

# **Global Warming Survival Project Laboratory Notebook**

NAME

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SCHOOL

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CLASS

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PROJECT

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Research studies in all areas require the investigators to keep accurate and complete records of all details pertaining to the study. If the study's records are not complete and information is not entered, then the entire study could be viewed as meaningless. In science, study records are often recorded in a special journal called 'The Lab Notebook'. Scientists know that the information recorded in the Lab Notebook is vital to the success for the following reasons.

The Lab Notebook provides the investigator with a 'how to' way for repeating successful methods. If an investigator, for example, accidentally found a good way to make a plant container and wanted to repeat the 'accident' at a later time, the investigator would encounter a number of problems if accurate and detailed notes were not available.

The Lab Notebook also allows investigators to share their results and successful methods with other investigators. If lab team A, for example, finds that their plants are not growing very well and the team members notice that the plants from lab team B are growing very well, then team A could provide team B with useful information from their Lab Notebook that would help them with plant growth.

The Lab Notebook provides investigators with a way to examine their methods and equipment design before the investigators use the equipment or methods. The review of methods and equipment prevents the investigators from using flawed methods and/or equipment before these problems have a chance to cause actual damage.

The Lab Notebook is vital in helping the study investigators convince investigators in other labs that their findings are valid. Other labs may need to repeat the results of the study before they are convinced that the results are true. If the other lab does not have all of the necessary study details they may be unable to repeat the study's results and will announce to other labs that the study's results are not valid.

Investigators in this lab are about to undertake an important study that may eventually help Earth's residents to adapt to the ongoing effects of Global Warming. For this reason, investigators need to be diligent in their efforts to create and maintain their Lab Notebooks.





Plant Nutrient Solution Materials	
Brand Name and Manufacturer of Nutrient Concentrate	Ionic Bloom 3-2-6. Hydrodynamics International
Device used to Measure the nutrient concentrate	Graduated cylinder (50 mL)
Water Storage Container	Water can; (2.5 gal)
Container for mixing nutrient solution	Plastic pitcher (2 L)
Device used for stirring the nutrient solution	12" Ruler, spatula, spoon. etc.

**Describe your method for preparing nutrient solution from the nutrient concentrate**

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**Explain how to find the volume of a liquid in a graduated cylinder**

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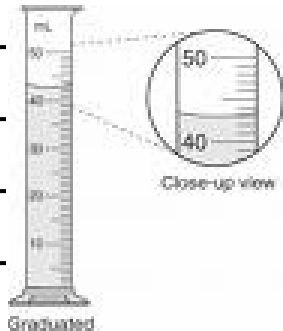
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Graduated Cylinder  
50 milliliters




The diagram shows a 50 mL graduated cylinder. A circular inset provides a close-up view of the scale between 40 and 50 mL. The liquid level is shown to be exactly halfway between the 40 and 50 mL marks, which is 45 mL. The word 'Graduated' is written at the bottom of the cylinder.

Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

Light System Materials	
The light support container	
Used to add mass to the light support container	
The light bulb	Type of bulb?
	How much light and power?
The light bulb holder	
Clamp light support	
Provides power from the outlet	

**Sketch and label the lighting setup used to supply light to one plant**

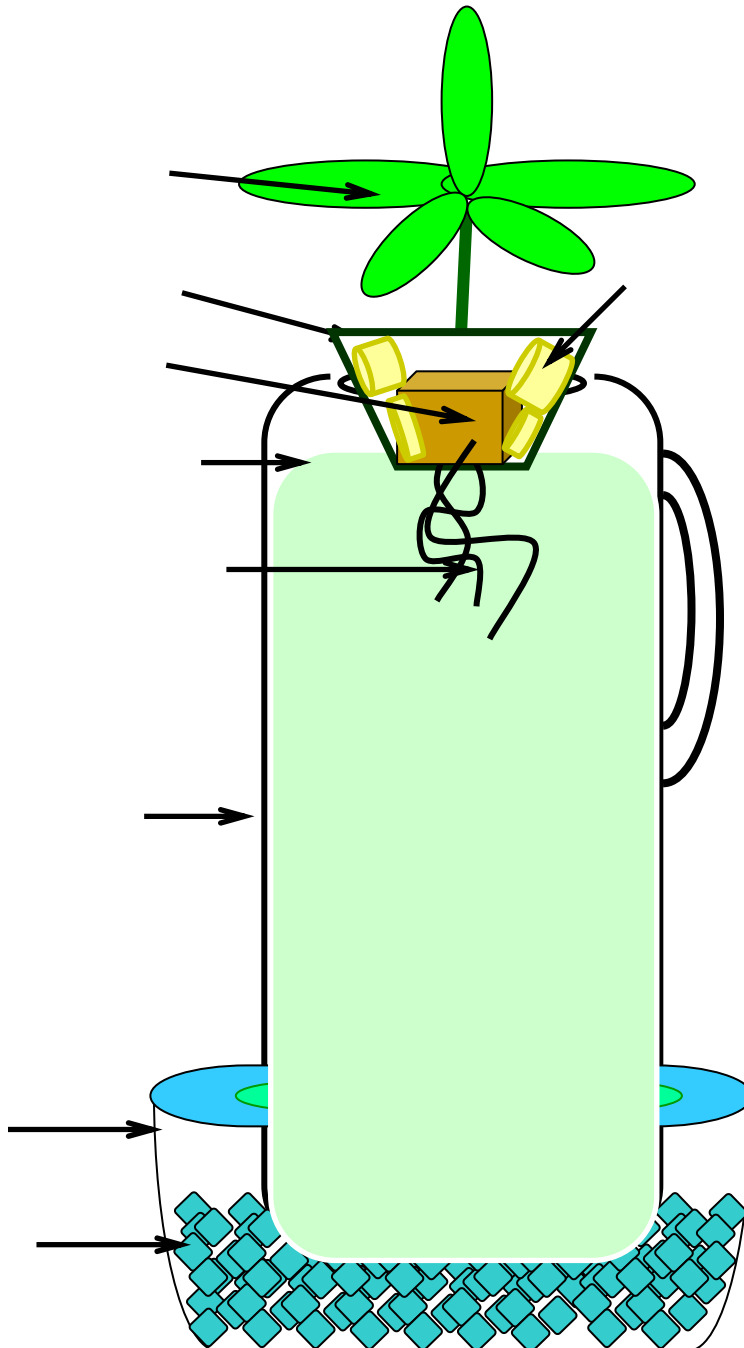




Entry Date \_\_\_\_\_

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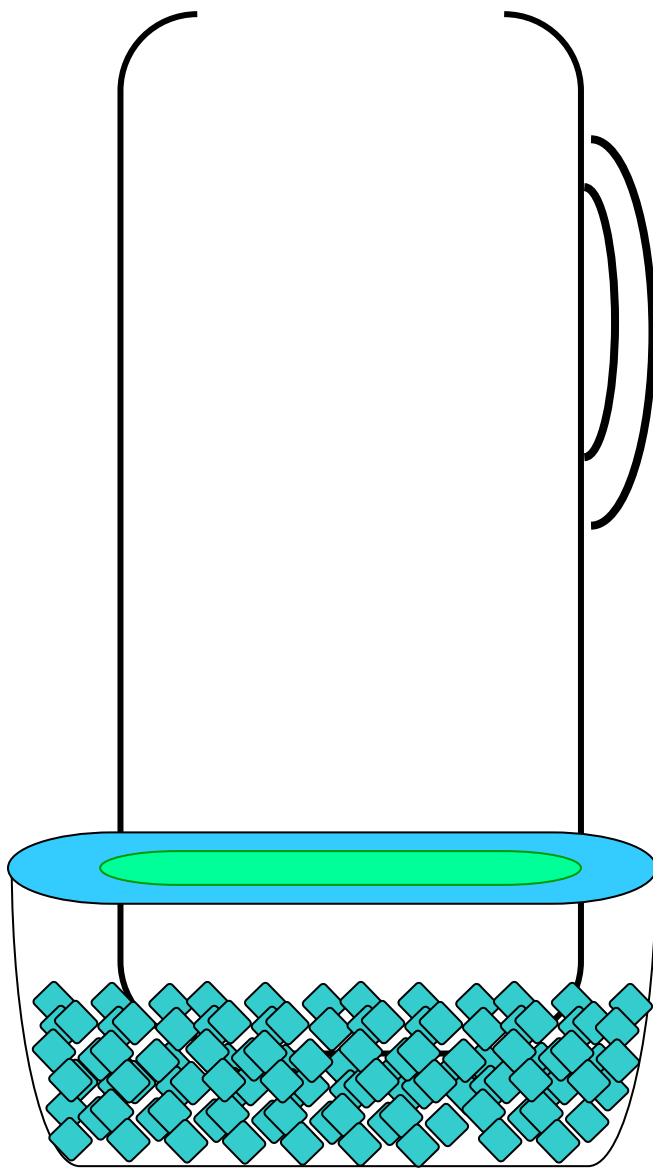
**Identify the following parts in the sketch of a plant on the starting day of the study**  
Plant, Plant Holding-Cup, Rockwool Cube, Cotton Ball, The Nutrient Solution Level, Plant Root, Plant Container, Support Base, Gravel



Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

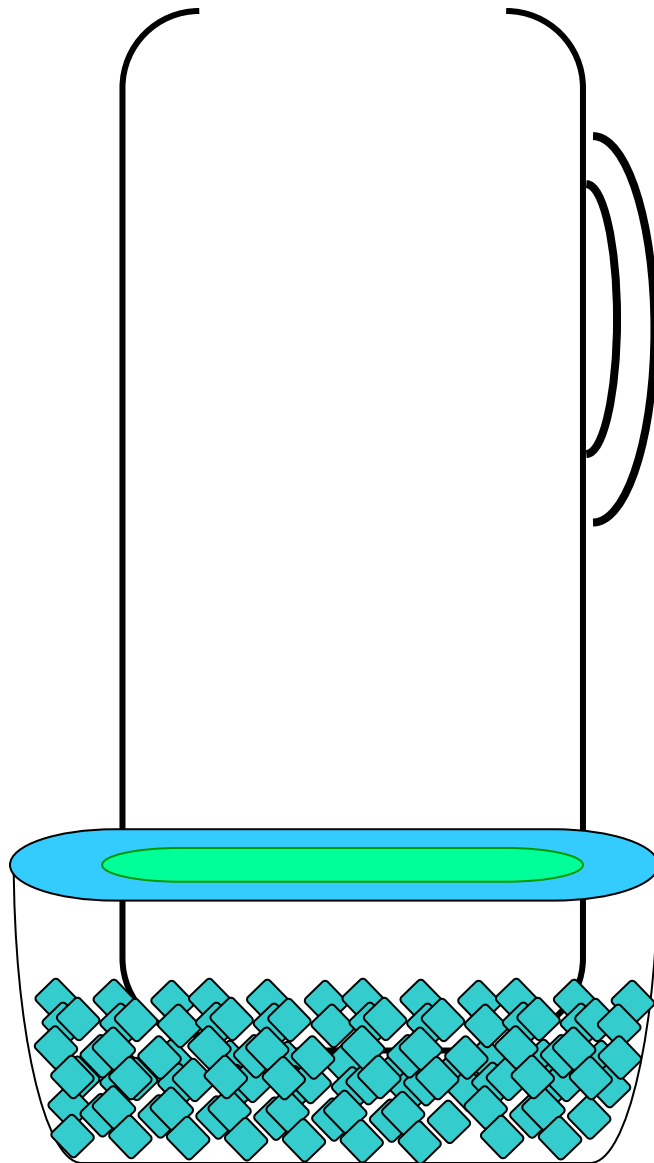
Sketch and label a plant and container on a refill day. Refer to the figure on page 6



Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

**Sketch and label a plant and container just after refill day.**



Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

Materials for Measuring Plant Mass	
Triple Beam or Electronic Balance	Maximum mass limit:
Weighing Container	
Towel	

**Describe your method for finding the total mass of a growing plant**

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**Explain how to use the tare mass and total mass to find the plant mass**

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Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

Some of the measurement data in a study does not change in value from the beginning to the end of the study. It would be a waste of space to place this 'one-time' data in the same table as the data that changes from one measurement date to the next so investigators usually put one-time data in a separate data table.

Write the name of the study in the space below. The possible studies are:

**Finding the Best Drought Resistant Plant, Finding the Best Growing Plant and Finding the Best Over-all Plant.**

Choose the one-time data table and write the table number in the space provided.

Study Name: \_\_\_\_\_

Table Number \_\_\_\_\_

**1**

Start Date	Starting Nutrient Solution Height (cm)	Final Plant Mass (g)

**2**

Starting Nutrient Solution Height (cm)	Final Plant Mass (g)

**3**

Start Date	Final Plant Mass (g)

**Table 1 has all of the information that tables 2 and 3 have. What is the disadvantage in using table 1 for all three possible studies?**

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Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

The measurement data (often called 'raw data') changes during the course of the study. Depending on the type of study, there are three possible measurement data tables.

Write the name of the study in the space below. The possible studies are:

**Finding the Best Drought Resistant Plant, Finding the Best Growing Plant and Finding the Best Over-all Plant.**

Choose the measurement data table that is best for the study and write the table number in the space provided.

Study Name: \_\_\_\_\_

Table Number \_\_\_\_\_

**1**

Nutrient Solution Height (cm)	Container Refill (Yes/No)	Weighing Container Mass (g)	Plant Mass (g)

**2**

Measure Date	Weighing Container Mass (g)	Plant Mass (g)

**3**

Measure Date	Nutrient Solution Height (cm)	Container Refill (Yes/No)	Weighing Container Mass (g)	Plant Mass (g)

**All three of the above measurement data tables have one row underneath the headings row. What does the number of rows underneath the headings row in the measurement table tell the investigator about the study?**

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**How many blank rows will the measurement table require for your study?**

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Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

The graphing data table is made by calculating data in the measurement data table. Results from graphing the data in the graphing table will provide the investigator with information used to make conclusions about the plants. Depending on the type of study, there are two possible graphing data tables.

Write the name of the study in the space below. The possible studies are:

**Finding the Best Drought Resistant Plant; Finding the Best Growing Plant**

Choose the graphing table that is best for the study and write the table number in the space provided.

Study Name: \_\_\_\_\_

Table Number \_\_\_\_\_

**1**

Plant Mass (g)	Nutrient Solution Used (L)

**2**

Plant Mass (g)	Time (Days)

**The data pairs in the graphing data table will produce a straight line curve when entered into a scatter plot. If the slope of the line has a large value, what conclusion can the investigator make about the plant?**

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**Why is there not a graphing table to help investigators find the Best Overall-All Plant?**

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Entry Date \_\_\_\_\_

Initials \_\_\_\_\_

The summary bar graph presents the studies' conclusions. This graph compares the results of all individual plants in the study and allows the viewer to quickly visualize the results. Depending on the type of study, there are three possible measurement data tables.

Write the name of the study in the space below. The possible studies are:

**Finding the Best Drought Resistant Plant, Finding the Best Growing Plant and Finding the Best Over-all Plant.**

Choose the summary bar graph table that is capable of producing the summary bar graph that best represents the results of the study. Write the table number in the space provided and answer the questions.

Study Name: \_\_\_\_\_

Table Number \_\_\_\_\_

**1**

<u>Plant Mass (g)</u>
<u>N.S. Used (L)</u>

**2**

<u>Plant Mass (g)</u>
<u>Time (Days)</u>

**3**

<u>Plant Mass (g)</u>	<u>Plant Mass (g)</u>
<u>Time (Days)</u>	<u>N.S. Used (L)</u>

All three of the above summary-bar-graph tables have one row underneath the headings row. What does the number of rows underneath the headings row in the graphing table tell the investigator about the study?

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Some of the data points in the summary bar graph are close to the top of the graph while others are near the bottom of the graph. What is the relationship between the height of the point on the summary bar graph and the evaluation of the plant in the studies for the Best Drought Resistant Plant, Best Growing Plant and the Best Over-all Plant?

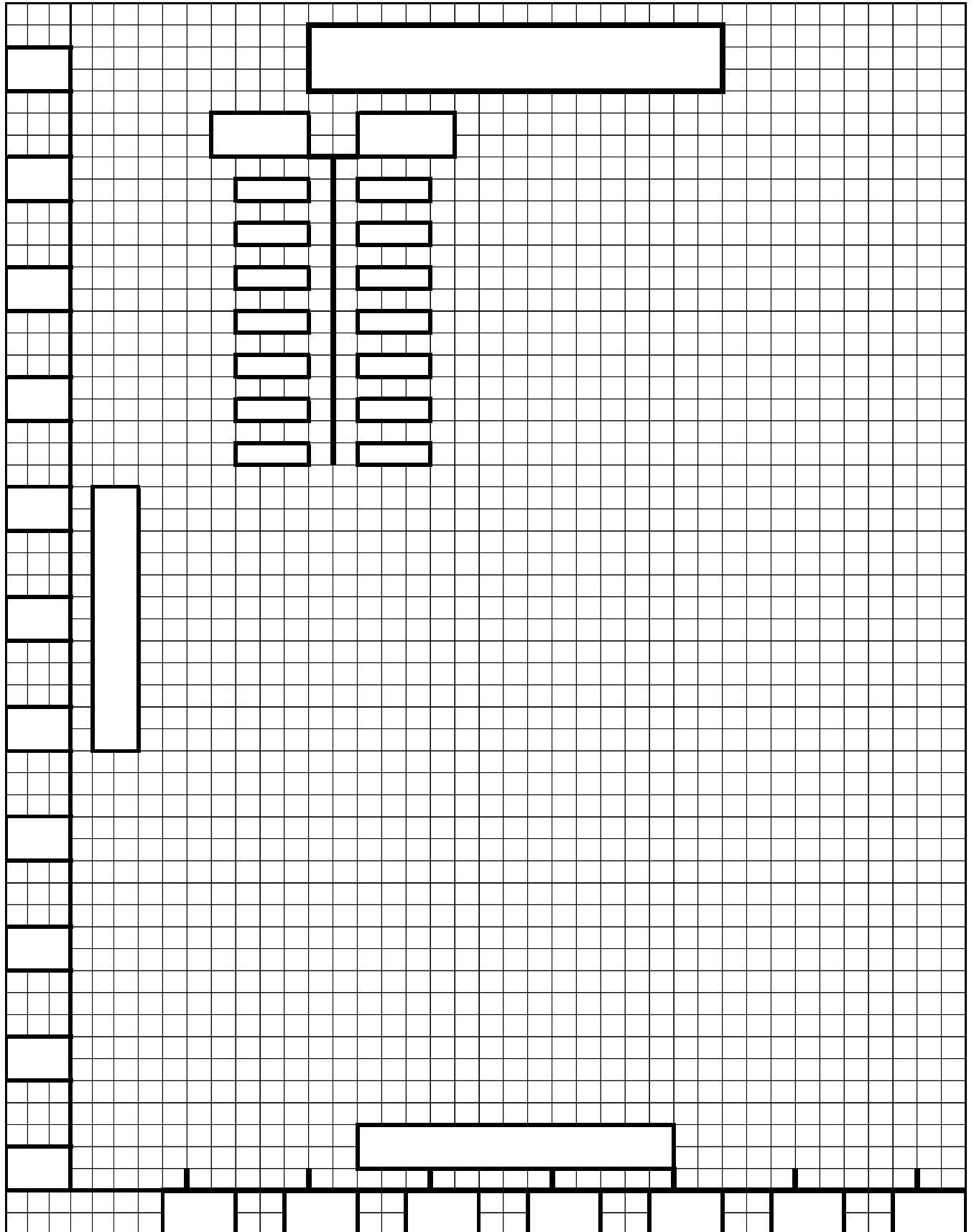
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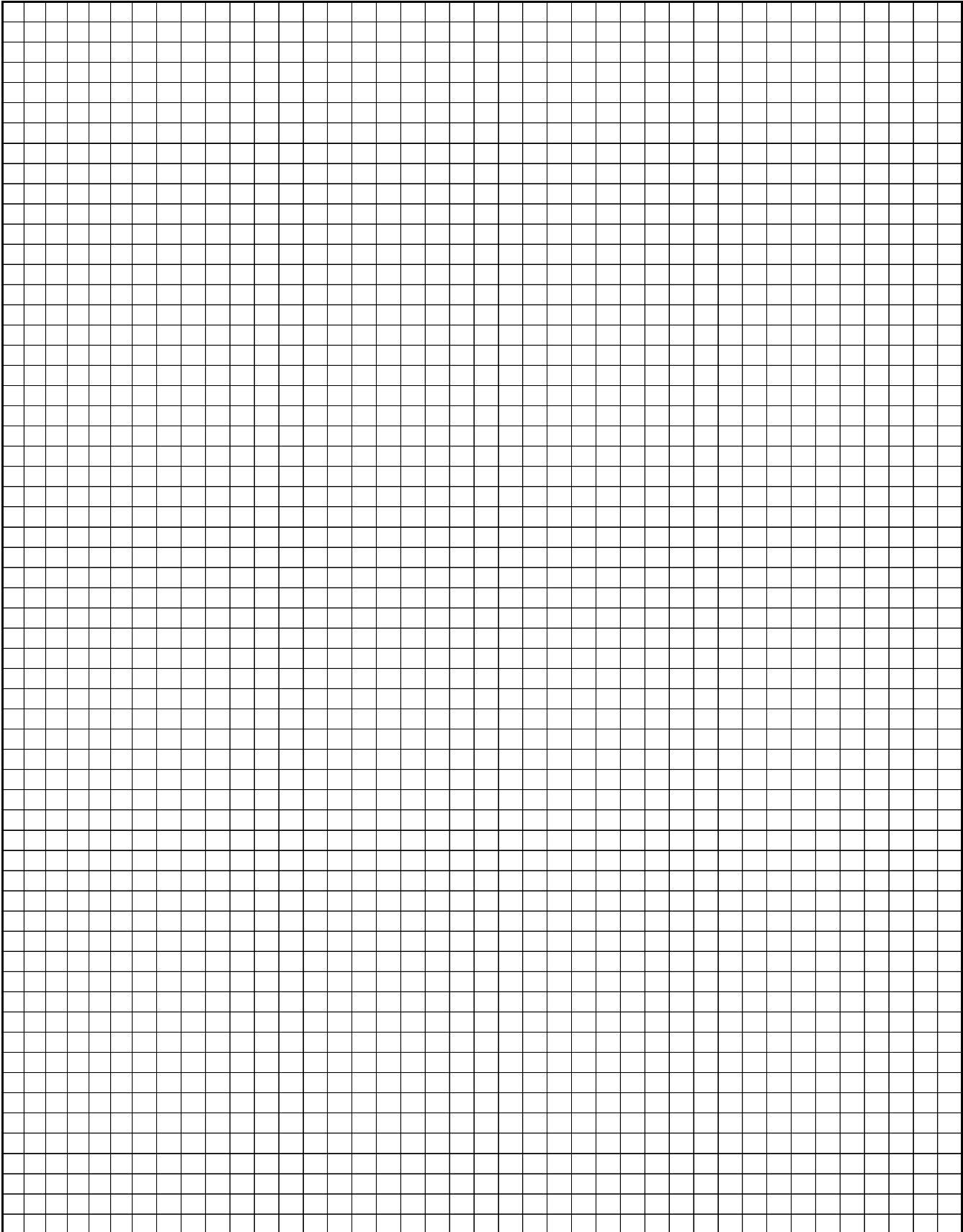
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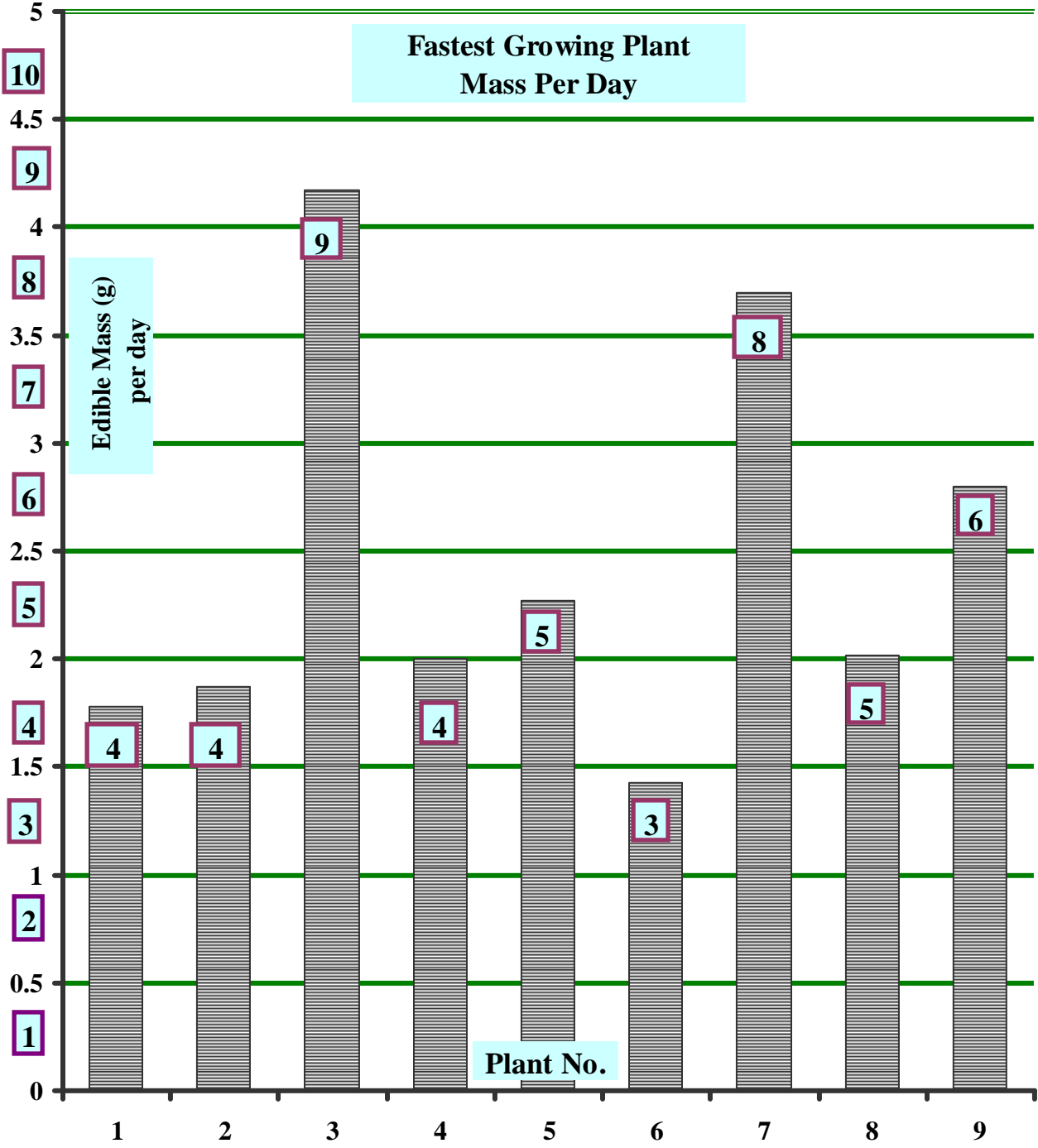
# Template for Scatter-Plot Graph



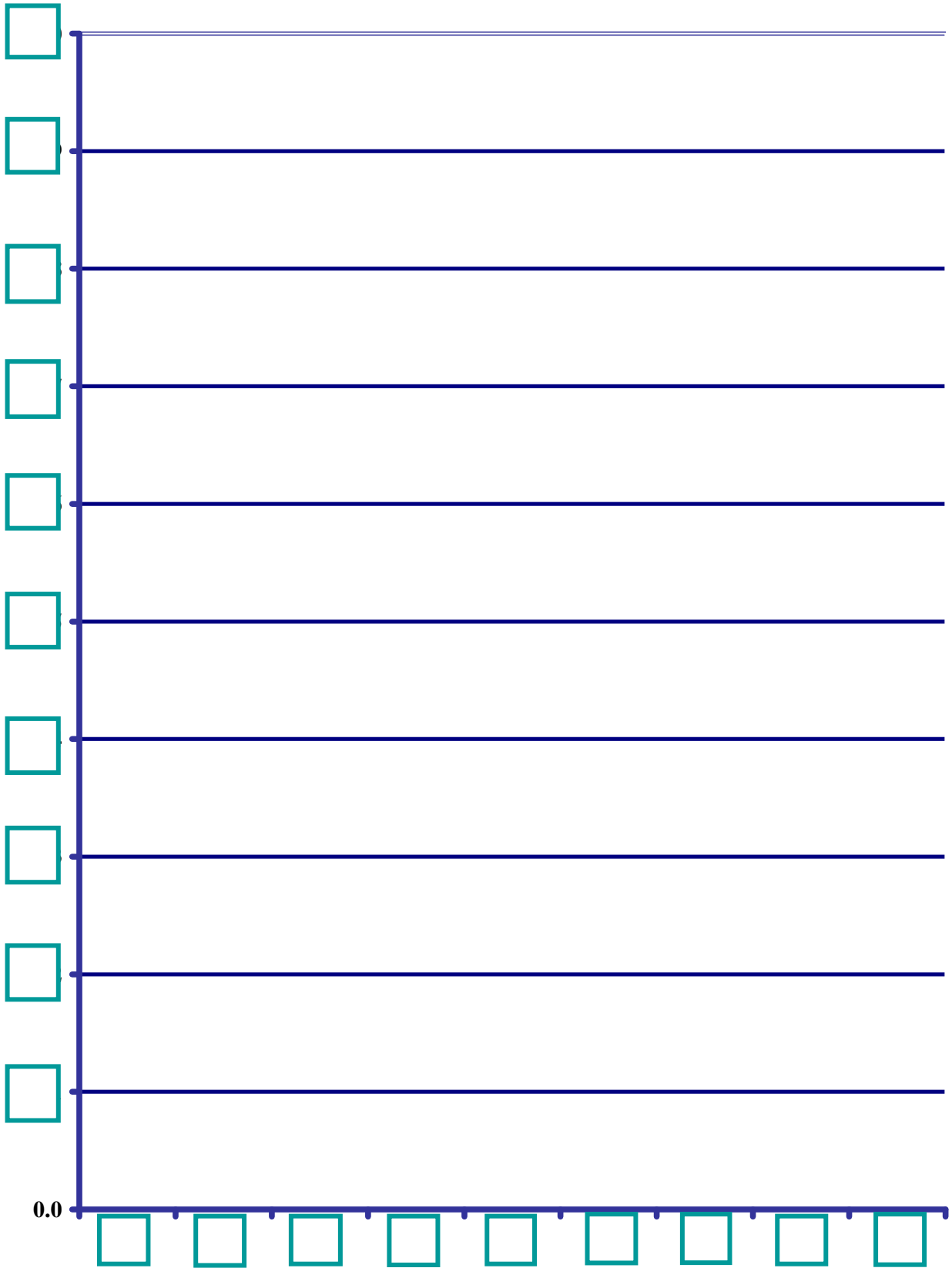
# Blank Graph Sheet for Scatter-Plot Graphs



Example of a Summary Bar Graph



# Template for a Summary Bar Graph



Blank Graph Sheet for Summary Bar Graphs

