Newton's Second Law
Lesson Notes

Newton's Second Law:
The acceleration of an object is ...
- **Directly proportional** to the **net force** that acts upon it, and
- **Inversely proportional** to the **mass** of the object, and
- In the **same direction as** the **net force**.

Acceleration and Net Force
- Double F_{net} ⇒ Double a
- Triple F_{net} ⇒ Triple a
- Halve F_{net} ⇒ Halve a
- By whatever *factor* $\mathbf{F_{net}}$ is changed, **a** is changed by the

Use the above to fill in the missing table cells.

	F_{net} (N)	a (m/s^2)
1	20.0	4.0
2	40.0	8.0
3	60.0	12.0
4	10.0	2.0
5	5.0	
6	30.0	
7	80.0	

Your Turn to Practice $a \propto F_{net}$
1. An object has an acceleration of 16.0 m/s/s. If the net force acting upon this object were doubled, then its new acceleration would be _____ m/s/s.

2. An object has an acceleration of 16.0 m/s/s. If the net force acting upon this object were tripled, then its new acceleration would be _____ m/s/s.

3. An object has an acceleration of 16.0 m/s/s. If the net force acting upon this object were halved, then its new acceleration would be _____ m/s/s.

4. An object has an acceleration of 16.0 m/s/s. If the net force acting upon this object were 1/3 the original value, then its new acceleration would be _____ m/s/s.

Acceleration and Mass

- Double m ⇒ Halve a
- Triple m ⇒ One-third a
- Halve m ⇒ Double a
- By whatever *factor* **m** is changed, **a** is changed by the reci

	m (kg)	a (m/s^2)
1	4.0	12.0
2	8.0	6.0
3	12.0	4.0
4	2.0	24.0
5	1.0	
6	6.0	
7	16.0	

Use the above to fill in the missing table cells.

Your Turn to Practice a α 1/m

1. An object has an acceleration of **16.0 m/s/s**. If the mass of this object were **doubled**, then its **new acceleration** would be _____ m/s/s.

2. An object has an acceleration of **16.0 m/s/s**. If the mass of this object were **tripled**, then its **new acceleration** would be _____ m/s/s.

3. An object has an acceleration of **16.0 m/s/s**. If the mass of this object were **halved**, then its **new acceleration** would be _____ m/s/s.

4. An object has an acceleration of **16.0 m/s/s**. If the mass of this object were **1/3 the original value**, then its **new acceleration** would be _____ m/s/s.