## Scientific Method Part 4: Analyzing Data Test (Demo Version)

Read each question carefully.

"Margo's Magnet Experiment"

Margo predicted that magnet strength would increase with temperature. She experimented to find out if this is true. She tested the same magnet at four temperatures. For this experiment, she started by bringing the magnet to the correct temperature. Then she lowered it into a bowl of 200 paperclips for about two seconds. Then she removed it from the bowl. Lastly, she counted the number of paperclips the magnet had attracted. She conducted three trials at each temperature. The table below shows her results.

**How Temperature Affects Magnet Strength**

| Temperature (°C) | Number of Paperclips Attracted to Magnets | | | |
|---|---|---|---|---|
| | Trial 1 | Trial 2 | Trial 3 | Average |
| -78 | 185 | 160 | 151 | 165 |
| 0 | 112 | 99 | 68 | 93 |
| 30 | 63 | 58 | 49 | 57 |
| 100 | 15 | 21 | 30 | 22 |

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1) from "Margo's Magnet Experiment"

What trend does the data show?

A) The magnet's strength decreased as its temperature increased.

B) With each new trial, the magnet attracted fewer paperclips.

C) The magnet attracted the most paperclips in the first trial at each temperature.

D) With each increase in temperature, the magnet attracted an average of 50 fewer paperclips.

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## Scientific Method Part 4: Analyzing Data Test (Demo Version)

"Lorrie's Experiment: Water and Erosion"

Lorrie wanted to know how the force of water affects erosion. She guessed that sprinkling water onto a pile of dirt would cause more erosion than pouring water onto a pile of dirt. For her experiment, she built a pile of dirt 30 centimeters high. She poured one liter of water onto the pile and measured how many centimeters the pile lost in height. Then she sprinkled one liter of water onto the pile and measured it again. She did two trials. The table below shows her data.

**Height Lost to Erosion**

| Water Flow | Height Lost (cm) | |
|---|---|---|
| | Trial 1 | Trial 2 |
| sprinkled | 2.5 | 2.5 |
| poured | 4.5 | 5.0 |

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2) from "Lorrie's Experiment: Water and Erosion"

What trend does her data show?

A) Pouring water onto the pile caused about half the erosion as sprinkling water onto the pile.

B) Pouring water onto the pile caused about twice the erosion as sprinkling water onto the pile.

C) Sprinkling water onto the pile caused about one quarter the erosion as pouring water onto the pile.

D) Sprinkling water onto the pile caused about three times the erosion as pouring water onto the pile.

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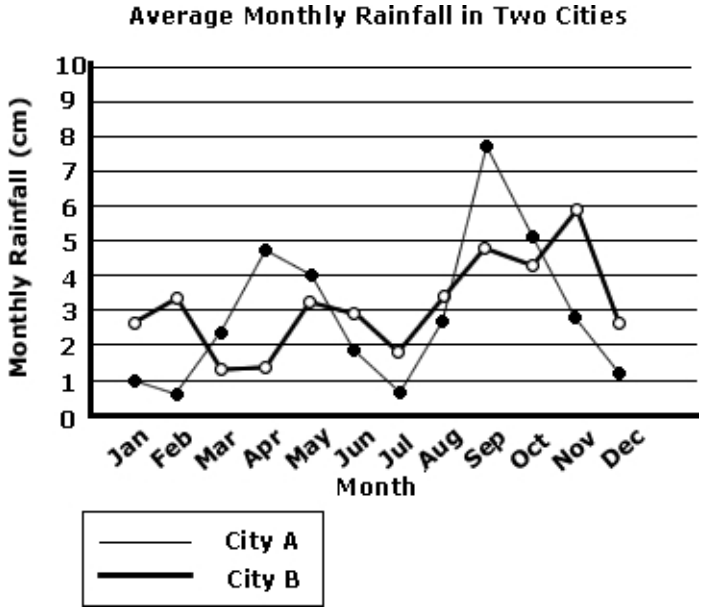
3) The graph shows the average monthly rainfall for two cities.

What trend does the data show?




A) The rainfall in both cities is greatest during fall.

B) The rainfall in both cities is greatest during spring.

C) Both cities receive more rainfall during summer than winter.

D) Both cities receive more rainfall during spring than winter.

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4) from "Lorrie's Experiment: Water and Erosion"

Based on trends in her results, what conclusion can she make?

A) The more water that is poured at once, the more erosion it will cause.

B) The more water that is sprinkled at once, the more erosion it will cause.

C) The more force water has, the less erosion it will cause.

D) The more force water has, the more erosion it will cause.

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5) from "Margo's Magnet Experiment"

Based on trends in her results, what conclusion can Margo make?

A) Paperclips are magnetic.

B) Heat causes magnets to weaken.

C) Magnets at room temperature are not strong.

D) Very hot magnets will not attract any paperclips.

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6) A student learned that faster vibrations produce higher-pitched sounds. She filled three glass bottles with water, then tapped each bottle with a spoon to make the glass vibrate. She recorded the pitches of the sounds.

Based on trends in her results, what conclusion can she make?

Tapping Bottle Experiment

| Water added | Pitch |
|---|---|
| 100 mL | high |
| 250 mL | medium |
| 500 mL | low |

A) Tapping a bottle with more force will cause louder sounds than tapping it softly.

B) Adding water makes the glass vibrate more slowly when it is tapped with a spoon.

C) Bottles filled with water make higher-pitched sounds than bottles filled with other liquids.

D) Glass bottles filled nearly to the top make higher-pitched sounds than nearly empty bottles.

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7) Janet wants to know how the shade from clouds affects air temperature.

Which information does she need to collect?

A) the average temperature over the course of a month

B) the types of clouds seen during winter and summer

C) the air temperature before and after a thunderstorm

D) the change in temperature as a cloud blocks the sun

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8) Arthur wants to know which flower colors are preferred by hummingbirds.

Which information does he need to collect?

A) the amount of nectar gathered by hummingbirds

B) the types of plants most visited by hummingbirds

C) the time it takes a hummingbird to drain a flower's nectar

D) the number of hummingbirds that visit his yard each day

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9) Jackson wants to know if plants grow better in cool weather or warm weather.

Which information does he need to collect?

A) the leaf color and number of insects near the plant

B) the changes in temperature and plant height over time

C) the amount of rainfall and number of flowers on the plant

D) the date a plant begins to flower and the shape of its leaves

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## Scientific Method Part 4: Analyzing Data Test (Demo Version)

"Carlos's Pill Bug Experiment"

Carlos wanted to find out if pill bugs like warm temperatures or cool temperatures. He tested this by filling one cup with cool water and the other with warm water. He balanced a strip of cardboard along the tops of the two cups. One end sat on one cup and the other end on the other cup. There was 20 centimeters of space between the two cups. He placed ten pill bugs onto the cardboard in the middle of the two cups. He watched the pill bugs to see what they did. He tested this three times. Each time he used water with different temperatures. His results are below.

**Observations During Pill Bug Experiment**

**13 °C and 28 °C**

**At first, three of the 10 pill bugs moved toward the cool water. Then they turned around, and all 10 pill bugs moved toward the warm water.**

**10 °C and 30 °C**

**Eight of the 10 pill bugs moved toward the warm water. The other two sat still in between the two cups of water.**

**8 °C and 33 °C**

**One pill bug moved toward the cool water and then became still. The other nine moved toward the warm water.**

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10) from "Carlos's Pill Bug Experiment"

Which prediction does the data support?

A) Pill bugs prefer warm weather to cold weather.

B) Pill bugs like to drink cool water rather than warm water.

C) Pill bugs choose humid environments over dry environments.

D) Pill bugs live longer when they are warm than when they are cold.

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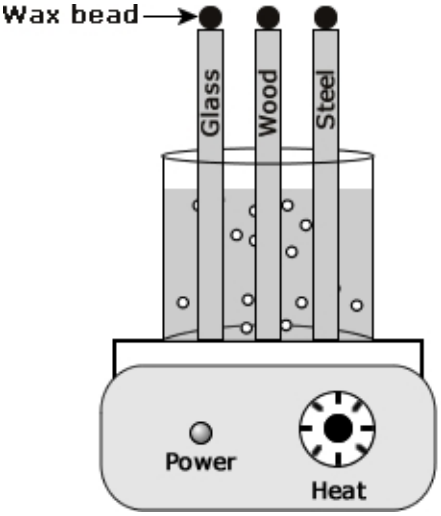
## Scientific Method Part 4: Analyzing Data Test (Demo Version)

"Heat Conduction Experiment"

A student predicted that metal would conduct heat better than wood or glass. To test her idea, she collected one glass rod, one wooden rod, and one steel rod. She placed a wax bead on the top of each rod. Then she placed the rods into boiling water and recorded the time it took for the wax beads to begin melting. Her experimental setup and data are shown below.




| Rod | Melt time (min:sec) |
|---|---|
| Glass | 4:54 |
| Wood | did not melt |
| Steel | 1:34 |

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11) from "Heat Conduction Experiment"

Was the student's prediction correct?

A) Yes, her prediction was correct.

B) No, her prediction was not correct.

C) More information is needed.

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12) from "Heat Conduction Experiment"

Based on the results, what prediction should the student make?

A) A shoe will conduct heat better than a sock.

B) A key will conduct heat better than a pencil.

C) A board will conduct heat better than a window.

D) A glass pan will conduct heat better than a metal pan.

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13) from "Margo's Magnet Experiment"

Based on the results, which prediction should she make?

A) A magnet heated to 150 °C will pick up fewer than 20 paperclips.

B) A magnet placed in the sun will pick up more paperclips than a magnet placed in the shade.

C) A magnet cooled to -78 °C will pick up at least 180 paperclips if there are over 200 in the bowl.

D) A magnet at 30 °C will pick up more than 60 paperclips if it is left in the bowl for more than 2 seconds.

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## Scientific Method Part 4: Analyzing Data Test (Demo Version)

"April's Experiment: How Much Water Does a Plant Need?"

April wanted to find out how much water a small potted plant needs to be healthy. She chose three of the same type of plant, all the same size. She watered one plant each day. She watered the second plant every five days. She watered the third plant every 10 days. Every five days, she recorded what each plant looked like. She guessed that the plant she gave water to just once every 10 days would wilt, but that the other two plants would stay healthy. The table below shows her data. The "mL" stands for milliliters.

How Amount of Water Affects Plant Growth

| | Plant A 250 mL every day | Plant B 250 mL every 5 days | Plant C 250 mL every 10 days |
|---|---|---|---|
| Day 5 | healthy | healthy | healthy |
| Day 10 | partly wilted | healthy | healthy |
| Day 15 | partly wilted | healthy | healthy |
| Day 20 | wilted all over | healthy | healthy |
| Day 25 | wilted all over | healthy | healthy |
| Day 30 | wilted all over | healthy | healthy |
| Day 35 | wilted all over | healthy | partly wilted |

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14) from "April's Experiment: How Much Water Does a Plant Need?"

Based on the results, what prediction should she make?

A) A potted plant that is watered once every other day will be healthy.

B) A potted plant that is watered once a week will be healthy.

C) A potted plant that is watered once every two weeks will be healthy.

D) A potted plant that is watered once every other hour will be healthy.

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