

# ACT 13: Newton's laws medley

## Part 1: Forces and Newton's First Law

Go to <http://www.physicsclassroom.com/Class/newtlaws/u2l1a.cfm>

Use this page to answer the following questions **ON A SEPARATE SHEET OF PAPER!**

1. Why is Newton's first law also referred to as the law of inertia?
2. On this page, click on <http://www.physicsclassroom.com/Class/newtlaws/u2l1d.cfm#balanced> . Here you will see the discussion on balanced and unbalanced forces. Copy down the 3<sup>rd</sup> diagram of the book being moved, and add notes to the diagram such that you can show why forces on the book are not balanced.
3. Now go back to the previous page, scroll down to the bottom and click on the animation link. Read through the first 3 paragraphs. Looking at the animation, how does this demonstrate Newton's first law?
4. Now scroll down and click the link that states Newton's First Law of Motion. This should take you back to the initial page. Scroll down to the bottom, click on lesson two the "Meaning of force."
  - a. What is a "contact" force and state the 6 examples
  - b. What is a "at a distance" force and state the 3 examples

## PART 2: Newton's Second Law

5. Now click on

<http://www.physicsclassroom.com/class/newtlaws/Lesson-3/Newton-s-Second-Law> , Newton's Second Law

- a. Why does the acceleration have to be  $0\text{m/s}^2$  for the forces to be balanced?
  - b. As the force acting on an object is increased, what happens to the acceleration?
  - c. If the force is applied but to an object with more mass, what happens to the acceleration?
  - d. What is the formula describing Newton's Second Law?
  - e. Now scroll down to the table with the 5 practice problems. Set those up and answer below. Check your answers once you have tried them and make corrections as needed.
  - f. Using your answers, from the table. Looking at A and B, what happens to the acceleration when the force is doubled, keeping the mass constant?
  - g. Looking at 2 and 3, what happens to the acceleration when the force is kept constant and the mass is doubled?
6. What is true about the net force in relation to the direction?
- a. Try the two oil drop problems to check your understanding.

### **Part 3: The Big Misconception**

Scroll to the bottom of the page and click on the “The Big Misconception”

7. As you are reading through, what idea is referred to as the most common misconception?

8. Reading the first situation with Anna and Noah, with whom do you agree with and why?

Now click on the check answer and add any new information to your answer to make it accurate.

9. Read through the sledding paragraph, and at the end, it is said that Forces do not cause \_\_\_\_\_; forces cause \_\_\_\_\_.

10. Continue reading....why does a book on a table actually come to a stop?

### **Part 4: Newton’s Third Law**

Now click on Lesson 4, Newton’s 3<sup>rd</sup> Law of Motion

11. State Newton’s 3<sup>rd</sup> Law of Motion

12. When it is said that forces come in pairs, what does this mean in terms of size and direction?

13. Choose one of the 3 examples given in the reading and put in your own words.

14. Scroll down to the “Check Your Understanding” section. Try the 4 problems and check your answers.

15. Now click on the Action Reaction pairs link in the yellow column to the left. Read and do the subsequent problems.