

# **Apple Frozen Overnight**

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### **Abstract:**

This experiment is centered around the following question: “What would happen if a sealed apple was placed into a home refrigerator freezer and remained there for precisely one day?” When a sort of meat, ice cream, or anything that would usually go into a freezer is placed in one, it only becomes harder in its basic form. However, will I be able to say the same for fruit, like an apple for instance, and what exactly will become of the apple once it is done freezing for a day? Before we obtained results, we theorized that the apple would remain the same shape as it was before it was placed in the freezer.

### **Introduction:**

According to the company’s official website’s troubleshooting section, Hotpoint refrigerators, like the model in my house, have their built-in freezer pre-set to operate between -18 and -26 degrees to conform to guidelines provided by the Department of the Environment, Food, and Rural Affairs, or DEFRA if you will. The freezing air temperature is 32 degrees Fahrenheit (0 degree Celsius) or below. Water and other liquids can freeze into ice when it is placed in a freezer and all foods contain some water, which is why meat freezes so well, according to Nourish by WebMD’s article “What to Know About Freezer Burn and Meat” In the article, it states “All food contains some water. It’s part of the reason that food freezes so well. When you put things like meat in your freezer, it sits in a closed space with a constant dry temperature.” What effects will occur to an apple’s physical and chemical properties are subjected to freezing conditions? Will said conditions have an impact on the apple’s structure or will the structure stay the same as it was before? According to HGTV’s article on freezing apples, it states that “Perhaps more important to keep in mind, though, is that freezing an apple does alter the texture, leaving the flesh spongier than that of a fresh apple.” Will this experiment accept or refute this statement? I went ahead to find out for myself with an experiment.

The experiment hypothesizes that the apple would not undergo a physical or chemical change and will remain the same if placed in a freezer for a precise day.

### **Materials and Experimental Procedures:**

The materials used for this experiment were:

- ❖ Two Gala apples from Yes! Apples
- ❖ 1 Ziploc Freezer Quart seal top bag
- ❖ iPhone
- ❖ Knife
- ❖ Cutting Board or Hard Surface

### **Method Steps:**

1. Leave one apple outside on the table. This will be the control group for experiment

2. Place one apple inside a Ziploc Freezer Quart seal top bag
3. Seal the bag
4. Place the bag in the furthest parts of the refrigerator freezer
5. Close the refrigerator freezer. This will be the treatment group for experiment
6. Set a timer on the iPhone for 24 hours and wait until the timer finishes
7. Take the Ziploc bag out of the freezer
8. Get the control group apple from Table
9. Open the Ziploc bag and remove the treatment group apple
10. Place both apples on a cutting board or a hard surface
11. Compare the two apples and take notes on your findings
  - a. Examine any differences between the apples' outside features and how the two apples feel from touching them alone, especially if the frozen apple does not feel the same as the other apple
  - b. Slice each apple into four pieces and
  - c. Examine any differences between the apple's inside features and how differently the two apples feel from touching them. Also, take notes if the frozen apple does not cut like the other apple.

**Results:**

The graph was made to record my findings after the treatment group apple was finished being frozen for 24 hours.

Apples	Features
<b>Control Group - Normal Apple</b>	<ul style="list-style-type: none"> <li>❖ <b>Easier to cut with a knife</b></li> <li>❖ <b>Less juice on the inside</b></li> <li>❖ <b>Tasted crunchier</b></li> </ul>
<b>Treatment Group - Frozen Apple</b>	<ul style="list-style-type: none"> <li>❖ <b>Harder to cut with a knife</b></li> <li>❖ <b>It tasted somewhat mushier than normal apple</b></li> <li>❖ <b>Stiffer</b></li> <li>❖ <b>Noticeably had more juice on the inside</b></li> <li>❖ <b>Outer features remain unchanged, so no physical changes were found</b></li> </ul>

Overall, there were a few minor differences, but no major differences regarding physical and chemical properties or matter, as believed.



**Figure 1:** The two apples. Normal apple on the left, frozen apple on the right.



**Figure 2:** The two apples after I sliced them up to observe their insides.

### **Discussion**

To start the discussion, we need to discuss how the experiment answered the question in the abstract: “What would happen if a sealed apple was placed into a home refrigerator freezer and remained there for precisely one day?” After being frozen in precisely a single day, the apple had not undergone any significant changes. The only two changes present are that the apple became stiffer and harder to cut with a knife compared to an unfrozen apple and that the frozen apple had more juice concealed inside said apple. This rules out any foreseeable physical or chemical changes in the apples.

Afterward, we will need to see if the experiment aligns well with our hypothesis. The hypothesis was that the apple would not undergo a physical or chemical change and will remain the same even after being placed inside the freezer for a day. The experiment mostly supports this belief, except for how the apple became harder and had more juice inside as a result of the freezing period. However, for the most part, the apple had no significant changes affecting its form. Ergo, we can say that the experiment, despite some minor details, proves our hypothesis an accurate prediction.

### **Conclusion**

Based on the results of this experiment, I’ve reached this conclusion. If a sealed apple was placed into a home refrigerator freezer and remained there for precisely one day, the apple will harden and conceal most of its juices inside itself, but the apple will remain in the same form as it was nonetheless.

### **References**

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