

Conservation of Mass

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CHAPTER

1

Conservation of Mass

- Describe an example of mass remaining the same in a change of matter.
- State the law of conservation of mass.



If you build a campfire like this one, you start with a big pile of logs. As the fire burns, the pile of logs slowly shrinks. By the end of the evening, all that's left is a small pile of ashes. What happened to the matter that you started with? Was it destroyed by the fire?

Where's the Matter?

It may seem as though burning destroys matter, but the same amount, or mass, of matter still exists after a campfire as before. Look at the sketch in **Figure 1.1**. It shows that when wood burns, it combines with oxygen and changes not only to ashes but also to carbon dioxide and water vapor. The gases float off into the air, leaving behind just the ashes. Suppose you had measured the mass of the wood before it burned and the mass of the ashes after it burned. Also suppose you had been able to measure the oxygen used by the fire and the gases produced by the fire. What would you find? The total mass of matter after the fire would be the same as the total mass of matter before the fire.

Q: What can you infer from this example?

A: You can infer that burning does not destroy matter. It just changes matter into different substances.

Law of Conservation of Mass

This burning campfire example illustrates a very important law in science: the **law of conservation of mass**. This law states that matter cannot be created or destroyed. Even when matter goes through a physical or chemical change, the total mass of matter always remains the same.

Q: How could you show that the mass of matter remains the same when matter changes state?

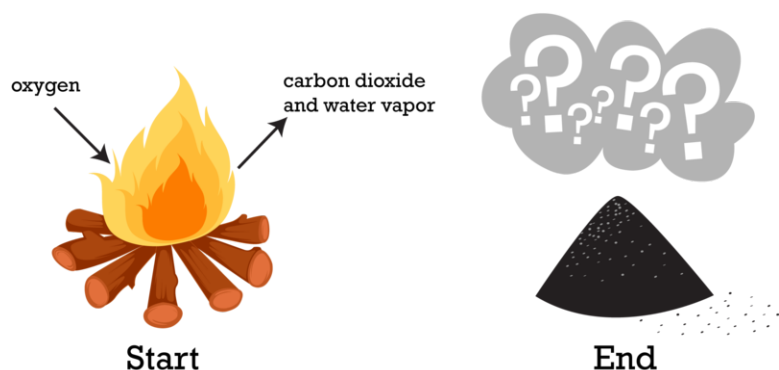


FIGURE 1.1

Burning is a chemical process.

A: You could find the mass of a quantity of liquid water. Then you could freeze the water and find the mass of the ice. The mass before and after freezing would be the same, showing that mass is conserved when matter changes state.

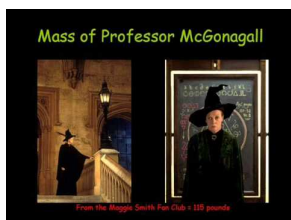
Summary

- Burning and other changes in matter do not destroy matter. The mass of matter is always the same before and after the changes occur.
- The law of conservation of mass states that matter cannot be created or destroyed.

Explore More

At the following URL, apply the law of conservation of mass to a scene from a Harry Potter film. Then answer the questions below.

<http://www.youtube.com/watch?v=3TsTOnNmKf8> (2:05)



MEDIA

Click image to the left or use the URL below.

URL: <http://www.ck12.org/flx/render/embeddedobject/54912>

1. What is the mass of the professor in kilograms? What is the mass of the cat in kilograms? (*Hint:* 1 pound = 0.45 kilograms)
2. The scene must be magic because it defies the law of conservation of mass. Explain why.

Review

1. What is the law of conservation of mass?
2. Describe an example of the law of conservation of mass.

References

1. Christopher Auyeung. [Burning is a chemical process](#) . CC BY-NC 3.0