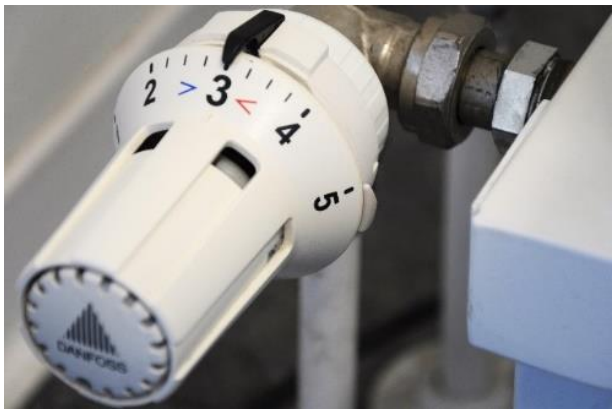

Quarterly Problem

Science Edition

Heat pump

It has become cold and the heating season begins. An important technology of the future for this kind of weather is the heat pump. But how does it work?

When you inflate a bicycle tire, the pump gets warm in the process because the air inside is compressed. Conversely, deodorant that comes out of an aerosol can is cold because there is much more pressure inside the can than outside, and the gas expands rapidly as it comes out of the aerosol can.

Consider how to use these effects to build a mechanism that heats an apartment.

1. In groups of two or three, design such a mechanism.
2. Present your inventions to each other.
3. Then research how a heat pump works.
4. In what ways does it differ from your inventions? Why do you think it is done this way in practice?

Extra question: Heating with a heat pump is extremely energy efficient compared to other heating systems. Why?

Brainstorm-Box
In some European countries, there is currently a huge shortage of skilled workers in the field of heat pump installation, which is slowing down the switch to climate-friendly heating. Maybe you can imagine doing an apprenticeship in this field?

How does your invention work?

What parts does it consist of? What exactly are they for and what conditions do they have to fulfill? What happens when the machine runs? Where does it get hot or cold and why? Under what conditions does the invention work best? What are its advantages and disadvantages?

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