

# What Affects Growth?

## Environmental & Genetic Factors

### Graphing Activity Bundle

- ✓ Students graph, analyze, and interpret experimental data on plants and animals.
- ✓ 4 Complete Activities with Answer Keys
- ✓ Builds Data Literacy

#### What Affects Growth? Exploring Environmental and Genetic Factors Through Data

##### Activity 1: Drought and Plant Growth

Title: How Does Water Affect Plant Growth?

Instructions:  
Below is data from an experiment where identical plants were grown under different watering conditions. Graph the average plant height over time for each condition.

##### Data Table:

| Week | Regular Watering Height (cm) | Limited Watering Height (cm) | No Water Height (cm) |
|------|------------------------------|------------------------------|----------------------|
| 1    | 2                            | 2                            | 2                    |
| 2    | 4                            | 3                            | 2                    |
| 3    | 6                            | 4                            | 1.5                  |
| 4    | 8                            | 5                            | 1                    |
| 5    | 10                           | 5.5                          | 1                    |

##### Student Task:

- Create a line graph with Week on the x-axis and Height (cm) on the y-axis.
- Use different colored lines for each watering condition.

##### Questions:

1. Which plants grew the most over five weeks?
2. What does the graph suggest about the importance of water in plant growth?
3. How did the plants with no water change over time?



# 6th, 7th, 8th Grade

# What Affects Growth?

## Graphing Activity Bundle

✓ **Real-World Science Skills:** Students learn how to graph, analyze, and interpret data using real experiments on plants and animals.

✓ **4 Complete Activities + Graphing**

**Overview:** Includes hands-on graphing tasks and questions on drought, fertilizer, genetics, and habitat size.

✓ **Builds Data Literacy:** Covers bar and line graphs, axis labeling, titles, and choosing the right graph type for the data.

✓ **Answer Key Included:** Comes with teacher-guided solutions and clear explanations to support student understanding.



# What Affects Growth?

## Graphing Activity Bundle

### What Affects Growth? Exploring Environmental and Genetic Factors Through Data

#### How to Graph Scientific Data

##### What to Do

- Title Your Graph**
  - Write a clear title that tells what your graph is about.
  - Example: *Effect of Water on Plant Growth*
- Label Your Axes**
  - X-axis (horizontal):** This is where you put the independent variable (what you changed).
  - Y-axis (vertical):** This is where you put the dependent variable (what you measured).
- Use Even Spacing**
  - Make sure your numbers go up evenly (e.g., 1, 2, 3 or 5, 10, 15).
  - Start your axes at zero unless told otherwise.
- Plot Points Carefully**
  - Use a dot or "x" to show each data point.
  - For line graphs: connect the dots with straight lines or draw a line of best fit.
  - For bar graphs: make each bar the same width and evenly spaced.
- Use a Key or Legend (if needed)**
  - If your graph has more than one line or color, use a small box to explain what each color or symbol means.

##### Rules to Remember

- Use **graph paper** or a ruler to keep things neat.
- Always label your units (e.g., cm, g, weeks).
- Double-check your data before plotting.
- Choose the correct type of graph:
  - Line graph** = showing change over time.
  - Bar graph** = comparing different groups.

##### What Not to Do

- Don't leave off axis labels or units.
- Don't start your graph at a random number.
- Don't connect points in a bar graph.
- Don't squish your data — use the whole space.
- Don't forget a title!

### What Affects Growth? Exploring Environmental and Genetic Factors Through Data

#### Activity 1: Drought and Plant Growth

Title: How Does Water Affect Plant Growth?

##### Instructions:

Below is data from an experiment where identical plants were grown under different watering conditions. Graph the **average plant height** over time for each condition.

##### Data Table:

| Week | Regular Watering Height (cm) | Limited Watering Height (cm) | No Water Height (cm) |
|------|------------------------------|------------------------------|----------------------|
| 1    | 2                            | 2                            | 2                    |
| 2    | 4                            | 3                            | 2                    |
| 3    | 6                            | 4                            | 1.5                  |
| 4    | 8                            | 5                            | 1                    |
| 5    | 10                           | 5.5                          | 1                    |

##### Student Tasks:

- Create a line graph with **Week** on the x-axis and **Height (cm)** on the y-axis.
- Use different colored lines for each watering condition.

##### Questions:

- Which plants grew the most over five weeks?
- What does the graph suggest about the importance of water in plant growth?
- How did the plants with no water change over time?

#### Activity 2: Fertilizer and Plant Growth

Title: Does Fertilizer Make Plants Grow Taller?

##### Instructions:

The table shows plant height after 4 weeks based on the type of fertilizer used. Graph the final height for each group.

##### Data Table:

| Fertilizer Type     | Final Plant Height (cm) |
|---------------------|-------------------------|
| No Fertilizer       | 8                       |
| Organic Fertilizer  | 12                      |
| Chemical Fertilizer | 15                      |

##### Student Tasks:

- Create a **bar graph** with Fertilizer Type on the x-axis and Plant Height on the y-axis.

##### Questions:

- Which fertilizer helped plants grow the tallest?
- How does using no fertilizer compare to using organic or chemical fertilizers?
- What might be some reasons different fertilizers affect growth differently?

#### Activity 3: Seed Variety and Growth Rate

Title: Do Different Seeds Grow at the Same Rate?

##### Instructions:

Three varieties of sunflower seeds were planted in identical conditions. Use the table to compare their average height after each week.

##### Data Table:

| Week | Seed Variety 'A' Height (cm) | Seed Variety 'B' Height (cm) | Seed Variety 'C' Height (cm) |
|------|------------------------------|------------------------------|------------------------------|
| 1    | 1                            | 1                            | 1                            |
| 2    | 3                            | 2                            | 2                            |
| 3    | 6                            | 4                            | 5                            |
| 4    | 9                            | 5                            | 7                            |
| 5    | 12                           | 6                            | 8                            |

##### Student Tasks:

- Create a **line graph** showing height over time for each variety.
- Use a different line color for each seed type.

##### Questions:

- Which seed variety grew the fastest?
- Which grew the slowest?
- What does this tell us about genetic differences in plants?

#### Activity 4: Fish Size in Different Pond Sizes

Title: Does Pond Size Affect Fish Growth?

##### Instructions:

The following table shows the average weight of fish after 6 months living in different pond sizes.

##### Data Table:

| Pond Size   | Average Fish Weight (grams) |
|-------------|-----------------------------|
| Small Pond  | 150                         |
| Medium Pond | 230                         |
| Large Pond  | 320                         |

##### Student Tasks:

- Create a **bar graph** with Pond Size on the x-axis and Fish Weight on the y-axis.

##### Questions:

- In which pond did fish grow the largest?
- What does the data suggest about the effect of space on animal growth?
- How might pond size affect things like food availability or competition?

#### Teacher Answer Key

##### Activity 1: Drought and Plant Growth Questions & Answers:

- What trend do you see as the number of weeks without water increases?  
**Plant height decreases as the number of drought weeks increases.**
- Which condition led to the tallest plant growth?  
**No drought (0 weeks without water).**
- How does drought affect plant growth based on this data?  
**Drought reduces plant growth — the longer the drought, the shorter the plants.**

##### Activity 2: Fertilizer and Plant Growth Questions & Answers:

- Which group of plants grew the tallest on average?  
**Group C (High fertilizer).**
- How did increasing the amount of fertilizer affect plant growth?  
**More fertilizer led to more growth.**
- Is there a point where more fertilizer might not help or could hurt plant growth? Explain your thinking.  
**Possibly yes. Too much fertilizer can damage plants, but the data here only shows positive growth.**

##### Activity 3: Seed Variety and Growth in Different Conditions Questions & Answers:

- Which seed variety grew the most in dry soil?  
**Seed B (9 cm).**
- Which seed variety grew the most in wet soil?  
**Seed A (14 cm).**
- How does the environment affect how well each seed variety grows?  
**Different seeds grow better in different soil conditions — Seed A does best in wet soil, while Seed B performs better in dry.**

##### Activity 4: Fish Size in Different Pond Sizes Questions & Answers:

- In which pond size did the fish grow the largest?  
**Large Pond (320 cm).**
- How does pond size seem to affect fish growth?  
**Larger ponds lead to larger fish.**
- Why might fish grow larger in bigger ponds?  
**More space, food, and less competition/stress can help fish grow bigger.**

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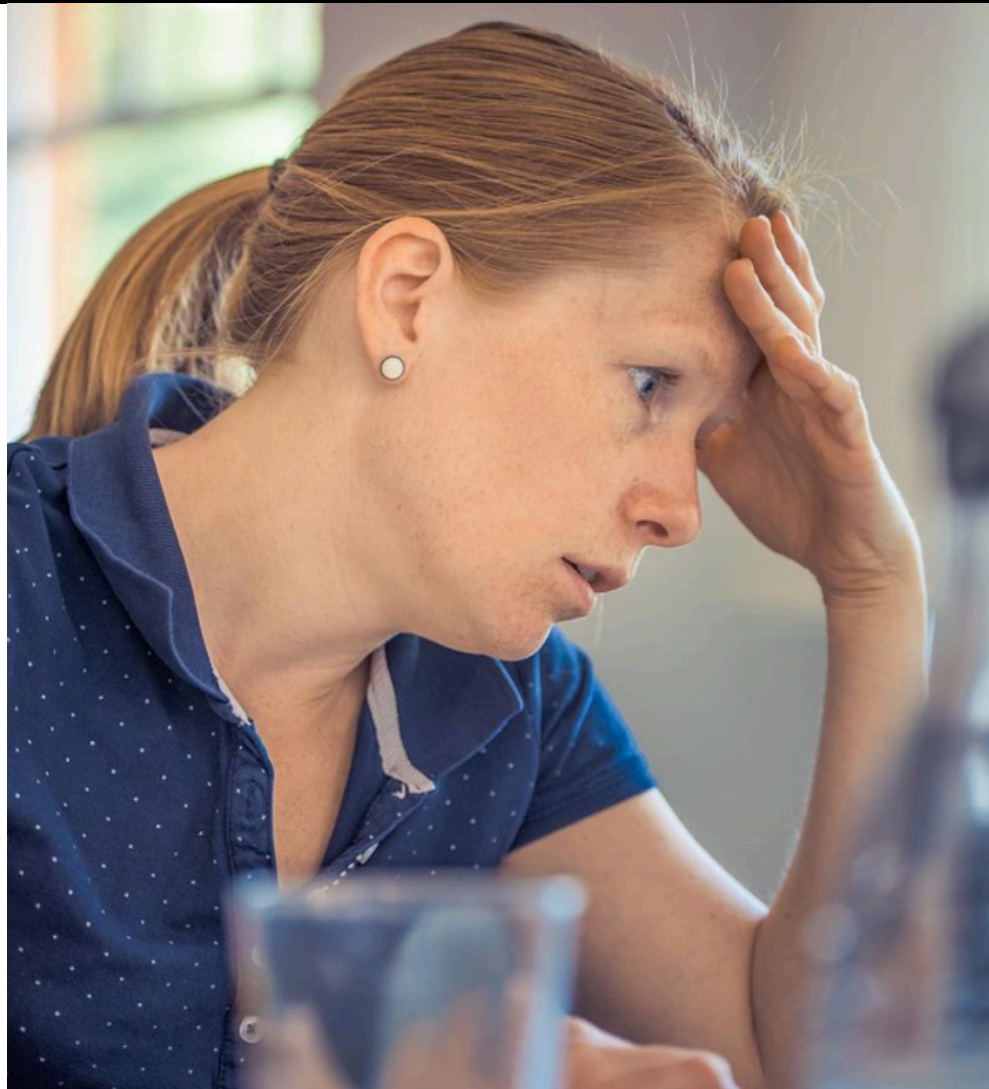
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- **Middle School Science Teachers**
- **Teachers using NGSS**
- **Teachers who want to increase their student's engagement and retention**
- **Teachers not looking to reinvent the wheel**

# Save yourself the STRESS AND TIME

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