***Date :*** _____

# SPU3UI Unit 2 : DYNAMICS

## Dynamics:

Recall

Kinematics – the study of _____

Dynamics – the study of _____ that cause _____

The symbol for force is ____

Force is measured in _____: symbol __

1___ is very small – about the _____ of ___ quarters held in your hand.

*Note – the Newton is named after Sir Isaac Newton who was the most important scientist of his time and came up with the key principles that are still followed today.*

## ***Definition of Force***

A force is a _____ or a _____ on one object caused by the _____ with another object. Forces only exist as a result of the _____.

## ***Fundamental Forces***

| Name | Relative Strength | Range | Effect |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

## ***Everyday Forces***

| Type | Description | Action |
|---|---|---|
| | | |
| | | |
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## ***Free Body Diagrams***

Free Body Diagrams (FBD's) contain <u>all</u> of the forces acting on the body of interest.

Example – sports car driving down a highway. Draw the FBD of the sportscar.

Apply the method described above and using the everyday forces in the table on the previous page, construct free-body diagrams for the various situations described below.

1. A book is at rest on a tabletop. Diagram the forces acting on the book.
2. A girl is suspended motionless from the ceiling by two ropes. Diagram the forces acting on the combination of girl and bar.
3. An egg is free-falling from a nest in a tree. Neglect air resistance. Diagram the forces acting on the egg as it is falling.
4. A flying squirrel is gliding (no *wing flaps*) from a tree to the ground at constant velocity. Consider air resistance. Diagram the forces acting on the squirrel.
5. A rightward force is applied to a book in order to move it across a desk with a rightward acceleration. Consider frictional forces. Neglect air resistance. Diagram the forces acting on the book.
6. A rightward force is applied to a book in order to move it across a desk at constant velocity. Consider frictional forces. Neglect air resistance. Diagram the forces acting on the book.
7. A college student rests a backpack upon his shoulder. The pack is suspended motionless by one strap from one shoulder. Diagram the vertical forces acting on the backpack.
8. A skydiver is descending with a constant velocity. Consider air resistance. Diagram the forces acting upon the skydiver.
9. A force is applied to the right to drag a sled across loosely packed snow with a rightward acceleration. Diagram the forces acting upon the sled.
10. A football is moving upwards towards its peak after having been *booted* by the punter. Diagram the forces acting upon the football as it rises upward towards its peak.
11. A car is coasting to the right and slowing down. Diagram the forces acting upon the car.