Investigate effectiveness of a biological washing powder

Plan:
We will try and investigate how long it takes for the food stain to dissolve depending on the temperature, since the rate of reaction changes as the temperature changes. We will do this by using water with different temperatures.

Hypothesis:
We believe that the food stain will dissolve faster as the temperature increases. But it will stop increasing once it reaches its optimum temperature which is 40C, because once it goes over 40C the enzymes will start to denature and thus the reaction will start to slow down again.

Materials:
Washing powder
5C water
40C water
100C water
Beaker
Tripods
Bunsen burner
Cloth
Stop watch
Stirring rods
Ketchup

Independent and controlled variables:
The time will be kept as an independent variable and we will make sure that the controlled variables are the amount of water, amount of washing powder, amount of stain stuff and the size of the material used. We will do this because in order for us to make a good experiment we need to make sure that some of the variables are controlled so that our results will be more accurate, we can not control the time as we are changing the temperatures.

Method:
We used 150ml of water in a beaker, and then added4 ml of washing powder into it. We then took three drops of ketchup and rubbed it on the cloth and then we put it in the water bath with the 5C water in it so we could keep the water temperature constant. We then added the piece of cloth and the washing powder at the same time. We started the stop watch immediately and stirred constantly until the stain was removed and wrote down how long it took. After that we repeated the same thing but we put the cloth inside a hot water bath which was 40C, we then repeated this another time, but this time we put the stained cloth in a beaker which contained 100C water from the kettle and kept the temperature constant with a Bunsen burner.

Results:

Temperature(degrees Celsius)	5 degrees	40 degrees	100 degrees
Time(minutes and seconds)	1:10	1:51	2:17

Conclusion:
As you can see our original hypothesis was not correct, as we predicted that by increasing the temperature the stain would dissolve much faster. But looking at our results table, it is obvious to see that the cloth with the stain, dissolved much faster in the beaker which contained water of 5C. What we predicted was that as the temperature increases over the optimum temperature it will take more time for the stain to dissolve as the enzymes are denaturing. I think that if we did this experiment again and improved it by changing what we did wrong, we could make our results be more accurate and our hypothesis would be correct.

Evaluation:
There were a few things we could have improved in this experiment such as the beaker/cloth size, we could have repeated the experiment more times and used a food substance that was easier to measure since ketchup is fairly hard to. Another thing we could improve if we would do this experiment again would be that the person steering the cloth on the beaker should not be changed around, as that person keeps the same speed the whole time, and if we changed person every time, the results wouldn't be as accurate since the speed changes as the person steering changes.