

1.3.3: Physical Change



Figure 1.3.3.1 (Credit: User: Paul / Wikimedia Commons; Source: http://commons.wikimedia.org/wiki/File:Vandalized_car.jpg(opens in new window); License: CC by 2.0(opens in new window))

How does a car go from new and shiny to old and beaten up?

Want to buy a car – cheap? Notice there is no specification such as “in good condition” or “needs a little work.” The car above is pretty beat up. The body is damaged, the windows are broken, and the interior is probably torn up. But this is still a car. It has all the components of a car, even though you would not want to buy it in the present condition. But change that condition and you have a (possibly) useable car.

Physical Change

As an ice cube melts, its shape changes as it acquires the ability to flow. However, its composition does not change. **Melting** is an example of a **physical change**. A physical change is a change to a sample of matter in which some properties of the material change, but the identity of the matter does not. Physical changes can further be classified as reversible or irreversible. The melted ice cube may be refrozen, so melting is a reversible physical change. Physical changes that involve a change of state are all reversible. Other changes of state include **vaporization** (liquid to gas), **freezing** (liquid to solid), and **condensation** (gas to liquid). Dissolving is also a reversible physical change. When salt is dissolved into water, the salt is said to have entered the aqueous state. The salt may be regained by boiling off the water, leaving the salt behind.



Figure 1.3.3.2: Melting ice in the Beaufort Sea. (Credit: Courtesy of Rear Admiral Harley D. Nygren, NOAA; Source: http://commons.wikimedia.org/wiki/File:NOAA_arctic_spring_1950_corp1104.jpg(opens in new window); License: Public Domain)

When a piece of wood is ground into sawdust, that change is irreversible since the sawdust cannot be reconstituted into the same piece of wood that it was before. Cutting grass or pulverizing a rock are examples of irreversible physical changes. Chopping wood for a fire also represents an irreversible physical change, since the pieces cannot be put back together to form the tree.



Figure 1.3.3.3: Chopping wood is an irreversible physical change. (Credit: stevepb; Source: <https://pixabay.com/photos/axe-chopper-cut-split-hatchet-674841/>(opens in new window); License: Pixabay License)

Physical Changes vs. Chemical Changes

What is the difference between physical and chemical changes? Watch the video to find out.



Summary

- A physical change is a change to a sample of matter in which some properties of the material change, but the identity of the matter does not.
- A physical change can be reversible where the original form of the matter can be restored, or irreversible where the original form cannot be restored.
- Melting ice and grinding wood into sawdust are examples of physical changes.

Review

1. Define physical change.
2. Why is melting an ice cube a reversible physical change?
3. Give an example of an irreversible physical change.

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