Name: _____ Date: _____

How a Refrigerator Moves Heat

Circle group

A fridge does not make cold. Cold is just a lack of heat. What a fridge really does is move heat. It moves heat from inside the box to the outside, so the inside gets cooler. The trick is a special fluid called a refrigerant. It flows around a sealed loop of tubes.

The loop has four main parts. It starts at the compressor. This pump squeezes the refrigerant gas. Squeezing a gas makes it hot. So the gas leaves the compressor hot and under high pressure.

Next, the hot gas flows through the condenser. These are the coils on the back or bottom of the fridge. The air in the room is cooler than the gas. So heat moves from the gas into the air. As the gas loses heat, it turns into a liquid. If you touch the coils, you can often feel the warmth.

Then the liquid goes through a narrow opening called the expansion valve. Here the pressure drops. The liquid spreads out and gets very cold. Some of it turns into a gas.

Last, the cold refrigerant flows through the evaporator. These are the coils inside the fridge. The inside of the fridge is warmer than the refrigerant. So heat moves from the food and the air into the coils. The heat makes the liquid all turn into gas. The gas goes back to the compressor, and the loop starts again. As long as the compressor runs, heat keeps moving out of the box. The food inside stays cool.

Questions

1. What does a fridge really do?

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_____

2. What is a refrigerant?

_____

_____

3. What does the compressor do?

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_____

4. What happens in the condenser?

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_____

5. What happens at the expansion valve?

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_____

6. What happens in the evaporator?

_____

_____

7. Why do the coils on the back of a fridge often feel warm?

_____

_____

8. Would leaving the fridge door open cool down a room? How do you know?

_____

_____

Words to know

refrigerant: the special fluid that carries heat around a refrigerator's tubes
compressor: a pump that squeezes a gas into a smaller space
condenser: the coils where a hot gas gives off heat and turns into a liquid
expansion valve: a narrow opening where a liquid's pressure drops so it becomes very cold
evaporator: the coils where a cold liquid takes in heat and turns into a gas

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

How a Refrigerator Moves Heat

Triangle group

A refrigerator does not make cold. Cold is simply the absence of heat. What a refrigerator does is move heat from the inside of the box to the outside, so that the inside gets cooler. The trick is a special fluid called a refrigerant, which circulates through a sealed loop of tubes.

The loop has four main parts. The cycle begins at the compressor, a pump that squeezes the refrigerant gas. Squeezing a gas makes it hot, so the gas leaves the compressor under high pressure and at a high temperature.

Next, the hot gas flows through the condenser, the coils on the back or the bottom of the refrigerator. The air in the room is cooler than the gas, so heat flows from the gas into the air. As the gas loses heat, it condenses into a liquid. If you touch the coils, you can often feel the warmth.

The liquid then passes through a narrow opening called the expansion valve. When the pressure drops, the liquid expands and becomes very cold, and some of it turns into a gas.

Finally, the cold refrigerant flows through the evaporator, the coils inside the refrigerator. The inside of the refrigerator is warmer than the refrigerant, so heat flows from the food and the air into the coils. The heat makes the liquid evaporate completely into a gas, and the gas returns to the compressor, where the cycle starts again. As long as the compressor keeps running, heat keeps moving out of the box, and the food inside stays cool.

Questions

1. What does a refrigerator really do?

_____

_____

2. What is a refrigerant?

_____

_____

3. What does the compressor do to the refrigerant?

_____

_____

4. What happens in the condenser?

_____

_____

5. What happens at the expansion valve?

_____

_____

6. What happens in the evaporator?

_____

_____

7. Why are the coils on the back of a refrigerator often warm?

_____

_____

8. Would leaving the refrigerator door open cool a room, and what in the passage tells you?

_____

_____

Words to know

refrigerant: the special fluid that carries heat around a refrigerator's tubes
compressor: a pump that squeezes a gas into a smaller space
condenser: the coils where a hot gas gives off heat and turns into a liquid
expansion valve: a narrow opening where a liquid's pressure drops so it becomes very cold
evaporator: the coils where a cold liquid takes in heat and turns into a gas

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

How a Refrigerator Moves Heat

Square group

A refrigerator does not manufacture cold; cold is simply the absence of heat. What a refrigerator actually accomplishes is transferring heat from the interior of the box to the exterior, so that the interior becomes progressively cooler. The secret is a specialized fluid called a refrigerant, which circulates continuously through a sealed loop of tubing.

The loop comprises four principal components. The cycle commences at the compressor, a pump that squeezes the refrigerant gas. Compressing a gas raises its temperature, so the gas exits the compressor under high pressure and at an elevated temperature.

Next, the hot gas travels through the condenser, the coils mounted on the back or underneath the refrigerator. Because the surrounding room air is cooler than the gas, heat flows from the gas into the air, and as the gas surrenders heat, it condenses into a liquid. If you touch these coils, you can frequently detect their warmth.

The liquid subsequently passes through a narrow opening called the expansion valve. As the pressure drops, the liquid expands and becomes extremely cold, and a portion of it evaporates into a gas.

Finally, the frigid refrigerant circulates through the evaporator, the coils positioned inside the refrigerator. Since the interior of the refrigerator is warmer than the refrigerant, heat flows from the food and the surrounding air into the coils. This absorbed heat causes the remaining liquid to evaporate completely into a gas, which returns to the compressor, where the cycle begins again. As long as the compressor continues operating, heat keeps flowing out of the box, and the food inside remains cool.

Questions

1. What is the essential task a refrigerator performs?

_____

_____

2. What is a refrigerant?

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_____

3. What effect does the compressor have on the refrigerant?

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4. Describe what occurs in the condenser.

_____

_____

5. What happens to the refrigerant at the expansion valve?

_____

_____

6. Describe what occurs in the evaporator.

_____

_____

7. Explain why the coils on the back of a refrigerator often feel warm.

_____

_____

8. Would propping open the refrigerator door cool a room? Justify your answer with the passage.

_____

_____

Words to know

refrigerant: the special fluid that carries heat around a refrigerator's tubes
compressor: a pump that squeezes a gas into a smaller space
condenser: the coils where a hot gas gives off heat and turns into a liquid
expansion valve: a narrow opening where a liquid's pressure drops so it becomes very cold
evaporator: the coils where a cold liquid takes in heat and turns into a gas

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: How a Refrigerator Moves Heat

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: How a Refrigerator Moves Heat

Easier · 254 words · Flesch-Kincaid grade 2.6

1. It moves heat from inside the box to the outside.
2. A special fluid that flows around a sealed loop of tubes.
3. It squeezes the gas, which makes it hot and puts it under high pressure.
4. Heat moves from the hot gas into the cooler room air, and the gas turns into a liquid.
5. The pressure drops, and the liquid spreads out and gets very cold.
6. Heat moves from the food and air inside the fridge into the cold coils, and the refrigerant turns into a gas.
7. They are giving off the heat the fridge moved out of the inside.
8. No. A fridge only moves heat from one place to another, and the coils on the back would give that heat back to the room.

Triangle: How a Refrigerator Moves Heat

This passage · 258 words · Flesch-Kincaid grade 7

1. It moves heat from the inside of the box to the outside.
2. A special fluid that circulates through a sealed loop of tubes.
3. It squeezes the gas, which makes it hot and puts it under high pressure.
4. Heat flows from the hot gas into the cooler room air, and the gas condenses into a liquid.
5. The pressure drops, and the liquid expands and becomes very cold.
6. Heat flows from the food and air inside the refrigerator into the cold coils, and the refrigerant evaporates into a gas.
7. They are releasing the heat that the refrigerator moved out from the inside.
8. No. A refrigerator only moves heat from one place to another, and the coils at the back would give that heat back to the room.

Square: How a Refrigerator Moves Heat

Harder · 264 words · Flesch-Kincaid grade 11.5

1. It transfers heat from the interior of the box to the exterior.
2. A specialized fluid that circulates through a sealed loop of tubing.
3. It squeezes the gas, raising its temperature and placing it under high pressure.
4. Heat flows from the hot gas into the cooler room air, and the gas condenses into a liquid.
5. The pressure drops, so the liquid expands and becomes extremely cold.
6. Heat flows from the food and air inside the refrigerator into the cold coils, and the refrigerant evaporates completely into a gas.
7. They are releasing the heat that the refrigerator transferred out of its interior.

8. No. A refrigerator only transfers heat from one place to another, and the coils on the back would release that heat back into the same room.