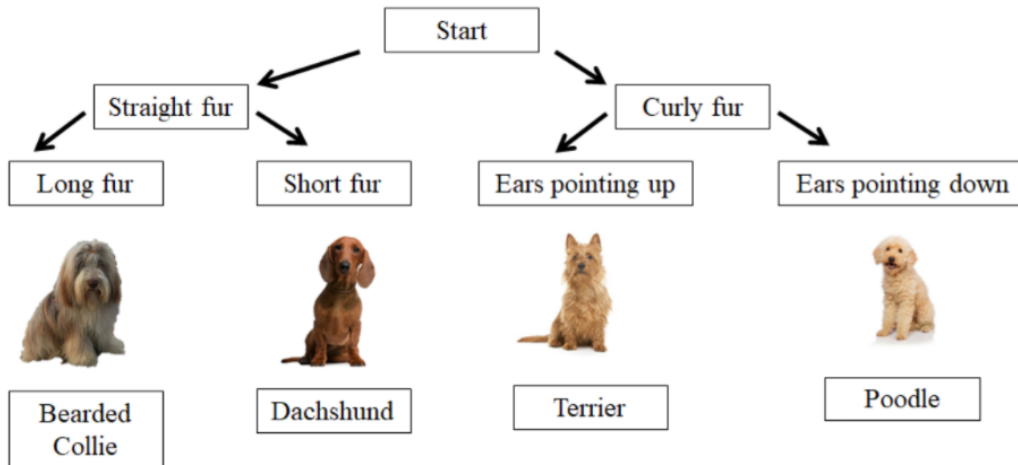


1. Biologists often use charts called dichotomous keys to identify different types of organisms. To use a dichotomous key, choose the characteristic that best matches the organism you are trying to identify. Continue doing so until the species is identified.



Bobby's family recently adopted this dog, and he is curious to find out what breed it is.



Using the dichotomous key, what breed of dog is this most likely to be?

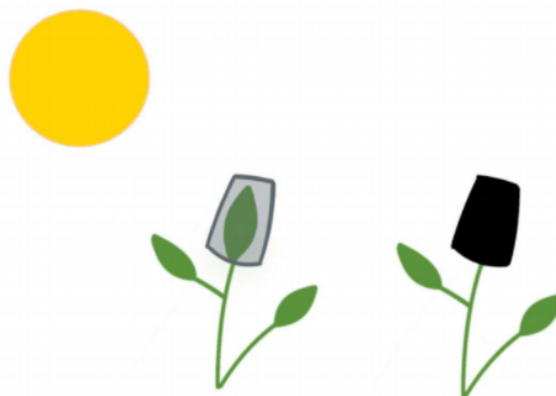
- A. Terrier
 - B. Poodle
 - C. Dachshund
 - D. Bearded Collie
2. Have you wondered how temperature changes with altitude? For example, at the cruising altitude of most jet aircrafts (between 9,000 and 12,000 m) the air temperature ranges from $-40\text{ }^{\circ}\text{C}$ to $-57\text{ }^{\circ}\text{C}$. It can be approximated that every 100 m going up, the air temperature drops by about $1\text{ }^{\circ}\text{C}$. A group of tourists start its hike at the bottom of the Alatau mountain on a sunny day, when the temperature is $32\text{ }^{\circ}\text{C}$.



At what altitude are tourists expected to face the snow?

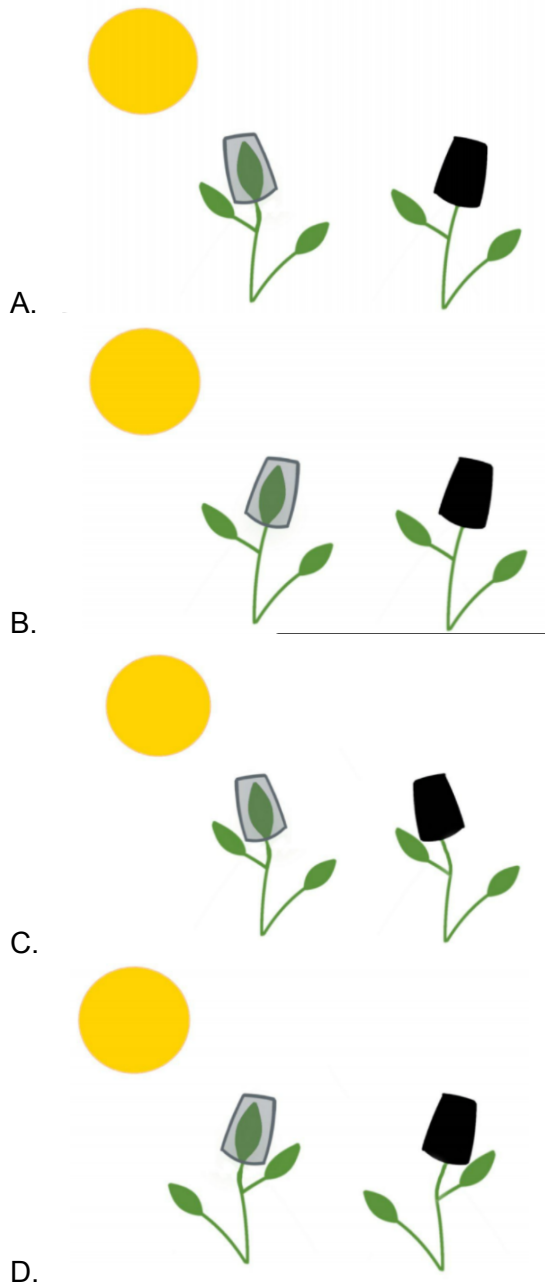
- A. 1 000 m - 2 000 m
 - B. 2 000 m - 3 000 m
 - C. 3 000 m - 4 000 m
 - D. 4 000 m - 5 000 m
3. Phototropism combines the Greek photo, or "light," and tropism, "a turning". Put together the term phototropism refers to the movement of organisms towards light. In plants, phototropism helps to get the maximum amount of available energy by turning and growing in the sun's direction. Auxin is the plant hormone that is responsible for phototropism. This hormone is concentrated in the head of the stem.

Some students want to check the action of the auxin and put caps on the head of the stems. First cap is transparent (transmits the light), the second cap is opaque (does not transmit the light).



Day 1. Transparent - left, opaque - right.

Which of the following diagrams best reflects the observations that will be made after a couple of days?



4. An electromagnet can be made by coiling a wire around an iron object such as a nail, and then connecting the wire to a battery.

Electromagnets are commonly found in everyday items, such as fans and speakers.

You can learn how to make a simple electromagnet by watching the video below:

<https://www.youtube.com/watch?v=Gk-SBhNY-IM>

The greater the number of coils around the nail, the stronger the electromagnet will be. Bob sets up an experiment to investigate the relationship between the number of coils and the maximum weight the electromagnet can lift. His results are shown below:

Number of coils	Maximum mass lifted by electromagnet
10	6g
30	17g
50	30g
70	43g

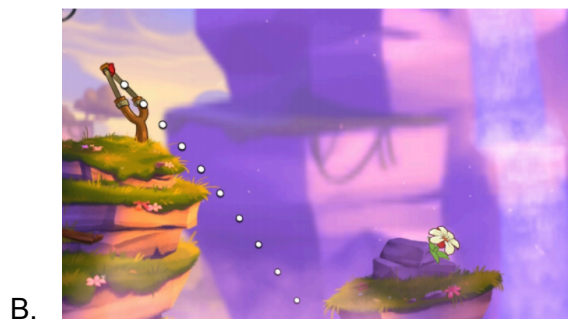
Bob wants to lift even heavier objects with his electromagnet, and decides to build an electromagnet with 100 coils. Can you estimate the maximum mass that can be lifted by this electromagnet?

- A. 50 g
- B. 60 g
- C. 70 g
- D. 75 g

5. You are playing angry birds. Your goal is to send the bird as far as you can:



Which trajectory is the best option for your goal?



Answers

1. B
2. C
3. A
4. B
5. D