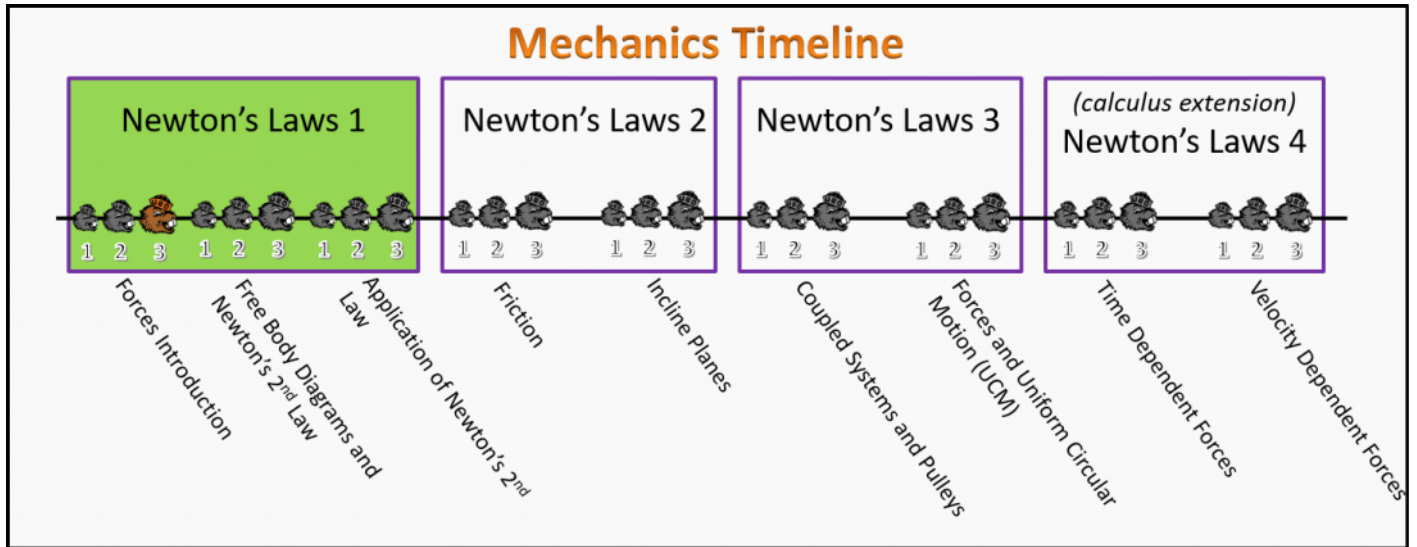


Newton's Laws 1

Foundation Stage (N1.L1.3)

Post-Lecture 1 Forces Introduction



Questions

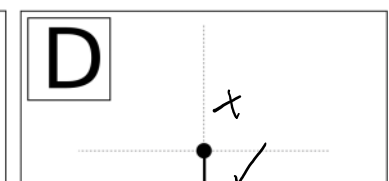
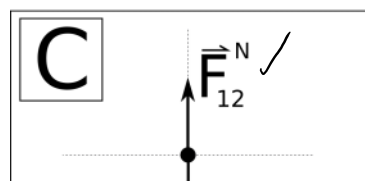
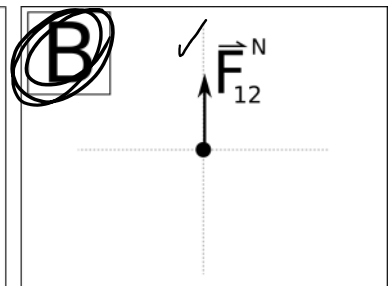
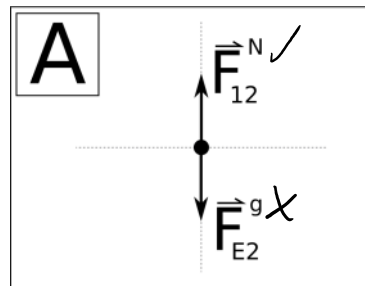
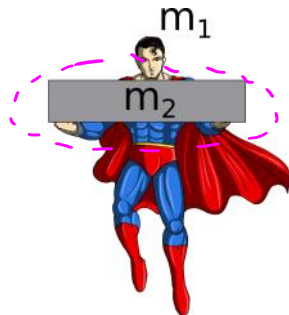
N1.L1.3-01

Description: Match proper FBD with given scenario.

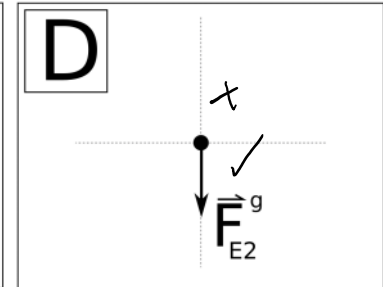
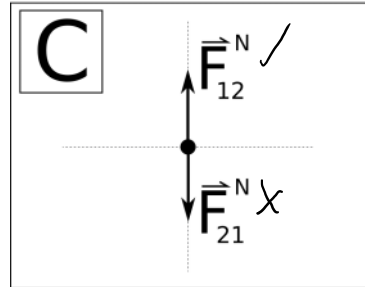
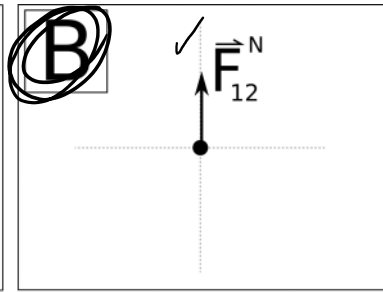
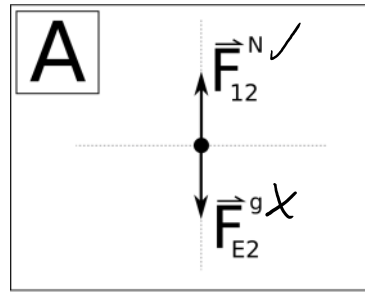
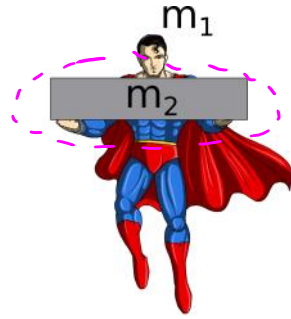
Learning Objectives: [?]

Problem Statement: Superman (m_1) is delivering a package of mass m_2 from the Earth to the planet Omicron Persei 8. While superman is pushing the object in outer space i.e. far away from massive objects, which of the following free body diagrams best represent the forces acting on the package?

- (1) A
- B
- (3) C
- (4) D



- (1) A
- B
- (3) C
- (4) D

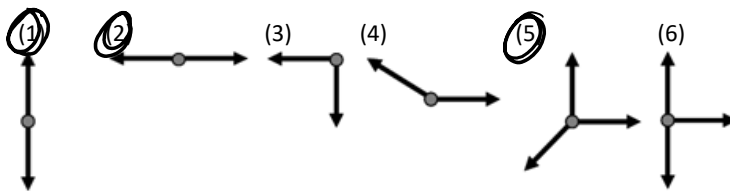


N1.L1.3-02

Description: Which systems can be in equilibrium?

Learning Objectives: [?]

Problem Statement: The following (2-dimensional) force diagrams shows the directions of all the forces acting on the relevant object. Assuming that the sizes of each force can be adjusted to any nonzero value but the directions cannot be changed, which of the objects can be put into equilibrium?



N1.L1.3-03

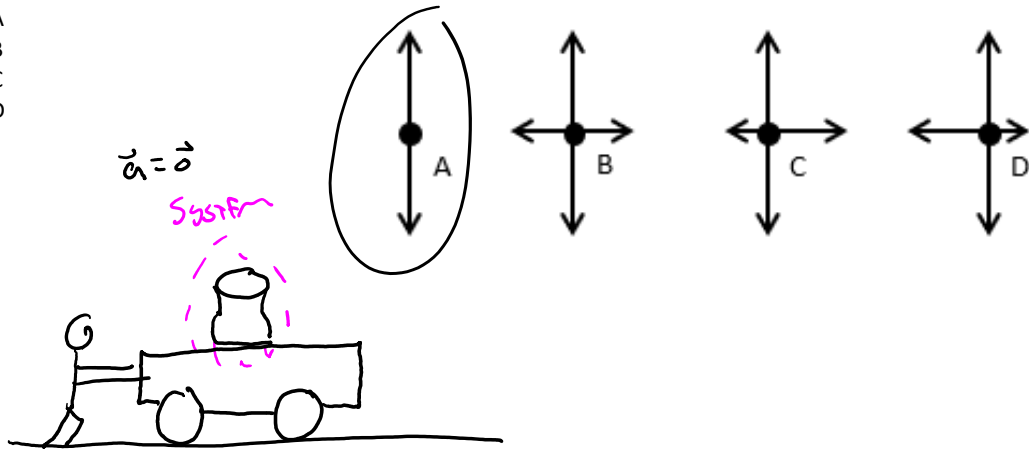
Description: Forces acting on an object in equilibrium.

Learning Objectives: [?]

Problem Statement: A person pushes a cart to the left at constant velocity on a level floor. A teapot sits on the cart without slipping.

Assume there is no air resistance. Choose the correct free-body diagram for the teapot.

- (1) A
- (2) B
- (3) C
- (4) D



N1.L1.3-04

Description: Given mass, weight, and acceleration in an elevator, calculate reading of scale.

Learning Objectives: [?]

Problem Statement: A person with a mass of 80 kg has a force of gravity from the earth on them of about 800 N. This person is standing on a scale while in an elevator that is moving upwards but slowing down with an acceleration of 1 m/s². What value does the scale read?

- (1) 800 N
- (2) 880 N
- (3) 720 N



FBD M₁



$$\sum F_y = M a_y$$

$$|\vec{F}_{AI}^N| - |\vec{F}_{EI}^G| = M_1 a_{1y}$$

$$F_{AI}^N - 800 = -(80)(1)$$

$$F_{AI}^N \approx 720 \text{ N}$$

N1.L1.3-05

Description: Given mass, initial velocity, and net force, match correct velocity vs time graph.

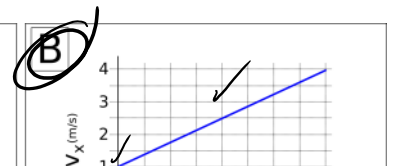
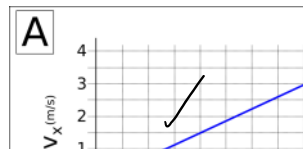
Learning Objectives: [?]

Problem Statement: Benny the beaver is initially traveling in the x-direction at 1 m/s. The net force in the x-direction on Benny the beaver is 30.0 N. Benny has a mass of 20 kg. Which velocity vs time graph best represents Benny's motion along the x-direction?

- (1) A
- (2) B
- (3) C
- (4) D

$$\sum F_x = 30 \text{ N}$$

$$M a_x = 30$$



- (3) C
- (4) D

$$Ma_x = 30$$

$$20 a_x = 30$$

$$a_x = 1.5 \text{ m/s}^2$$

↑
SLOPE OF $V_x(t)$

