**NAME: ANSWER KEY** Handed out on **2/12/19** Test on **2/21/19**

UNIT 3: INVISIBLE FORCES STUDY GUIDE

**IMPORTANT VOCABULARY:** You should be able to define each word and use it in a meaningful sentence.

**Force: a push or a pull; Your hand can give a force that’s either a push or a pull.**

**Balanced forces: two or more forces that together, cause no change in motion; The car stays still when two students push on the car with the same force from opposite directions.**

**Unbalanced forces: two or more forces that together, cause a change in motion; When two kids were pushing against another kid, there were unbalanced forces and the kid fell down**

**Net force: all of the forces acting on an object added together; Since the net forces acting on an object are equal to zero, the object stays still.**

**Gravity: the force that pulls things towards the earth; When you go into space the force of gravity is much weaker than it is on earth.**

**Mass: how much matter an object has; Sasha has a smaller mass than an elephant.**

**Friction: the resistance force of one surface against another surface; You feel friction when you rub your hand against the carpet.**

**Resistance: when one force goes against another force; The magnets had a lot of resistance because both of their south poles were facing one another.**

**Magnet: an object that produces a magnetic field; it attracts (pulls) objects that are made of iron or steel towards it and repels (pushes) other magnetic objects away from it; The magnet was attracted to the iron.**

**Attract: to pull towards; The magnet attracted the iron nut.**

**Repel: to push away; The magnet repels the other magnet.**

**Magnetic poles: the two ends of the magnet (north and south) where the magnetic field flows from; North and south are both magnetic poles.**

**Magnetic field: the area around the magnet that can attract and repel objects when they are inside it; The magnet attracts the steel when it is inside of the magnetic field.**

**PRACTICE QUESTIONS:**

3-PS2-1:

**What are these forces? Write balanced or unbalanced next to each situation.**

1. An arch bridge that doesn’t move when cars drive over it: **balanced**
2. Two friends push on a toy truck from opposite directions and the truck moves to the left: **unbalanced**
3. When teachers and students have a tug of war and the teachers cause the kids to fall: **unbalanced**
4. Two friends push on a toy truck from opposite directions and the truck doesn’t move: **balanced**

**Predict:** If my friend and I push on an object with equal force from opposite directions, what will MOST LIKELY happen:

**The forces would be balanced. The truck would not move.**

3-PS2-2:

Two children pushed on a truck from opposite directions. They recorded what happened when they pushed on the truck at the same time.

|  |  |
| --- | --- |
| Trial # | Motion of object |
| 1 | Truck moved right |
| 2 | Truck moved left |
| 3 | Truck stayed still |
| 4 | Truck stayed still |

**Explain why the truck moved in trials 1 and 2, but not in trials 3 and 4.**

**In trials 1 and 2, they pushed with unequal force and in trials 3 and 4, they pushed with equal force.**

**Predict what will happen if I have 2 friends push on the same side of the truck. What evidence did you use to make this prediction?**

**The truck will move in the direction that the people are pushing. I know this because in trials 1 and 2, the truck moved in the direction of the stronger force.**

3-PS2-3:

What causes friction?

**The tiny, microscopic bumps on all surfaces cause friction when they are rubbed against one another.**

Why do we experience friction, even on a smooth slide?

**Every surface has microscopic bumps that push against you when you go down the slide.**

How can you create more friction? **Make the surface bumpier**

How can you create less friction? **Make the surface smoother**

When I moved two bar magnets together, they repelled. Why did that happen? **The same poles of the magnet (north and north or south and south) were facing each other**

Which charged particles move in between surfaces when you rub them together? **Negative charges**

Why did the paper stick to my balloon in my demonstration during class? **The paper stuck to the balloon because the balloon picked up extra negative charges from my arm. The extra negative charges moved to the paper, which had no charge and was neutral. The paper stuck to the balloon because it was picking up those negative charges.**

Draw a picture of the charges on the balloon and my arm after I’ve rubbed the balloon on my arm for 30 sec.





**Before**: Both arm and balloon are neutral (specific number of + and – charges does not matter)

**After**: The arm gives some of its negative charges to the balloon, making it negatively charged.

3PS2-4:

**I keep losing my keys in my purse. Keys are not magnetic, but how could I use magnets to help solve this problem?**

IDEA: **I would attach a magnet to my keys and put a magnet on the side of my purse.**

HOW TO TEST YOUR IDEA: **I would attach the keys to the magnet. I would shake my purse around for 10 seconds (using a timer). Then I would see if the keys were still there. I would repeat this 3 times to make sure it worked each time.**

**To study for your test:**

* Re-watch the Mystery Science videos (videos are linked on the 3rd grade website)
* Create vocabulary flash cards (Unit 3 vocabulary is posted on the third grade website)
* Review science notebook notes