

Graphs & Data Tables

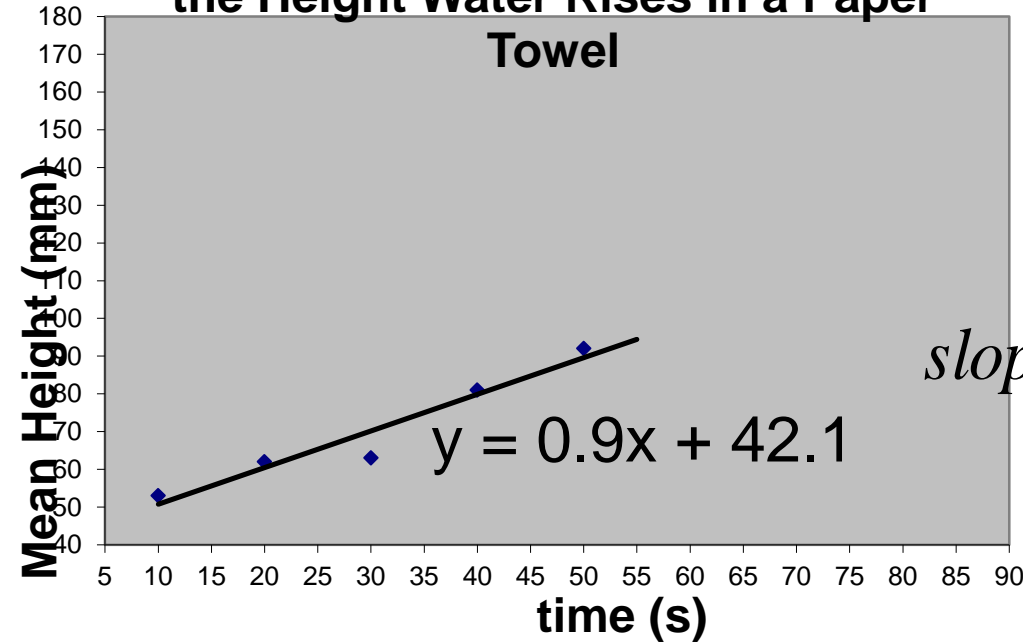
What does the slope tell you?

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{height}}{\text{time}} = \text{rate (speed)}$$

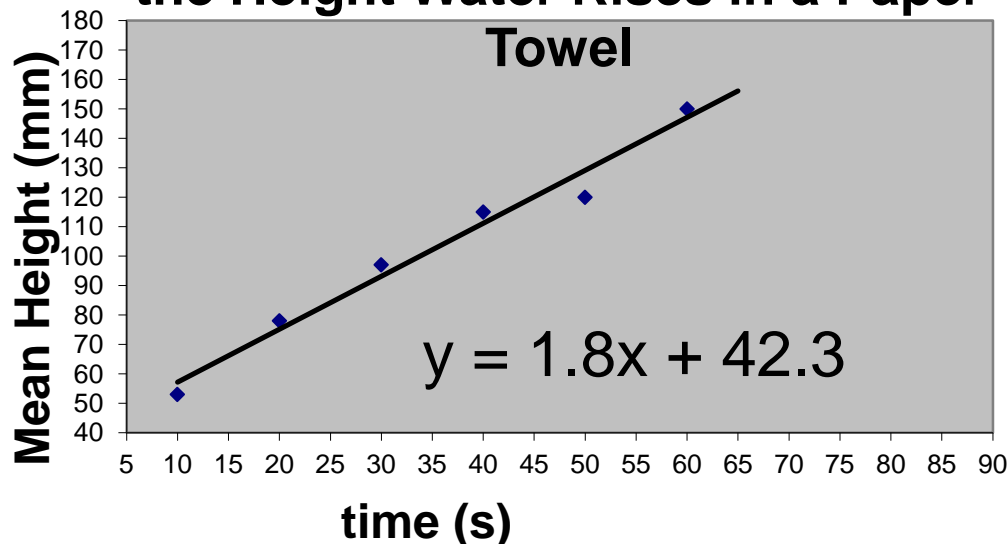
The slopes of the lines on the graphs represents the rate (speed) at which the water is rising in the paper towels.

The steeper slope is the faster rate.

The Effect of Submersion Time on the Height Water Rises in a Paper Towel



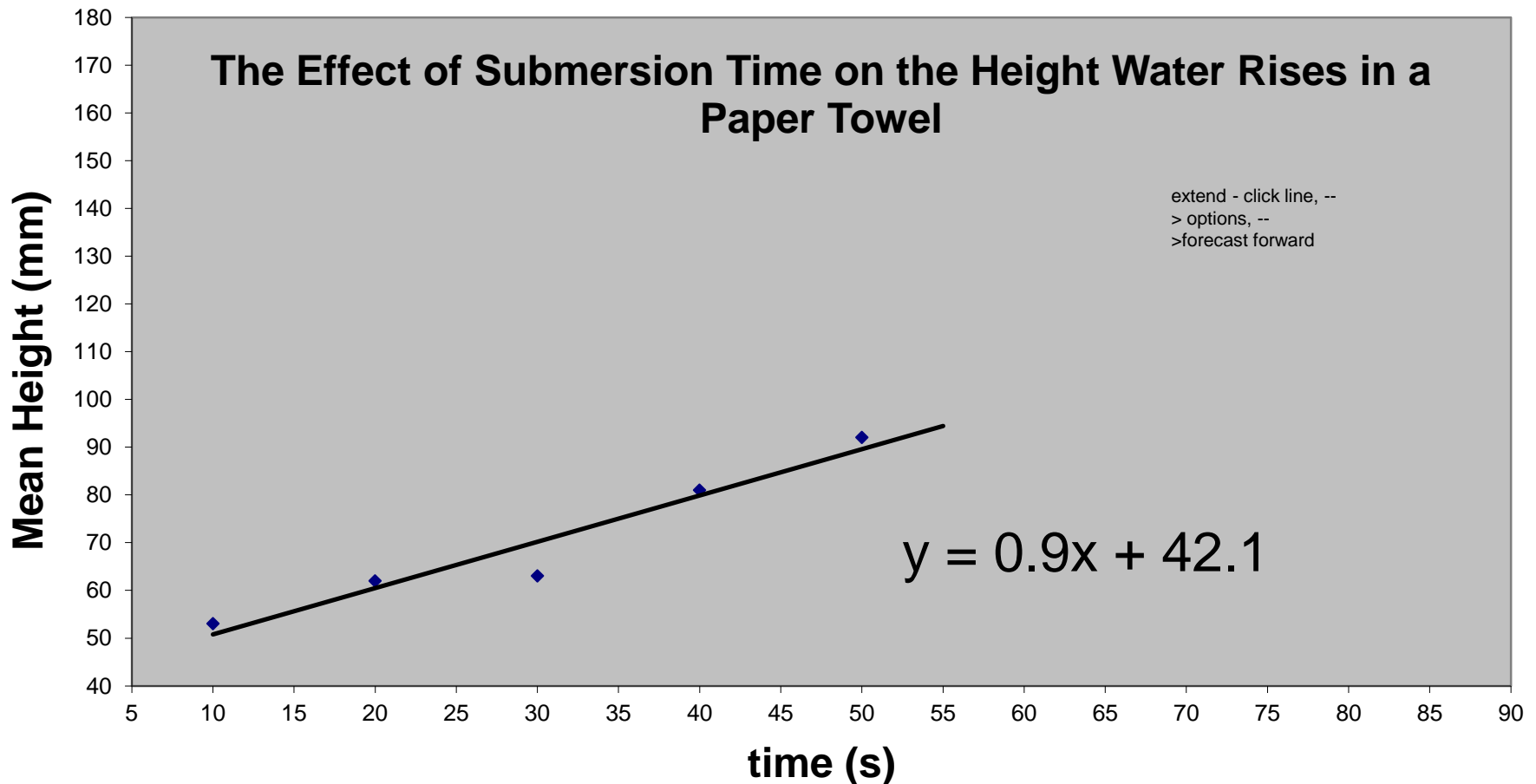
The Effect of Submersion Time on the Height Water Rises in a Paper Towel



You can use a graph to predict outcomes.

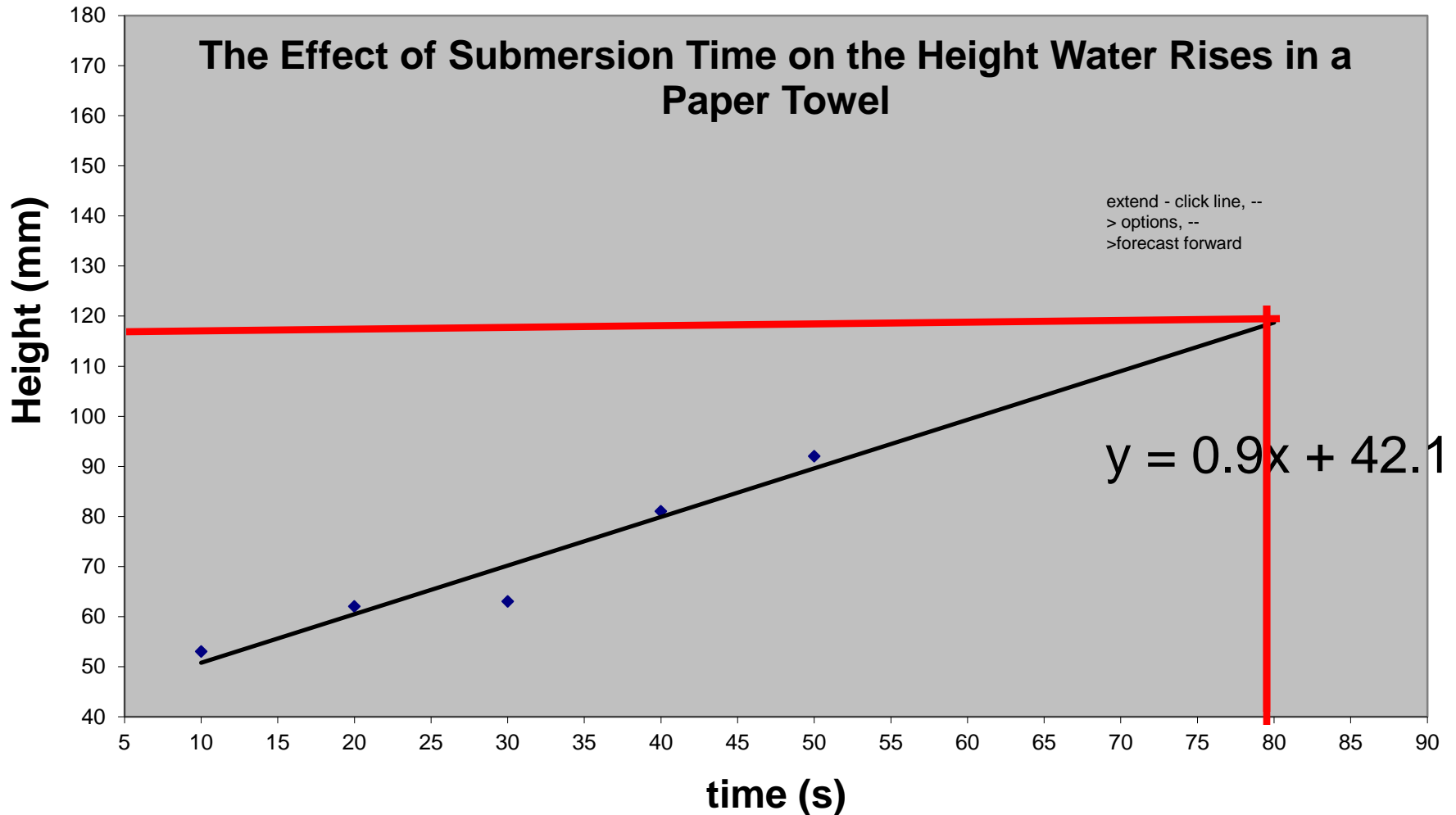
What would the height be when the submersion time is 80 seconds?

To predict the outcome, extend the trend line to 80 seconds.



Draw a line from the trend line where $x = 80$ s.

When time = 80 s, Height is approximately 118 mm



| time | altitude (ft) | temperature ('F) | pressure (psi) |
|----------|---------------|------------------|----------------|
| 7:08 am | 0 | 74 | 14.7 |
| 7: 34 am | 26,000 | -27 | 6.8 |
| 7:50 am | 43,000 | -73 | 2.4 |
| 8: 10 am | 53,000 | -94 | 1.4 |
| 8:25 am | 65,000 | -80 | 0.74 |
| 9:05 am | 95,000 | -41 | 0.2 |
| 9:47 am | 113,740 | -29 | 0.09 |

According to a *National Geographic* article, two men manned a hot-air balloon and ascended to the edge of the atmosphere. They recorded the following data during their ascent.

- 1. How did the pressure change as the altitude increased?**
 - a. The pressure increased.**
 - b. The pressure decreased.**
 - c. The pressure remained constant.**
 - d. None of the above**

| time | altitude (ft) | temperature ('F) | pressure (psi) |
|----------|---------------|---------------------|-------------------|
| 7:08 am | 0 | 74 | 14.7 |
| 7: 34 am | 26000 | -27 | 6.8 |
| 7:50 am | 43000 | -73 | 2.4 |
| 8: 10 am | 53000 | -94 | 1.4 |
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According to a *National Geographic* article, two men manned a hot-air balloon and ascended to the edge of the atmosphere. They recorded the following data during their ascent.

2. At what altitude did they experience the coldest recorded temperature?

53,000 ft

| time | altitude (ft) | temperature ('F) | pressure (psi) |
|----------|---------------|------------------|----------------|
| 7:08 am | 0 | 74 | 14.7 |
| 7: 34 am | 26,000 | -27 | 6.8 |
| 7:50 am | 43,000 | -73 | 2.4 |
| 8: 10 am | 53,000 | -94 | 1.4 |
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According to a *National Geographic* article, two men manned a hot-air balloon and ascended to the edge of the atmosphere. They recorded the following data during their ascent.

3. How long did it take them to go from an altitude of 0 feet to their maximum of 113,740 feet.?

Report your answer in minutes.

7:08 am – 9:47 am = 2 hr 39 min

(2 x 60) + 39 min = 159 minutes

Page 21, GEE Book

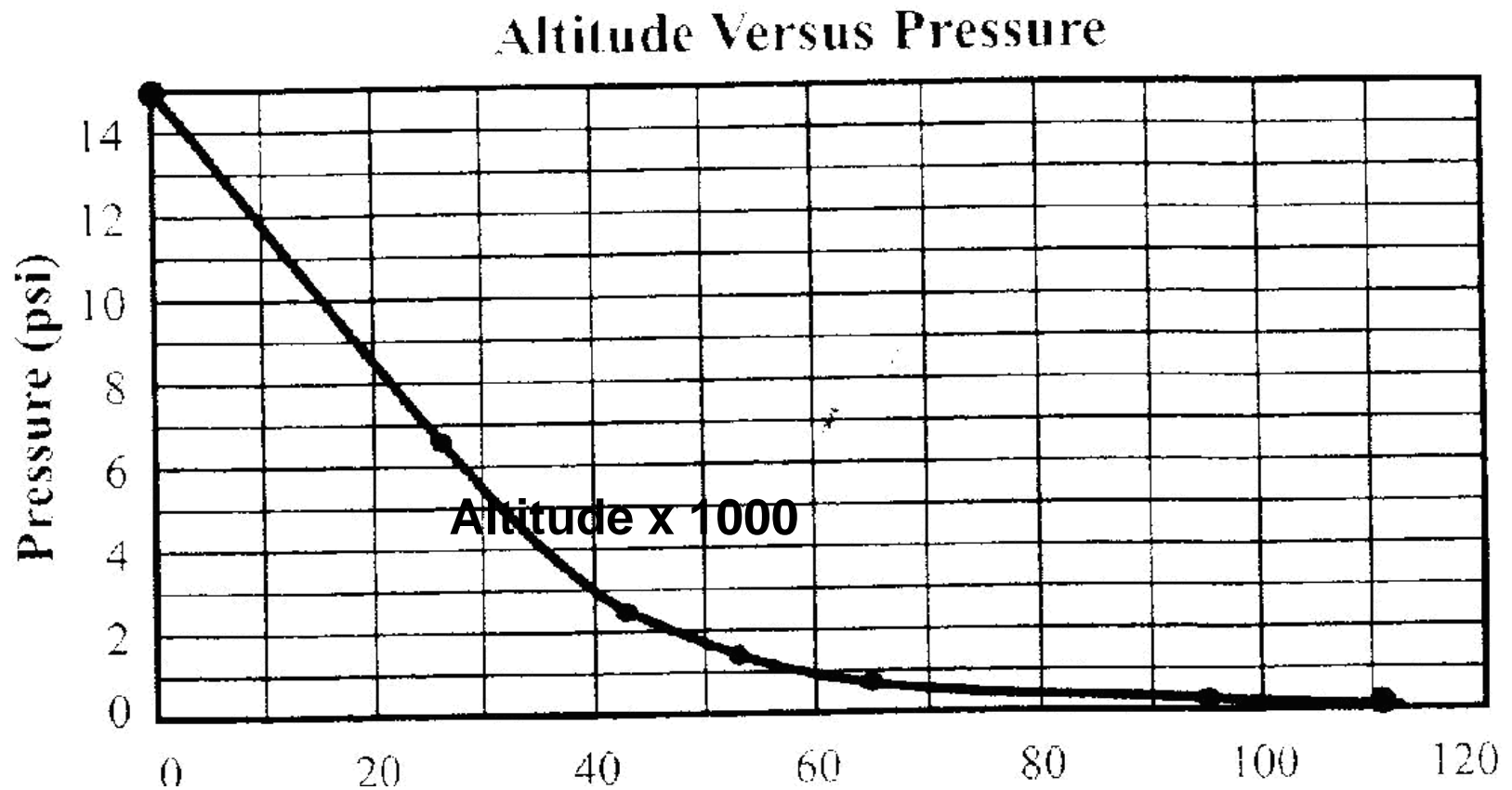
| time | altitude (ft) | temperatur e (°F) | pressure (psi) |
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| 7:08 am | 0 | 74 | 14.7 |
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According to a *National Geographic* article, two men manned a hot-air balloon and ascended to the edge of the atmosphere. They recorded the following data during their ascent.

How much did the pressure drop between 40,000 feet and 60,000 feet?

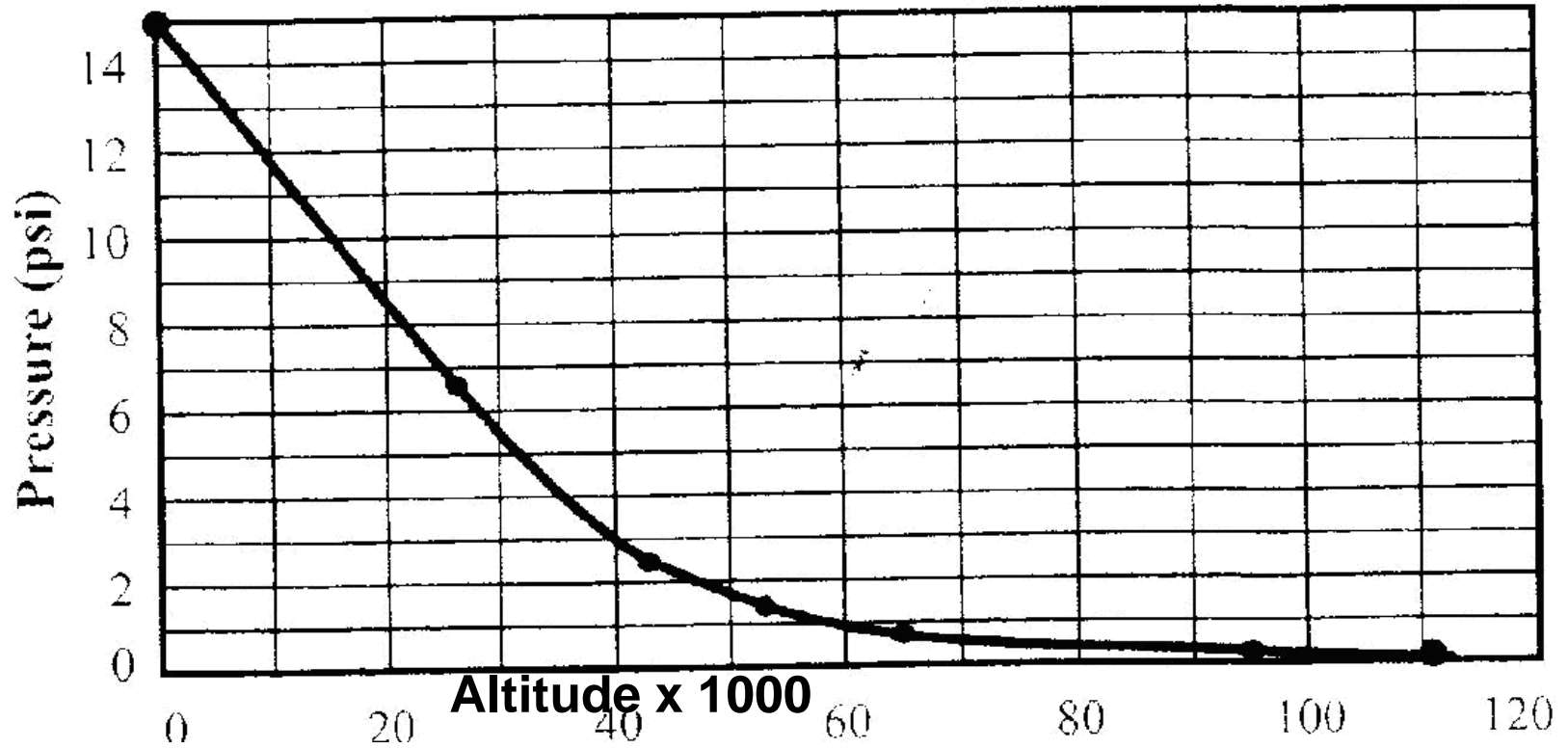
Give the range of altitudes during which the pressure drops the fastest..

A line graph is best used to show how one variable changes with respect to another.



A line graph is best used to show how one variable changes with respect to another.

Altitude Versus Pressure



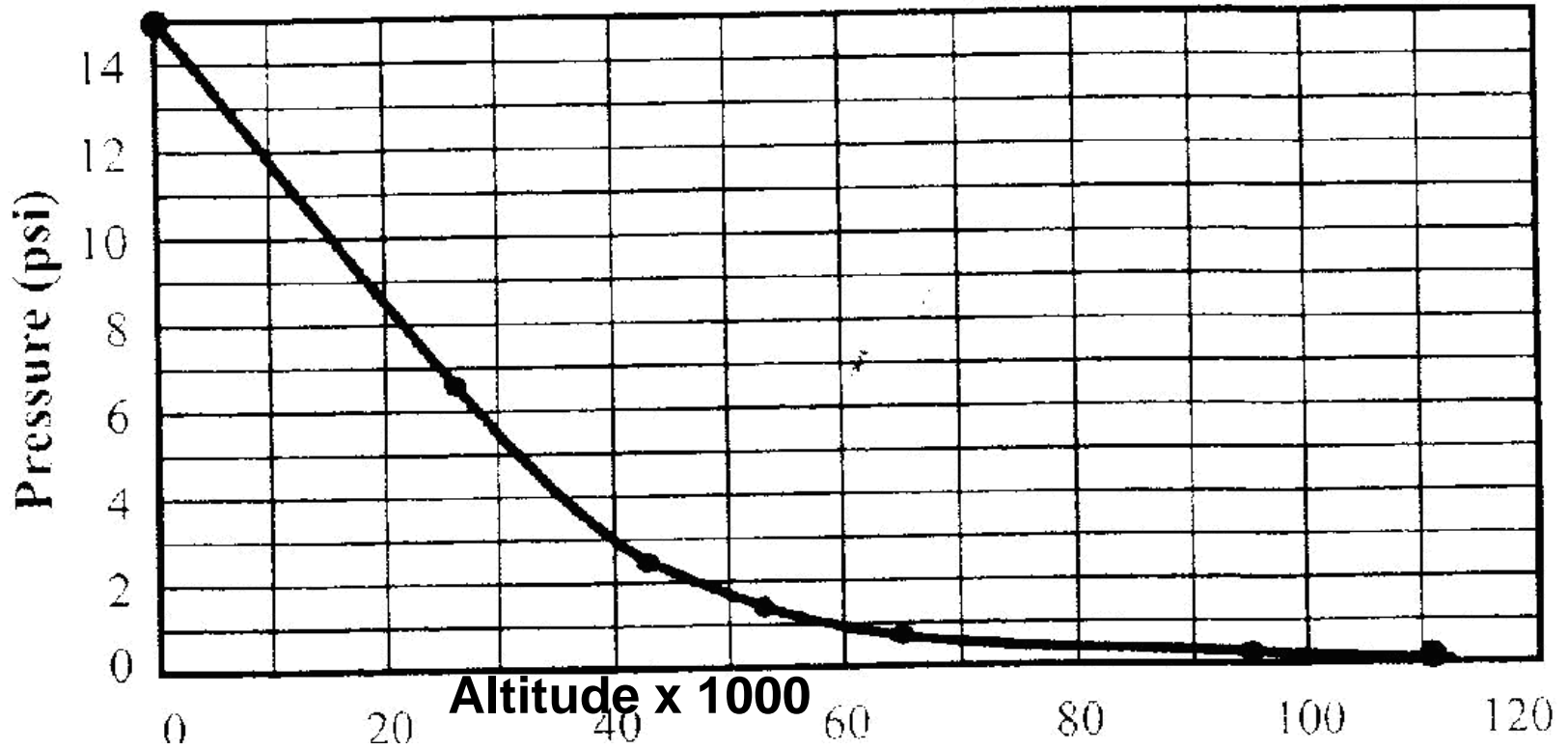
4. How much did the pressure drop between 40,000 feet and 60,000 feet?

40,000 ft = 3 psi, 60,000 ft = 1 psi

$3 - 1 = 2$ psi

A line graph is best used to show how one variable changes with respect to another.

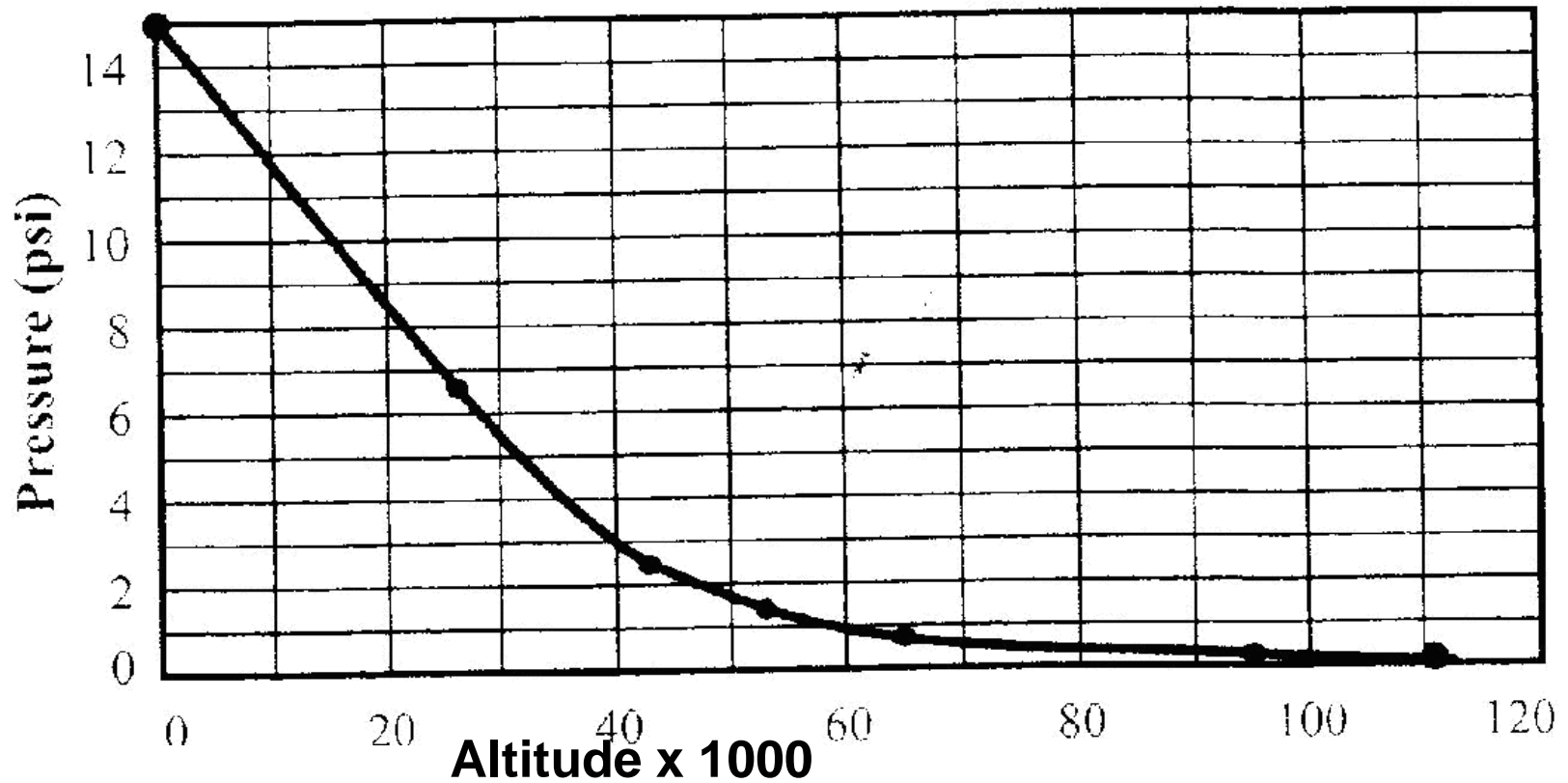
Altitude Versus Pressure



5. Give the range of altitudes (in thousand feet) during which the pressure drops the fastest.

- a. 0 - 10 b. 0 - 20 c. 0 - 30
d. 0 - 40 e. 0 - 50 f. 10 - 30

Altitude Versus Pressure

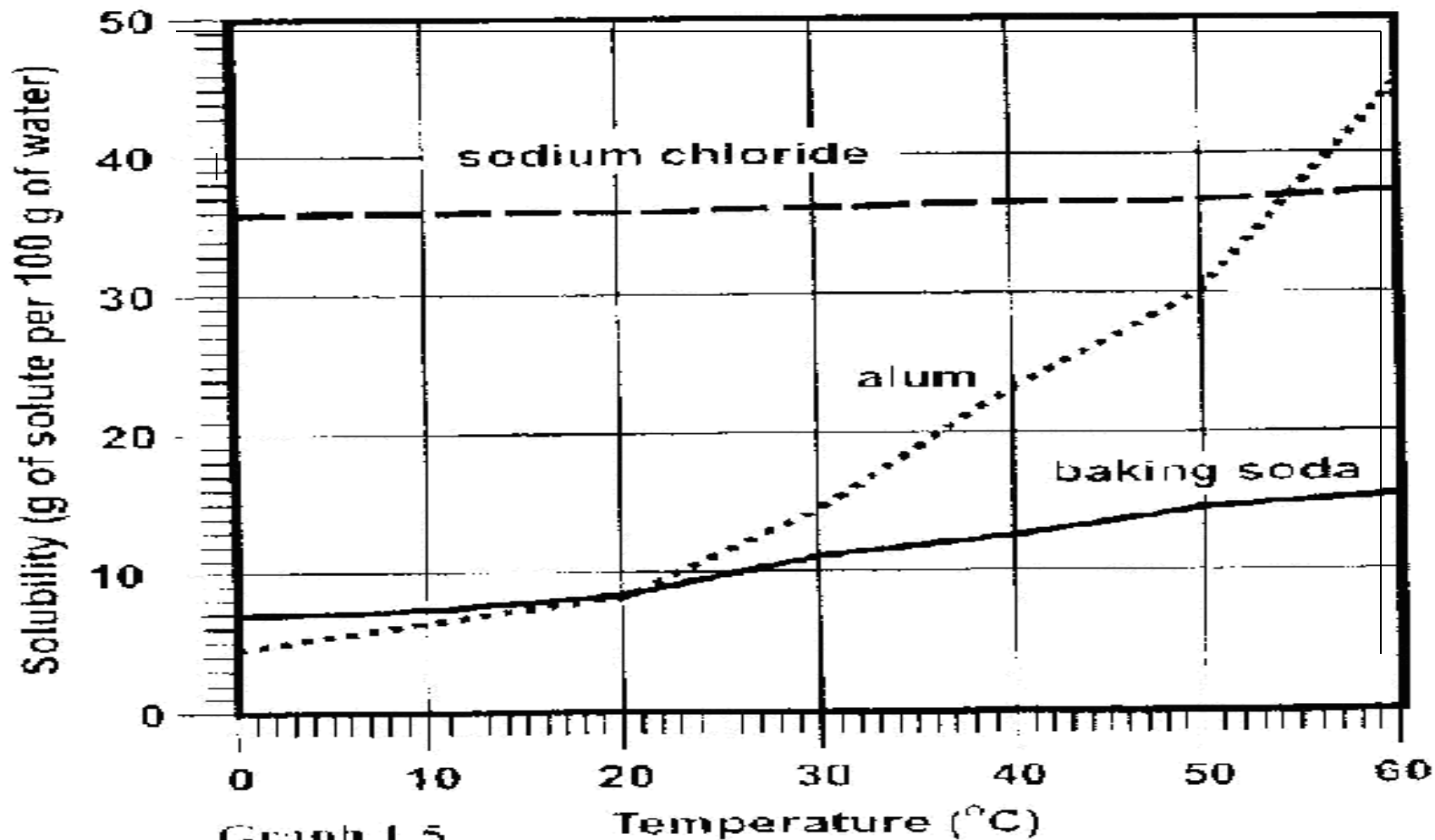


Give a reason why graphing this data is easier to analyze than comparing the same data in the previous table.

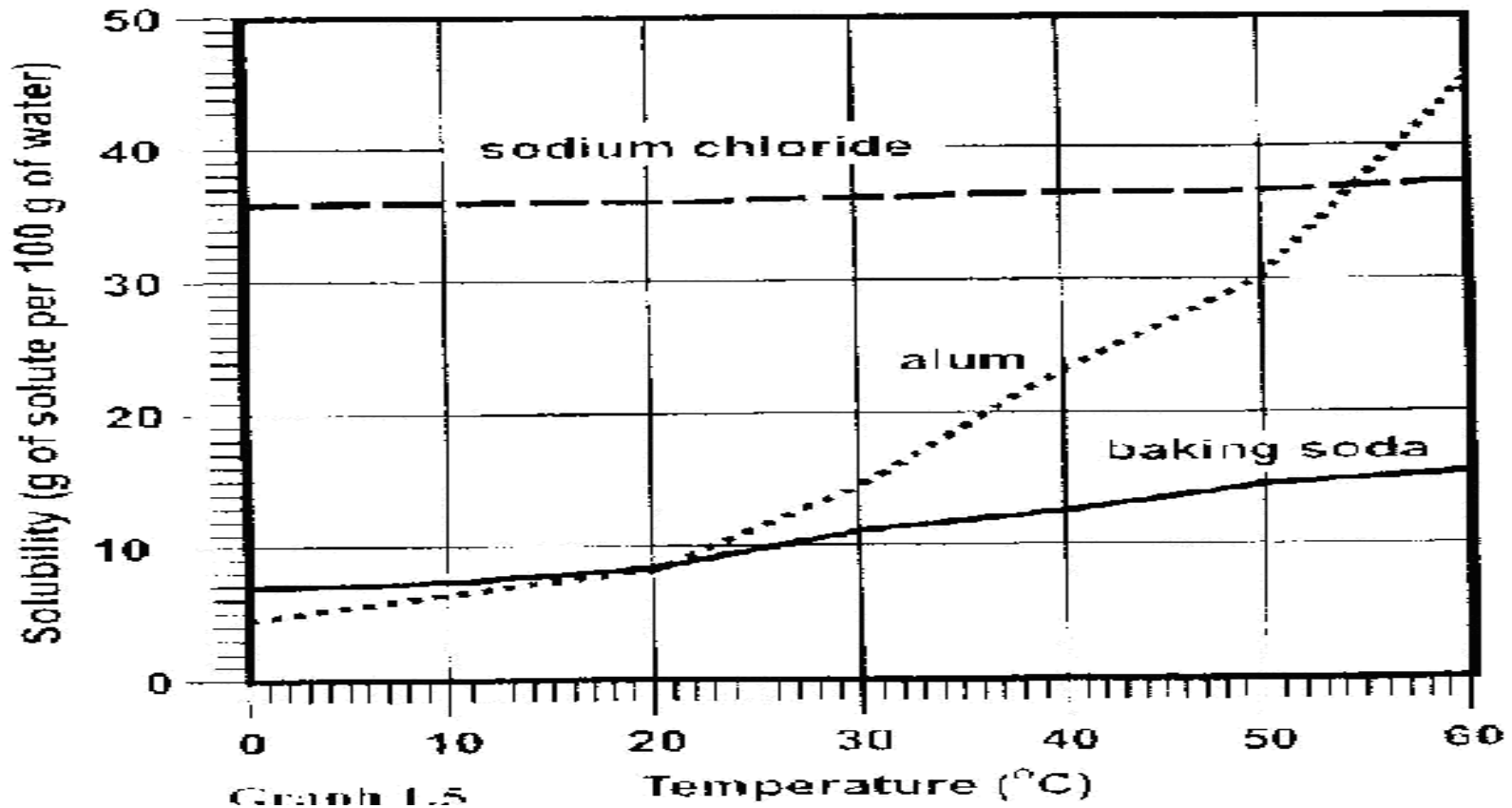
- The data in a line graph is a visual representation of the relationship between the two variables, altitude and pressure.**
- You can see the rate and direction of change from the slope.**

Multiple line graphs are used to compare multiple values.

Solubility versus Temperature



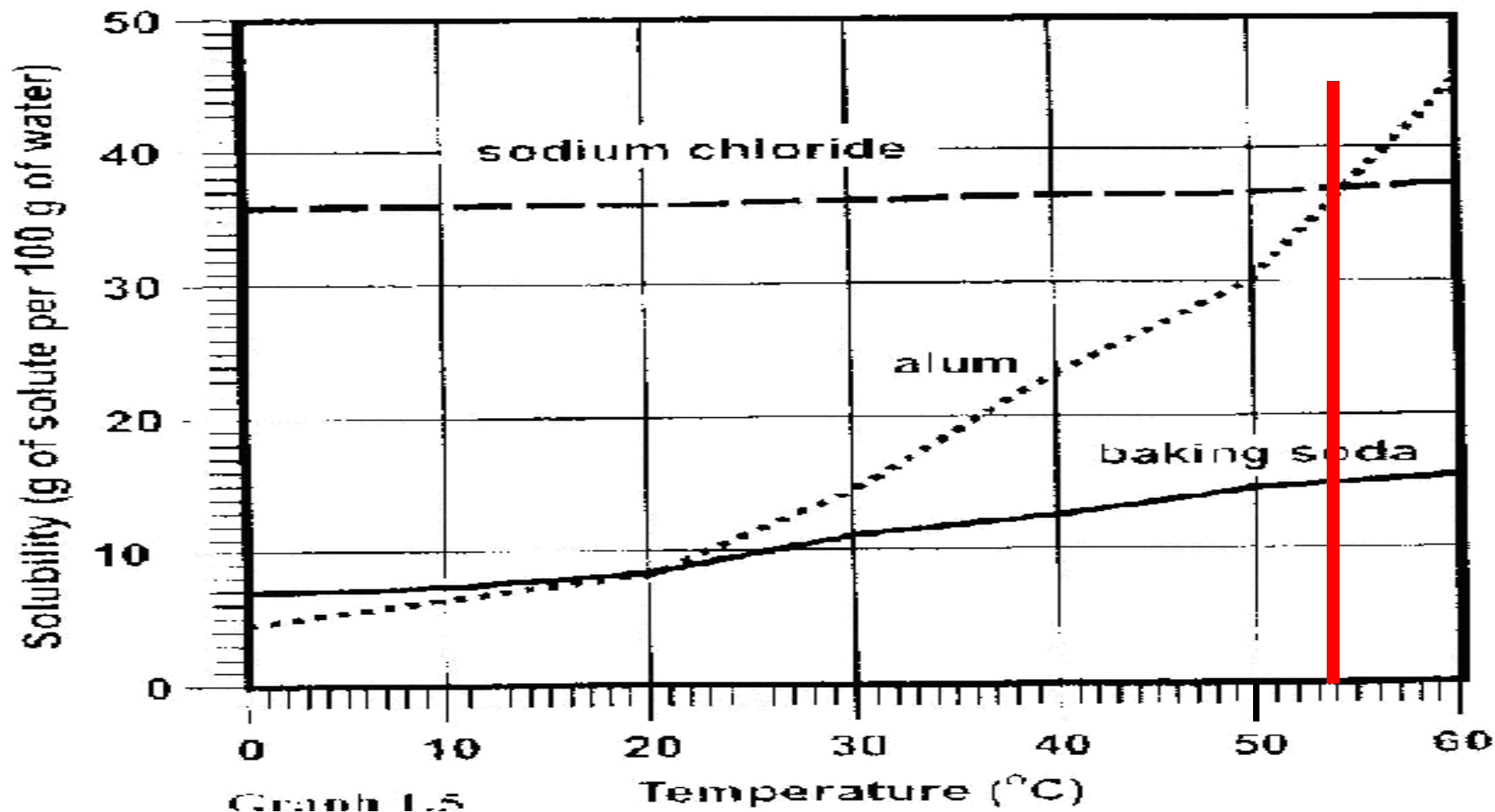
Solubility versus Temperature



6. At 20°C, which two substances have the same solubility?

- a. alum & baking soda
- b. alum and sodium chloride
- c. sodium chloride and baking soda
- d. none of the above

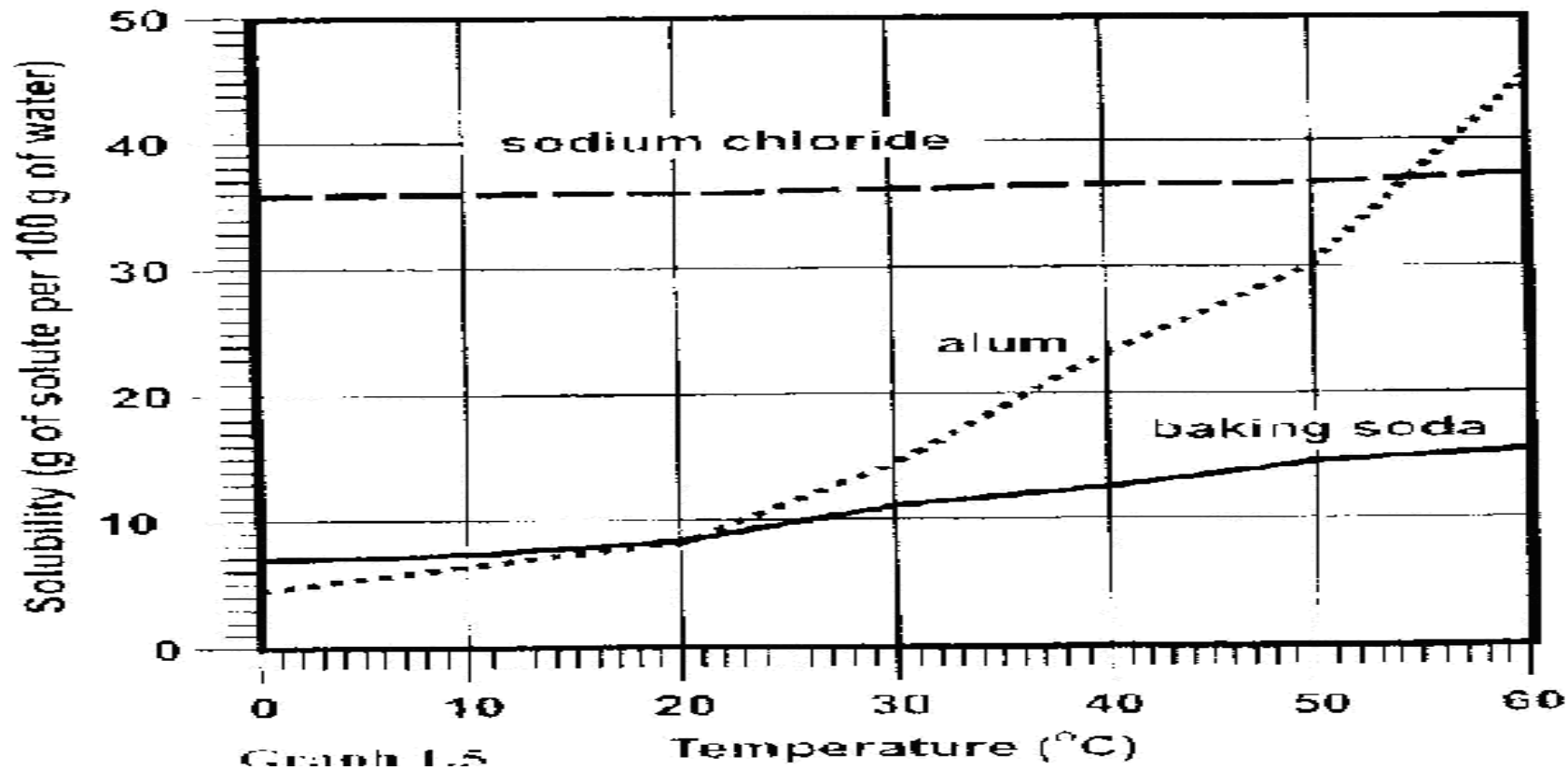
Solubility versus Temperature



7. At about what temperature does alum have the same solubility as sodium chloride?

54 – 55 ° C

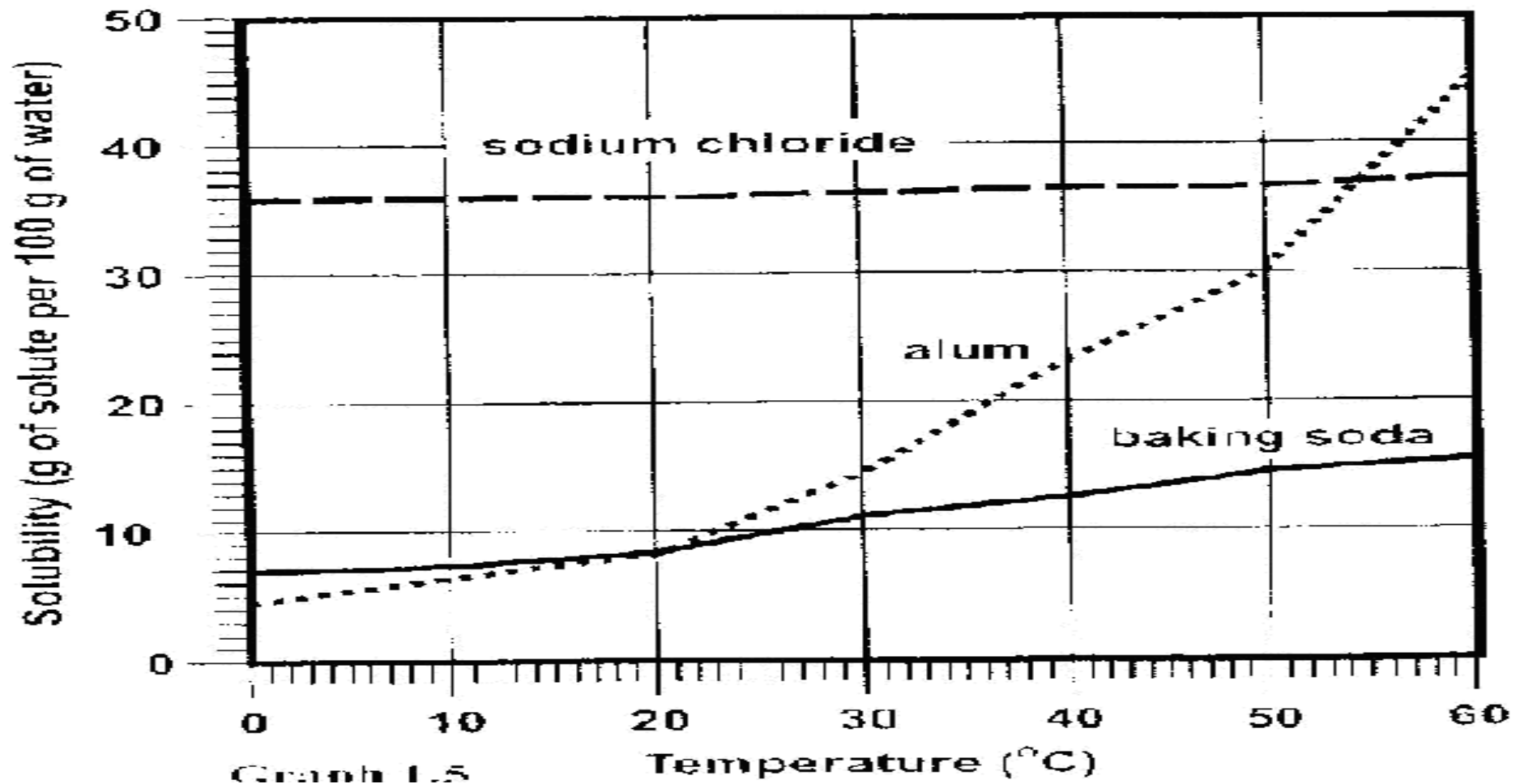
Solubility versus Temperature



8. Which substance's solubility is least affected by temperature?

- a. alum
- b. baking soda
- c. sodium chloride
- d. none of the above

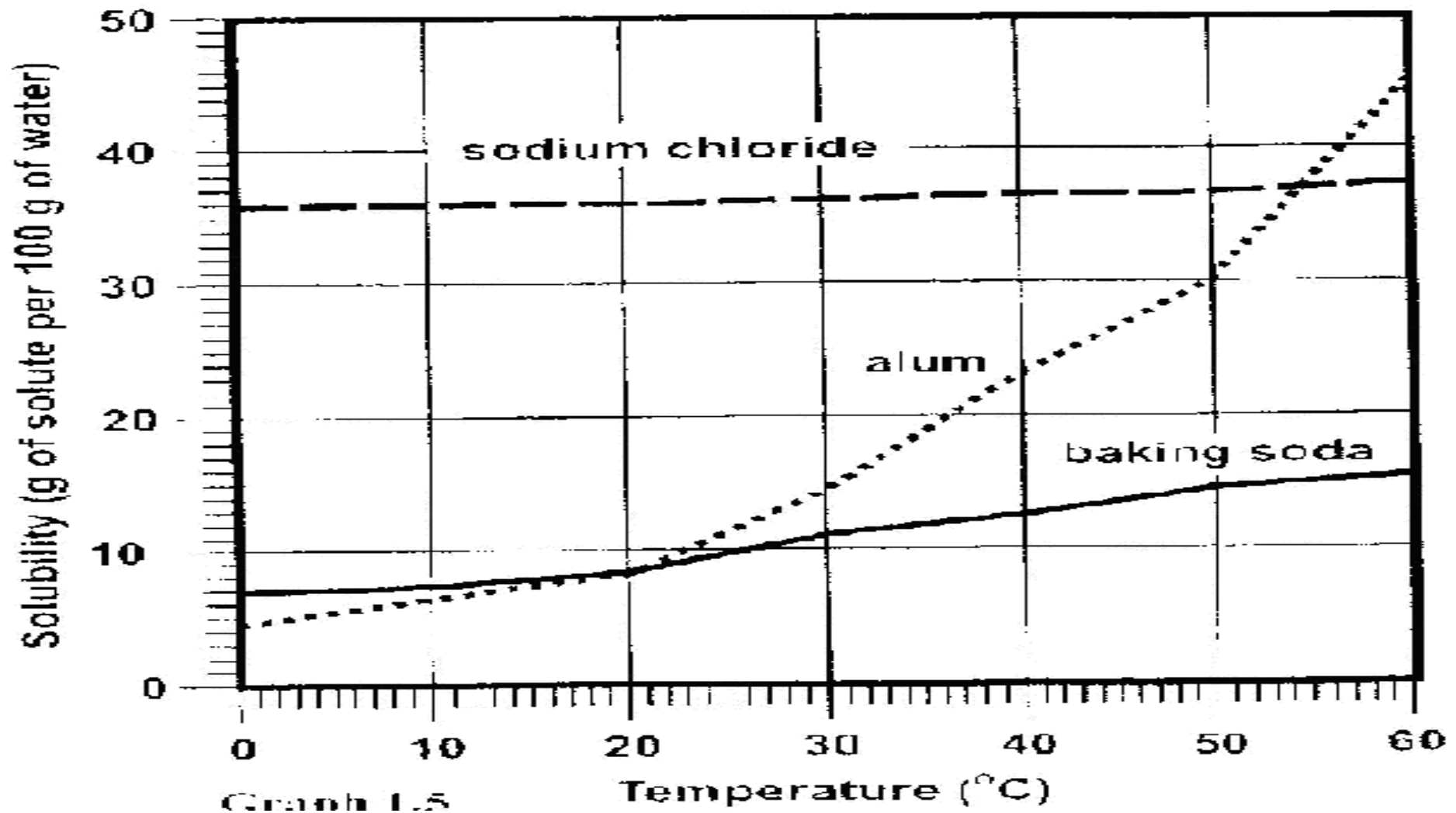
Solubility versus Temperature



9. At 50° C, how many grams of alum will dissolve in 100 grams of water?

30 grams

Solubility versus Temperature



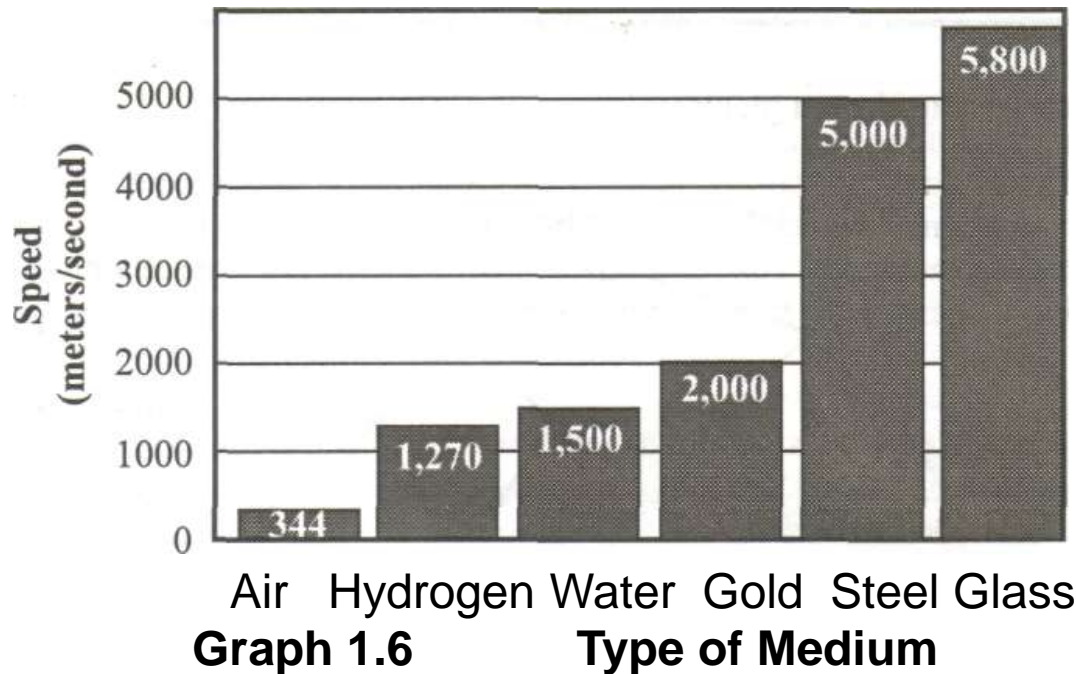
10. About how much does the solubility of sodium chloride increase from 0°C to 60°C ?



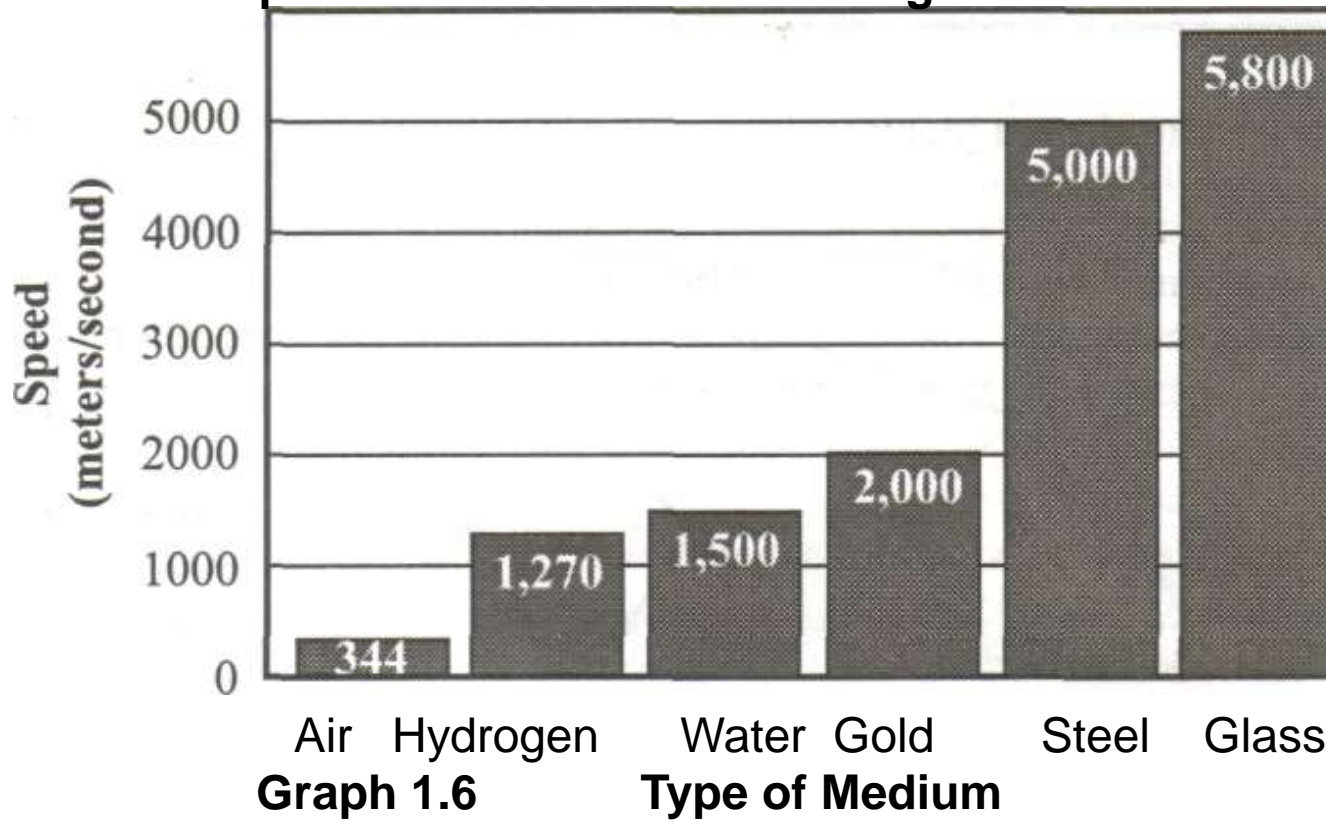
2 grams per 100 mL of water

Bar graphs are used to show easy-to-read, unconnected bars which represent a discrete quantity of information.

The Speed of Sound Waves Through a Medium



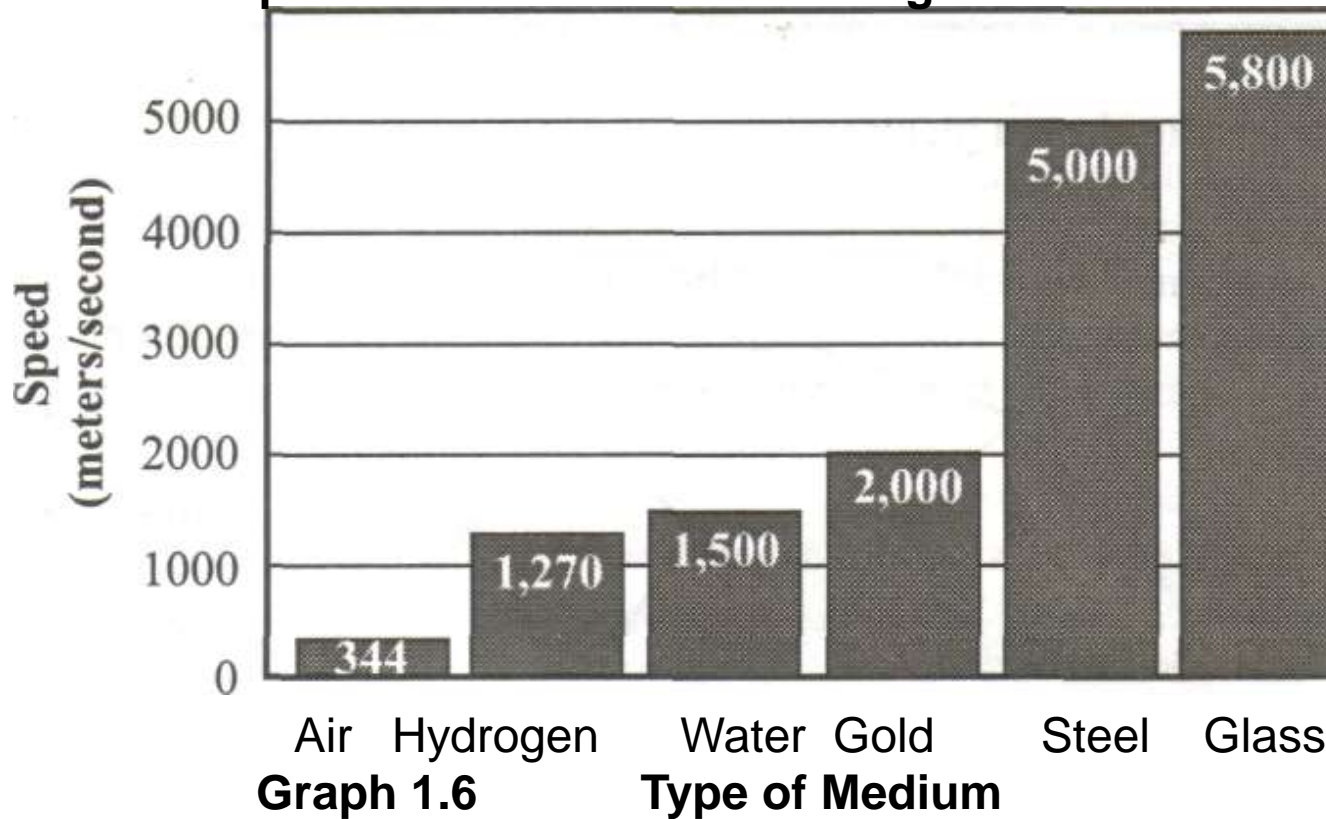
The Speed of Sound Waves Through a Medium



11. What is the speed of sound through water?

1500 m/s

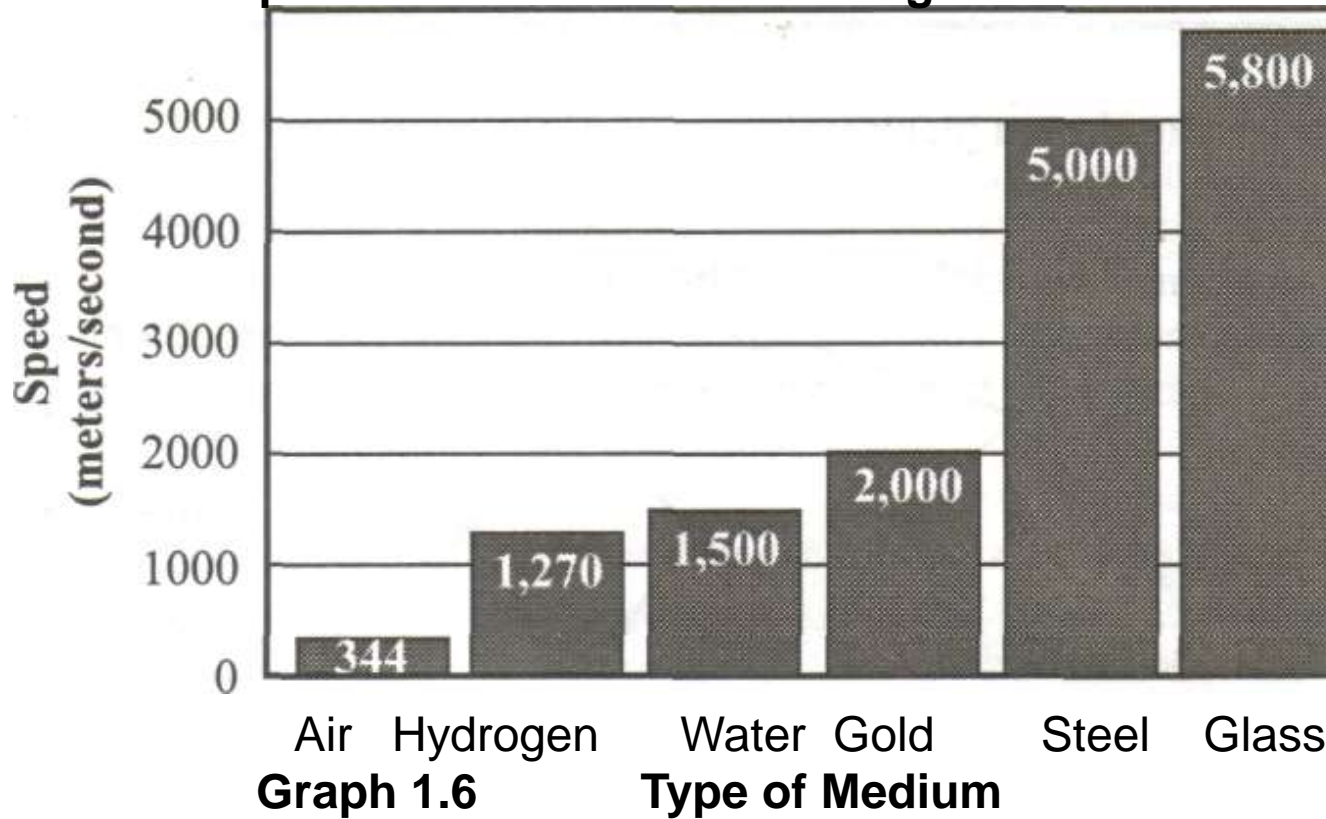
The Speed of Sound Waves Through a Medium



12. How much faster does sound travel through steel than through gold?

$$5000 \text{ m/s} - 2000 \text{ m/s} = 3000 \text{ m/s}$$

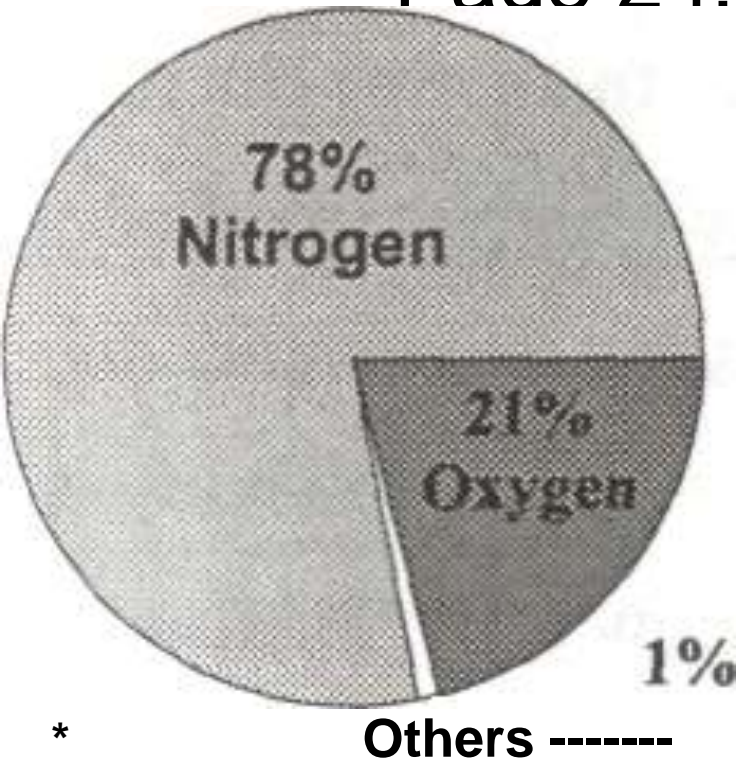
The Speed of Sound Waves Through a Medium



13. In which medium does sound travel the slowest?

- a. Air b. Hydrogen c. Water
d. Gold e. Steel f. Glass

Page 24. Circle or Pie Graphs



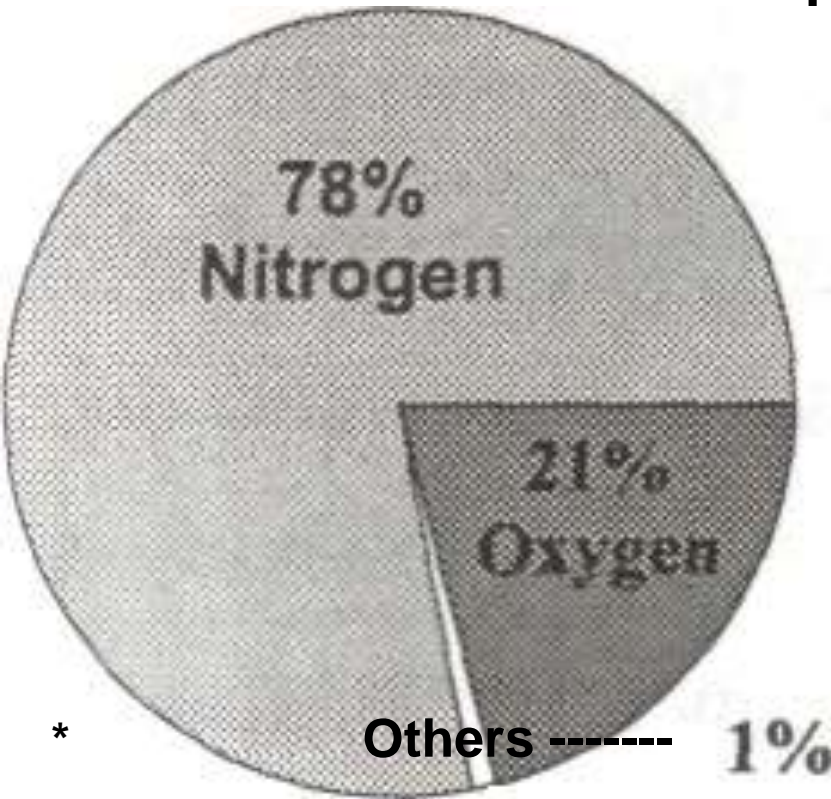
A circle graph is used to show parts of a whole.

Many times, circle graphs show percentages of a total. Circle graphs are also called pie graphs or pie charts.

Circle graph 1.7 shows the percentages of gases in the atmosphere.

14. What is the total percent of the circle graph?

100%



Why would a circle graph not measure the growth of a plant?

A plant's growth is not measured in percent.

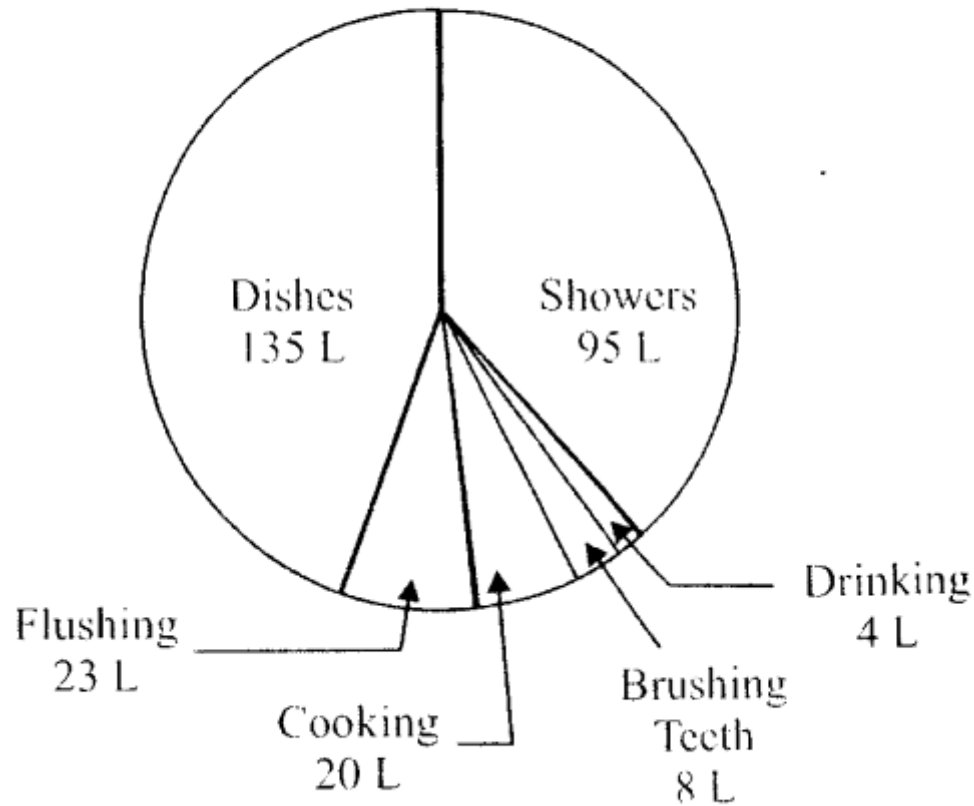
15. A person breathing at rest inhales about 500 mL of atmospheric air per breath. How many mL of nitrogen are in that 500 mL?

$$500 \text{ mL} \times 78\% = 500 \times .78 = 390\text{mL}$$

To convert % to decimal number, divide the % number by 100.

**Average Daily Water Use in the Home
(based on 285 Liters/Day)**

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16. What area of water usage consumes the most water?

A. Dishes

B. Showers

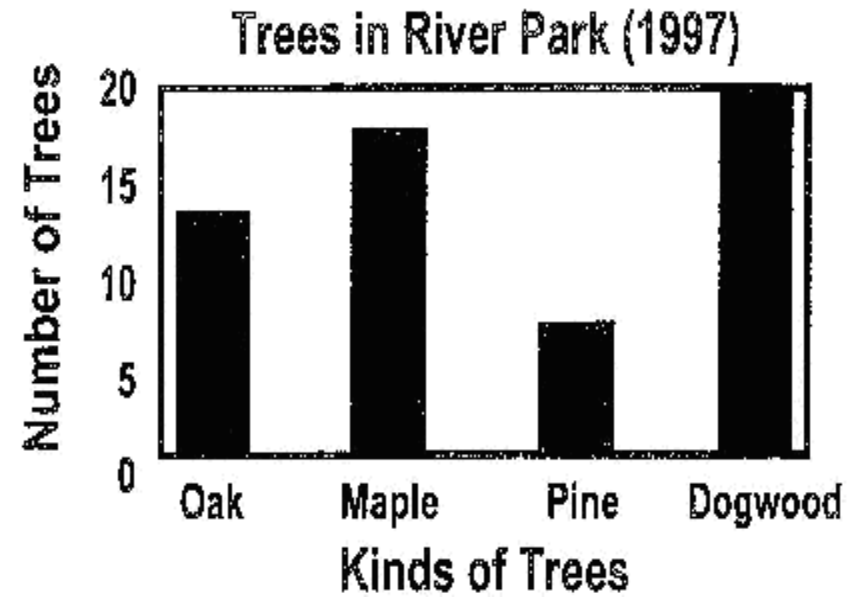
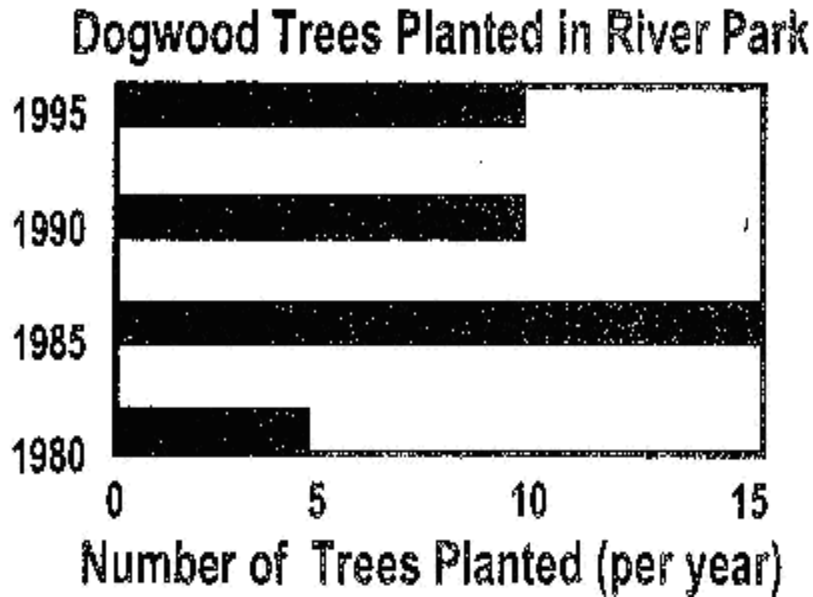
C. Drinking

D. Cooking

E. Brushing Teeth

F. Flushing

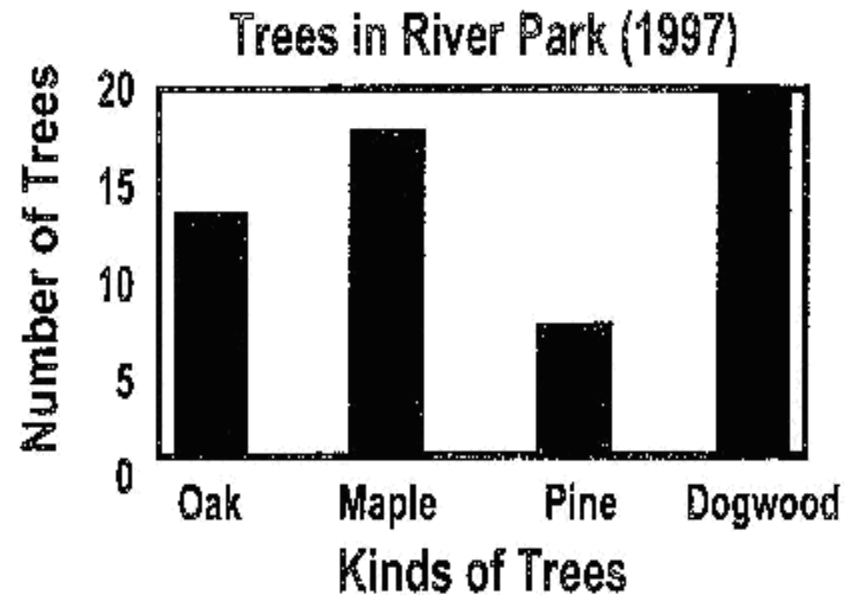
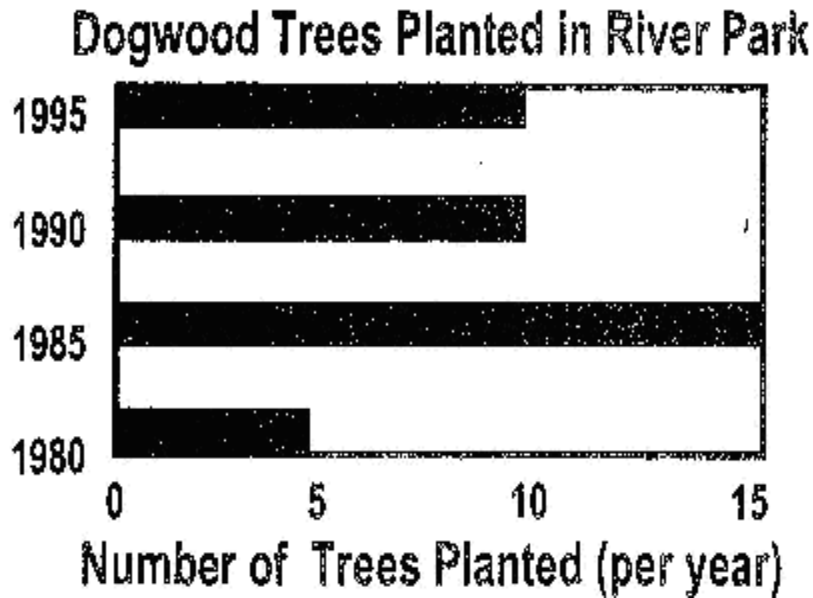
P. 35



17. How many dogwood trees were in the park in 1997?

- A. 20 C. 10
B. 15 D. 5

P. 35



18. What is the total number of dogwood trees planted between 1980 and 1995?

A. 5 C. 30

B. 15 D. 40

P. 35

| Incubation Temperature of Turtle Eggs Versus Sex of Hatchling | | | | |
|---|-------------|----------------|------------------|------------------|
| Four Groups of 25 Eggs | Temperature | Number of Male | Number of Female | Eggs Not Hatched |
| Group 1 | 26°C | 21 | 2 | 2 |
| Group 2 | 28°C | 13 | 11 | 1 |
| Group 3 | 30°C | 1 | 19 | 5 |
| Group 4 | 32°C | 1 | 20 | 4 |

19. At what temperature did most of the turtle eggs hatch?
- A. 26°C B. 28°C C. 30°C D. 32°C

| Incubation Temperature of Turtle Eggs Versus Sex of Hatchling | | | | |
|---|-------------|----------------|------------------|------------------|
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| Group 3 | 30°C | 1 | 19 | 5 |
| Group 4 | 32°C | 1 | 20 | 4 |

20. What temperature produced the most females?
- A. 26 C
 - B. 28°C
 - C. 30°C
 - D. 32°C

| Incubation Temperature of Turtle Eggs Versus Sex of Hatchling | | | | |
|---|-------------|----------------|------------------|------------------|
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| Group 3 | 30°C | 1 | 19 | 5 |
| Group 4 | 32°C | 1 | 20 | 4 |

21. What temperature produced the most males?
 A. 26°C B. 28°C C. 30°C D. 32°C

| Incubation Temperature of Turtle Eggs Versus Sex of Hatchling | | | | |
|---|-------------|----------------|------------------|------------------|
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| Group 3 | 30°C | 1 | 19 | 5 |
| Group 4 | 32°C | 1 | 20 | 4 |

22. What conclusion can be made about the relationship between incubation temperature and the number of male hatchlings in comparison to incubation temperature and the number of female hatchlings?

- A. **B.** C. D.



22. What conclusion can be made about the relationship between incubation temperature and the number of male hatchlings in comparison to incubation temperature and the number of female hatchlings?

- A. Higher temperatures during incubation produce more males, and lower temperatures during incubation produce more females.
- B. Higher temperatures during incubation produce more females, and lower temperatures during incubation produce more males.
- C. Higher temperatures during incubation caused more eggs to hatch.
- D. No relationship can be determined between incubation temperature and the sex of turtle hatchlings.

Research Design

- Read page 36 ABC book:
 - Problem
 - Question
 - Hypothesis
 - Materials
 - Directions

Green Bean Plants Experiment, page 36 - 37

23. What was the independent variable in the experiment with the green bean plants?

A. The type of soil

B. The amount of water

C. The amount of sunlight

D. The type of bean plant



Green Bean Plants Experiment, page 36 - 37

24. Which plants were the control group plants?

- A. The plants in the full sunlight
- B. The plants that receive little sunlight
- C. The plants in the dark.
- D. All the above
- E. None of the above.

Green Bean Plants Experiment, page 36 - 37

What are the controls?

(Which factors were kept constant in order for the data to be valid.)

Same amount of water

Same type plant (green beans)

Same type of cup (with a hole in the bottom)

Same type of potting soil

Same temperature for all plants

Green Bean Plants Experiment, page 36 - 37

25. All factors were kept constant in order for the data to be valid except

- A. The type of soil
- B. The amount of water

C. The amount of sunlight

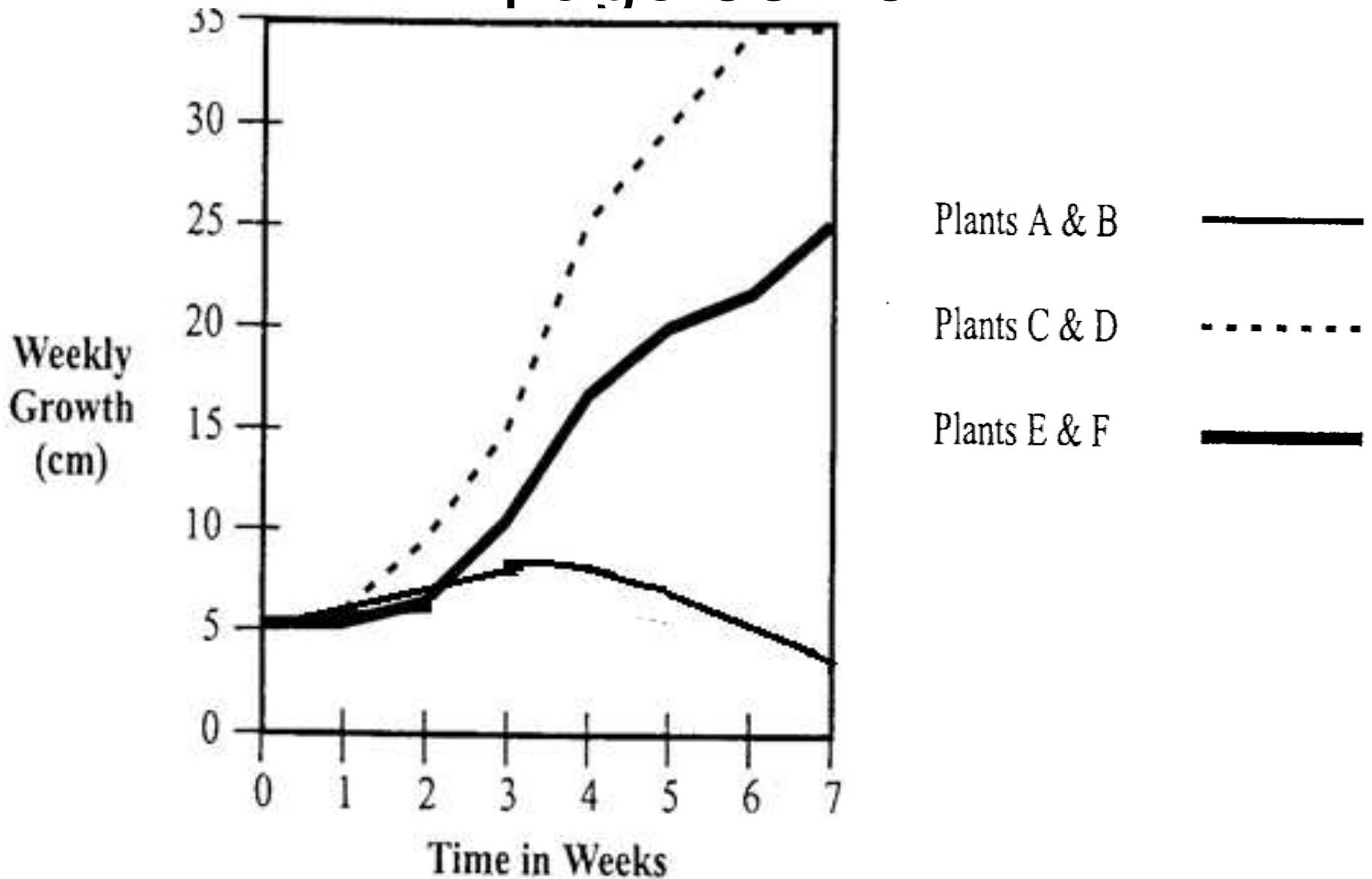
The IV

D. The type of bean plant

Page 37

- **Go to page 37**
- **Graph the effect of time in weeks on weekly growth.**
- **Plot three different lines on your graph:**
 - **Plants A & B**
 - **Plants C & D**
 - **Plants E & F**

Green Bean Plants Experiment, page 36 - 37



Green Bean Plants Experiment, page 36 - 37

26. In which week did plants C & D show the fastest growth?

A. Weeks 1 - 2

B. Weeks 2 - 3

C. Weeks 3 - 4

D. Weeks 4 - 5

E. Weeks 5 - 6

F. Weeks 6 - 7

Green Bean Plants Experiment, page 36 - 37

27. In which week did plants C & D show the least growth?

A. Weeks 1 - 2

B. Weeks 2 - 3

C. Weeks 3 - 4

D. Weeks 4 - 5

E. Weeks 5 - 6

F. Weeks 6 - 7

Green Bean Plants Experiment, page 36 - 37

28. What happened to plants A & B in the fourth week?

A. Grew faster than plants C & D

B. Grew faster than plants E & F

C. Grew slowly

D. The plants died

E. None of the above

Green Bean Plants Experiment, page 36 - 37

29. What conclusion can you draw about the growth of the plants in relationship to the amount of light they each received?
- A. Some plants grew faster.
 - B. Some plants died.
 - C. The more sunlight the plants received, the faster they grew.
 - D. Some plants grew slower.
 - E. Not enough information to reach a conclusion.

Green Bean Plants Experiment, page 36 - 37

Look on page 36 and write the hypothesis on your white board.

Green beans will grow better in full sunlight.

30. Does the investigation support the hypothesis?

Yes

No

Why or why not?

Because the plants in full sunlight grew faster in a shorter period of time.

- 31. Predict what might happen if this experiment was repeated for tomato plants.**
- A. Tomato plants will grow faster than green beans**
 - B. Tomato plants will grow slower than green beans.**
 - C. Tomato plants exposed to full sunlight will grow faster than tomato plants in the shade.**
 - D. Not enough information.**

Because

Tomato plants are green plants and should react to sunlight as any other green plant.