A reversible change is one that can be reversed, or undone.

A reversible change you will have seen in action is liquid water freezing and becoming solid ice when it is cooled below 0°C. When ice is heated above 0°C, it melts and becomes water again. The hydrogen and oxygen atoms that make up water do not change and the water returns to its original state. Nothing has been added or taken away and no gas is emitted.

Sometimes, however, substances change and they can’t easily go back. These changes are called irreversible changes.

An example of an irreversible change is when you fry an egg. A cooked egg can’t go back to its original state even if it is cooled, heated some more, separated or filtered.
In this experiment, you will investigate a chemical reaction between bicarbonate of soda and vinegar. When the two substances are mixed, do you think the changes that happen will be reversible or irreversible? Why?

**Equipment:**
- 4 tbsp of bicarbonate of soda
- 250 ml of vinegar
- An empty plastic bottle
- A funnel
- A balloon
- A tablespoon
- A plastic tray

**Method:**
1. Pour 250 ml of vinegar into an empty plastic bottle.
2. Place the bottle onto a plastic tray.
3. Using a funnel to avoid spillage, carefully spoon 4 tbsp of bicarbonate of soda into a balloon.
4. Without putting any bicarbonate of soda into the bottle, secure the balloon onto the top of the plastic bottle, letting the balloon hang down to the side.
5. Carefully, but quickly, tip the bicarbonate of soda from inside the balloon into the bottle, keeping the balloon fastened to the bottle.
6. Stand back and observe what happens inside the bottle and to the balloon.
7. Record your observations.
Results:
Observations when bicarbonate of soda was mixed with vinegar:
What happened inside the bottle?
What happened to the balloon? Why do you think this is?
After the experiment, what did the bottle feel like?

Conclusion:
I think that the change that happened when bicarbonate of soda and vinegar were mixed is
this is because

What questions do you have about reversible and irreversible changes? How could you investigate these further?
When you mixed the bicarbonate of soda with the vinegar, you will have noticed lots of bubbles were produced in the bottle and the balloon inflated. This is because there was a chemical reaction in which carbon dioxide gas was formed. This chemical reaction was an irreversible change because the molecules of carbon dioxide cannot be returned back into the mixture.

Did you notice the bottle get a little colder? The chemical reaction needed heat to work, so it took in heat from the surrounding environment, making the bottle feel cooler.

The acidic vinegar and alkaline bicarbonate of soda molecules chemically changed into something new: sodium acetate and water (not forgetting the carbon dioxide gas). These substances cannot go back to being vinegar and bicarbonate of soda – even if you filtered, heated or cooled the mixture. So don’t go thinking you can get the vinegar back and put it on your chips!