How Can You Explain This? A Fogged Mirror

It is a cold, winter day. You take a hot shower and the mirror in the bathroom fogs up.

1. Imagine you can see the particles when water vapor from the shower hits the cold mirror. Draw a scientific model including:

   - temperature change
   - particle motion
   - kinetic energy
   - arrows / indicators of motion
   - scientific vocabulary

   Clearly label all model components.

2. Using your model as evidence, explain how water vapor fogs up a mirror.

   Water vapor starts as a liquid. It changes phase to become water vapor when it is heated. As a gas particle, it bounces and moves independently. As the hot water vapor touches the cold mirror, condensation happens as the particles cool, turning the water vapor back into a liquid phase.
3. Imagine you're going to do an investigation to find out why the mirror gets fogged up. Write a testable science question that you could answer by doing an experiment.

**why does the mirror get fogged up and how does this happen?**

You want to see yourself in the mirror, so you grab a hair dryer, turn it on high, and point the hot air at the mirror. Soon the fog clears from the mirror so you can see yourself again.

4. Circle all of the claims that are true:
   a. The hairdryer physically blows all of the water drops back into the air.
   b. The hot air from the hairdryer increases the kinetic energy of the water particles on the mirror.
   c. The hot air from the hairdryer changes the water drops into a different substance that you can no longer see.
   d. Cold objects like the mirror attract hotter objects like the steam towards them.
   e. The density of the water vapor causes the water drops to form on the mirror.
   f. There are fewer water particles in the room after you clear off the mirror using the hairdryer.
5. Imagine you can see the particles when the fog clears from the mirror. Draw a model of why the fog clears from the mirror when you use the hairdryer. Be sure to show the following:

- temperature change
- particle motion
- kinetic energy
- arrows / indicators of motion
- scientific vocabulary

Clearly label all model components.

6. Referring to parts of your model as evidence, explain how fog clears from the mirror.

The "fog" is just liquid water particles that have condensed onto the cold mirror. When the hairdryer blows on the cold mirror, the liquid warms as well, causing it to evaporated into water vapor in the air, which is why there is no fog left on the mirror.
7. You want to stop the mirror from fogging up when you take a shower. How would you do that using everyday objects and materials? Sketch a design that might stop the mirror fogging up.

Based on your understanding of the science involved, explain how your design stops the mirror fogging up.

By opening a window, the water vapor that would condense on the mirror, instead the particles travel outside through the window preventing the mirror from getting foggy. The hot water vapor is pushing with more force than slower, cold gas particles from the outside, which means the water vapor wants expand. With having more space. When the window is open it is no longer a closed system trapping the water vapor inside.