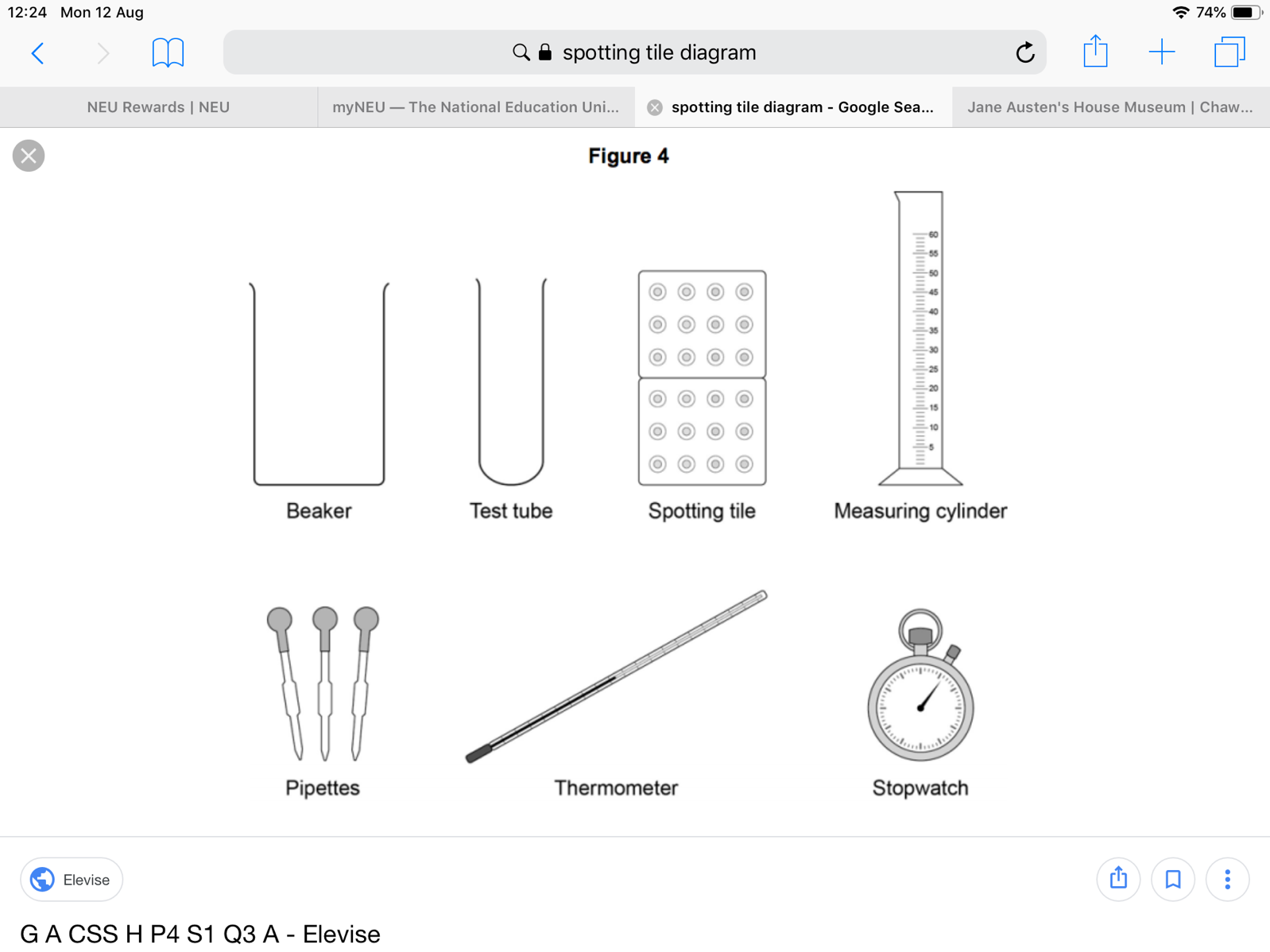
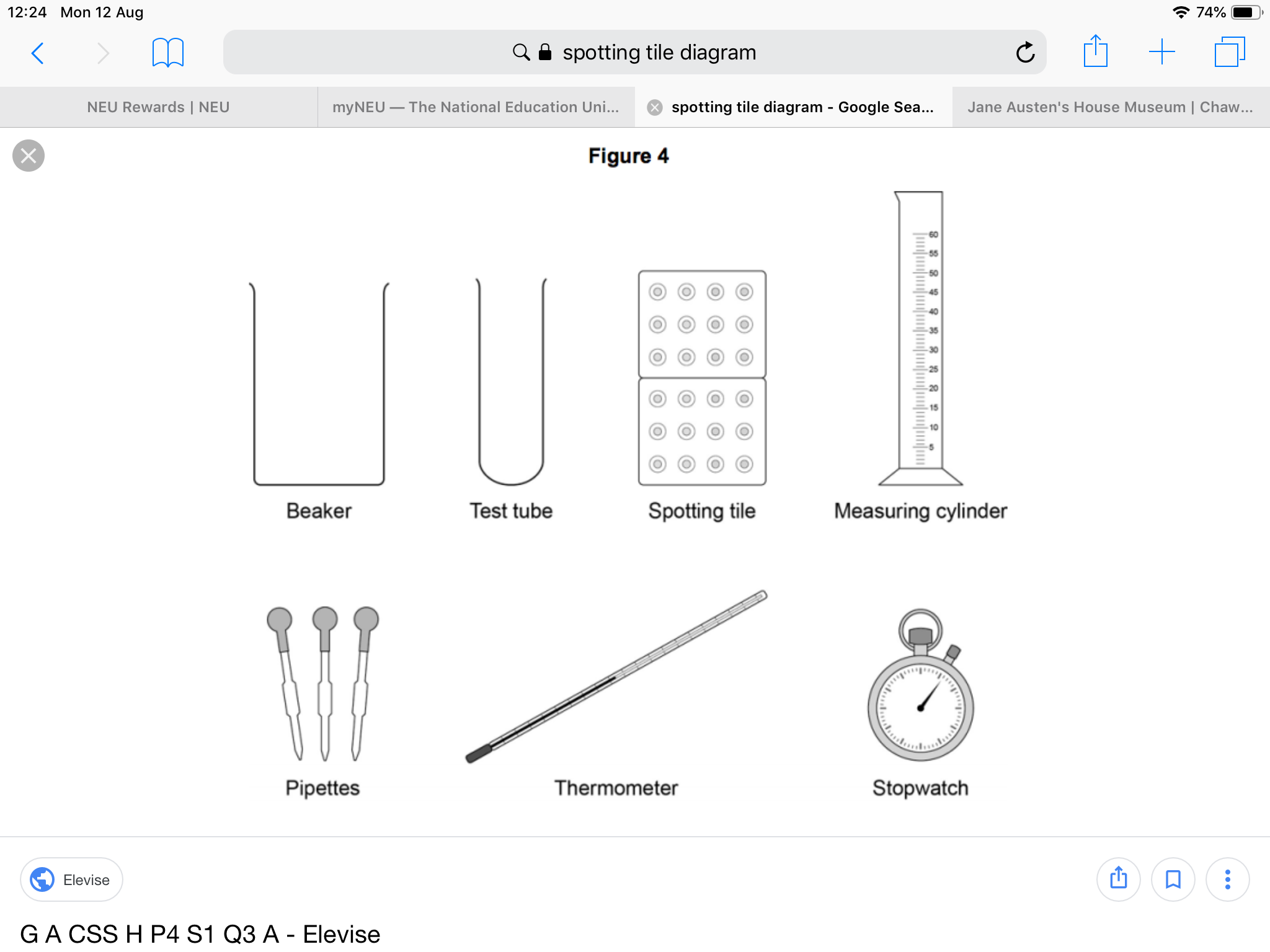
**AQA Biology**

**Required Practical 5- Enzymes**

**Method**

1. Place 1 drop of iodine into each well on the spotting tile.
2. Place labelled test tubes containing the buffered pH solutions, amylase solution and starch solutions in to the water bath. Allow them to reach 35°C

**The temperature must be controlled with a water bath**

1. Add 2cm3 of one of the buffered solutions to a test tube
2. Add 2cm3 of amylase AND start the stop clock
3. Mix using a glass rod
4. After 30 seconds, remove a drop of the mixture and add to the first well of the spotting tile.
5. Repeat, adding a drop of the mixture every 30 seconds
6. Continue until the iodine solution and the amylase/buffer/starch mixture stays orange

**When the iodine no longer changes colour it means that there is no starch present**

1. Repeat with solutions of different pH (2,4,6,8)

**Add samples into well every 30 secs.**

**Spotting tile- iodine in each well.**

**Test tube containing starch, *amylase* solution & pH buffer.**

**Glossary**

Enzyme-

Amylase-

Starch-

Iodine-

Optimum-

Denature-

***Aims***

* To investigate the effect of pH on the rate of reaction of an enzyme.
* To accurately measure and record time, temperature, volume and pH.
* To find the rate of reaction by measuring the time taken for an indicator to change colour.
* To explain how a water bath can be used to control temperature and explain why this is important.

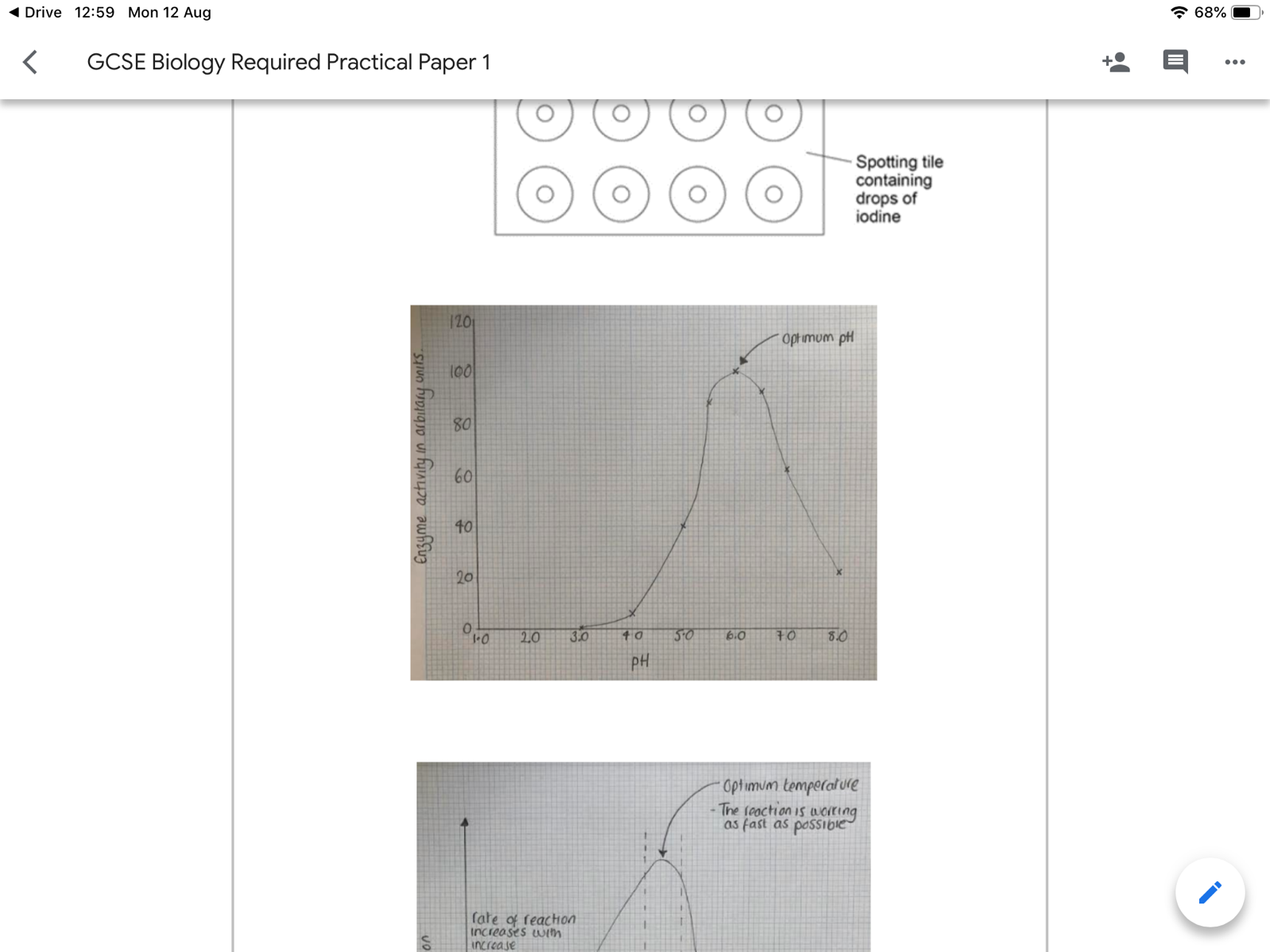
Explain why it is important to let all test tubes reach the temperature of the water bath before mixing the solutions together. Explain **how** you know this has happened. (2 marks)

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**Results**

**Tasks**

1. Collect your results.
2. Draw a graph of your data. ***Remember that the independent variable (one we change) goes on the x axis***.
3. Draw a line of best fit. Remember that a **curve** may be more suitable.

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| --- | --- |
| **pH** | **Time taken for amylase to break down starch (secs)** |
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Use your graph to describe how pH affects the rate of reaction of amylase. Why does the graph have this shape?

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**Exam Practice**

1. Suggest why it is important to have a drop of iodine in the spotting tile as a zero time (1 mark).

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1. This experiment tests how pH affects the rate of an enzyme-controlled reaction. Identify two other factors that would affect the rate of a reaction. (2 marks)

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