

A refrigerator is kept open in a closed room. Does the net temperature of the room increase or remain the same. If so why?

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In any refrigerator a certain amount of heat Q_2 is absorbed from the objects you want to cool and a *larger* amount of heat Q_1 is released to the outside through the radiator behind the refrigerator. If you keep your hand on the radiator, it will feel warm. The refrigerator is normally kept in a room with the radiator about a foot from the wall and close to a window. The heat released is carried away by air currents to the open space outside the room. Normally the compressor of a refrigerator operates only for part of the time because the thermostat switches off the compressor when a set temperature is reached. When the door of the refrigerator is kept open, the compressor will work all the time as the heat in the room is too large and the temperature never reaches the cut off point of the thermostatic switch. So more heat is released into the room than what is absorbed. If the ventilation is insufficient this will cause the room to warm up. In fact if all the doors and windows in the room are closed and there is no ventilation, the temperature of the room will increase *even when the door of the refrigerator is kept closed*. This is because the radiator of the refrigerator releases heat into the room.

In an air conditioned room the air conditioner projects through a hole in the window so that its radiator is outside the room. The air conditioner thus rejects the heat to the open space outside. If a refrigerator is also positioned through a hole in the wall so that *its radiator rejects heat to the open space outside the room*, the refrigerator will cool the room if its door is left open.

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If my theory of relativity is proven successful, Germany will claim me as a German and France will declare that I am a citizen of the world. Should my theory prove untrue, France will say that I am a German and Germany will declare that I am a Jew.

Einstein