

GRAPHING

Independent variable: The aspect of the experiment that is manipulated by the scientist.

If I change the color of light, will the plant grow better?

Will increasing the amount of sugar given to yeast enable them to reproduce faster?

I wonder how temperature affects the rate of growth of plants?

What is the independent variable?

Adding ~~peat moss~~ to the soil will improve plant growth.



Different temperatures.

“X” axis Independent variable.

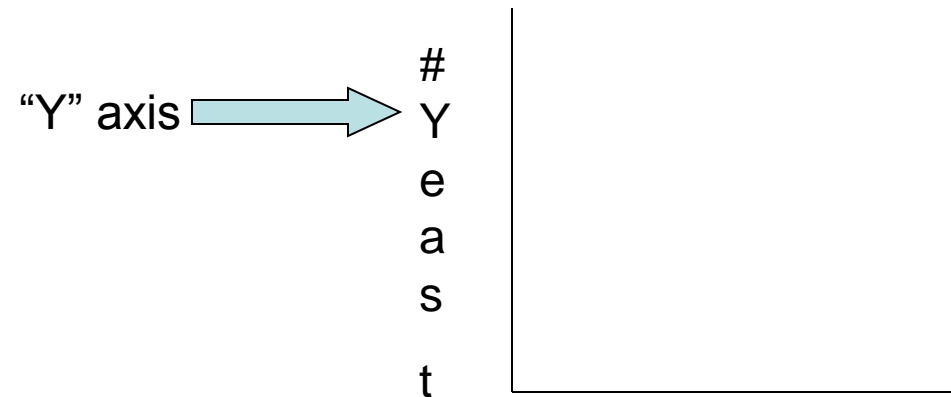
DEPENDENT VARIABLE

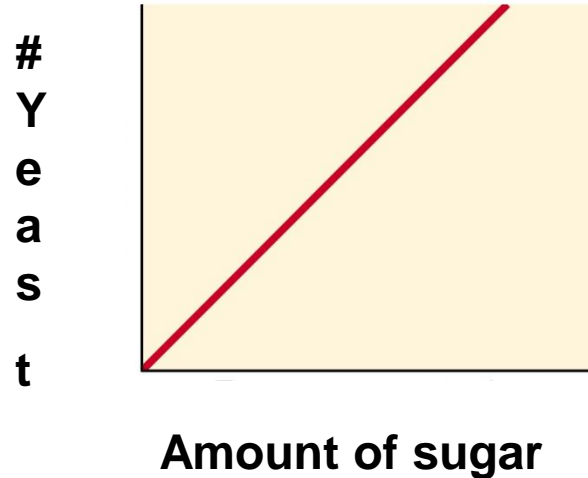
What is being measured or observed or data. (You will make a table to record these observations.)

What could you measure & record in the following?

If I change the color of light, will the plant grow better?

Will increasing the amount of sugar given to yeast enable them to reproduce faster?





Choose from the 2 explanations below. Which one makes sense?

1. As the number of yeast grew more numerous, there was more sugar.

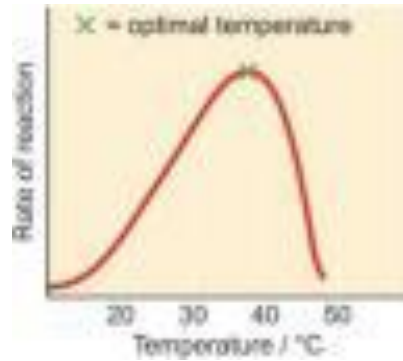
2. As the amount of sugar increased, the # of yeast grew more numerous.

The “cause” of the change always goes on the “X” axis;

The “effect” belongs on the “Y” axis.

The “cause” is the independent variable.

The “effect” is the dependent variable.



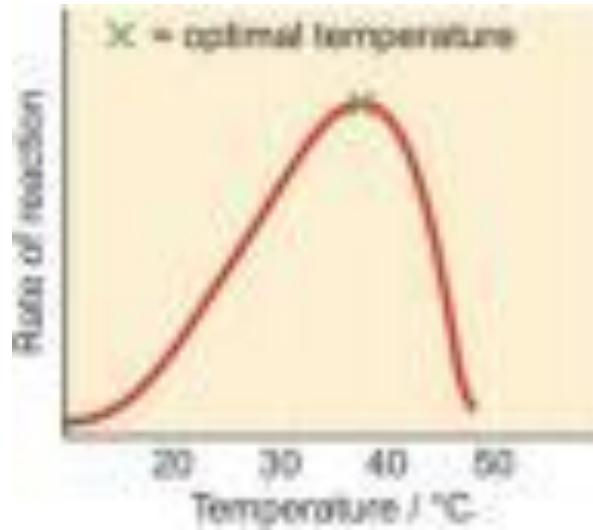
What is the independent variable shown on this graph?

What is still missing on this graph?

Both axes need to include units.

There is no title.

What do we know about the “x” axis?



We know the scientist was changing the temperature.

We know she used the Celsius temperature scale.

We also know the temperatures used varied from a low of 10 degrees to a high of 50 degrees.

What do we know about the “y” axis?

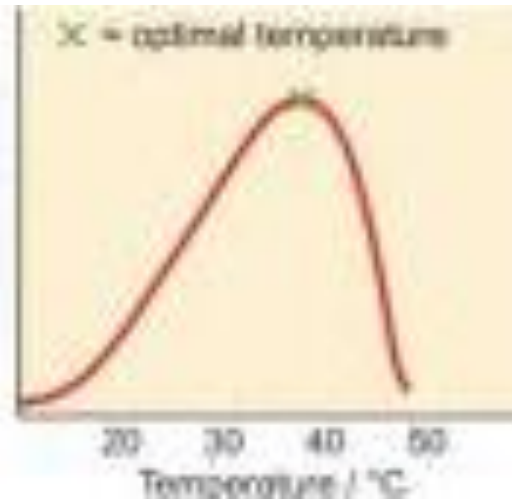
We know the scientist was recording the rate of the reaction.

But what more information could we have?

Was she measuring in seconds, hours, days?

What exactly was being measured that showed her the rate was changing?

**Rate of
reaction.
of
bubbles
of CO₂
per
Minute.**



Now we know more information about the “y” axis.

Just one thing left: A great title.

Why is this so hard to remember? Go to the next slide



The title combines the independent & dependent variable & explains the contents of the graph.

Here are some examples:

The effect of exercise on the heart rate.

The change of height due to increasing fertilizer.

How to space the units on a graph?

1. Subtract the lowest unit used from the highest unit to get a range.

Example: If the temperature range was from 20 degrees C to 70 degrees C than the range = 50 degrees C.

2. Count the number of spaces (NOT LINES).

Example: The number of spaces = 12. (The lines = 13 but we don't care about lines 😞)

3. Divide the range by the # of spaces. So: 50 divided by 12 = 4.16

4. Round up to the next number. 4.15 rounds up to 5.

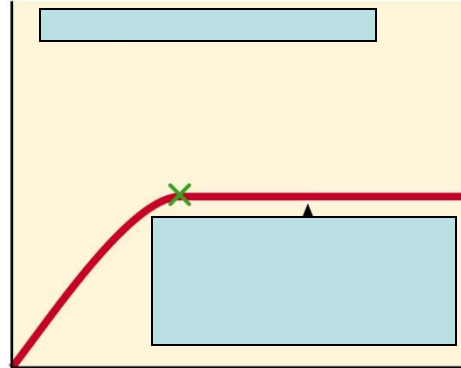
5. Begin numbering the LINES but don't start at zero unless your range began at zero.

**What information can
You read in this graph?**

**The effect of sugar concentration
on the growth rate of yeast.**

**Well something is getting
larger to a point & then
leveling off.**

**But I don't know what is
causing the change AND I
don't know what change is
being measured.**



What if I add a title that includes the independent & dependent variable?

Name the independent variable? _____

Name the dependent variable? _____

List some possible ways to measure each of the above.

Bar graphs are used when there is not a mathematical relationship.

* A line graph only used when there is a mathematical or numerical relationship between the values of the independent variable.

Choose either line graph or bar graph for each of the following:

- 1. The effect of amount of fertilizer on the rate of plant growth.**
- 2. The effect of different fertilizers on the rate of plant growth.**

Checklist for your perfect graph.

- 1. Title which includes the independent & dependent variable.**
- 2. “X” axis labeled with the independent variable.**
- 3. “Y” axis labeled with the dependent variable.**
- 4. Axis units are spaced equally & the type of unit is shown.**
- 5. Choose the type of graph; line or bar graph.**
- 6. Fill in the data. Connect points on a line graph.**