

**5<sup>th</sup> Grade Released Test Questions on Scientific Process and Measurement**  
SOL 4.1 & SOL 5.1

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Questions are taken from 2000-2011 released tests and organized by topic. The year and question number precede each question.

Measurement - Q1-43

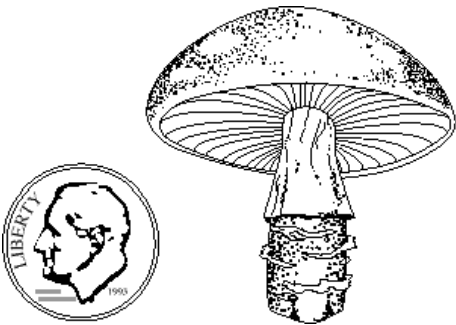
Scientific Process Q44-69

Classification Q70-80

Data, Tables and Graphs Q81-120

**MEASUREMENT – LENGTH**

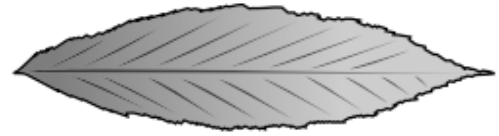
1. (2000-3) The **length** of an adult human footprint would be closest to 20
- a. millimeters
  - b. centimeters**
  - c. meters
  - d. decameters



2. (2000-10) About **how tall** is this mushroom?
- a. 1 kilometer
  - b. 4 centimeters**
  - c. 3 meters
  - d. 10 millimeters

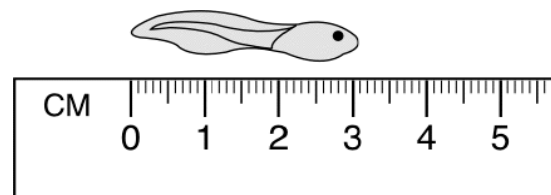
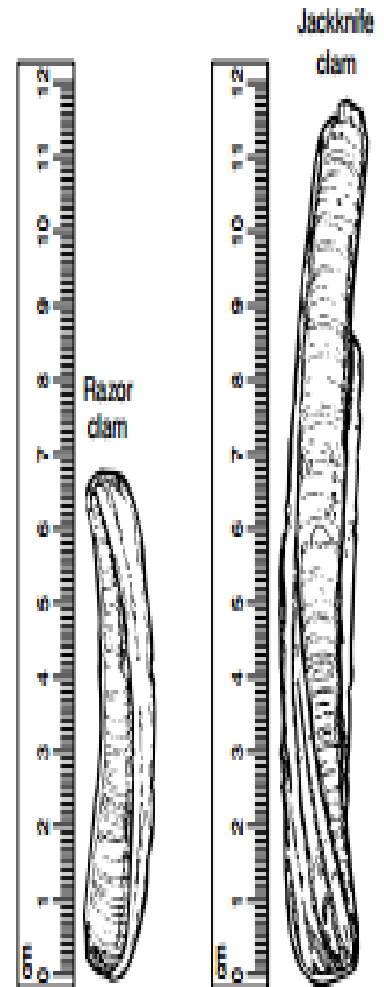


3. (2001-18) The picture shows a magnified view of a tick on a penny. About **how long** is the tick?
- a. 1 millimeter**
  - b. 2 kilometers
  - c. 4 meters
  - d. 10 centimeters



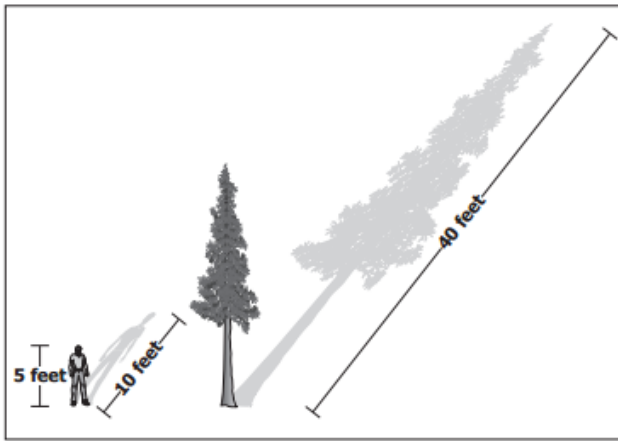
4. (2010-23) According to the picture, which measurement best identifies the **length** of the leaf?
- a. 5.0 cm
  - b. 6.0 cm
  - c. 6.5 cm**
  - d. 7.0 cm

5. (2010-8) About **how much longer** is the jackknife clam than the razor clam?
- a. 5 centimeters**
  - b. 7 centimeters
  - c. 10 centimeters
  - d. 12 centimeters



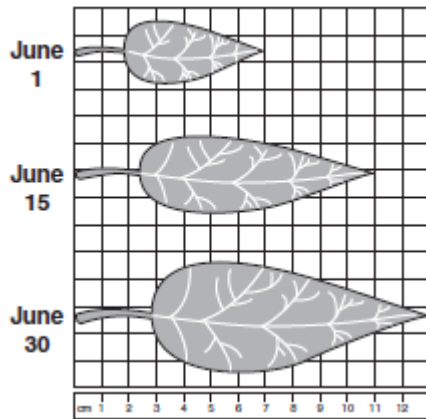
6. (2002-35) What is the **length** of the tadpole?
- a. 2.8 cm
  - b. 3.1 cm**
  - c. .5 cm
  - d. 0 cm

Objects and Their Shadows



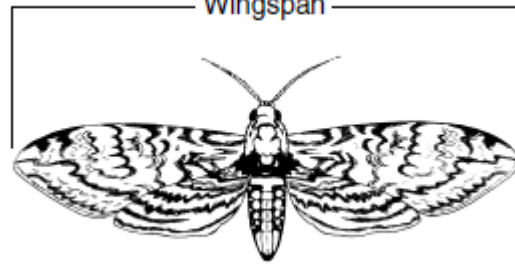
7. (2011-40) Based on information in the diagram, about **how tall** is the tree?
- a. 10 feet
  - b. 20 feet**
  - c. 40 feet
  - d. 80 feet

Growth of a Leaf



8. (2007-8) Three measurements of the same leaf were taken during June. Based on the graph, how much did the leaf **grow in length** from June 1 to June 30?
- a. 6 cm**
  - b. 7 cm
  - c. 11 cm
  - d. 13 cm

Wingspan



9. (2006-24) The **wingspan** of this moth is about
- a. 7 mm
  - b. 8 mm
  - c. 7 cm
  - d. 8 cm**

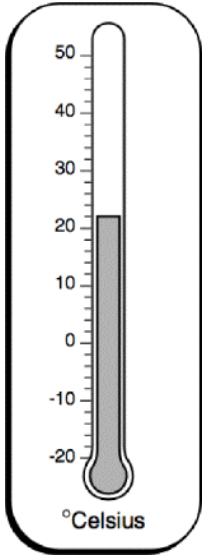


10. (2000-4) What is the **length** of this caterpillar?
- a. 6.0 cm
  - b. 6.5 cm
  - c. 7.0 cm**
  - d. 7.5 cm
11. (2006-33) By August, a student noticed that the sunflowers outside his house were as tall as the back door of his house. About **how tall** were the sunflowers?
- a. 0.2 meters
  - b. 2 meters**
  - c. 20 meters
  - d. 200 meters

12. (2004-11) Over the period of one year, a rock wall shifted 15 millimeters. Which of these lines best shows the **distance** the wall moved?
- (b)**



## MEASUREMENT - LIQUID VOLUME

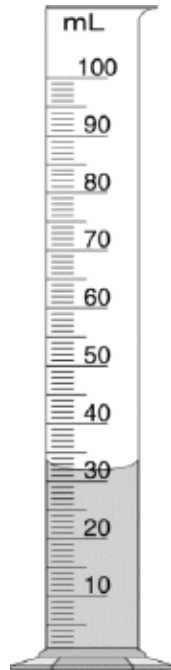


13. (2004-6) The picture shows a **thermometer** in a room. What is the **temperature** of this room?

- a. 19°C
- b. 20°C
- c. 21°C
- d. 22°C

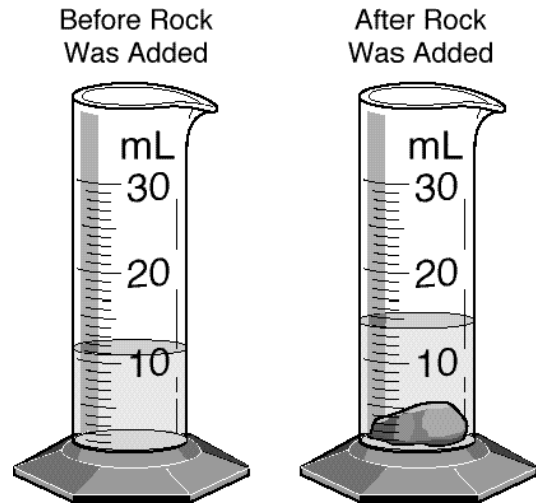
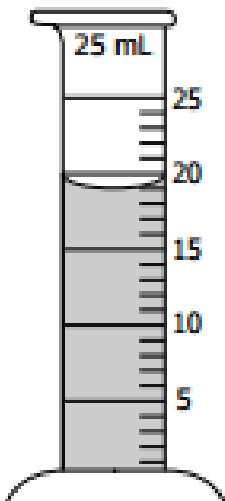
14. (2004-19)(2003-16) If 5 milliliters of vinegar are added to the water in the cylinder, what will be the **total volume** of the **liquid**?

- a. 30 milliliters
- b. 27 milliliters
- c. 37 milliliters
- d. 35 milliliters



15. (2010-35) Students filled a graduated cylinder with the amount of water shown. **How much more water** needs to be added to the cylinder to measure 25 mL?

- a. 2 mL
- b. 4 mL
- c. 6 mL
- d. 9 mL



16. (2000-8) What is the **difference between the water level** in the cylinder before and after the rock was added?

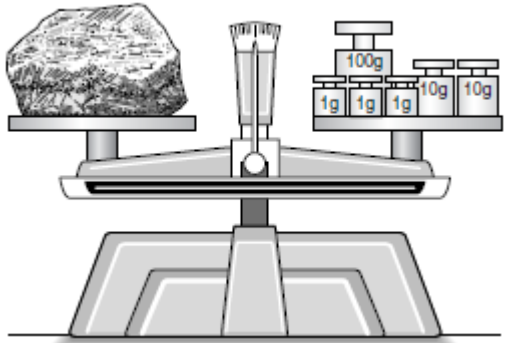
- a. 3 mL
- b. 11 mL
- c. 14 mL
- d. 25 mL

## MEASUREMENT - MASS



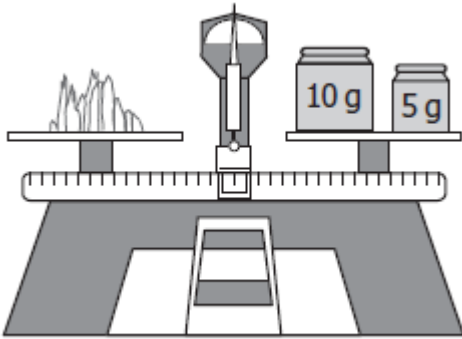
17. (2009-1) Based on the picture, the bag of leaves has —

- a. less mass than the pebble
- b. the same mass as the pebble
- c. the same volume as the pebble
- d. less volume than the pebble



18. (2006-19) Which of these is the most accurate reading of the **mass** of the rock on the **balance** scale pictured?

- a. 33 g
- b. 120.3 g
- c. 123 g
- d. 303 g

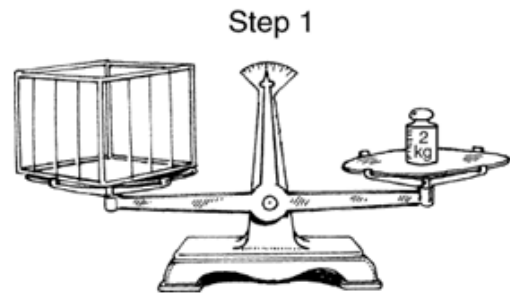


19. (2008-15) What is the **mass** of this mineral?

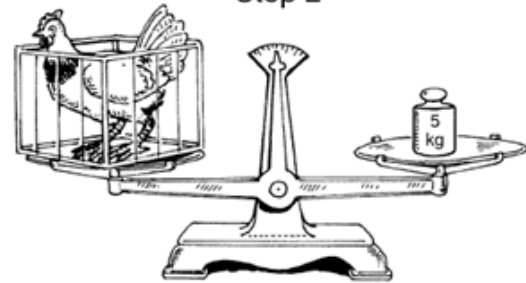
- a. 5 grams
- b. 10 grams
- c. 15 grams
- d. 20 grams

20. (2005-7) Which of the following measurements is most likely the **mass** of a pencil?

- a. 10 centimeters
- b. 17 kilograms
- c. 17 millimeters
- d. 10 grams



Step 1

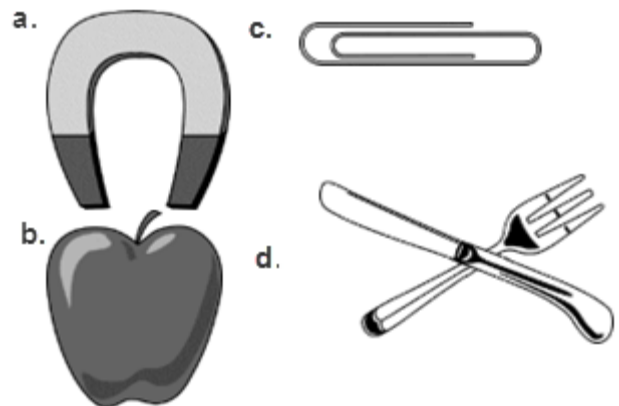


Step 2

21. (2001-19) Amanda studied the mass gain in chickens for her science project. Which of these is the **mass** of this chicken?

- a. 2 kg
- b. 3 kg
- c. 5 kg
- d. 7 kg

22. (2003-37) Which item below would have a **mass** closest to that of a thumbtack? (c)



## MEASUREMENT – UNITS

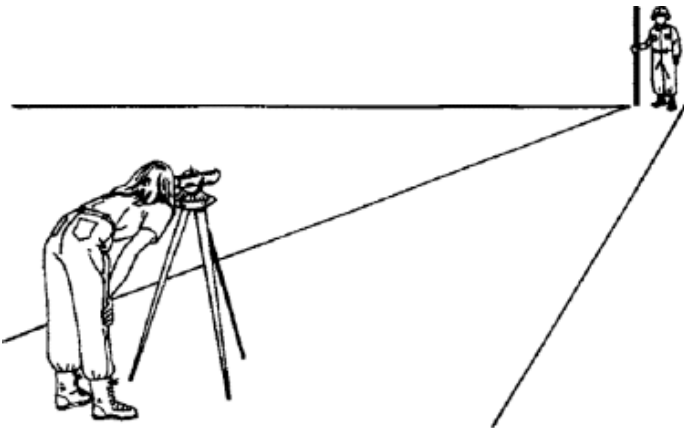
23. (2010-39) The **distance** between Richmond and Norfolk is **best measured in** —

- a. kilometers
- b. meters
- c. centimeters
- d. millimeters



24. (2009-19) **Which unit** is best to use for **measuring** the **width** of oak tree leaves?

- a. Centimeter
- b. Gram
- c. Kilometer
- d. Milliliter



25. (2003-38) This surveyor is measuring the distance of a road. The most appropriate **units** to measure this **distance** are -

- a. millimeters
- b. centimeters
- c. decimeters
- d. meters

26. (2004-38) During a study of the human body, students are asked to observe the back of their hands and record their observations. **What units** would be most appropriate for measuring the **width** of their hands?

- a. Grams
- b. Centimeters
- c. Liters
- d. Meters

27. (2002-9) Students must conduct an experiment in which they find out **how long** a rubber ball bounces before it comes to a stop. Which **unit** would be best for recording this information?

- a. Gram
- b. Degrees Celsius
- c. Meter
- d. Second

28. (2002-1) The **capacity** of an automobile gasoline tank would most likely be measured in -

- a. degrees Celsius (°C)
- b. grams (g)
- c. liters (l)
- d. meters (m)

29. (2005-19) The **height** of a tree would best be measured in —

- a. liters
- b. meters
- c. grams
- d. Celsius

30. (2001-33) Which of these **units** would be best to use to measure the amount of **water** in a test tube?

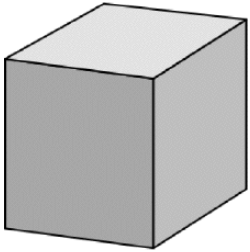
- a. Milliliters
- b. Meters
- c. Kilograms
- d. Seconds

31. (2008-11) Students collect pond water in their beakers. Which is the **best unit of measurement** for the **volume of water** they collect?

- a. Grams
- b. Meters
- c. Milliliters
- d. Centimeters

## MEASUREMENT - INSTRUMENTS

32. (2004-6) Which tools would be needed to measure the **size** and the **mass** of a block of wood?



- a. A watch with a second hand and a ruler
- b. A graduated cylinder and a thermometer

- c. A ruler and a balance
- d. A thermometer and a meter stick

33. (2010-40) Which tools are best used to determine the **speed** of a turtle as it walks along a path?

- a. Meter stick and graduated cylinder
- b. Stopwatch and meter stick
- c. Balance and metric ruler
- d. Balance and stopwatch

34. (2001-21) Which of these is needed to measure the **mass** of a rock?

- a. An anemometer
- b. A barometer
- c. A balance
- d. A metric ruler

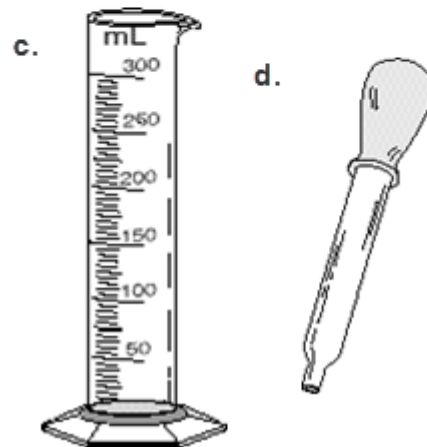
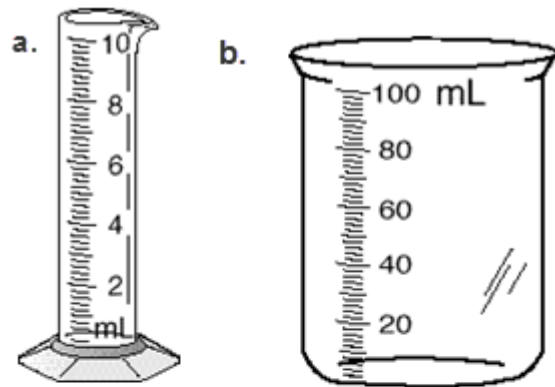
35. (2009-33) What tool is used to determine the **mass** of an object?

- a. Balance
- b. Meter stick
- c. Thermometer
- d. Graduated cylinder

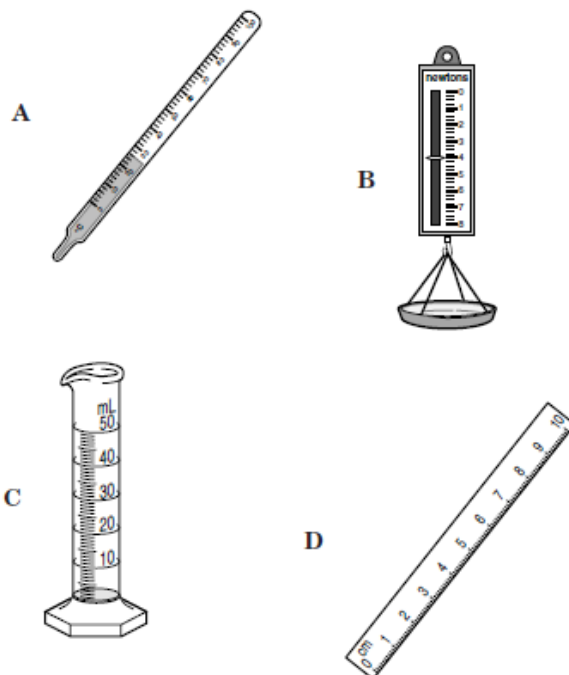
36. (2011-36) Which is the **best tool** for measuring the **temperature** of lake water?

- a. Meter stick
- b. Balance
- c. Graduated cylinder
- d. Thermometer

37. (2000-5) Which of these should be used to accurately measure **250 mL** of **water**? (c)



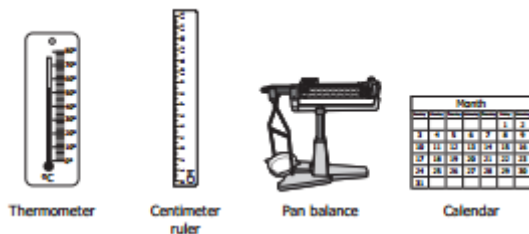
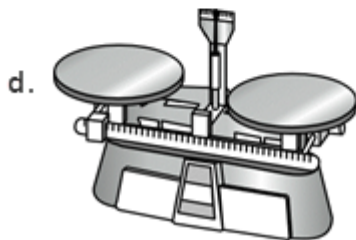
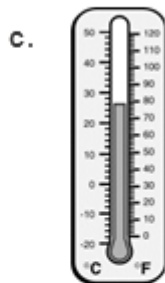
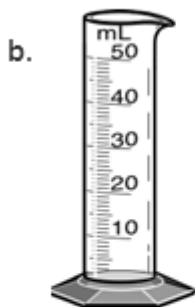
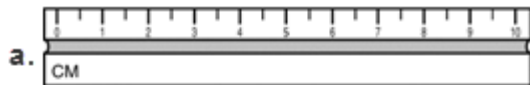
38. (2005-11) Which of these would be the **best** tool to **measure the volume** of water absorbed by a sponge? (c)



39. (2011-14) A student wants to compare the **masses** and **volumes** of three marbles. **Which two instruments** should be used?

- a. **Balance and graduated cylinder**
- b. Centimeter ruler and thermometer
- c. Graduated cylinder and centimeter ruler
- d. Thermometer and balance

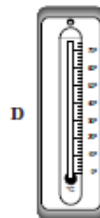
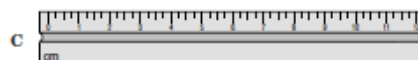
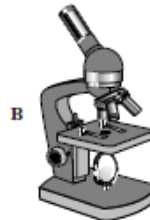
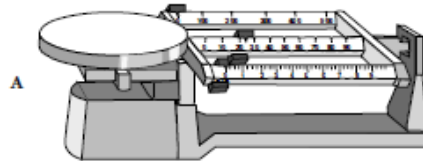
40. (2002-39) **Which of the following instruments** is used to measure **mass**? (d)



41. (2009-35) Juan is doing an experiment to see how long it takes an acorn to grow into a 0.5-meter-tall oak tree. **Which two instruments** should he choose?

- a. Thermometer and centimeter ruler
- b. Thermometer and calendar
- c. Centimeter ruler and pan balance
- d. **Centimeter ruler and calendar**

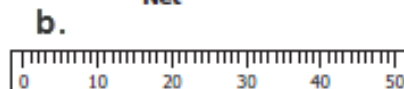
42. (2005-27) Which of these would be used to measure the mass of a marble? (a)



43. (2008-18) Which of these is the **best tool** to use when measuring the water depth at the edge of a pond? (b)



**Net**



**Meter stick**



**Beaker**



**Binoculars**



## SCIENTIFIC PROCESS

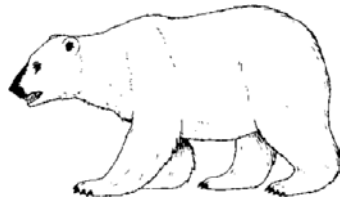
44. (2009-37) A group of students tested the effects of **different amounts of water** on ivy plant growth. Afterwards, they could not remember how much each plant grew per day. What should they have done to practice good science? (**data**)
- Discuss their observations with other groups in their class.
  - Conduct the experiment with more than one type of plant.
  - Record daily information in a data table.
  - Make up explanations for the results.

45. (2011-2) According to the picture, which of these is an **inference** rather than an **observation**?



- This animal has hair.
- This animal has a tail.
- This animal is arching its back.
- This animal is frightened.**

46. (2000-1) Which of these is a **conclusion** rather than an **observation**?



- This bear lives in a cold climate.**
- This bear has big teeth.
- This bear has black claws.
- This bear has small ears and eyes.



47. (2005-5) Based on the picture above, which of these is a **conclusion** rather than an **observation**?

- This animal has hair.
- This animal is standing.
- This animal has four legs.
- This animal is a mammal.**

48. (2003-29) Which of these can be **observed** in this picture?



- The moon is circular.**
- The moon spins around on its axis.
- The moon is solid rock.
- The moon has little air.

49. (2007-39) Which of the following is an **observation** about grasshoppers that a science class could have made on their nature walk?

- The grasshoppers will live longest in a container filled with plants.
- The grasshoppers are green with long back legs and antennae.**
- The grasshoppers will probably eat more grass than tree leaves.
- The grasshoppers all hatched from eggs laid the year before.

50. (2008-34) Students notice that in the fall leaves of sugar maple trees turn red, but the leaves of black oak trees turn brown. **The students are making** —

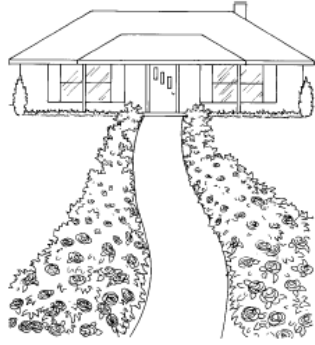
- an observation**
- a conclusion
- a prediction
- an inference

51. (2007-18) A group of students was preparing an activity to determine whether certain materials will float or sink when placed on water. Before the experiment started, one student said, "I think the sponge will float." **This statement was** —

- a conclusion
- a fact
- an observation
- a prediction**

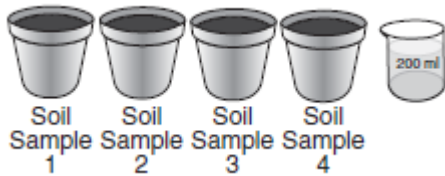


52. (2002-4) Sandy grows roses along her walkway. The roses close to the street had more blooms than the roses close to the house. Which statement is a **hypothesis** Sandy could make about her roses?



- There were many blooms on the roses near the house and fewer blooms on the roses closest to the street.
  - The roses closest to the street had more blooms because they received more sunlight.
  - The roses near the house were taller but had fewer blooms.
  - The roses close to the house had fewer blooms and leaves.
53. (2010-13) Max is doing an experiment on tomato plants. His hypothesis is, "A tomato plant will not grow in a shady area." On which of these relationships did Max base his **hypothesis**?

- Warm temperature causes plant growth.
- Sunlight causes plant growth.
- Tall plants cause shade.
- New plants need fresh water.



54. (2007-29) To find out which soil absorbs (holds) moisture best, each container shown must — (**variables/constants**)
- be made of a different material
  - have soil from the same place
  - be tested by the same person
  - contain the same amount of soil

55. (2003-13) Two students wanted to find out which of their toy race cars would go the farthest. They let each car roll down a ramp and then measured how far the cars rolled. Which of these should be held **constant** if they want a fair test of their cars?

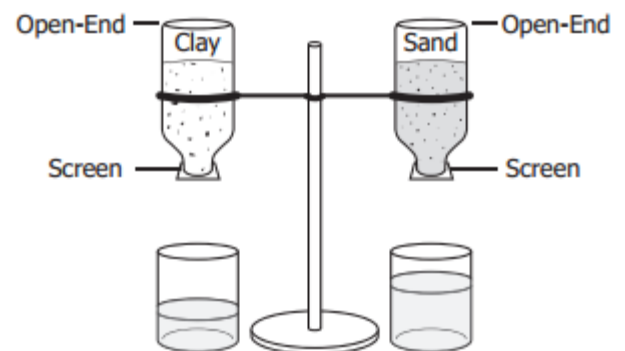
- The height of the ramp
- The weight of the ramp
- The length of the cars
- The shape of the cars

56. (2008-19) Three baseball players investigate to see who can throw a baseball the farthest. They mark off an area on the playground for their investigation. Which should they keep **constant**?

- Height of players
- Color of the baseballs thrown
- Order in which the players throw
- Spot from which players throw

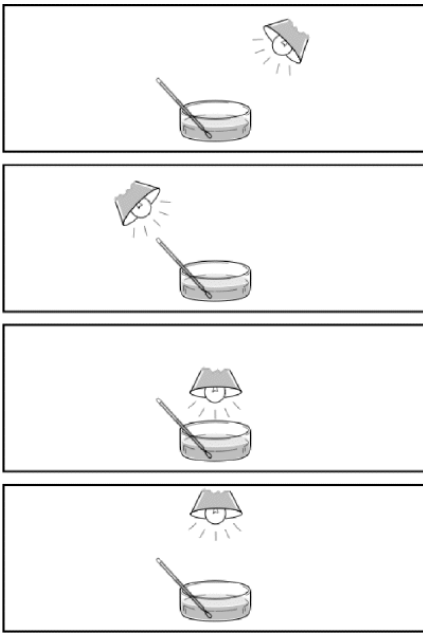
57. (2006-22) A student set up an experiment to test how much bean plants will grow in soil with salt in it. The student grew 50 plants in one group and 50 plants in the other group. The only thing that can be different in the two groups is the amount of — (**constants**)

- soil in each plant pot
- water given to each plant
- salt in the soil in each plant pot
- fertilizer given to each plant

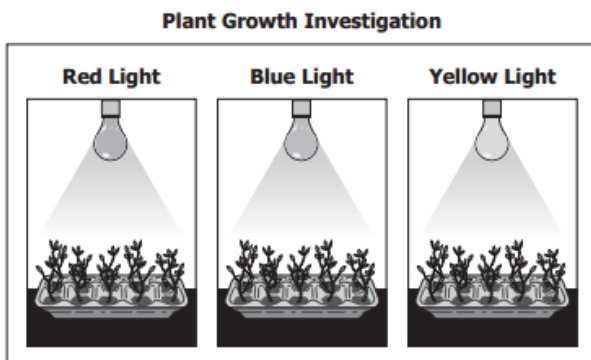


58. (2009-5) Students want to learn which of two soils holds more water. They put clay in one bottle and sand in the other. Then they put equal amounts of water in the bottles. Some of the water drained into beakers. Which of these is the **manipulated, independent variable**?

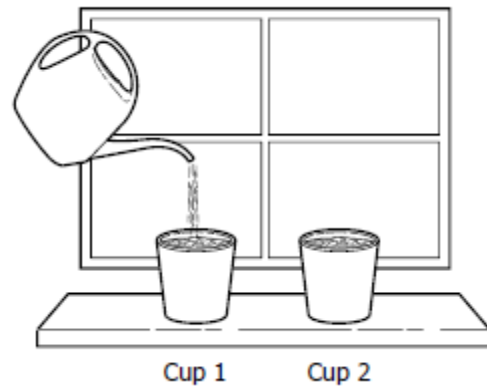
- Type of soil
- Type of beaker
- Amount of water
- Number of bottles



59. (2004-40) The pictures above show how one student tried to see how the heat from a light bulb affected the rate of evaporation of a liquid. What is the only **variable** being changed in this experiment?
- The size of the container
  - The position of the thermometer
  - The position of the light bulb
  - The amount of water

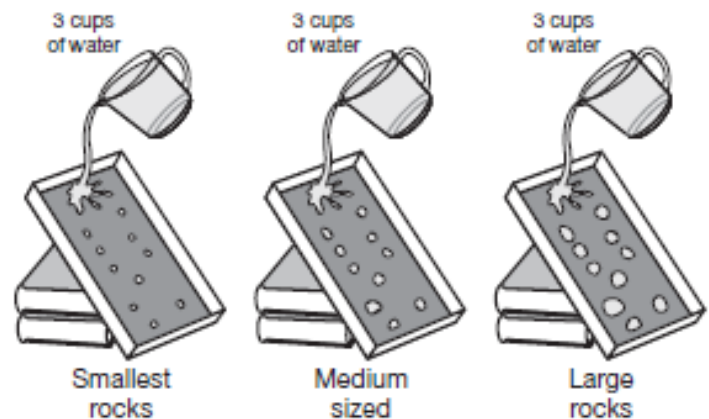


60. (2011-11) A student designed an investigation to test the effect of light color on plant growth. What was the **manipulated** (independent) **variable** in the investigation?
- Color of light bulb
  - Height of plant
  - Hours of light
  - Size of pot



61. (2010-21) Students planted bean seeds in the same kind of soil in separate cups. The cups were put next to each other on a sunny windowsill. Cup 1 was given 10 mL of water every other day. Cup 2 was given no water. Which of these is the **independent** (**manipulated**) **variable** in the experiment?
- The type of soil
  - The type of seed
  - The amount of water
  - The amount of sunlight

### Jackson's Experiment



62. (2007-16) In an experiment, Jackson tested to see how the size of rocks affects the amount of dirt that washes away when water flows downhill. Which **variable was manipulated**?
- Amount of water
  - Slope of the hill
  - Size of the rocks
  - Type of dirt

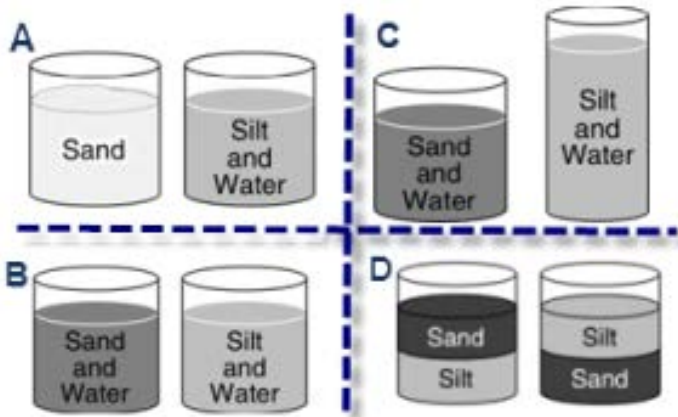
63. (2007-22) Sandy is conducting an investigation to find out which food his dog likes best. Which is the **manipulated variable** in his investigation?

- a. The color of his dog's food dish
- b. The kind of food he gives his dog**
- c. The amount of food he gives his dog
- d. The time of day he feeds his dog

64. (2002-24) Todd observes that his strawberry plant has grown little green strawberries. Which of these is a **prediction** Todd might make about his strawberry plant?

- a. The green berries will ripen into red berries.**
- b. The strawberry plant is growing under an oak tree.
- c. The strawberry plant doesn't have enough water.
- d. The green berries are a new type of strawberry.

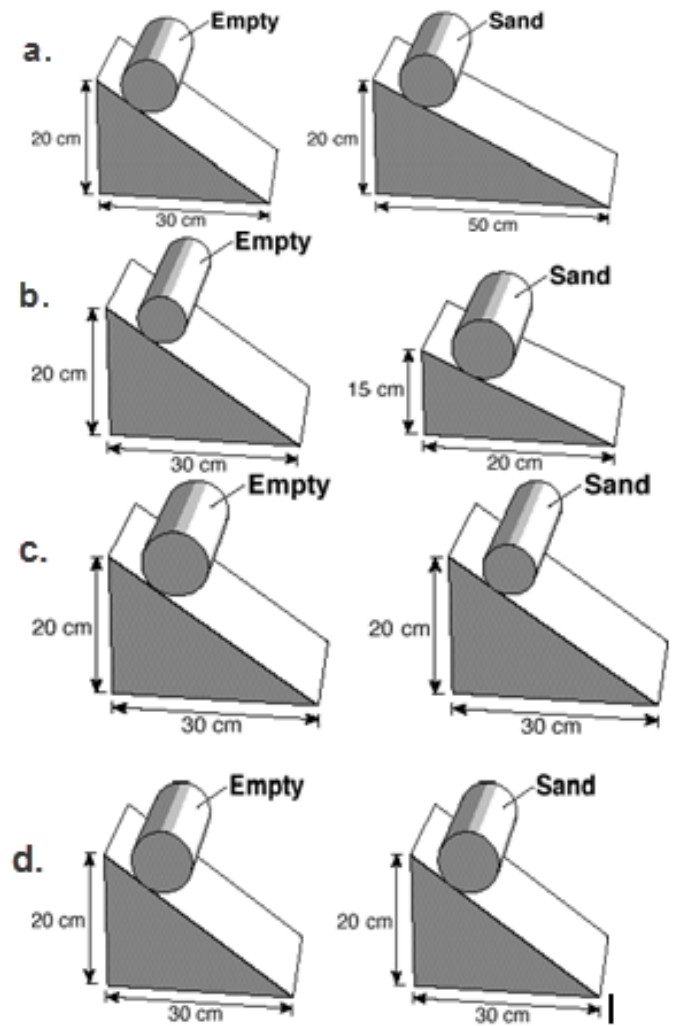
65. (2002-11) Which of these is the **fairest way** to find out if sand or silt will settle faster when mixed with water? **(b)**

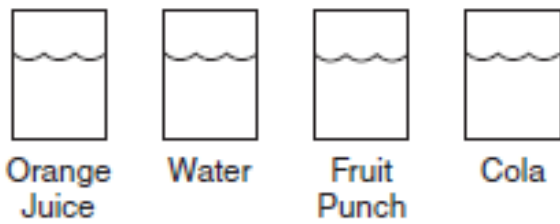


66. (2005-29) A student wants to show how much the use of gasoline has increased over the last ten years. This information would best be **displayed** in a —

- a. Diagram
- b. bar graph
- c. line graph
- d. stem-and-leaf plot

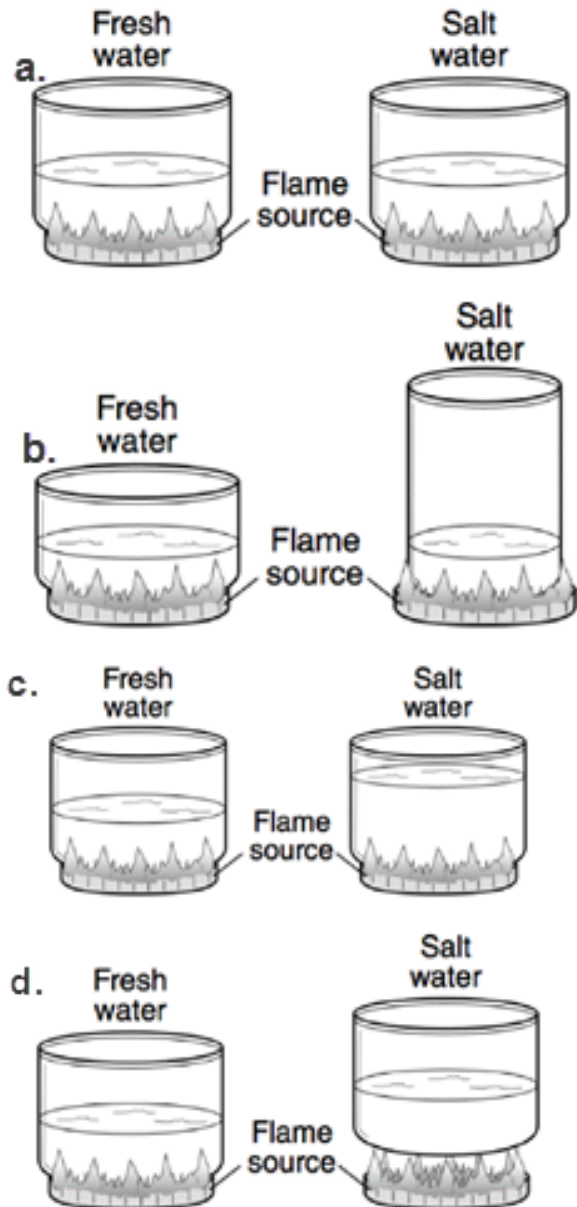
67. (2000-6) Students want to find out if an empty can rolls down a ramp faster than a can filled with sand. Which of these would be the **fairest way** to find out? **(d)**





68. (2007-11) A student thinks that orange juice will freeze faster than any other substance. She fills identical containers with the same amount of different liquids, then places each in the freezer. She checks them every five minutes and discovers that the orange juice is the last one to freeze and the water is the first to freeze. **Which should the student do next?**
- Change her results to match her original hypothesis.
  - Repeat her investigation to see if her results are the same.
  - Conclude that investigations can only be performed on water.
  - Tell her friends that investigations at school work better than at home.

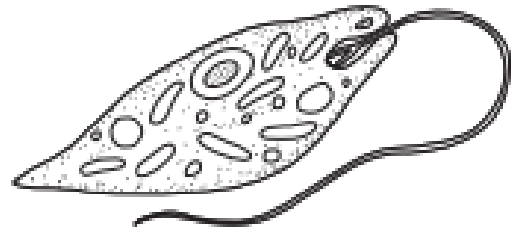
69. (2004-14) Which is the **fairest way** to find out if salt water boils faster than fresh water? (a)



# CLASSIFICATION

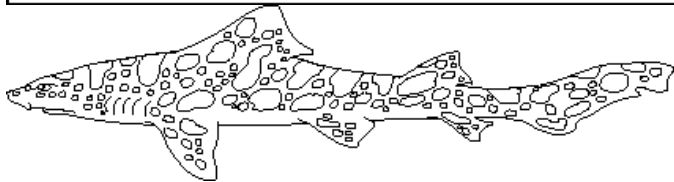
## Classification Key

- 1a Body kite-like in shape ..... Ray  
 1b Body not kite-like in shape ..... Go to 2
- 2a Nose saw-like in shape .....Swordfish  
 2b Nose not saw-like in shape .....Go to 3
- 3a Head extended on both sides ....Hammerhead shark  
 3b Head not extended on both sides .....Go to 4
- 4a Body has spots ..... Leopard shark  
 4b Body does not have spots .....Nurse shark



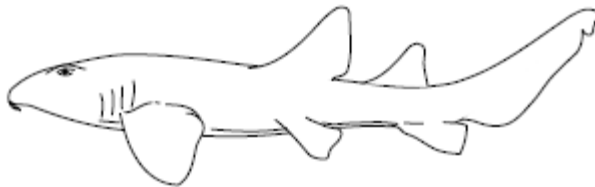
Lab: Microscopic Organisms

- 1 a. Has many tiny hairs ..... Go to 2  
 b. Has no tiny hairs ..... Go to 3
- 2 a. Has hairs all along edge ..... Paramecium  
 b. Has hairs along one end ..... Vorticella
- 3 a. Has one long tail ..... Euglena  
 b. Has many arm-like shapes ..... Amoeba



70. (2001-1) Using the picture and **classification key**, what is this animal?
- Swordfish
  - Hammerhead shark
  - Leopard shark**
  - Nurse shark

72. (2009-39) Lee uses a microscope during science class. He sees this organism in a drop of water. Which organism did he most likely see?(**identification key**)
- Paramecium
  - Vorticella
  - Euglena**
  - Amoeba



71. (2004-28) Using the picture and **classification key**, what is this animal?
- Swordfish
  - Hammerhead shark
  - Leopard shark
  - Nurse shark**

Mineral Chart

Mineral	Color	Transparency	Luster	Hardness
Gold	gold-yellow, brass-yellow, pale yellow	opaque	metallic	2.5 to 3
Pyrite	pale yellow to brass-yellow	opaque	metallic	6 to 6.5

73. (2011-27) Based on the information in the table, the best way to tell gold from pyrite is by which property?
- Color
  - Transparency
  - Luster
  - Hardness**



## Characteristics of Virginia Butterflies

Butterfly	Habitat	Adult food
Clouded Skipper	Forests and swamps	Pink, purple, or white flowers
Cloudywing	Woodland and forest edges	Blue, purple, pink, or white flowers
Silver-spotted Skipper	Woods and streams	Blue, red, pink, purple, and white flowers
Appalachian Brown	Wet swamps and forest edges	Sap

74. (2005-13) Plants use their location and flower color to attract pollinators. A plant with red flowers living along a woodland stream would most likely be pollinated by which of these butterflies?
- Clouded Skipper
  - Cloudywing
  - Silver-spotted Skipper
  - Appalachian Brown

START HERE	1	3
Does the creature have a round head? (go to 1)	Does the creature have one big eye? (go to 3) Does the creature have two eyes? (go to 4)	3 The creature is a Woznat.
		4 The creature is a Zapoom.
Does the creature have a square head? (go to 2)	2 Does the creature have horns? (go to 5) Does the creature have no horns? (go to 6)	5 The creature is a Nanner.
		6 The creature is an Ock.

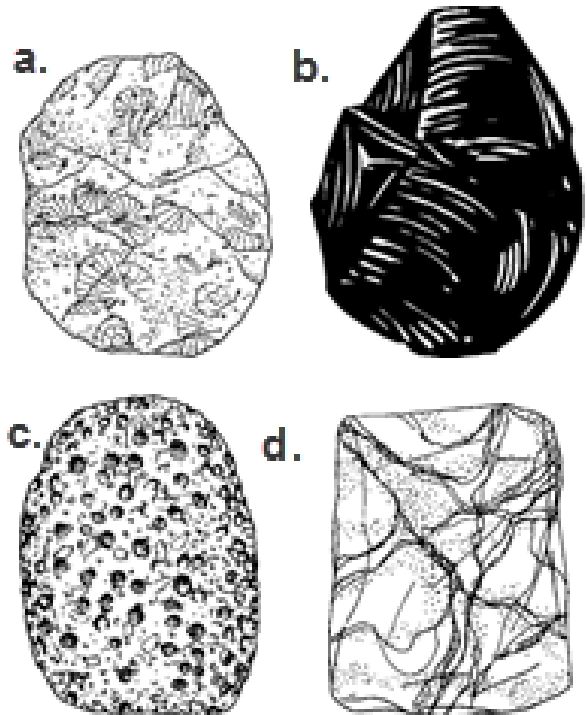


75. (2003-35) According to the **identification key**, what type of creature is creature Y?
- Woznat
  - Zapoom
  - Nanner
  - Ock

## Three Basic Types of Rocks

<b>Igneous</b>	Formed from cooled and hardened magma deep inside the Earth or from lava at the surface
<b>Sedimentary</b>	Formed when layers of sediments or rock pieces are cemented together; may contain fossils
<b>Metamorphic</b>	Formed when rocks are changed by heat, pressure or chemical action; may be banded

76. (2002-5) **According to the information in the chart**, which of the following rocks is a sedimentary rock? **(a)**





## Mineral Identification Chart

Mineral	Color	Hardness
Amphibole	Green to black	Less hard than a nail
Feldspar	White, pink, gray, green	Harder than glass
Garnet	Dark red	Harder than glass
Quartz	Colorless, gray, white	Harder than glass

77. (2010-2) A student observes a mineral that is colorless and harder than glass. Based on the chart, which mineral is the student observing?

- Amphibole
- Feldspar
- Garnet
- Quartz



### Adult Bird of Prey Key

- |    |                                      |                    |
|----|--------------------------------------|--------------------|
| 1a | Bill straight .....                  | Not a bird of prey |
| 1b | Bill curved and sharp .....          | Go to 2            |
| 2a | Both eyes on front of head .....     | Owl                |
| 2b | Eyes on sides of head .....          | Go to 3            |
| 3a | Feathers on head .....               | Go to 4            |
| 3b | No feathers on head .....            | Vulture            |
| 4a | Feathers on head are all dark .....  | Golden Eagle       |
| 4b | Feathers on head are all white ..... | Bald Eagle         |

78. (2008-29) Based on the bird of prey key, which bird is shown in the picture?

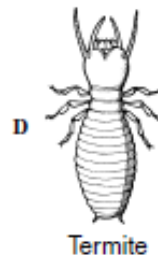
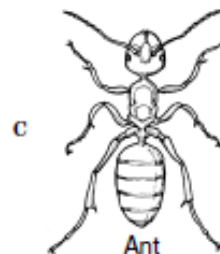
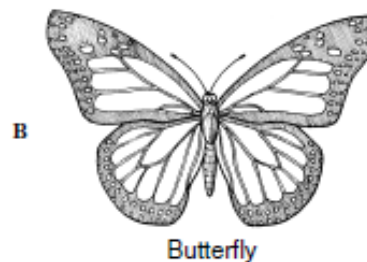
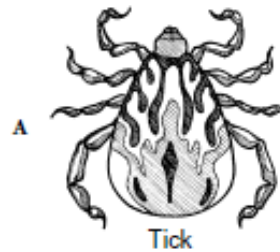
(identification key)

- Owl
- Vulture
- Golden eagle
- Bald eagle

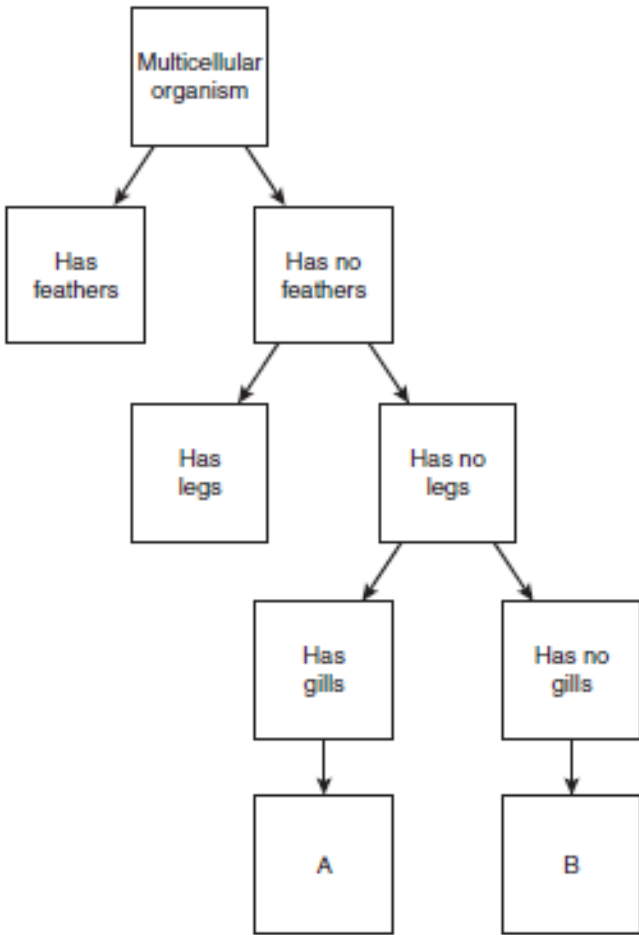
## Insect and Arachnid Identification

Animal Type	Insect	Arachnid
Body parts	3	2
Pairs of legs	3	4
Antennae	Yes	No

79. (2006-3) According to the table, which animal is an arachnid? (a)



## DATA, TABLES AND GRAPHS



80. (2007-3) Which of these belongs in square A of this flow chart?

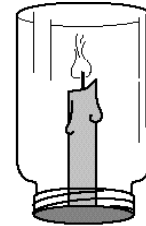
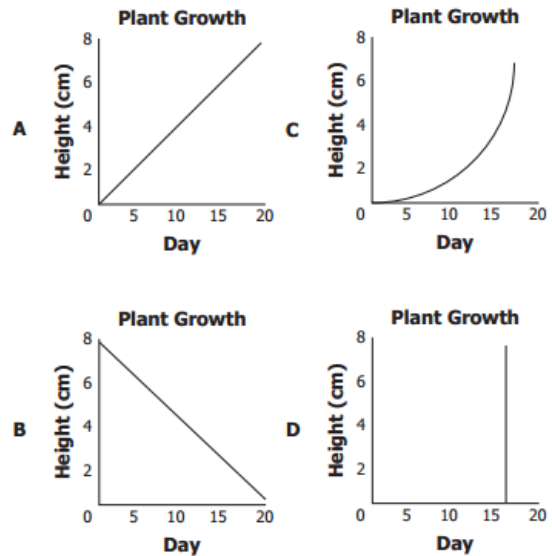
- a. Bird
- b. Toad
- c. Snake
- d. **Fish**

81. (2011-21)

**Plant Growth**

Day	Height (cm)
0	0
5	2
10	4
15	6
20	8

Which line graph *best* shows the data in the table?



82. (2000-9) The **graph** shows what happened when a candle was burned in different jars. The **results** of this experiment show that the bigger the jar, the

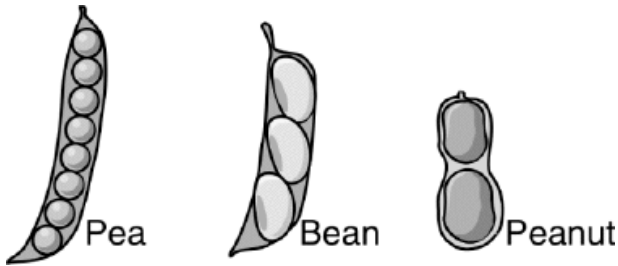
- a. faster the candle melted
- b. **longer the candle burned**
- c. brighter the candle's flame
- d. higher the candle's flame

83. (2001-40) How big would a jar have to be to keep the candle burning for 5 minutes? (refer to table from previous question).
- 1 liter
  - 5 liters
  - 10 liters
  - 15 liters

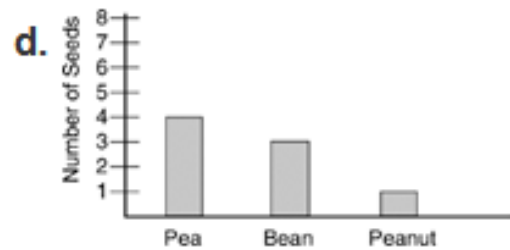
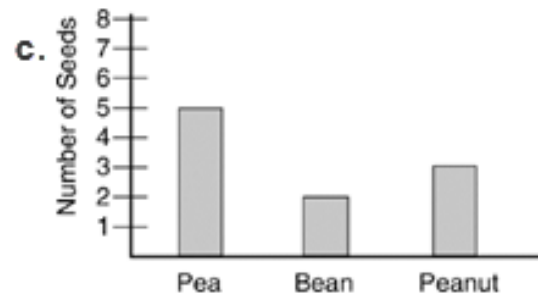
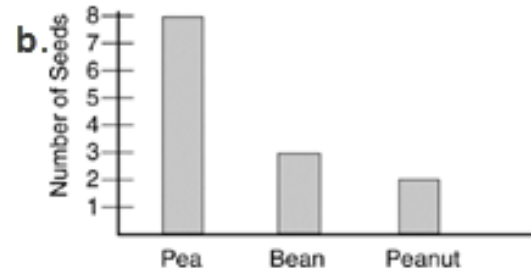
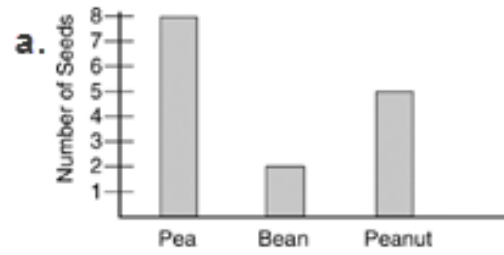
### Number of Flowers in a Field

Flower Color	Number of Flowers
Blue	4
Red	8
Yellow	15
White	10

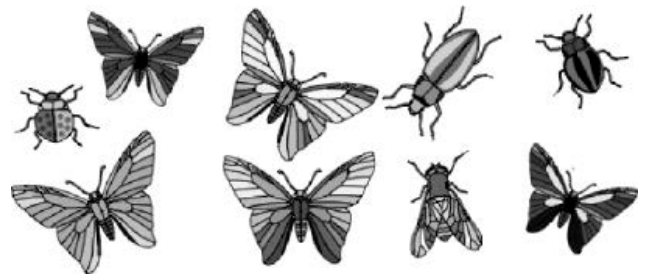
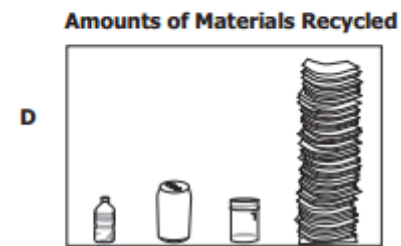
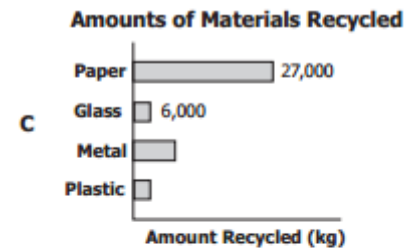
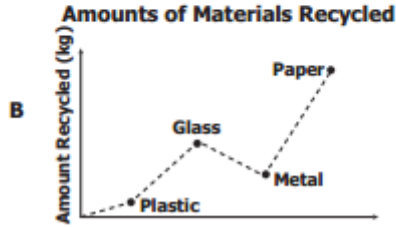
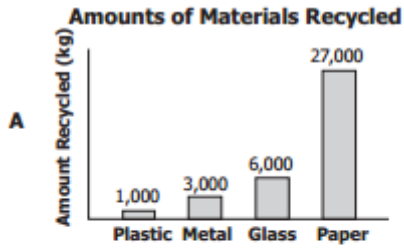
84. (2000-2) The **chart** shows the number of flowers seen in a field. **Which of these best shows these data?** (c)



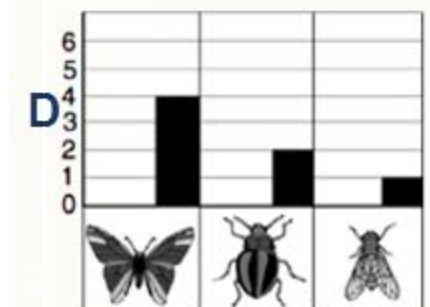
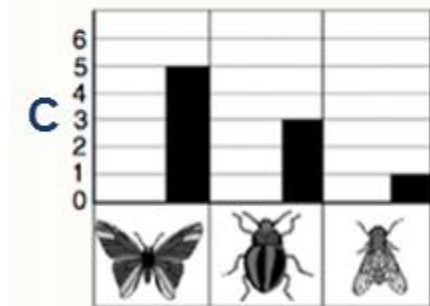
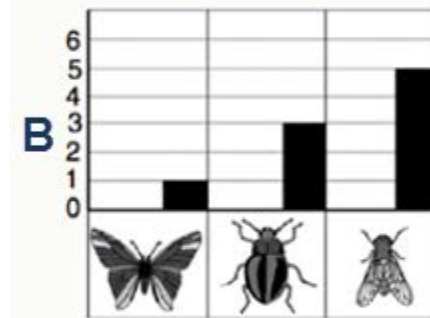
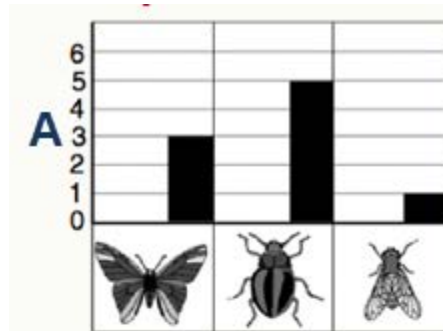
85. (2003-22) The picture above shows some different kinds of seed pods. Which **graph correctly shows** the number of seeds in each pod? (b)

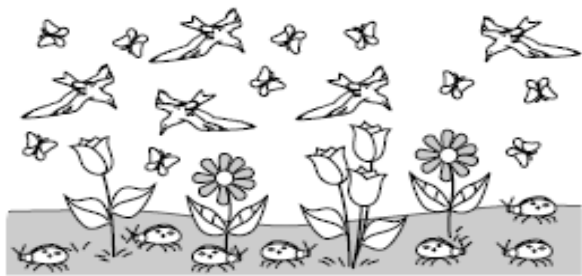


86. (2009-9) A student is writing a report on recycling. The student learns that different kinds of material are recycled in different amounts. **Which graph best shows the data?** (a)

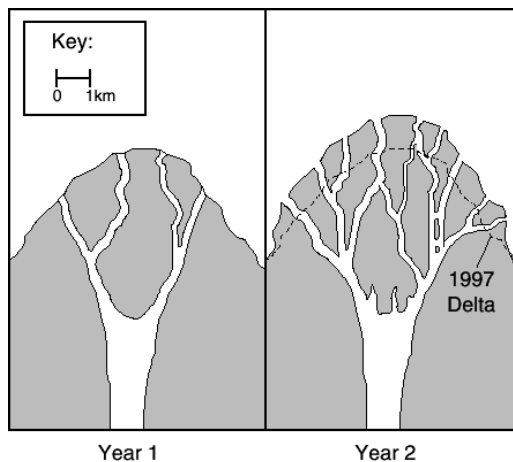
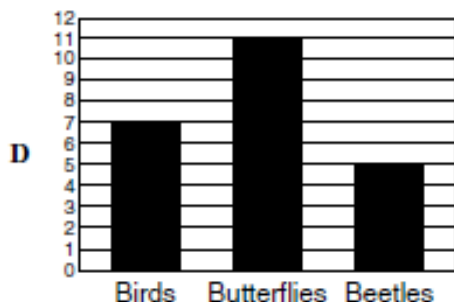
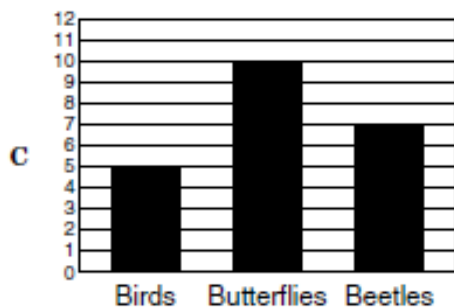
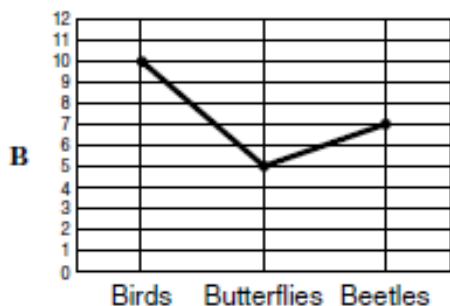
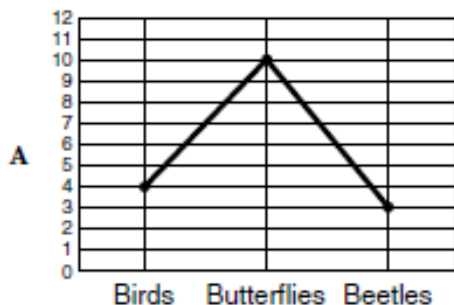


87. (2005-3) The picture shows some insects Dana saw while she was out walking. Which graph best represents what Dana saw? (c)



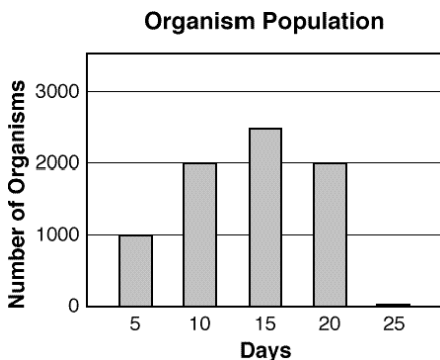


88. (2006-29) The picture shows some animals. Which graph most accurately shows the number of animals in the picture? (c)



89. (2001-15) The picture shows the development of a delta over a two-year period. According to this information, about how far did the delta reach into the ocean after 1997?

- a. 0.1km
- b. 0.5 km
- c. 1 km
- d. 1.5 km

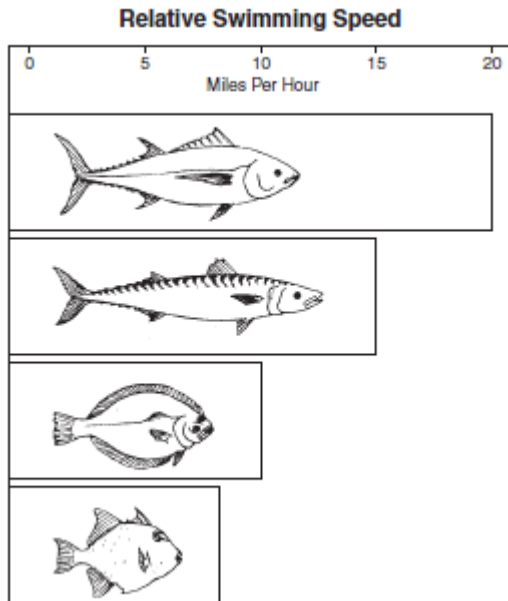


90. (2000-7) Jack grew some very small organisms in a jar of pond water. Each day, he counted the number of organisms he saw on a slide. Then he estimated how many organisms were in the jar. On what day were almost all of the organisms dead?

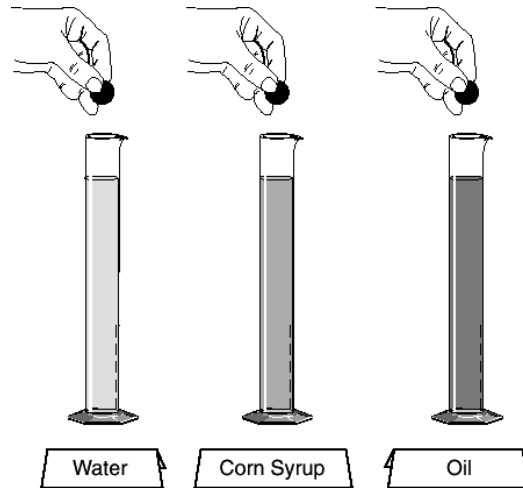
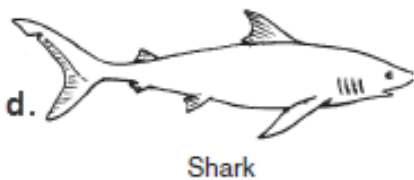
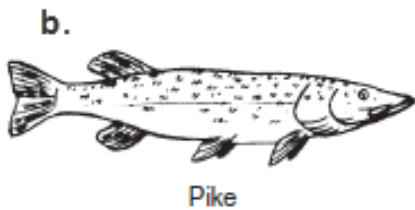
- a. 5
- b. 15
- c. 20
- d. 25

91. (2007-34) (use same graph) Jack grew some very small organisms in a jar of pond water. Each day, he counted the number of organisms he saw on a slide. Then he estimated how many organisms were in the jar. About how many organisms did he estimate were in the jar on day 15?

- a. 1000
- b. 1500
- c. 2000
- d. 2500**

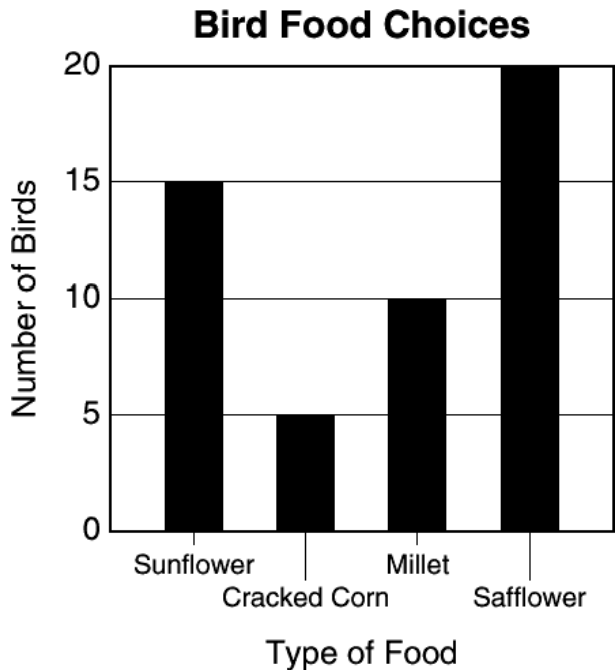


92. (2007-36) Which of these is probably the slowest fish? **(c)**



93. (2001-31) A student uses the equipment shown above to study which liquid is the thickest. **What information** is the most appropriate to record?

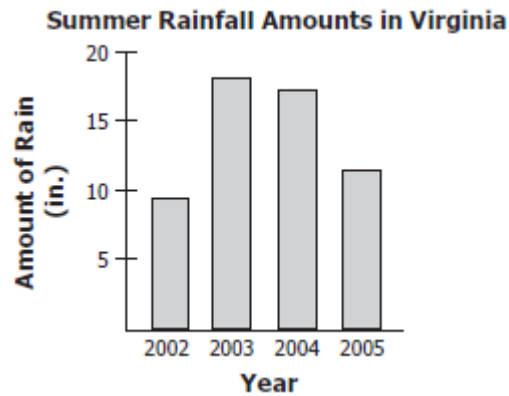
- a. The height of each of the graduated cylinders
- b. The time it takes for each marble to hit bottom**
- c. The size and mass of each of the marbles
- d. The volume of each of the liquids in the cylinders



94. (2001-39) **According to the graph**, which combination of food would probably bring the most birds to the feeder?

- a. Sunflower seeds and cracked corn
- b. Cracked corn and millet
- c. Millet and safflower seeds
- d. Sunflower and safflower seeds**





95. (2008-6) The graph shows the amount of rain that fell during the summer for each of four years. Weather data show that the average rainfall during the summer is about 12 inches. **Based on the graph**, rainfall was closest to the average during —
- 2002
  - 2003
  - 2004
  - 2005**

**Frequency Distribution of Backpack Mass**

Mass of Backpacks (kilograms)	Number of Students
0-1	1
2-3	10
4-5	8
6-7	1
8-9	2

96. (2002-12) Students in Mrs. Smith's class are trying to find the average mass of fifth-grade students' backpacks. The information is displayed on the **chart** above. **The chart shows that** fifth-grade students most frequently have backpacks with a mass of —
- 2-3 kilograms**
  - 4-5 kilograms
  - 6-7 kilograms
  - 8-9 kilograms

**Growth of a Plant**

Date	Height of Plant (cm)	Increase in Growth (cm)
March 3	2	0
March 7	4	2
March 11	6	2
March 15	8	2

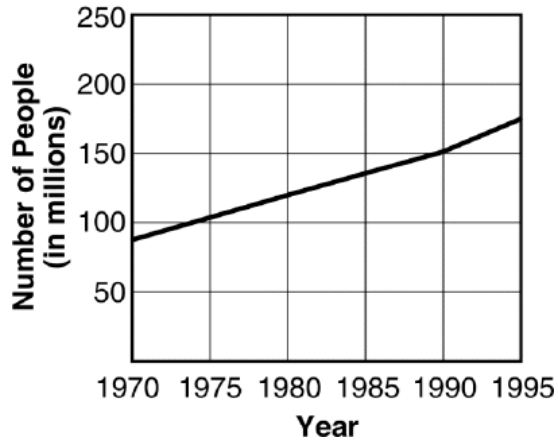
97. (2002-31) **Based on the information in the chart**, what would be the height of the plant on March 23?
- 10 cm
  - 12 cm**
  - 4 cm
  - 16 cm

**Comparison of Venus and Earth**

Planet	Diameter (km)	Mass Compared to Earth	Density	Highest Temperature at Surface
Venus	12,104	0.82	5.24	470°C
Earth	12,756	1.00	5.50	56°C

98. (2006-20) **The table above** compares some facts about Venus with some facts about the planet Earth. How are the two planets most different?
- Diameter
  - Mass
  - Density
  - Surface temperature**

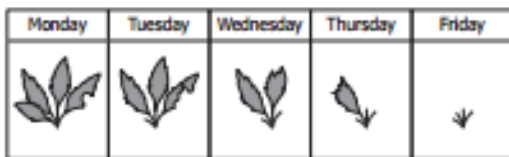
**Population of Brazil  
1970-1995**



e.

99. (2003-10) From the chart shown above, you can predict that for the year 2000, Brazil's population will –
- show a heavy drop
  - be a flat line even with 1995
  - have topped 250 million
  - continue its steady rise

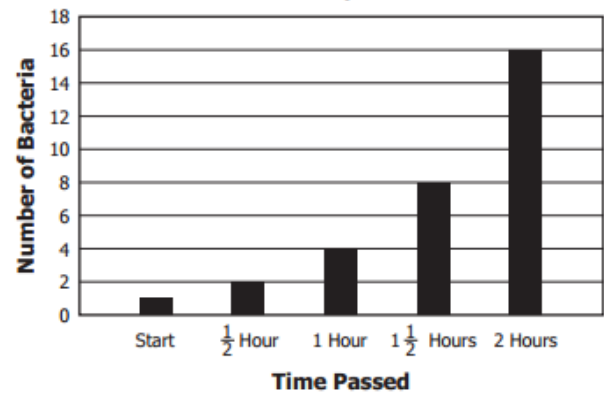
100. (2009-32) A boy placed four leaves in a caterpillar's cage.



He observed the number of leaves in the caterpillar's cage each day. Based on the data, the boy should infer that the caterpillar —

- is eating only every other day
- is eating each day
- will eat part of one leaf next Monday
- will stop eating during molting on Friday

**Bacteria Reproduction**

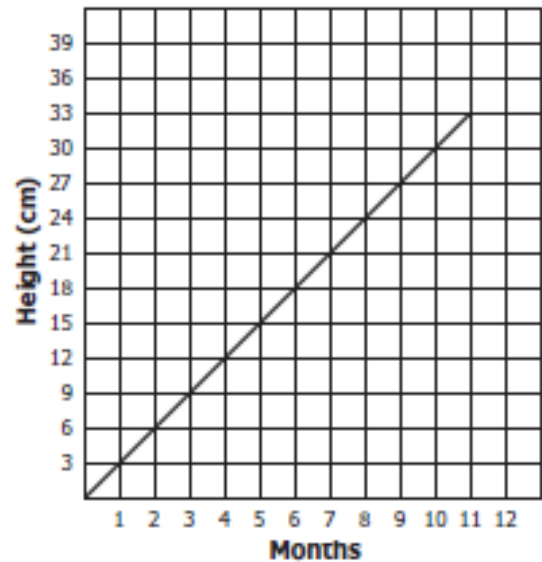
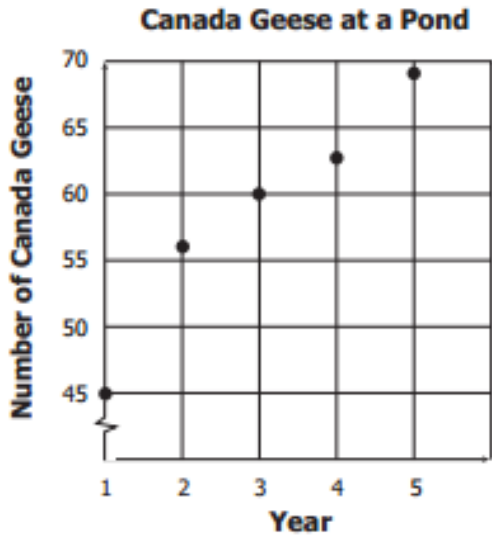


101. (2011-17) On a graph, students recorded how quickly bacteria reproduced over two hours. If the rate of reproduction stayed the same, how many bacteria would be present after 2 1/2 hours?
- 8
  - 16
  - 32
  - 64

**Bean Seed Growth**

Temperature (°C)	Days to Germinate
25	5
20	7
15	9
10	11
5	?

102. (2003-26) The chart shows the time it took for bean seeds to germinate at different temperatures. If the trend continues, at a temperature of 5°C the seeds probably will germinate in -
- 5 days
  - 8 days
  - 13 days
  - 16 days

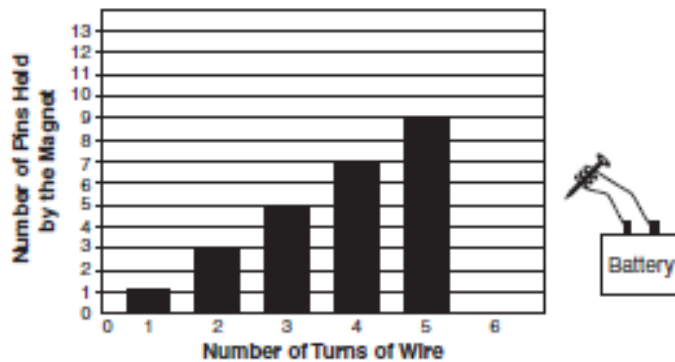


103. (2009-29) A student counted the number of Canada geese that have lived on a pond for the past five years. **Based on the graph**, how many geese will **probably** live on the pond in year 6? (**prediction based on data**)

- a. 60
- b. 65
- c. 70
- d. 75

105. (2008-4) The graph shows the **height change** of a plant over a period of 11 months. How tall should the plant be at month 12 if all conditions remain the same and the plant **continues to grow** at the same rate?

- a. 36 cm
- b. 39 cm
- c. 42 cm
- d. 45 cm



**Approximate Surface Gravity of Some Planets Compared to the Earth**

Planet	Surface Gravity
Mercury	0.38
Venus	0.90
Earth	1.00
Mars	0.38
Jupiter	2.53

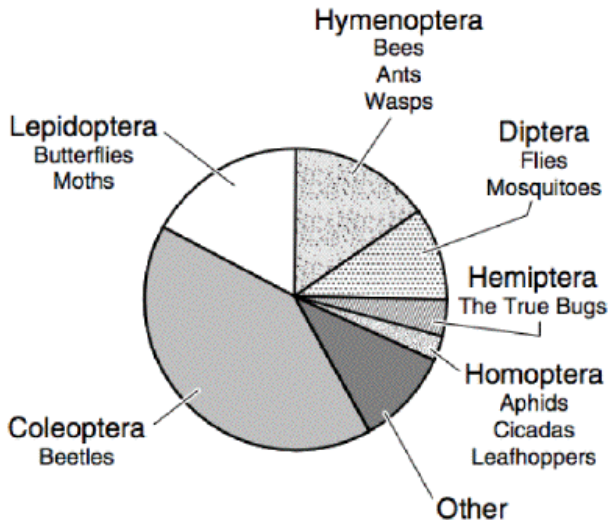
104. (2005-40) The picture shows the results of an experiment with an electromagnet. If the magnet had 6 turns of wire, how many pins would it probably pick up?

- a. 9
- b. 10
- c. 11
- d. 12

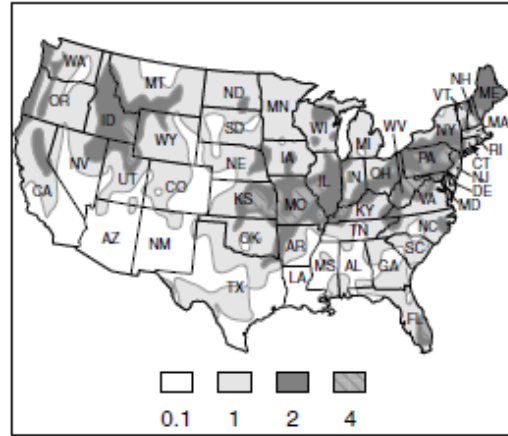
106. (2004-20) The larger the mass of a planet, the greater the pull of gravity on that planet's surface. **According to the information in the chart**, which of these planets has a mass closest to the Earth's mass?

- a. Mercury
- b. Venus
- c. Mars
- d. Jupiter

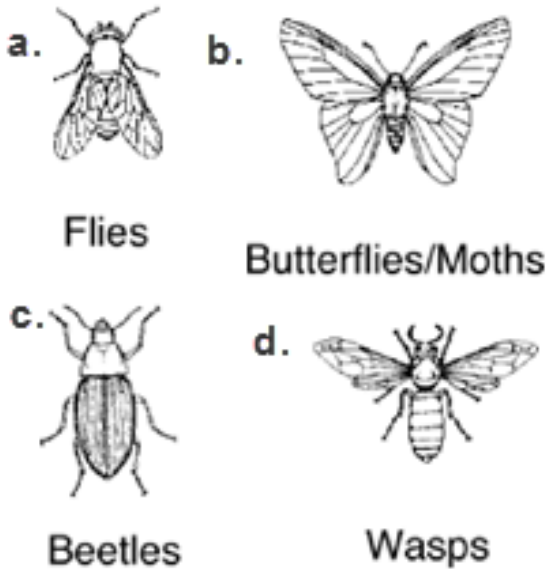
### Relative Numbers of Insects Seen



### Total Precipitation (Inches) Apr 14 – 20, 2002



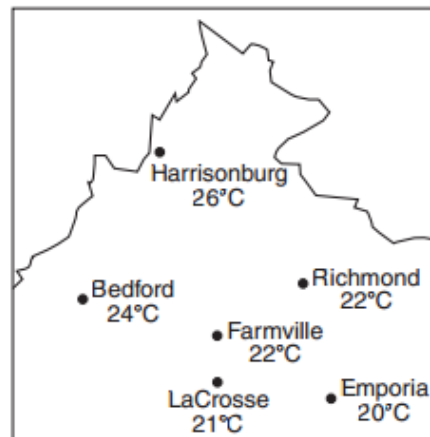
107. (2004-24) A science class went on a field trip and made a **graph** of the different kinds of insects that they saw. Which group of insects was seen the most? ©



108. (2006-38) **According to this precipitation map** of the continental United States, which of the following states would be the **least likely** to have floods for this weather period?

- a. Arizona (AZ)
- b. Florida (FL)
- c. Oregon (OR)
- d. Virginia (VA)

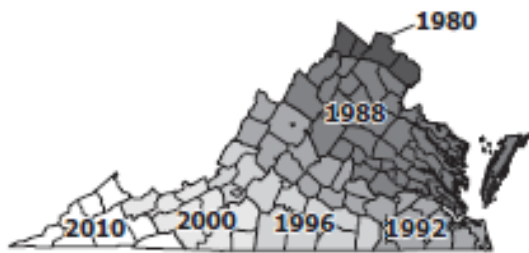
### Virginia



109. (2011-29) Which statement is supported by the **data** on this map?

- a. Emporia is colder than Bedford at the time of these measurements.
- b. Bedford is the hottest city in the state of Virginia.
- c. LaCrosse will become cooler over the next few days.
- d. Richmond, Farmville, and LaCrosse are all colder than Emporia.

### Spread of Gypsy Moths Across Virginia

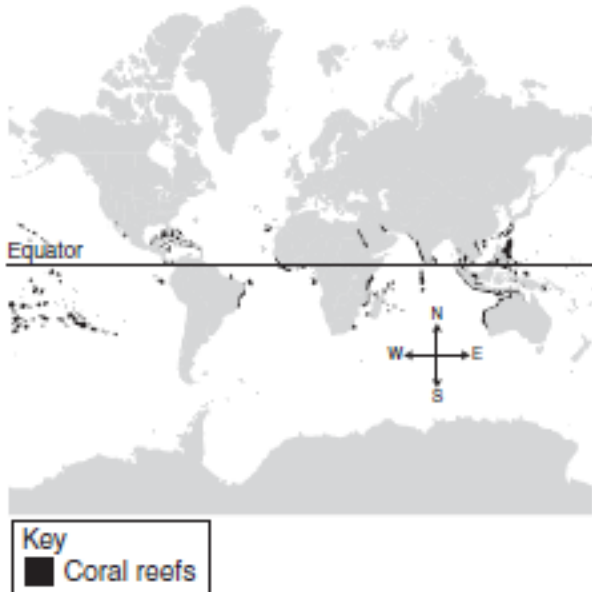


110. (2008-2) The map shows how gypsy moths have spread across Virginia over the years.

Based on the map, gypsy moths —

- a. live in every state in the United States
- b. will be in all of Virginia by 2010
- c. first came to Virginia in 1960
- d. stopped spreading in 1996

### Location of Coral Reefs



111. (2007-19) Many species of ocean organisms live in coral reefs. The map shows that most coral reefs are found near the equator. What does the location of coral reefs suggest about coral organisms?

- a. Corals need warm seawater to survive.
- b. Corals mostly live around volcanic islands.
- c. Ocean currents keep corals from migrating.
- d. Most ocean waters are too deep for corals.

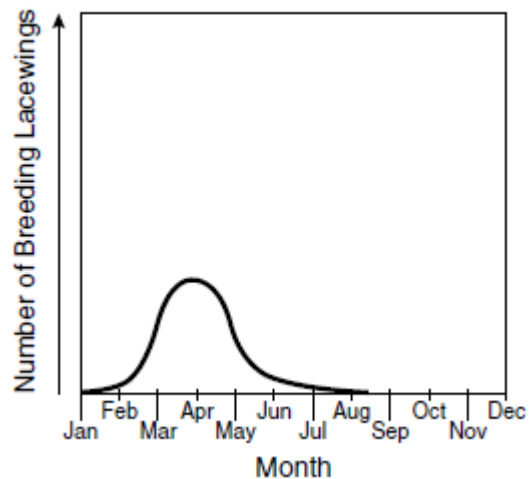
### Virginia Long-Term Average Temperature and Precipitation (1895–1998)

Month	Average Temperature (°F)	Average Precipitation (inches)
January	35.9	3.13
February	37.2	3.08
March	45.5	3.86
April	54.9	3.29
May	64.0	3.99
June	71.5	3.69

112. (2010-11) A teacher asked his class to help plan their science field trip schedule from January to June. Based on the table, which month with an average temperature above 50°F has the least amount of average precipitation?

- a. March
- b. April
- c. May
- d. June

### Lacewing Breeding Period



113. (2006-11) The lacewing is a common small insect. The graph shows the breeding period of one species of lacewing. During what season would most of these lacewings breed?

- a. Winter
- b. Summer
- c. Spring
- d. Fall

### Puppy Growth Chart

Age (weeks)	Weight (kg)
8	8.0
9	8.5
10	9.0
11	9.5
12	11.0
13	11.5

114. (2008-27) Based on the chart, between which two weeks did the growth pattern of the puppy change?
- 8–9 weeks
  - 9–10 weeks
  - 10–11 weeks
  - 11–12 weeks

### Distance Thrown by Students

Student	Distance Thrown (m)
1	15
2	75
3	10
4	16
5	8

115. (2003-5) Dennis conducted an experiment to determine which of his classmates could throw a ball the farthest. He recorded his results in the above table. Which student's measurement is an **unusual** result?
- 1
  - 2
  - 3
  - 4

Trial	Temperature (°C)
A	41
B	40
C	31
D	42

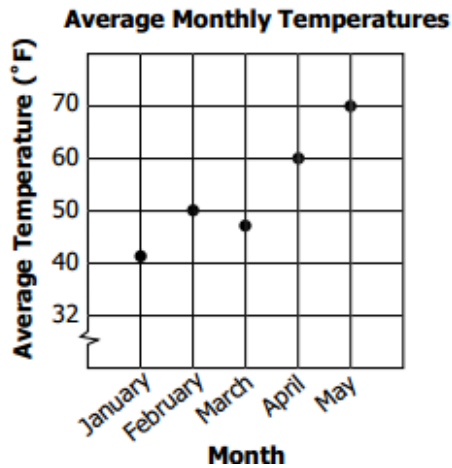
116. (2001-22) Students conducted an experiment in which they rubbed their palms together to warm their hands, then measured the temperature of their hands. The experiment was conducted 4 times. According to the data in the table, which of these trials is most **unusual**?
- A
  - B
  - C
  - D

### Garden Club Sunflower Sprouts

Pot	Number of sunflower seeds	Total number of sunflower sprouts
1	20	17
2	20	18
3	20	16
4	20	9

117. (2011-31) The school garden club planted sunflower seeds in 6-inch pots. Each pot was watered the same amount every two days. At the end of one month, the number of sprouts was counted. Which pot had an **unusual** number of sprouts?
- 1
  - 2
  - 3
  - 4





118. (2010-4) Temperatures normally increase every month from January through August. During which month was the average temperature most **unusual**?

- a. January
- b. February
- c. **March**
- d. April

**Temperature Log**

After Getting up in the Morning	After Reading a Book	After Math Class	After Playing Outside
36.8°C	37.1°C	32.2°C	37.7°C

119. (2006-39) A student used a thermometer to take his temperature at different times. He wrote down his measurements in a table. When did the student *most likely* record the temperature **inaccurately**?

- a. After getting up in the morning
- b. After reading a book
- c. **After math class**
- d. After playing outside

**Experimental Results**

Student	Numbers of Seeds Sprouted
1	25
2	19
3	27
4	5

120. (2005-37) Some students recorded the number of bean seeds that sprouted in their experimental plots. Each student began with the same number and type of seeds, the same type of soil plot, and the same amount of water and sunlight. Which of the following students most likely made an **error** in the experiment?

- a. 1
- b. 2
- c. 3
- d. **4**