves because of Earth’s *magnetism*.

 Like poles (S-S or N-N) repel. Opposite poles attract.

The closer the objects, the greater the magnetic force.

The magnetic force is greatest at the poles.

***2. Gravity****:* A pull that attracts objects to each other.

 noticeable only if one of the objects is very large.

The force of gravity between Earth and anything on it is extremely noticeable because the mass of Earth is so large. The pull of Earth’s gravity makes any object fall to the ground.

The Moon’s gravity pulls on Earth, causing water in the oceans to move toward the Moon (tides).

Earth’s gravity also pulls on the Moon. This force of gravity keeps the Moon moving around Earth.

The Sun’s gravity keeps Earth in orbit around the Sun.

***3. Friction:*** The force that opposes motion between two surfaces that are touching. Friction is produced when objects touch each other. Friction acts against motion.You can see the effect of friction as an object slides across a surface and slows down. The rougher the surfaces are, and the harder the surfaces press together, the more friction there will be.

* ***Three variables that influence friction:***

1. ***Texture of the surface****Rough surfaces* create more friction; *Smooth surfaces* create less friction.
2. ***Amount of surface area:*** The more surface area, the more friction between objects in liquids and gases (but not between 2 solids). Examples of this include air resistance (such as the size of a parachute) or the resistance of an object as it glides through water (a boat).
3. ***Lubrication:*** *Lubrication* such as oil or grease reduces friction.

Without lubrication, moving parts of machines would slow down or stop very quickly.

***Ch. 7 L.2 Notes Part II:*** *5-5.3 Explain how unbalanced forces affect the rate and direction of motion in objects.*

**Unbalanced forces** change the rate and direction of the

motion of objects.

Several forces can act on an object at the same time.

Sometimes forces are balanced which means that they are equal in strength but opposite in direction.

Balanced forces do not change the motion of objects; only unbalanced forces cause changes in motion.

An unbalanced force is one that does not have another force of equal magnitude (strength) and opposite direction.

***Rate of motion***is the speed of the object or how fast or slow the object is moving.

Unbalanced forces can change the rate or direction of motion of an object in different ways:

***1. Object at rest***

If an unbalanced force acts on an object at rest the object will move in the direction of the force.

A stronger force (push or pull) will make it move faster.

***2. Object in motion***

If an object is moving, an unbalanced force will change the motion of the object, either by speeding the object up, slowing it down, or making it change directions.

* If the force is applied in the same direction as the object is moving, the object will speed it up.
* If the force is applied in the opposite direction as the object is moving, the object will slow it down or stop it.
* If the force is applied to the side of the moving object, the object will turn.