Entropy and Negentropy

by Sophia Tutorial

WHAT'S COVERED

In this lesson, we'll discuss energy as it relates to physical and human systems and the effect on systems when energy is lost. The particular areas of focus include:

1. Energy in Systems
2. Entropy and Negentropy
3. Open and Closed Systems
4. Energy in Conflict

1. Energy in Systems

All living things need energy to function. As humans, we get our energy from food and air; plants get energy from soil, sun, and rain.

Physical systems, such as cars, need their own forms of energy to run effectively. This is also true within the human groups that we're part of.

EXAMPLE At work, you probably know what it's like to begin working with a team of people on a new project, and feel very energized about it. You may say something like, "I'm so excited about this." People talk about energy this way in work groups in order to feel like they're all in sync. They're working on something together, it's productive, and they're energized. By the same token, you have probably at some point talked about feeling drained at work because it's sapping your energy.

Human groups talk about their interactions in terms of the energy flow, and it's just as real there as it is in any of the physical systems, or in nature.

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2. Entropy and Negentropy

Entropy and negentropy are terms that come from physics in relation to the study of physical behavior. In this case, the behavior is thermal energy in physical systems and how energy is lost and replenished.

However, these terms have been adapted to describe human systems as well. In this context, **entropy** refers to disorder caused by loss of energy. It's another way of saying that something has broken down in chaos.

Within human systems, this loss of energy translates to less efficiency; we might use words like "broken

down” or “run down.”

Negentropy is the opposite of this. With negentropy, the energy drain is replaced, and there is more order and efficiency as a result.

In relation to energy in a system, there is also the concept of **homeostasis**, which refers to being balanced or stable. Within a system, you want to maintain the energy so that none is being lost.

Living and physical systems that require energy to operate will be affected by any change in the level of their energy.

> EXAMPLE As mentioned earlier, plants get the energy they need from soil, sun, and rain. If something like soil erosion or a drought occurs, the plants won’t be getting the energy they need. This would be an example of entropy in nature. Negentropy would be the process of replacing that lost energy, which in this instance would occur if someone watered the plants or replaced the nutrients in the soil.

> EXAMPLE If there's a power outage in your home during the winter, you would lose heat. If you have a fireplace, you could use that to replace the lost energy. That would be an example of negentropy because you don't like the idea of being without heat in the middle of a cold winter.

Likewise, the concepts entropy and negentropy can be applied to human groups and systems.

> EXAMPLE Say there have been some layoffs at a company. This means that some energy has been taken out of that system. There are not enough components, or people, to do the work. The other remaining people have to do all of the work, and this begins to drain the energy of these people who are taking on extra tasks. This may lead to people feeling overburdened not only physically, but also emotionally. This could then cause small conflicts that present themselves in the way people are interacting with one another.
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> Negentropy in this scenario would be the replacement of the energy lost through the layoffs. Perhaps management decides to bring in some temporary contract workers who can take on some of the tasks to alleviate the burden from people who were doing double the amount of work. In addition, the company decides to give bonuses to people for working so many hours. The physical energy has now been replenished by bringing in some additional people to help, and the emotional energy has also been replenished through the display of appreciation for all the hard work.

TERMS TO KNOW

Entropy
In science, a loss of energy; in human systems, the tendency of a system to become disorganized and less efficient due to gradual energy loss within the system.

Negentropy
In science, exported entropy from a system which keeps internal entropy low; in human systems, the tendency of a system to become better organized, improving or maintaining capacity and efficiency.

Homeostasis
The property of a system, which keeps it balanced, stable, or not subject to change.

3. Open and Closed Systems

In order to run effectively, it's important for systems to replenish and renew themselves with new energy.

There are two types of systems in the context of energy:

- **Open system:** A system in which new energy can come in to replace energy that's lost or draining.
- **Closed system:** A system in which the old energy stays stuck, and just keeps circulating. There's no way for new energy to come in.

Imagine being in your car with the doors and windows closed. If you turn on the air, it just circulates inside; you don't get any fresh air. You want a system to be open so that it can take in new energy.

TERMS TO KNOW

Open System
A system which is able to receive new energy from outside itself.

Closed System
A system which is unable to receive new energy from outside itself.

4. Energy in Conflict

Conflict is a very big drain on the energy in human groups and human systems, and conflict resolution can bring in new energy.

A conflict between two individuals drains energy not only from them but from the entire system in which they are components.

This is because, as you learned, the components of a system are interconnected; an issue with any one of those components will cause a ripple effect throughout the entire system, draining energy from others in the group.

Thus, conflict resolution is a process that can replenish that lost energy by addressing the conflict between the two parties.

Not only is it a patch over the issue, but it can ripple out and positively affect the entire group, serving as an energy source for the system.

This is possible because as a conflict-resolver, you are addressing the conflict as the cause of the drained energy in the system so that the whole system will improve and function efficiently.

SUMMARY

In this lesson, you learned about the role of **energy in systems**, both physical and human. You also learned about the scientific concepts of **entropy and negentropy** as they apply to human systems. Entropy is disorder due to the loss of energy in human systems; negentropy is the restoration of order due to a replenishment of that lost energy.

You now understand that **systems can be either open or closed**. An open system can receive new

energy to replace that which was lost, but a closed system cannot. **In the context of conflict, energy** can be lost when a dispute between two people, or components, within a system causes a ripple effect, draining energy from the entire system. You want the system to be open so that the conflict resolution process can replenish the lost energy by addressing the conflict.

Good luck!

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