**FPS – Forces Notes**

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| I can… |
| *Define force, gravity, and projectile motion.*  *Explain types of friction.* |

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| ***Forces - Notes*** | | |
| Bellwork – See the image to the right. What are pushes and pulls acting in this image? Write your ideas below. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | HSPS_Ch12s1-p356-Umbrlla |
| 1. ***What is a force?***  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. ***How do forces affect the motion of an object?***   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| 1. ***How do we measure force?***   The unit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which represents the force that causes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **1 N =** | | |
| 1. ***How do we represent forces?*** We can use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to show \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of forces. | | |
| 1. We can combine forces to determine whether they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Which do you think is happening in the picture to the right?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | HSPS_Ch12s1-p358-TugWar | |
| 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are forces that combine to produce a net force of zero, and do not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an object. 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are forces that combine to produce a net force **not** equal to zero and cause a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. 3. ***How do we combine forces?***   Look at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each force, and add them.  For our purposes, forces to the ***right and up*** will be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and forces to the ***left and down*** will be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | |
| 1. Combine the following forces.   HSPS_Ch12s1-p358-ArrwA  **20N**  **20N**  HSPS_Ch12s1-p358-ArrwB  **-40N**  **20N**  HSPS_Ch12s1-p358-ArrwC  **20N**  **-20N** | | |
| Which are ***unbalanced***? \_\_\_\_\_\_\_\_\_ Which are ***balanced***?\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| 1. ***What is friction?***   *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*   1. ***What are the four main types of friction?*** 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the friction that acts on objects that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is always acting in the direction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force. 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a force that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an object as it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is less than static friction. 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the friction force that acts on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ times less than static or sliding. 5. http://www.buzzle.com/images/sports/skydiving/air-resistance.jpg\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ opposes the motion of an object through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When it acts on an object through air, it is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (or drag). As the speed of the object increases, the fluid friction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | |
| 1. ***What is gravity?***   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a force that acts between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force and can act over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It pulls \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | |
| 1. Based on what we know, let’s try and describe the forces at play in this image of a boulder resting on a cliff. HSPS_Ch12s1-p361-Rock   What about for this person falling with a parachute? http://www.physicsclassroom.com/Class/newtlaws/u2l3e4.gif | | |
| 1. ***What happens to falling objects?***   Both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ affect the motion of a falling object.  As objects fall to the ground, they gain speed so they \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the constant velocity of a falling object when the force of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equals the force of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | |
| 1. What happens when changing forces on falling objects?   When you throw a ball, it follows a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. But why? It falls in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which is the motion of a falling object (or a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) after it is given an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Air resistance and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ act on the projectile.  Compare images A and B. Which is a projectile?  HSPS_Ch12s1-p362-GrvtyA HSPS_Ch12s1-p362-GrvtyB  Which will hit the ground first? | | |
| **Practice Questions** | | |
| Try these on your own or with a neighbor and then we will check our answers!   1. If an object is at rest, what must be true of the net force? 2. Give an example of the each of the 4 types of friction. 3. Describe two properties of the Earth’s gravity. 4. Why do projectiles follow a curved path? 5. Define the units of force. | | |