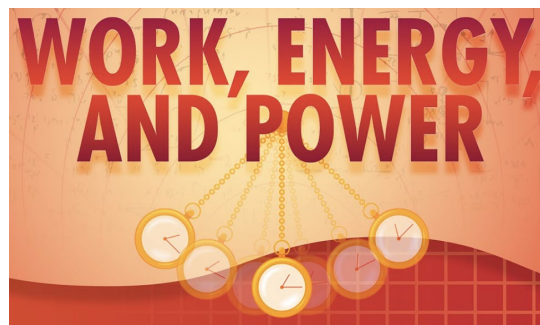


Grade 5 Science  
Week of February 22 – February 25

Work & Power

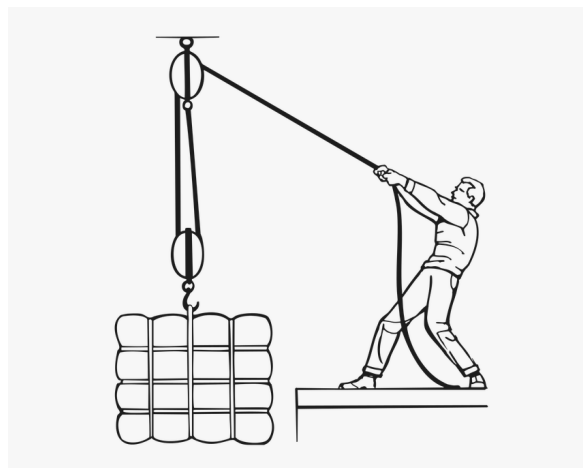
**Work, Energy, and Power**

In physics, **work**, **energy**, and **power** are all connected. Before we get into explaining these concepts further, let's take a look at what these words mean when they are used in physics.



**Work:** When force is applied to an object, resulting in the movement of that object... work is being done! In other words, work is the transfer of energy.

**For example,** below you will see an image of George, who is using a machine called a pulley to help him lift the parcel. George is using his energy to pull the rope, resulting in the parcel being lifted up.





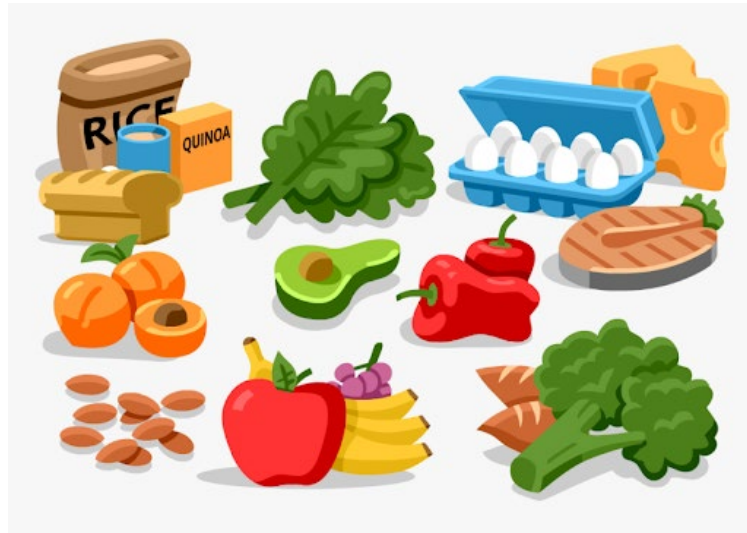
Something important to remember is that **if an object doesn't move, no work has been done.**

**For example:** Even if you push on a brick wall with all of your might, and **the wall doesn't move, no work has been done.**

But, If you drop a pencil and it falls to the floor, **work has been done because the pencil moved.**

**Energy:** The **ability** or the **capacity to do work** is called energy.

**For example,** the food that George ate this morning gave him the energy to pull the parcel up. The work that George is doing requires him to have energy. In other words, the work that George is doing is taking some of his energy away, so later on he will need to 're-fuel' by resting, drinking water and eating more food, in order to regain his energy.



**Power:** The rate at which work is done. Power is measured in Watts (W).

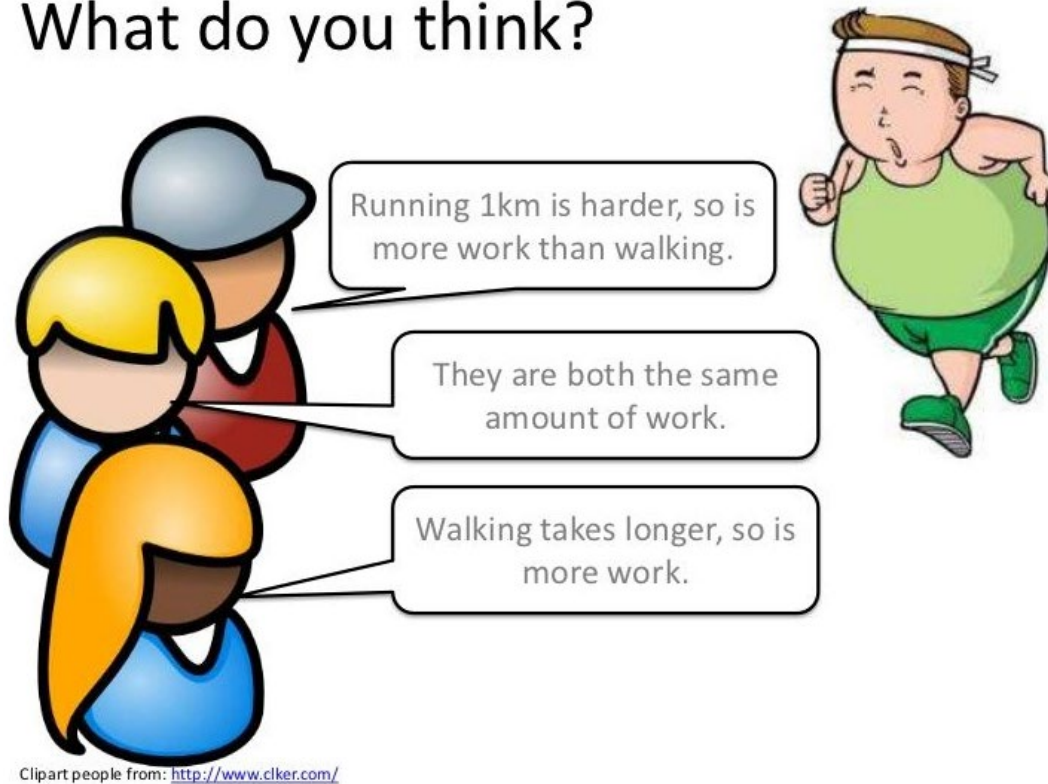
**For example,** George just ate his lunch, so he is full of energy! This energy allows him to put more power into his work and get it done quicker!



## Example

Now that you have a better idea as to what work, energy and power mean in physics, take a look at the image below. Use your new-found knowledge to think critically.

# What do you think?



Clipart people from: <http://www.clker.com/>

Follow along in your Learning Guide to answer the following questions:

- Is running 1 km **more work** than walking 1 km?
- Does running 1 km **requires more power** than walking 1 km?
- Does running 1km **use more energy** than walking 1 km?

# Conservation of Energy

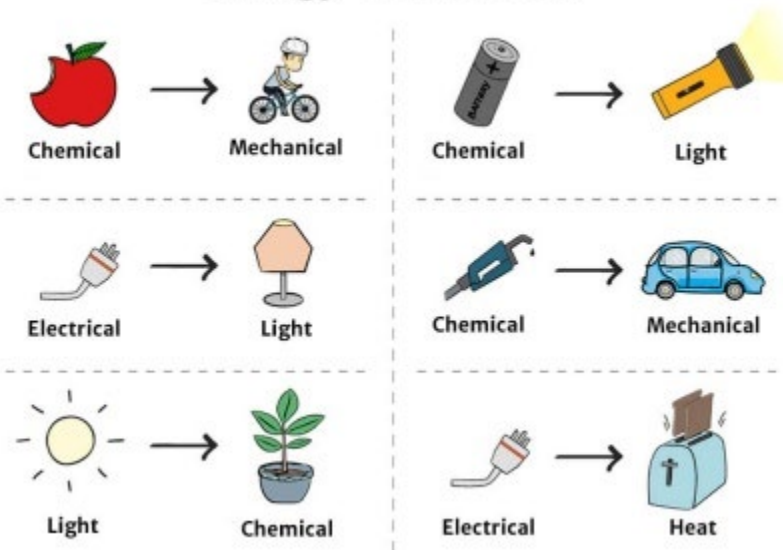
Did you know that energy can never be created or destroyed? It's true! Energy is converted from one state to another.



So what does this mean? Well, for example, when you eat an apple, the energy found in the apple is transferred to your body for you to use.

There are many different kinds of energy, but don't worry too much about them for now. What's important to remember is simply that energy can never be created or destroyed, it just changes from one state to another.

## Energy Conversion



1. Fill in the definition for the following physics terms:

**Work:**

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**Energy:**

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**Power:**

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2. **Fill in the blank:** If an object doesn't \_\_\_\_\_, no \_\_\_\_\_ has been done.

3. Using your knowledge, settle the debate between the people shown in the chapter *Apply Your Knowledge*. Circle the correct response to each question:

• Is running 1 km **more work** than walking 1 km?

Yes

No

• Does running 1 km **requires more power** than walking 1 km?

Yes

No

• Does running 1km **use more energy** than walking 1 km?

Yes

No



4. **True or False:** Brad works as a professional mover. He is attempting to lift a grand piano onto the moving truck. He lifts with all his energy and all his power but can't seem to get the piano to move. He tries for 2 hours, but still cannot get the piano to budge. Brad has done a lot of work.

a. True

b. False

5. Raoul and Patrick work in a furniture warehouse. Raoul loads 25 boxes into the delivery truck in 15 minutes, while Patrick loads 25 boxes into the delivery truck in 25 minutes. Raoul loading the boxes **quicker** than Patrick shows that he has more:

- a. Work
- b. Energy
- c. Power

6. Prudence had a sleepless night and forgot to eat breakfast this morning. She feels worn out and sluggish. Prudence lacks:

- a. Motivation
- b. Work ethic
- c. Energy
- d. Power

7. Which of the following scenarios shows **work being done**?

- a. Amy rides the elevator up to her office on the 15th floor
- b. James pulls his children in a wagon to the park
- c. The wind blows all of Mr. Gibbons fallen leaves into your yard
- d. None of the above
- e. All of the above

8. a) What is the **Law of Conservation of Energy**?

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b) **True or False:** When you eat a pear, energy from the pear is transferred to your body.

a. True

b. False

c). **True or False:** Energy can be made.

a. True

b. False