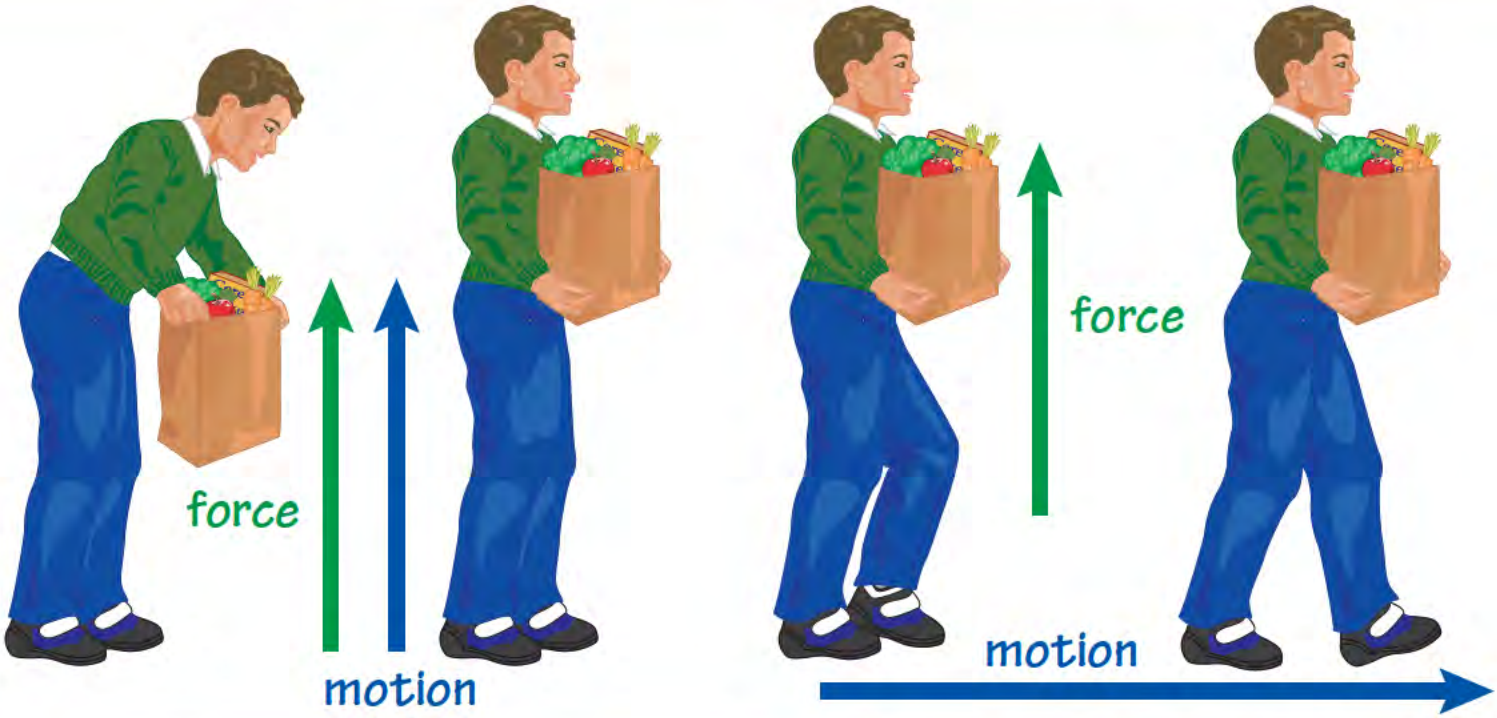
Work, Power & Simple Machines
Learning Guide



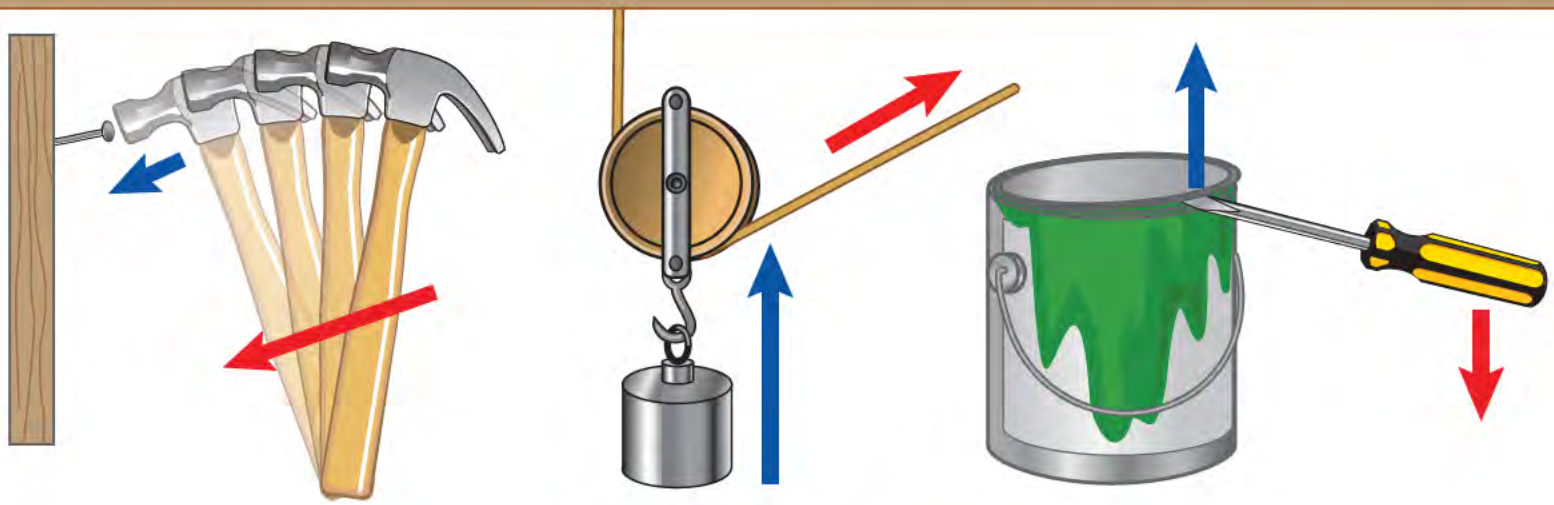


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Table of Contents

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ISBN 978-1-63212-074-8

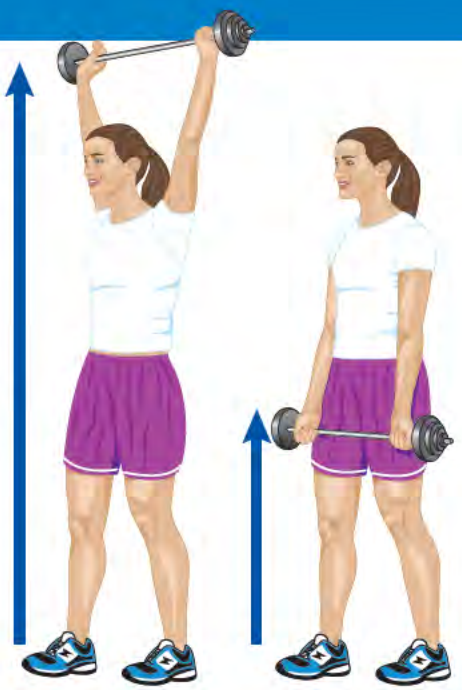
Printed in the United States of America.

LESSON 1

WHAT IS WORK?

Definition of Work

Work occurs when a **force** is exerted on an object and causes the object to **move**. The **force** exerted and the movement of the object must be in the **same direction** to be considered **work**.

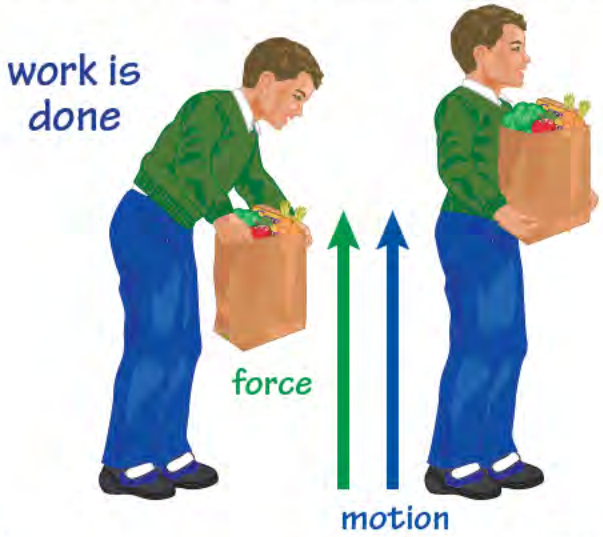


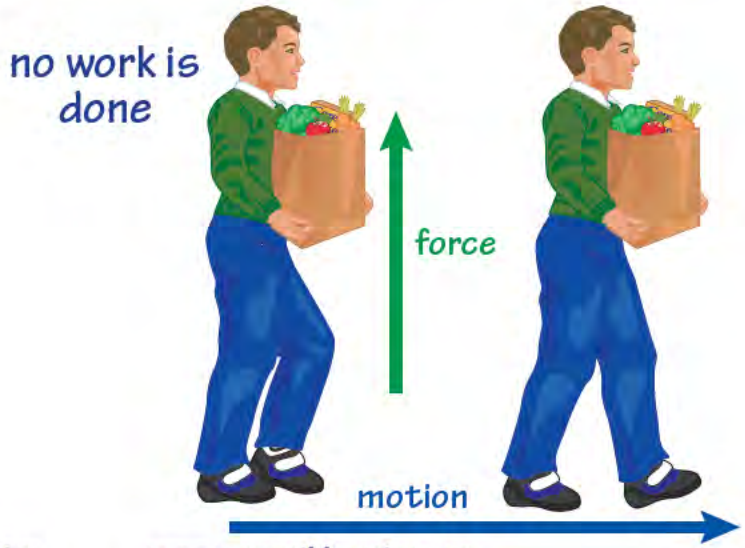
Work and Motion

If **force** is exerted and an object does not move, then **work** does **not** occur. For example, if you try to push a very heavy object, but the object **does not move**, then **work** is **not done**.

Work and Direction

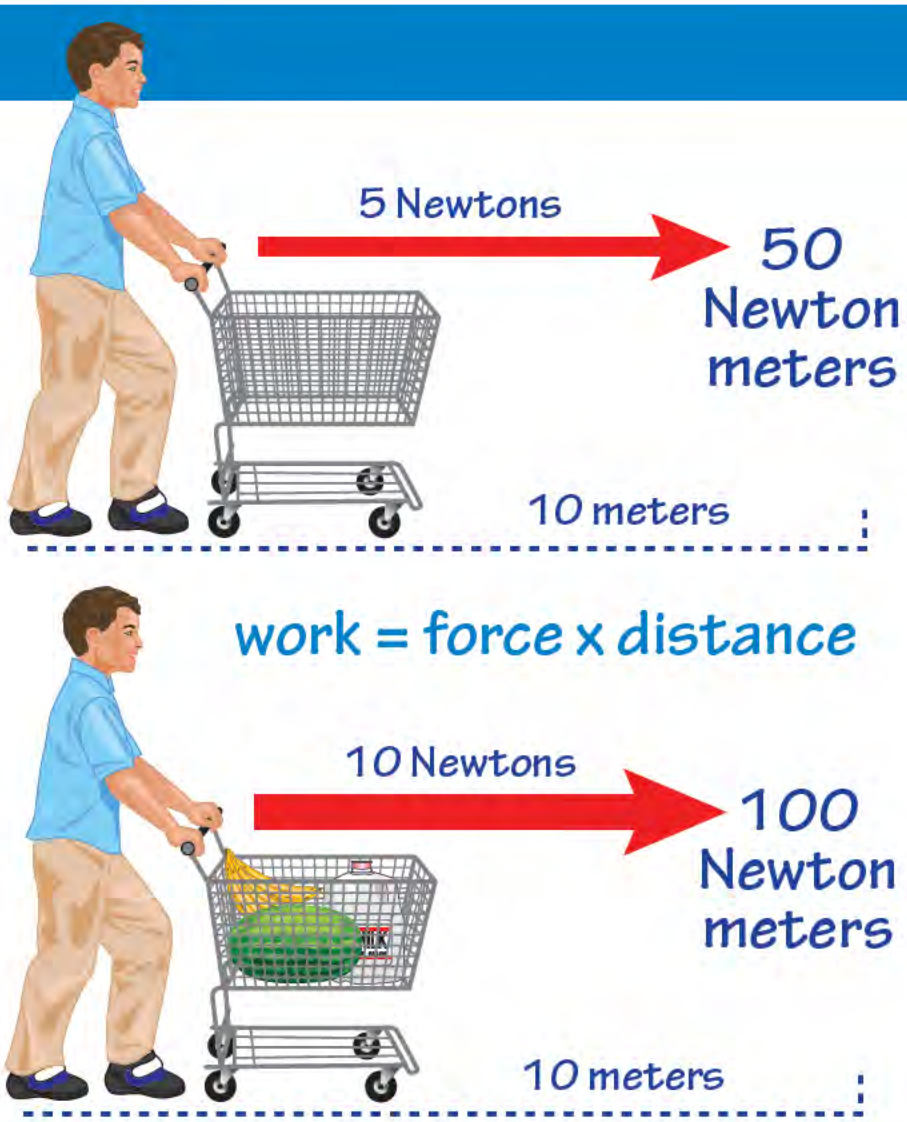
If the **force** exerted is in a **different direction** than the movement of an object, then **work** **does not** occur. When you pick up a grocery bag, the exerted force and movement of the grocery bag are in the **same direction**, so **work** **is done**. However, when you carry a grocery bag, you are exerting force in a vertical direction to hold the bag, but the bag moves in a horizontal direction as you walk. Carrying the grocery bag is **not** considered **work**.

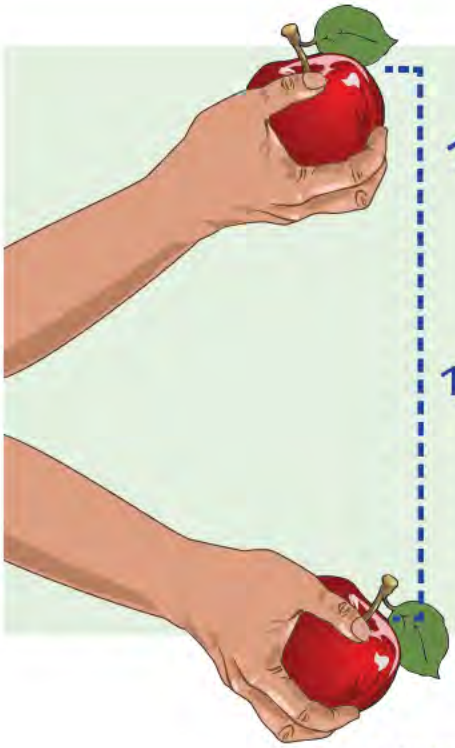




Calculating Work

The equation for **work** is **force times distance**. For example, if you use 5 Newtons of force to push a cart 10 meters, then the amount of **work** is equal to 50 Newton meters. If the cart becomes heavier and you need to exert 10 **Newtons of force** to move it the same distance, then the amount of **work** is equal to 100 Newton meters.





A Joule Is a Unit of Work

A **Newton meter** is also known as a **joule**. One **joule** is equal to the amount of **work** that is exerted when one **Newton** is exerted to move an object **one meter**.