



Solutions and
Crystallisation –
exam question

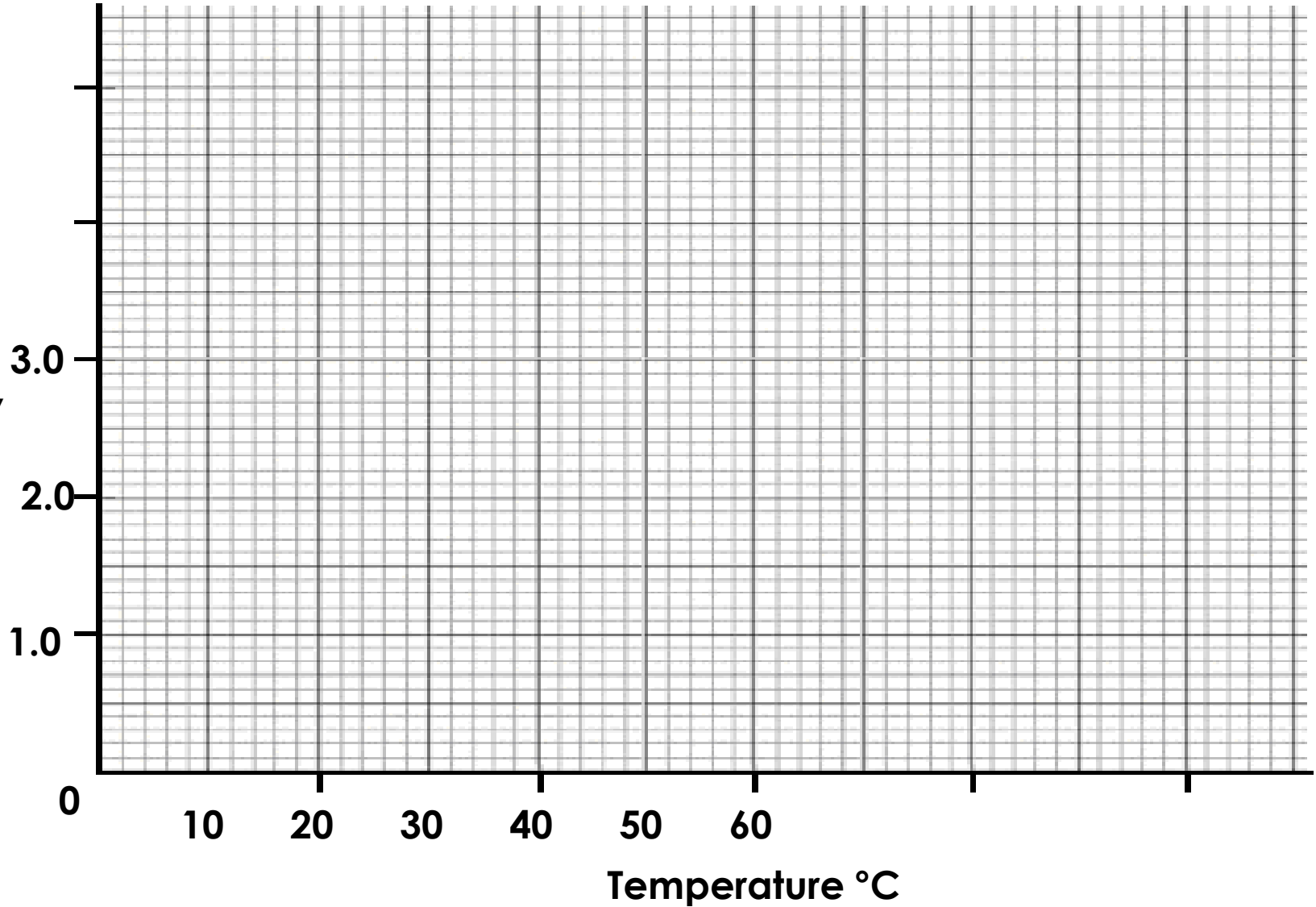
2012 - Higher


An experiment was performed to investigate the effect of temperature on the solubility of carbon dioxide in water. The data obtained from this experiment is given in the table below.

Solubility of CO ₂ (grams of CO ₂ per kg of water)	3.4	2.5	1.7	1.4	1.0	0.8	0.6
Temperature °C	0	10	20	30	40	50	60

Draw a graph of solubility against temperature in the grid below using the data from the table. A smooth curve is required.

bility
g





Usually the solubility of a solid increases with increasing temperature. The solubility of a gas decreases as the temperature increases.

Suggest a reason why this decrease happens.

From the graph estimate the temperature at which the solubility of CO₂ is 2 g per kg of water.

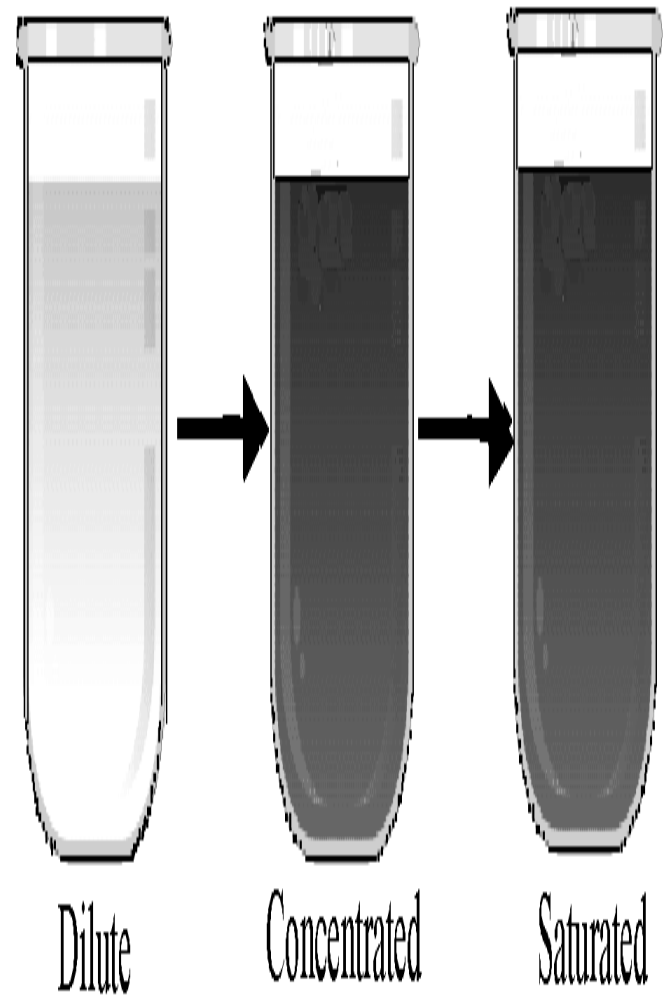
2012 - Ordinary

- A student recorded that **30 g of a salt dissolved in 100 cm³ of water at 40 °C.**
- Complete the following statement about solubility using a word from the list on the right.
- At **80 °C** the solubility of the salt would ?

Increase
Decrease

2011 - Higher

- The diagram shows three solutions of copper sulfate.
- Starting with a dilute solution state how to make it more concentrated.
- How do you know when a saturated solution has been produced?



2010 - Higher

100 g of water in the conical flask was brought to the required temperature using the water bath.

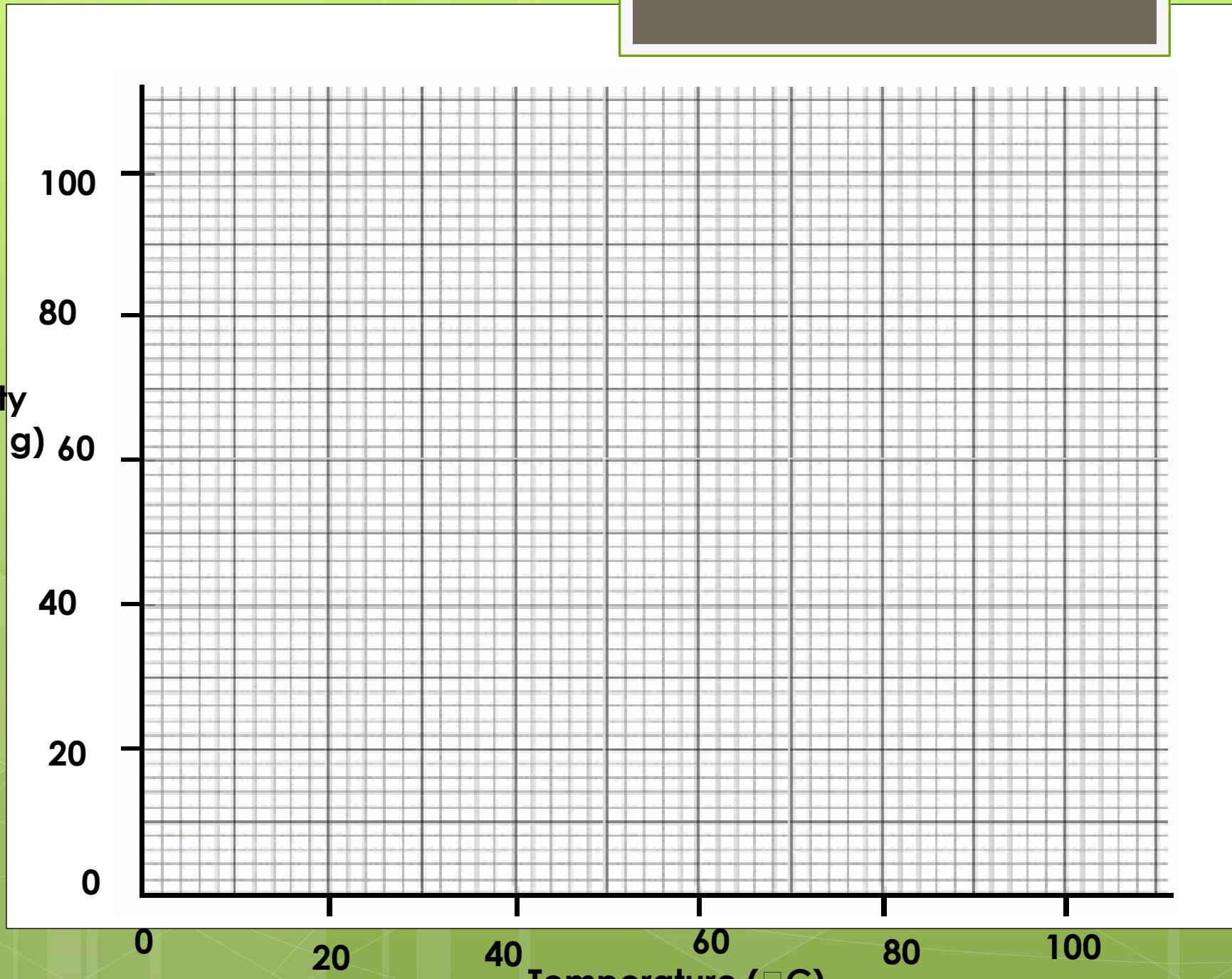
Copper sulfate crystals were added to the water until no more would dissolve. The mass of the copper sulfate crystals that dissolved was noted.

Temperature °C	0	20	40	60	80	100
Mass of Copper Sulfate crystals dissolved (g/100g)	14	21	29	40	55	75

Draw a graph of mass of copper sulfate crystals dissolved (solubility) against temperature in the grid below. A smooth curve through the plotted points is required

Use your graph to estimate the solubility of copper sulfate crystals at 10 °C.

Solubility
(g/100 g)



Describe, using an appropriate labelled diagram in the box provided, how to **grow and collect crystals** of copper sulfate from the solution produced at 100 °C.

2010 - Ordinary

Name the solvent in which the alum or copper sulfate was dissolved.

How was the solvent heated? What needed to be done to the hot saturated solution so that crystals formed?

Other than the piece of equipment used to heat the solvent name one other piece of equipment used in this experiment.



2009 - Ordinary

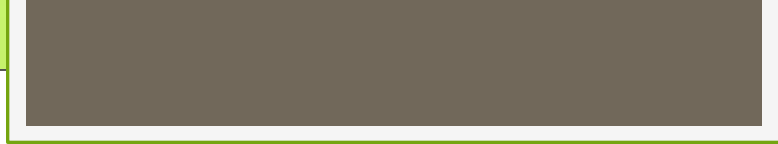
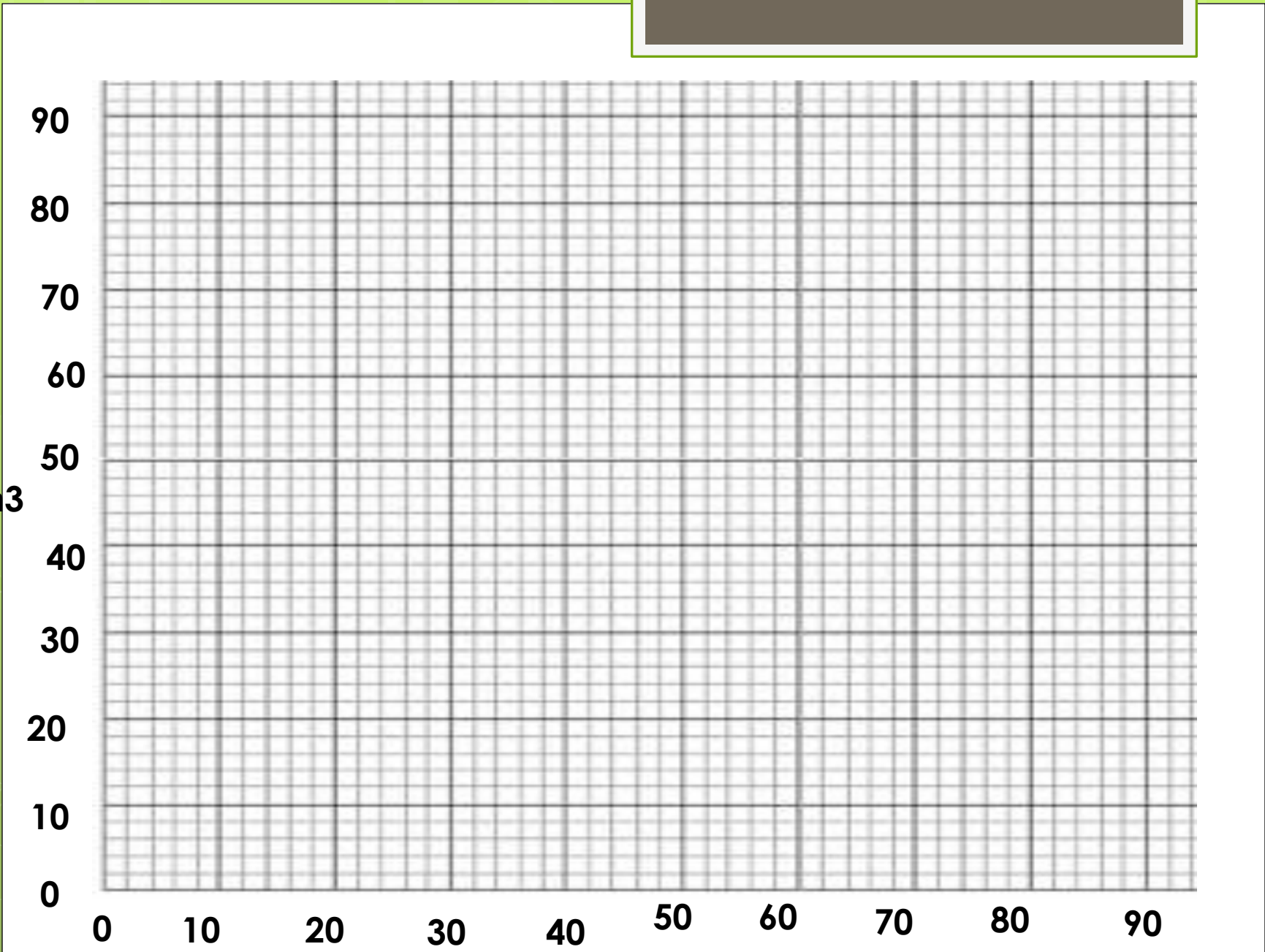
In a school laboratory, a student **investigated the solubility of a salt** in water.

The amount of salt which dissolved in water at different temperatures was measured. The data collected is presented in the table below.

Use this data to draw a graph of **solubility (y-axis)** against **temperature (x-axis)** using the grid provided below.

Temperature °C	20	30	40	70	90
Solubility g per 100 cm ³ of water	10	20	30	60	80

ty
0 cm³





Use the graph to estimate the solubility at 60 °C.

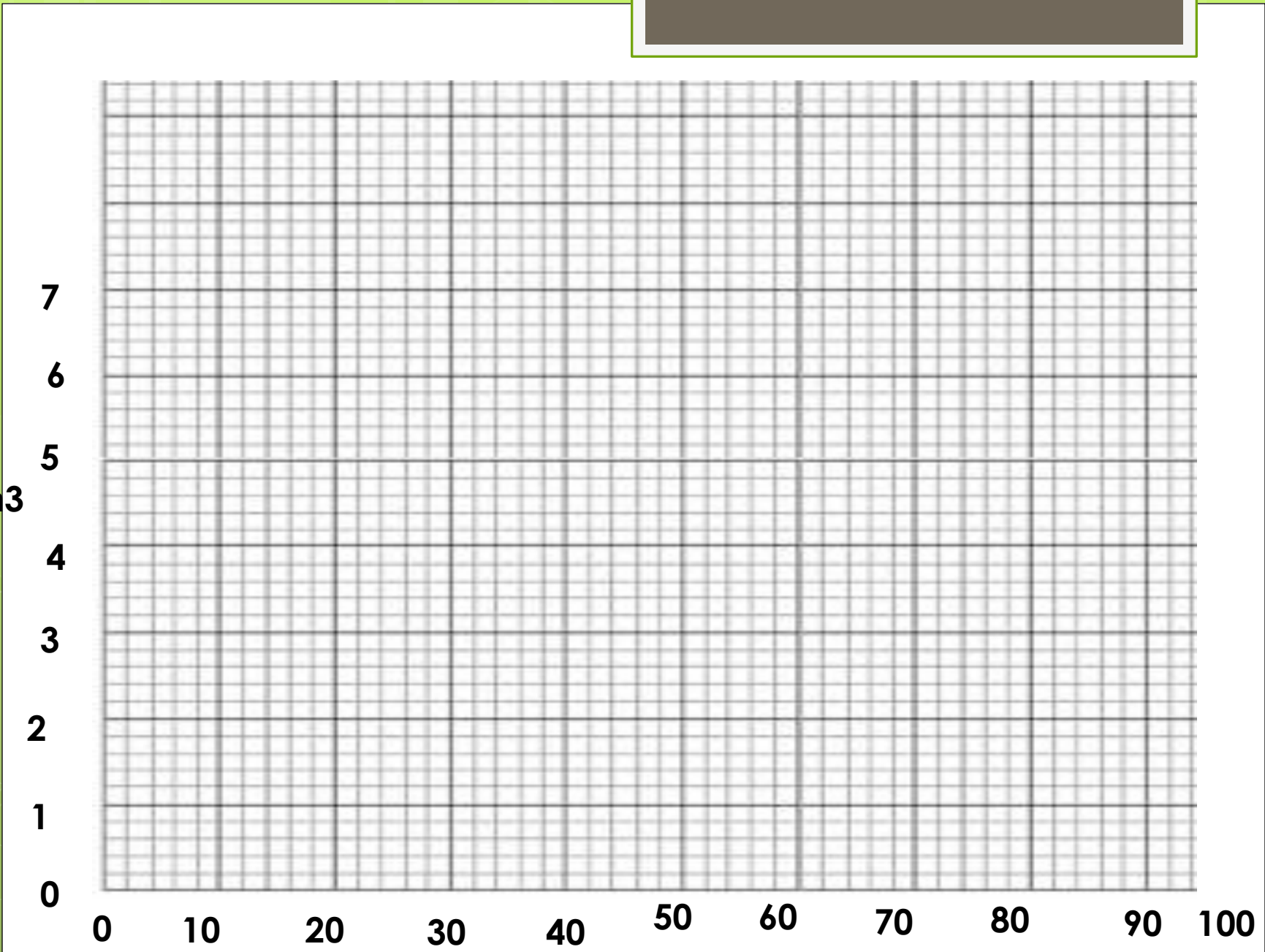
What can you **conclude** about the solubility of the salt in water from the graph?

2008 - Higher

The *limit of solubility* (maximum solubility) of oxygen gas (O_2) in water was measured, in *mg of oxygen per 100 g of water*, at a number of *different temperatures*. These measurements are given in the table

Solubility mg/100g water	7.0	4.3	3.0	2.3	1.4	0.8	0.0
Temperature °C	0	20	40	60	80	90	100

ty
0 cm³



Temperature (°C)

Use the graph to **estimate the solubility** of oxygen at 30 °C.

What **effect has temperature** on the **solubility** of oxygen in water?

Global warming has many implications. What **implication**, which could be inferred (concluded) from the information in the graph, might **global warming** have **for animals that live in water** e.g. fish?

2007 - Higher

Name a **substance**, other than water, that **forms crystals**.

Give **one difference** between crystalline and non-crystalline solids.

2007 - Higher

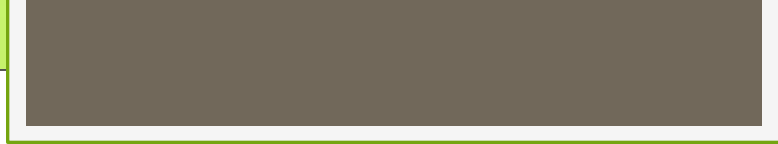
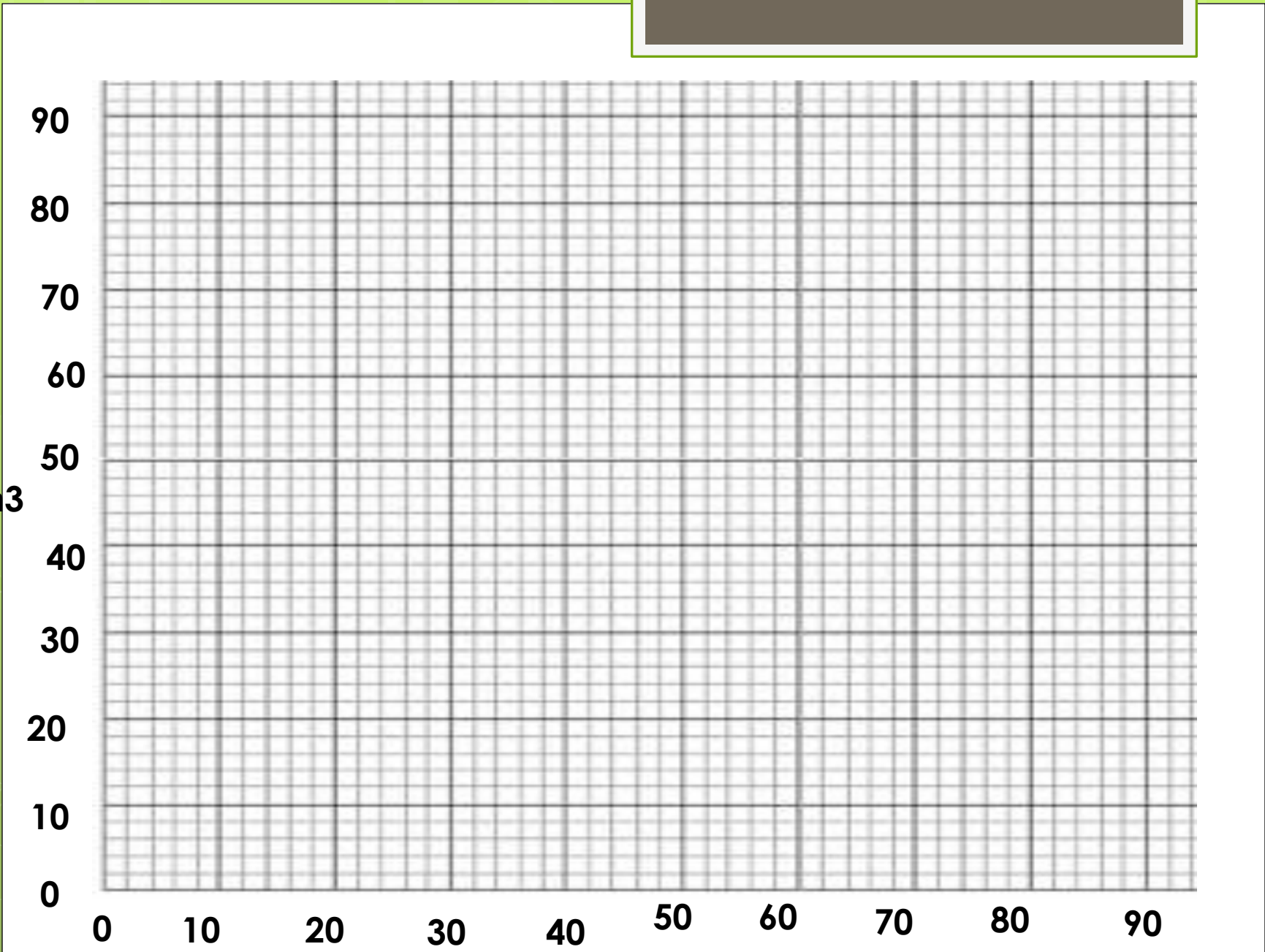
Distinguish between a **concentrated** and a **dilute** solution?

A pupil investigated the **effect of temperature on the solubility** of the salt ammonium chloride in water. She determined the maximum mass, in grams, of the salt that would dissolve in 100 g of water at various temperatures. The data from this experiment are given in the table.

Solubility g/100g water	29	37	46	55	66	77
Temperature ° C	0	20	40	60	80	100

Draw a graph to represent the data shown in the table

ty
0 cm³



Use the graph to **estimate the solubility** of ammonium chloride at 70 °C

What **conclusion** about the solubility of ammonium chloride can be drawn from analysis of the graph?

2006 – Ordinary

Describe how you could carry out an experiment to **grow crystals using alum or copper sulphate**. Include a diagram of any equipment used.