**Graphing Practice** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction**

Line graphs compare two variables. Each variable is plotted along an axis. The independent variable (manipulated)

goes on the x-axis, the dependent or responding variable goes on the y-axis.

**Line graphs are important in science for several reasons such as:**

* showing specific values of data. If one variable is known, the other can be determined.
* showing trends and relationships in data clearly.
* they visibly depict how one variable is affected by the other as it increases or decreases.
* allowing the viewer to make predictions within recorded data, called **interpolation**, and to make predictions
* about data not yet recorded, called **extrapolation**.

**Interpolation vs. Extrapolation**

Determine which of the examples below is interpolation and which is extrapolation. Explain why.

1. The value of Sarah’s car in 2008 was $17,500. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. The value of Sarah’s car in 2023 was $1,900. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**How to Construct a Line Graph:**

1. Identify the Variables & Label the Axes

a. **Independent Variable** – factor that is varied in an experiment and specifically controlled by the experimenter

 i. Label along the x-axis (horizontal) – include units

 ii. Typically found on the left side of a data table

b. **Dependent Variable** – factor that is measured in an experiment and will change as a result of the independent variable

 i. Label along the y-axis (vertical) – include units

 ii. Typically found on the right side of a data table



2. Determine the Graph Scale

 a. Determine the magnitude (numeric value) of each variable

 b. Establish a scale that best fits the range of each variable

 c. Spread the graph to use the MOST available space (use at least ¾ of the graph)

 d. Be consistent throughout each axes’ scale

3. Plot the data points

 a. Plot each data value on the graph with a dot

 b. If multiple sets of data are being plotted, use different colored lines and include a key

**Relationships:**

**Graphing Practice**

Background: The thickness of the annual rings indicates what type of environmental situation was occurring the

time of the tree’s development. A thin ring usually indicates a rough period of development such as lack of water,

forest fires, or insect infestation. On the other hand, a thick ring means a prosperous period of development. Use

the information from the data table below to create a proper scientific graph and to answer the corresponding

questions.

|  |  |  |
| --- | --- | --- |
| **Age of Trees (in years)**  | **Average Thickness of Annual Rings in Forest A (millimeters)**  | **Average Thickness of Annual Rings in Forest B (millimeters)**  |
| 10  | 20  | 24  |
| 20  | 24  | 28  |
| 30  | 30  | 35  |
| 35  | 34  | 38  |
| 50  | 41  | 45  |
| 60  | 46  | 51  |

1. What is the dependent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is the independent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What was the average thickness of annual rings for 40 year old trees in Forest A? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. What is it called when you make predictions within given data, such as made in question #3? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What was the mean thickness of annual rings for all trees found in Forest B? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Based on the data shown, what can be concluded about the comparative health of Forest A & B? \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. What type of relationship (constant, direct, or indirect) exists between the age of trees and the average thickness

of the tree’s rings? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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