Math
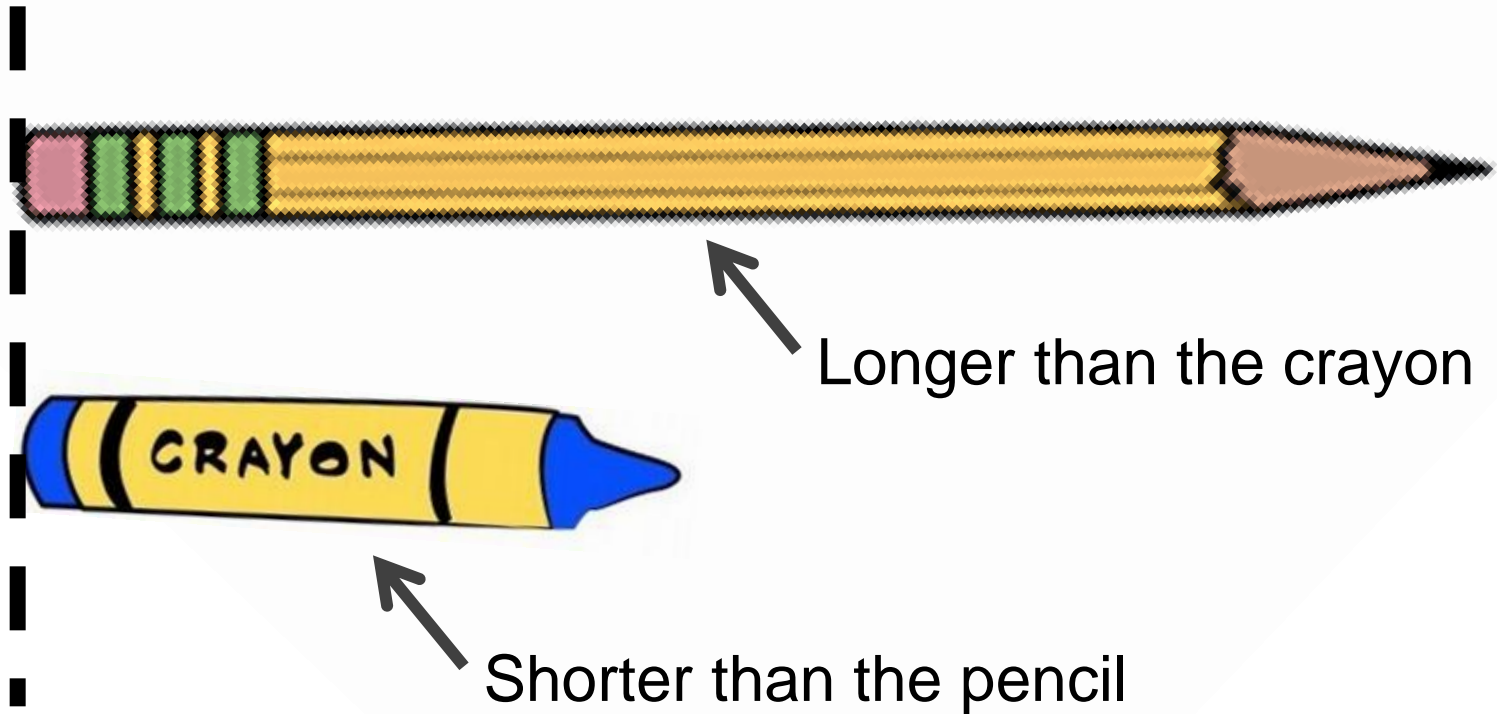# Shape and Space:
Measurement (Length)

Science and Mathematics Education Research Group
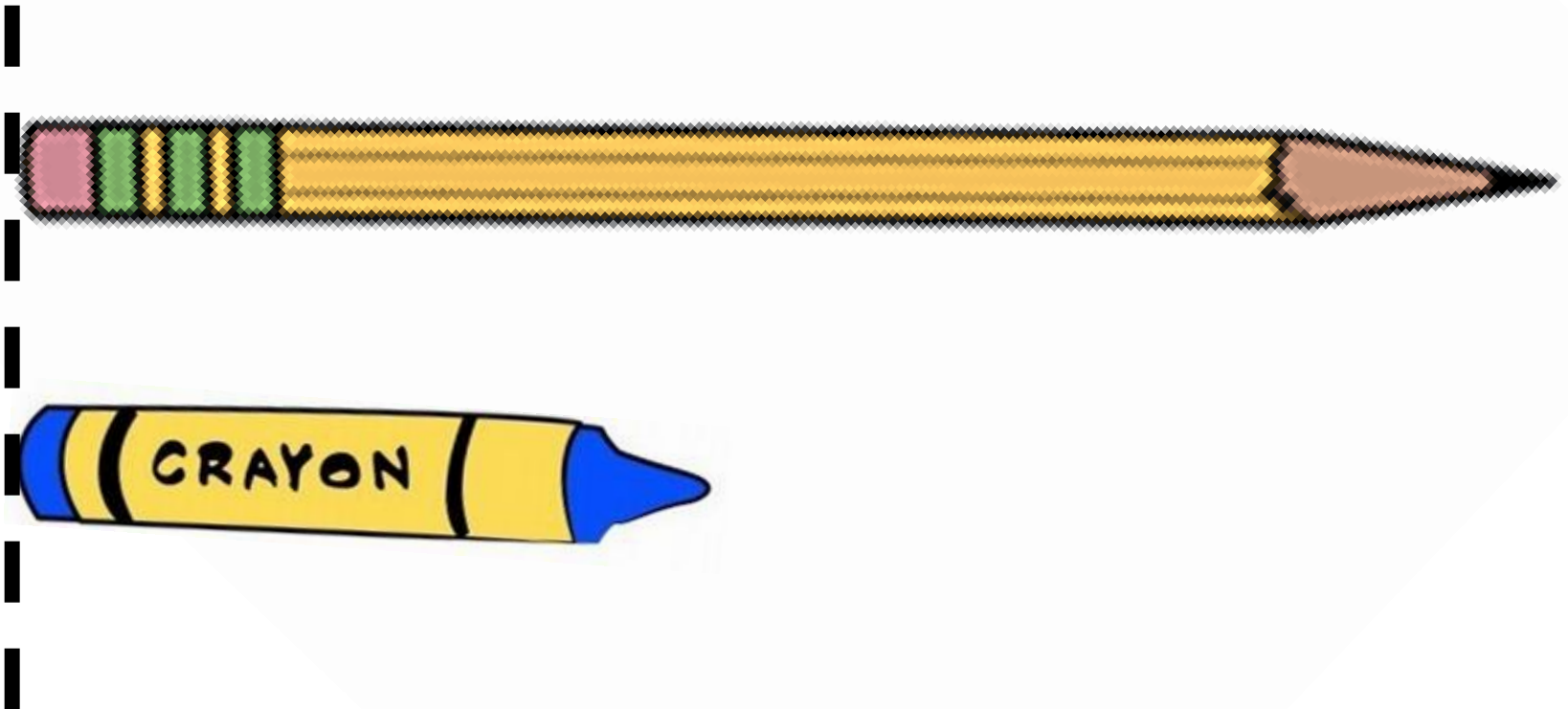
Measurement: Length

Measurement: Length
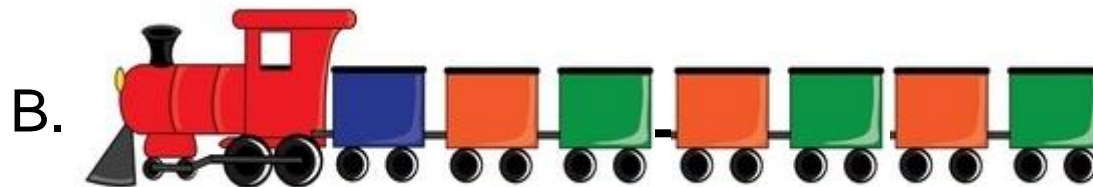
Longer than the crayon

CRAYON

Shorter than the pencil

Measurement: Length I

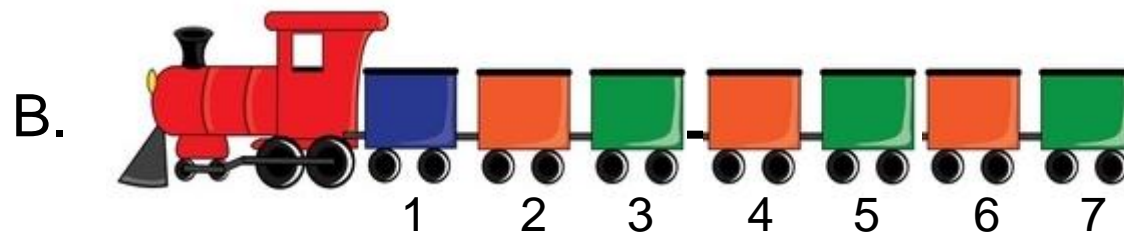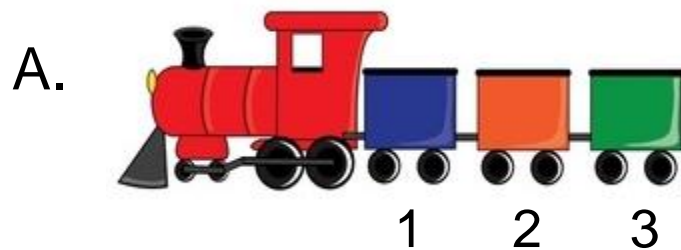Which train is **longer**? Explain your answer.

A.

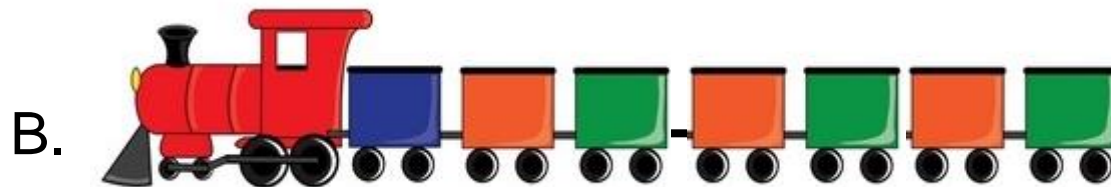B.

Solution

Answer: Train B is longer

Justification: The box cars are the same size. Train A has 3 box cars and Train B has 7 box cars.

7 box cars are longer than 3 box cars, so Train B is longer.

A.

1 2 3

B.

1 2 3 4 5 6 7
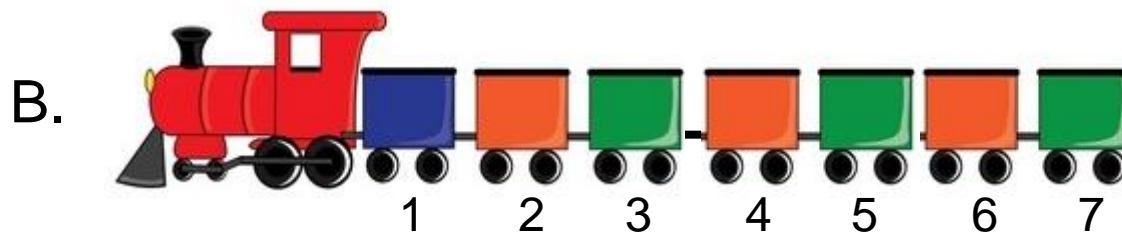
Measurement: Length II

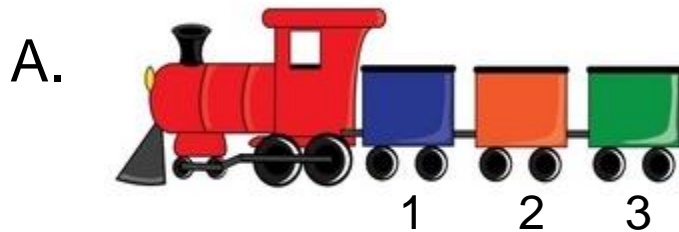Which train can carry more passengers? Explain your answer.

A.

B.

Solution

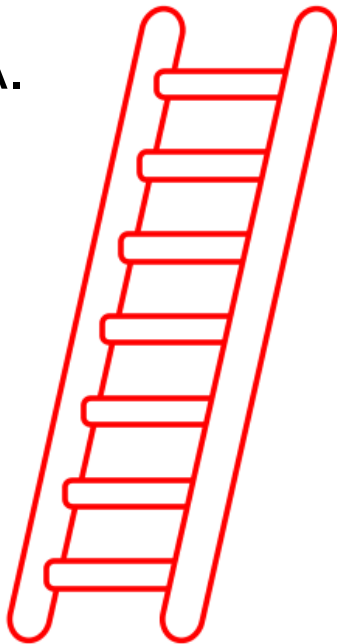**Answer:** Train B can carry more passengers.

Justification: Train A has 3 box cars and Train B has 7 box cars. The box cars are the same size so Train B is longer than Train A. Since Train B is longer, and has more cars, it can carry more passengers than Train A.

A.

1   2   3

B.

1   2   3   4   5   6   7

Measurement: Length III

Which ladder is **taller**? Explain your answer.
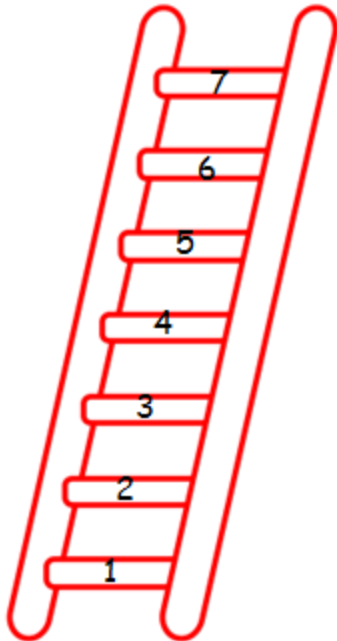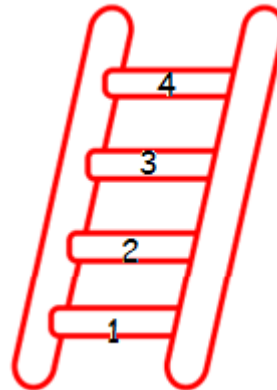
A.

B.

Solution

Answer: Ladder A is taller

Justification: Ladder A has 7 steps and Ladder B has 4 steps. The steps are the same size. 7 is greater than 4. Therefore, Ladder A is taller than Ladder B.

A.

B.

Measurement: Length IV
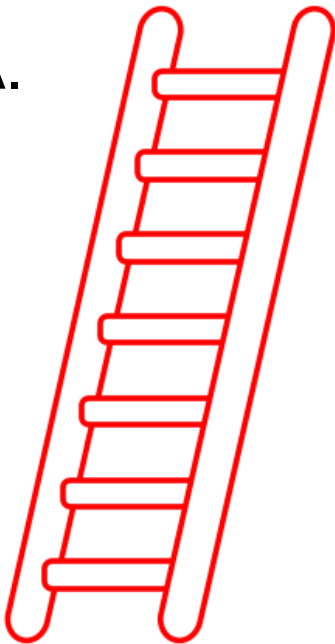
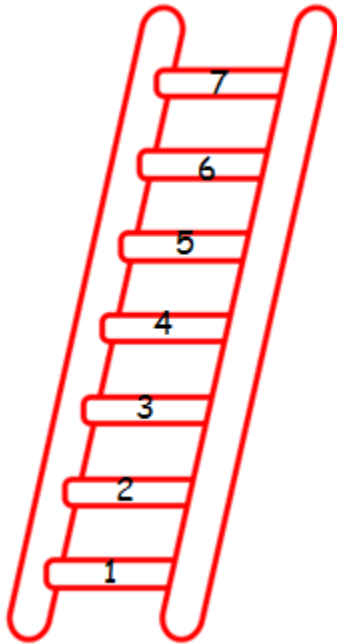Which ladder takes longer to climb? Explain your answer.

A.

B.

Solution

Answer: Ladder A takes longer to climb.

Justification: We know that Ladder A is taller than Ladder B. Because there are more steps in Ladder A, it will take longer for someone to climb it.

A.

B.
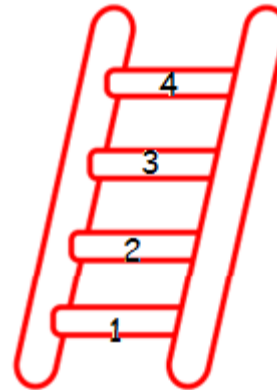
Measurement: Length V

Which crayon is **shorter**? Explain your answer.

A. Yellow Crayon

B. Blue Crayon

Solution

Answer: The yellow crayon is shorter.

Justification: The yellow crayon is 4 squares long and the blue crayon is 6 squares long. The squares are equal in size and 4 is less than 6. Thus, the yellow crayon is shorter.

Measurement: Length VI

Which crayon will be used up faster? Explain your answer.
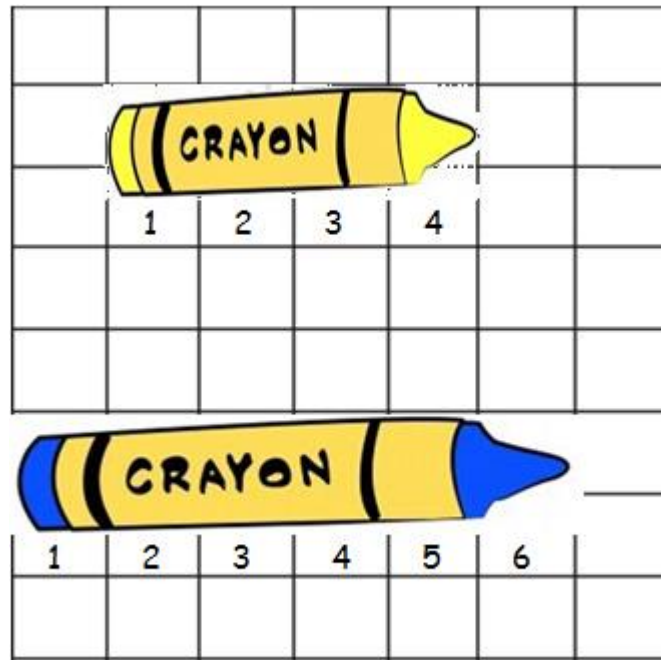
A. Yellow Crayon

B. Blue Crayon

Solution

Answer: The yellow crayon will be used up faster.

Justification: Crayons are made of wax. Less wax means a crayon will be used up faster. The yellow crayon is 4 squares long and the blue crayon is 6 squares long. The squares are equal in size and 4 is less than 6. Therefore, the yellow crayon is shorter, and made up of less wax, and will be used up faster.
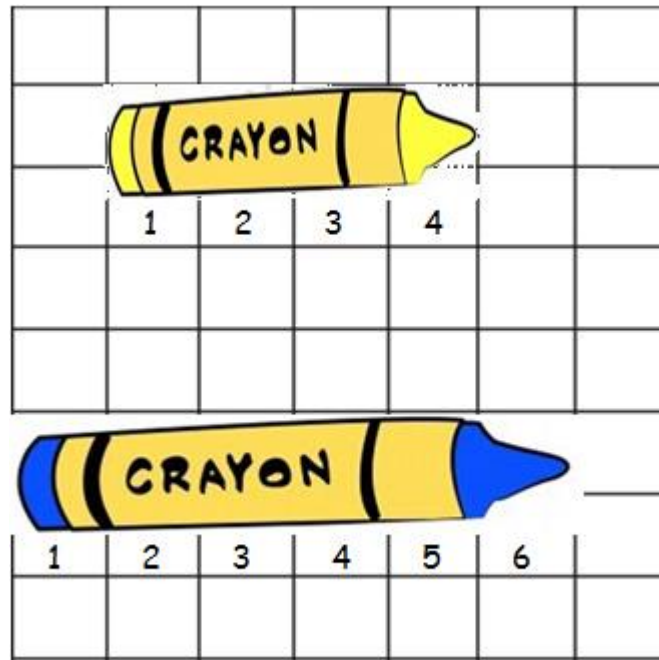
Measurement: Length VII

Which rectangle is **closest in height to** the blue rectangle? Why?
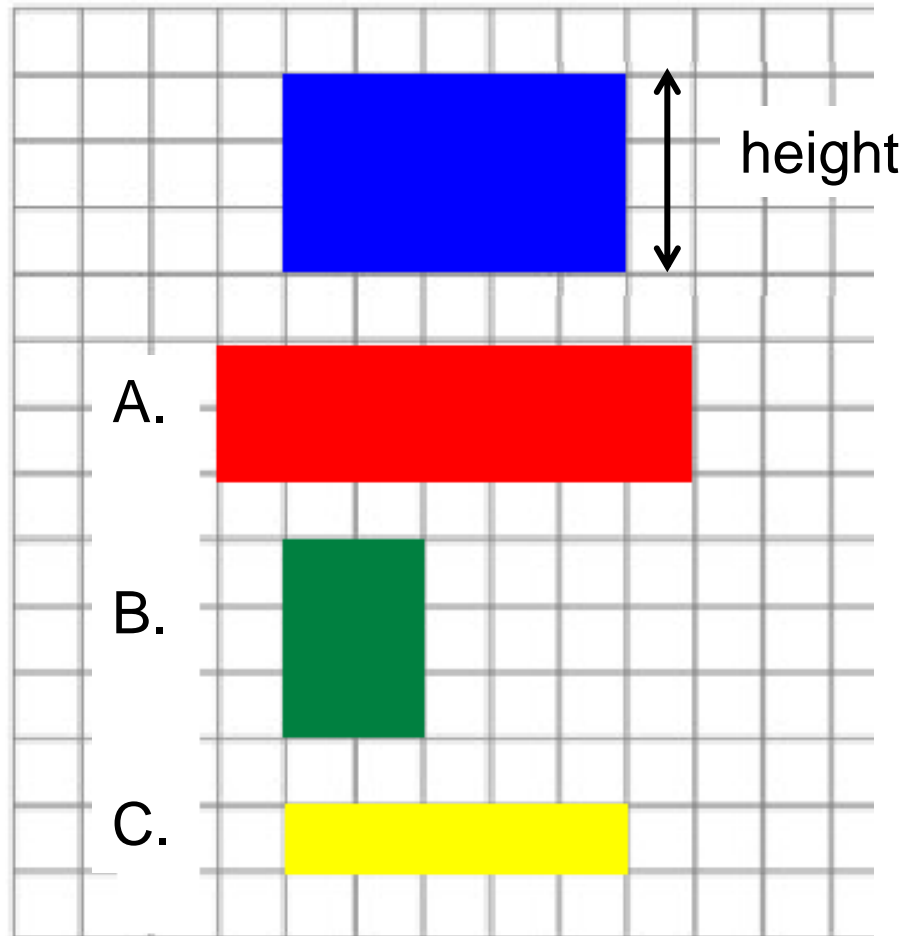
Solution

**Answer:** B – The green rectangle is about as tall as the blue rectangle

Justification: The blue rectangle is 3 squares tall and the green square is also 3 squares tall.
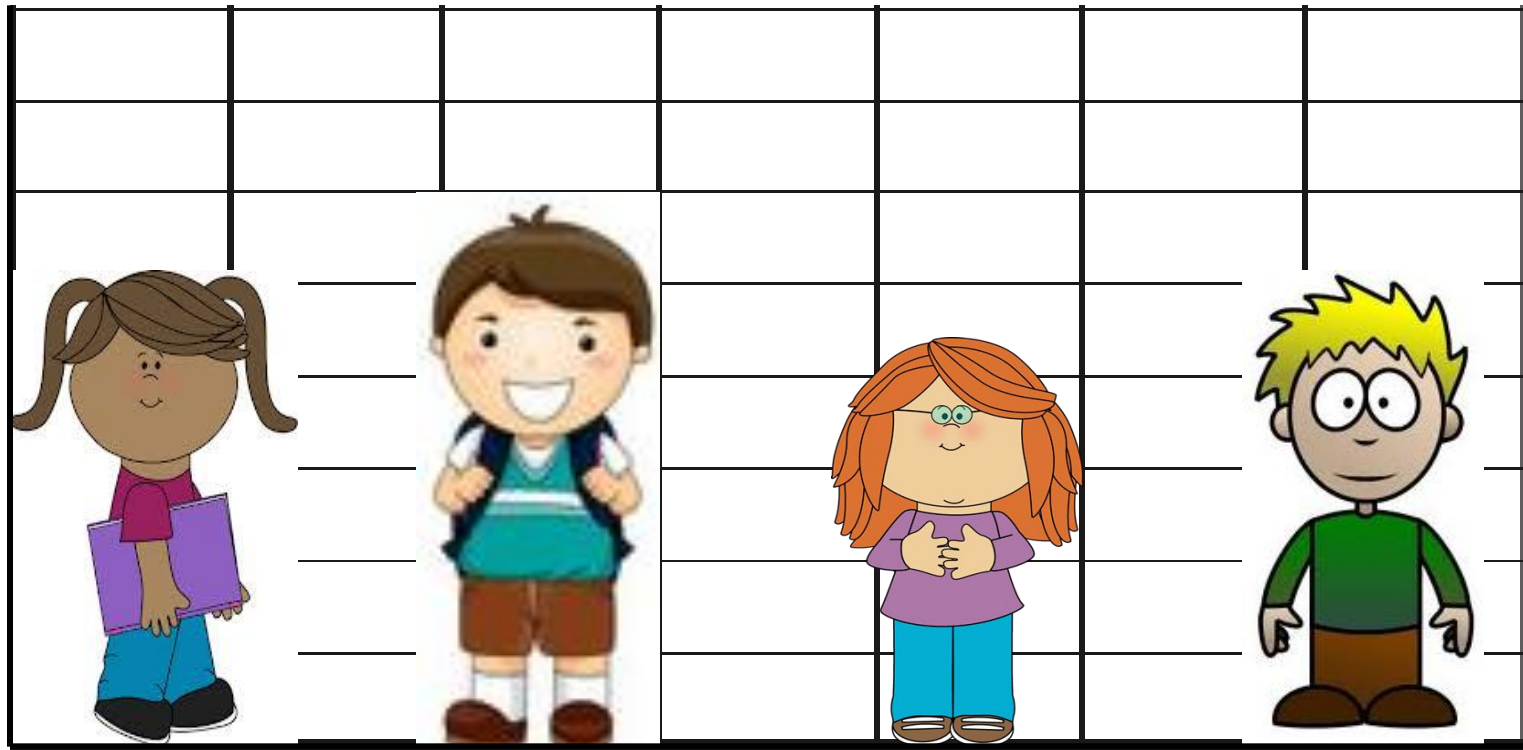
It is not A or C because the red rectangle is 2 squares tall and the yellow rectangle is 1 square tall.

Although the yellow rectangle has the same width as the blue rectangle (5), the question asks about height and not length.
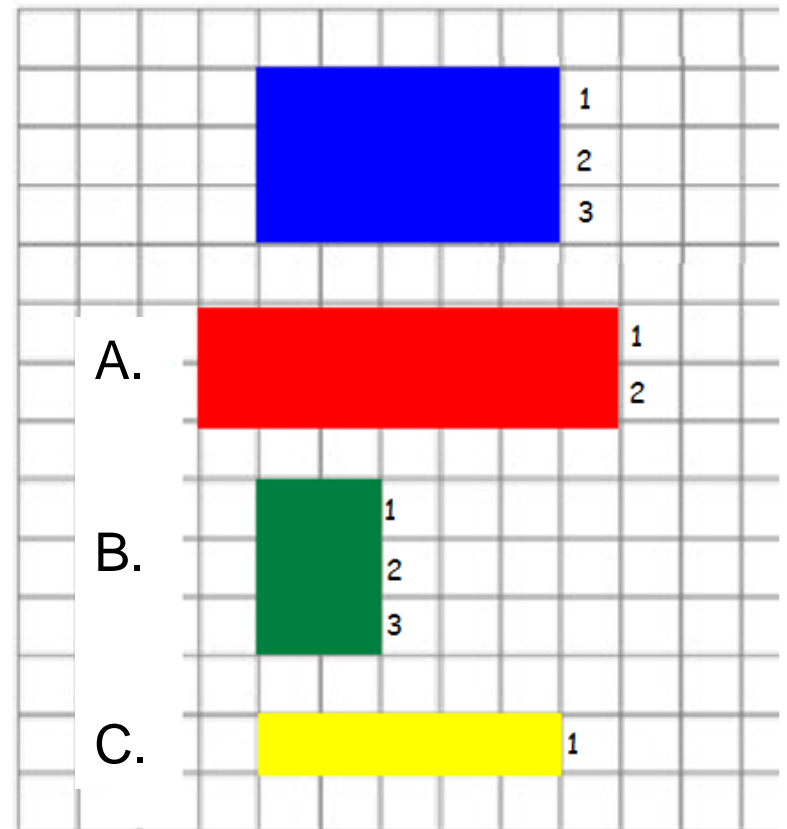
Measurement: Length VIII

Who is almost as tall as Nafisa? Explain your answer.

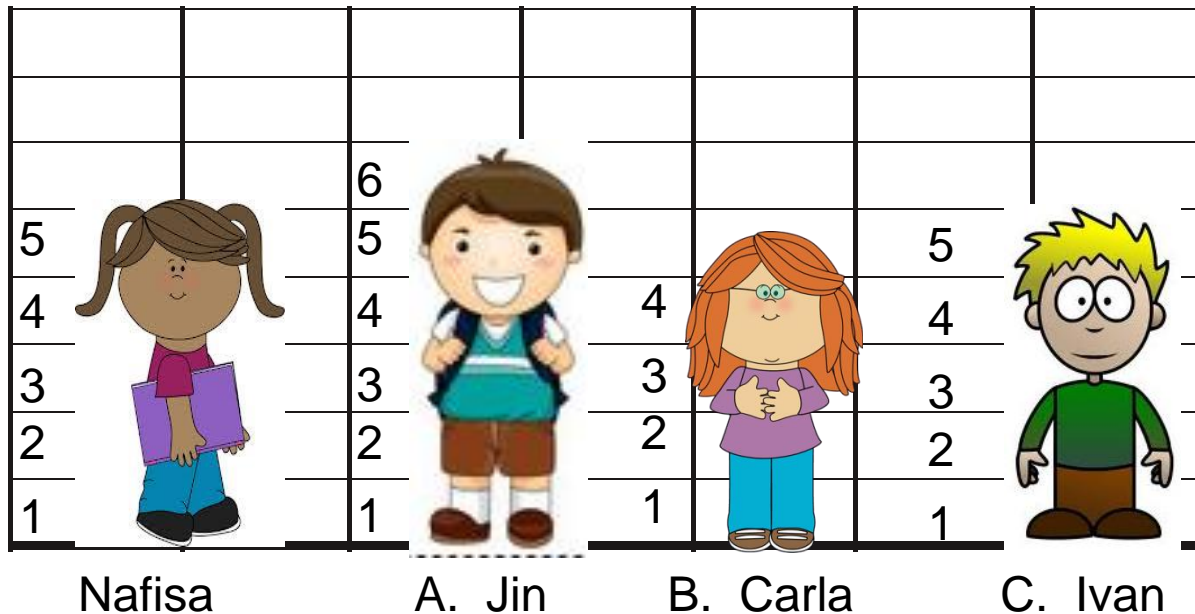Nafisa   A. Jin   B. Carla   C. Ivan

Solution

Answer: B - Carla

Justification: We are interested in the person who is almost as tall, but not as tall as Nafisa (5 squares). Jin (6 squares) is taller than Nafisa, and Ivan is the same height (5 squares). Carla is less than 5 squares, and so is *almost* as tall as Nafisa.

Nafisa   A. Jin   B. Carla   C. Ivan

Measurement: Length IX

Which line is the longest? Explain your answer.

A. Red

B. Blue
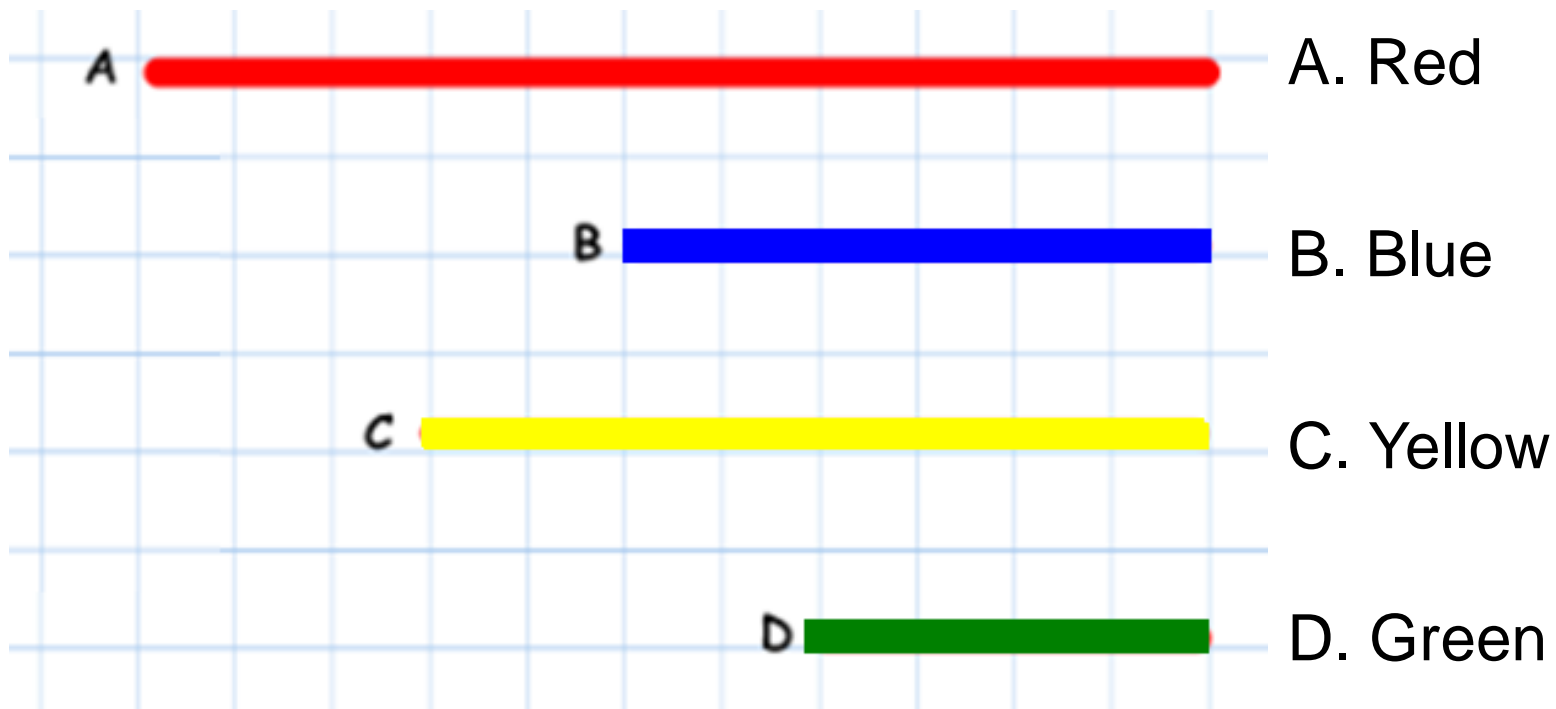
C. Yellow

D. Green

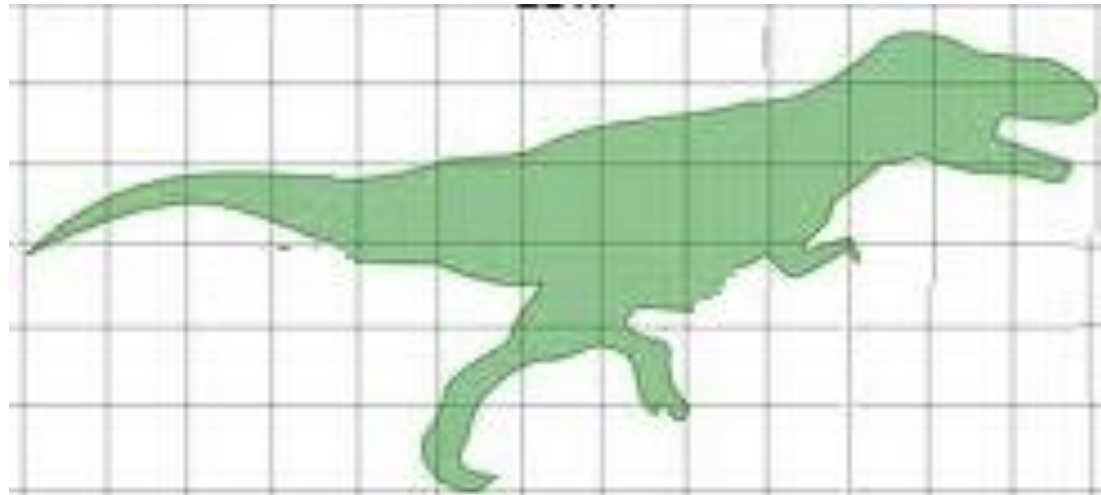# Solution

Answer: A – The red line is the longest

Justification: The red line is 11 squares long, while the blue line is 6 squares, the yellow line is 8 squares, and the green line is 4 squares long. 11 is greater than 6, 8, or 4. Therefore, the red line is the longest.
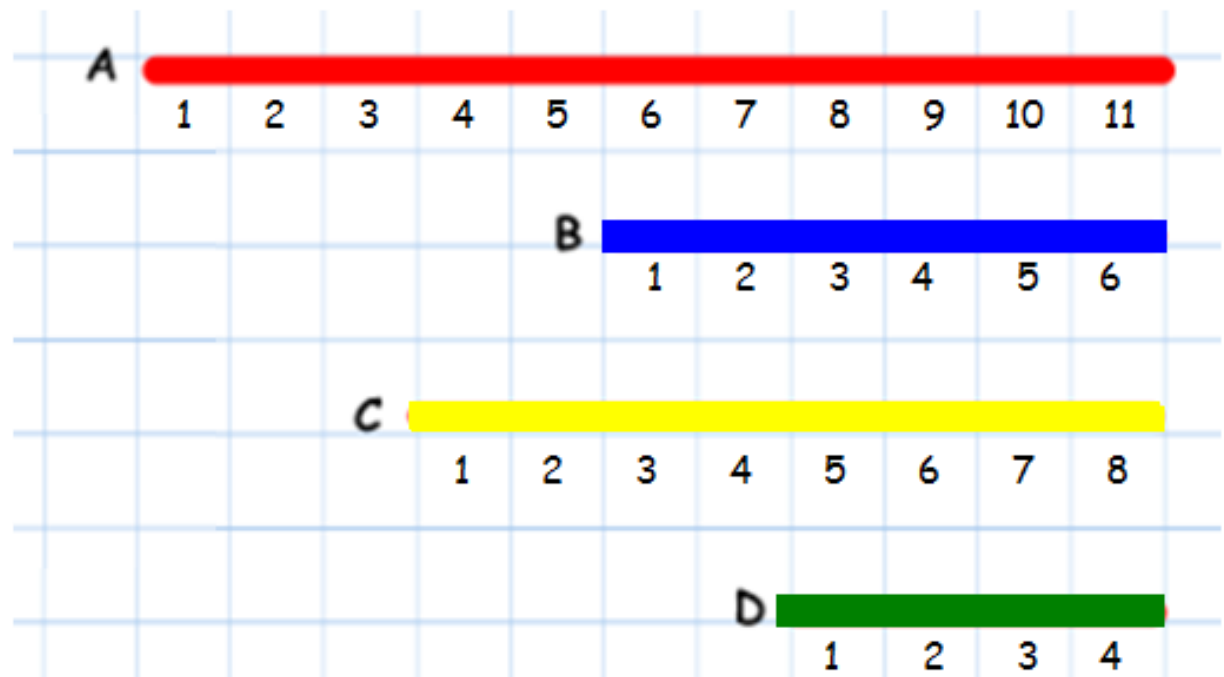
Measurement: Length X
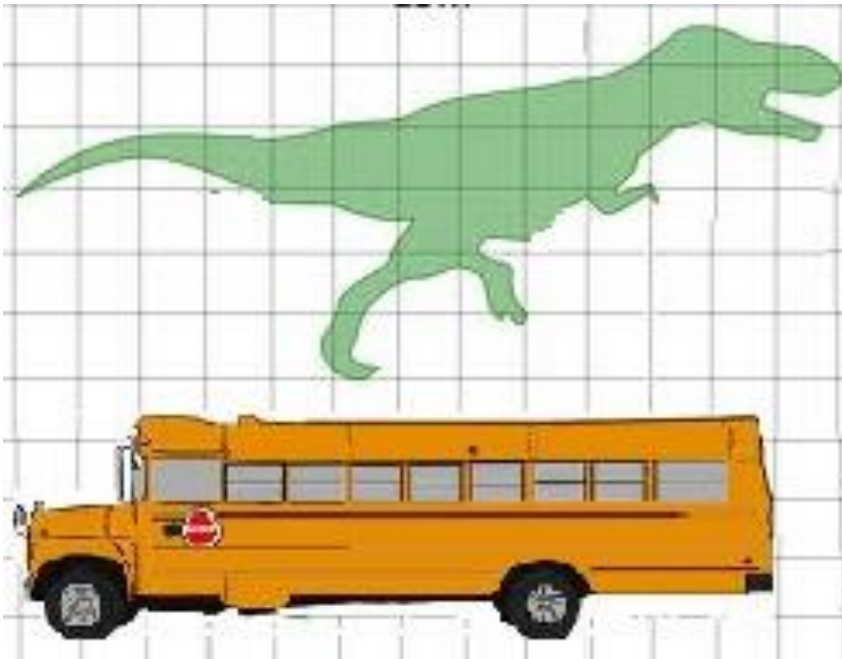
Which is longer? Explain your answer.

A. T-Rex

B. School bus

Solution

Answer: A – The T-Rex is longer.

Justification: The T-Rex is 13 squares long, while the bus is 12 squares long. 13 is greater than 12, therefore, the T-Rex is longer.
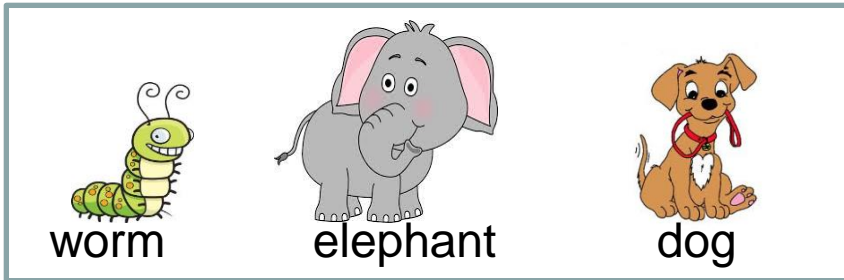

On average, an actual T-Rex is 13 metres and a school bus is 10-12 metres long.
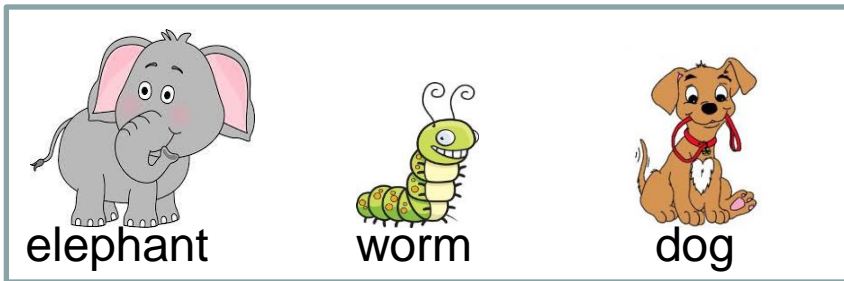
Measurement: Length XI

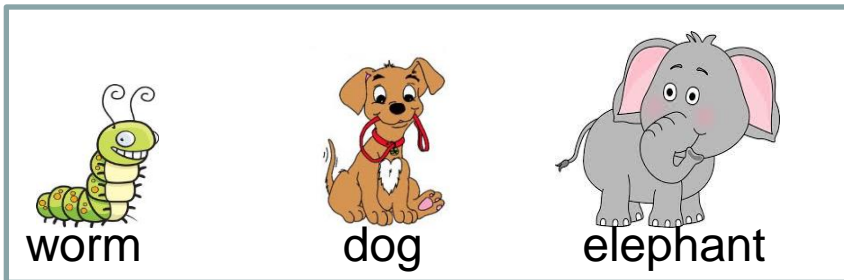Put in order from **shortest to tallest**. Explain your answer.

A.
worm   elephant   dog

B.
elephant   worm   dog

C.
worm   dog   elephant

Hint: Think about how big the animals are in real life

Solution

Answer: C. worm, dog, elephant

Justification: On average, a worm is approximately 1 cm tall (or 10 cm long), a dog is approximately 20-100 cm tall, and an elephant is approximately 2-4 m tall. Therefore, from shortest to tallest, the order is worm, dog, and then elephant.

The pictures show some of the height difference.

A.

worm   elephant   dog

B.

elephant   worm   dog

C.

worm   dog   elephant
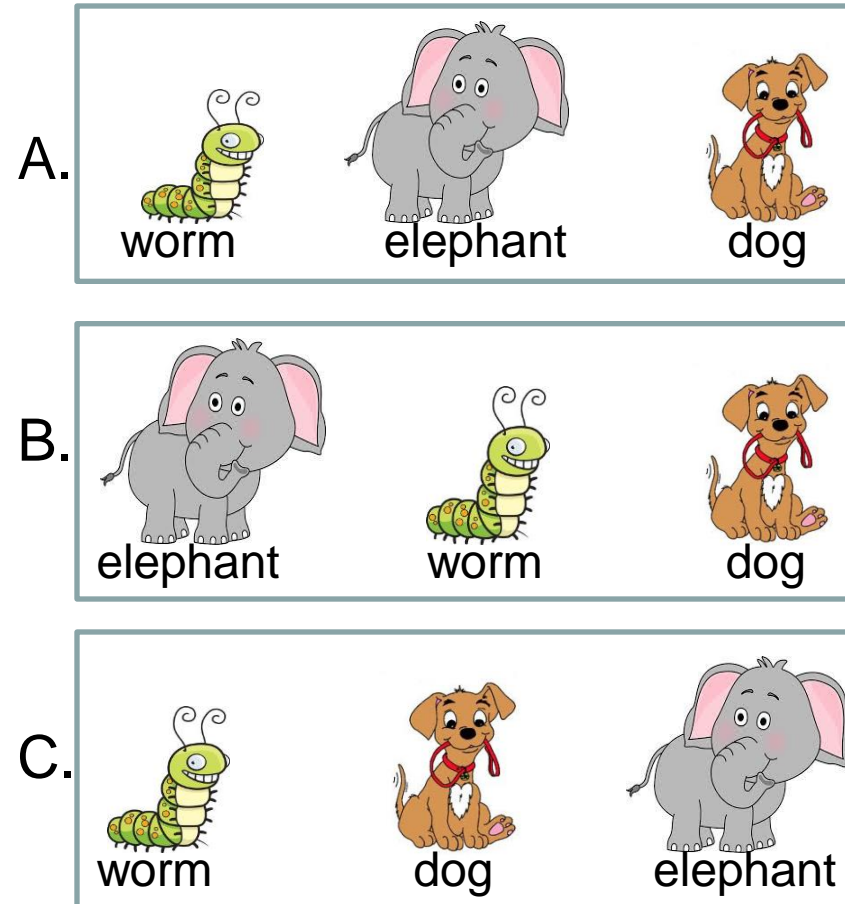
Measurement: Length XII

How long is the dog bowl?

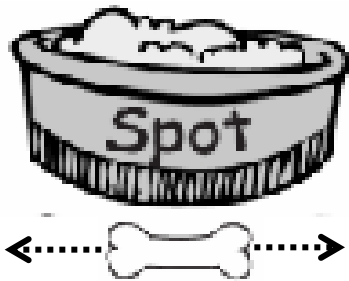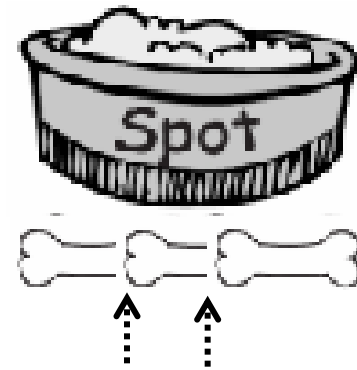A. 1 bone   B. 2 bones   C. 3 bones

Solution

Answer: B

Justification: To accurately measure the dog bowl, we want to line up bones without overlapping them or leaving gaps. Therefore, the answer is B, because A does not line up with the ends of the bowl, and C has overlapping bones.
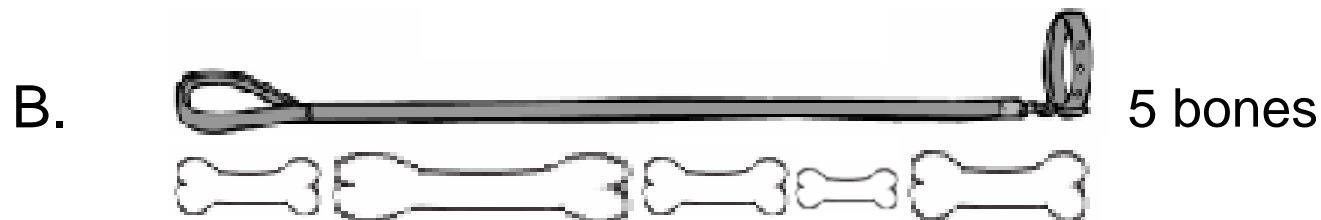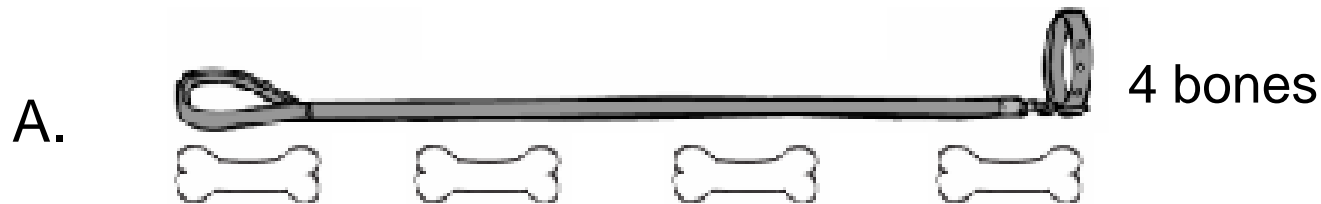

A. 1 bone   B. 2 bones   C. 3 bones

Measurement: Length XIII

How long is the dog leash?

A.   4 bones

B.   5 bones

C.   6 bones

Solution

Answer: C

Justification: The objective is to accurately measure the dog leash with non-standard units. It is not A because there are large gaps between the bones. It is not B because the bones are not all the same size. Therefore, the answer is C – 6 bones.

4 bones

5 bones

6 bones
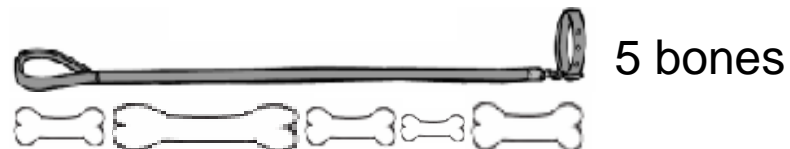
Measurement: Length XIV

How tall is the cupcake?

A. 6 chocolate candies

B. 5 chocolate candies

Solution

Answer: B

Justification: We are using chocolate chips to measure the height of this cupcake. It is important to make sure there are no gaps between chips, and that none of them overlap.

Therefore, the answer is Cupcake B, 5 chocolate candies tall. The chocolate candies used to measure Cupcake A all overlap.

Which cupcake is taller? Explain your answer.
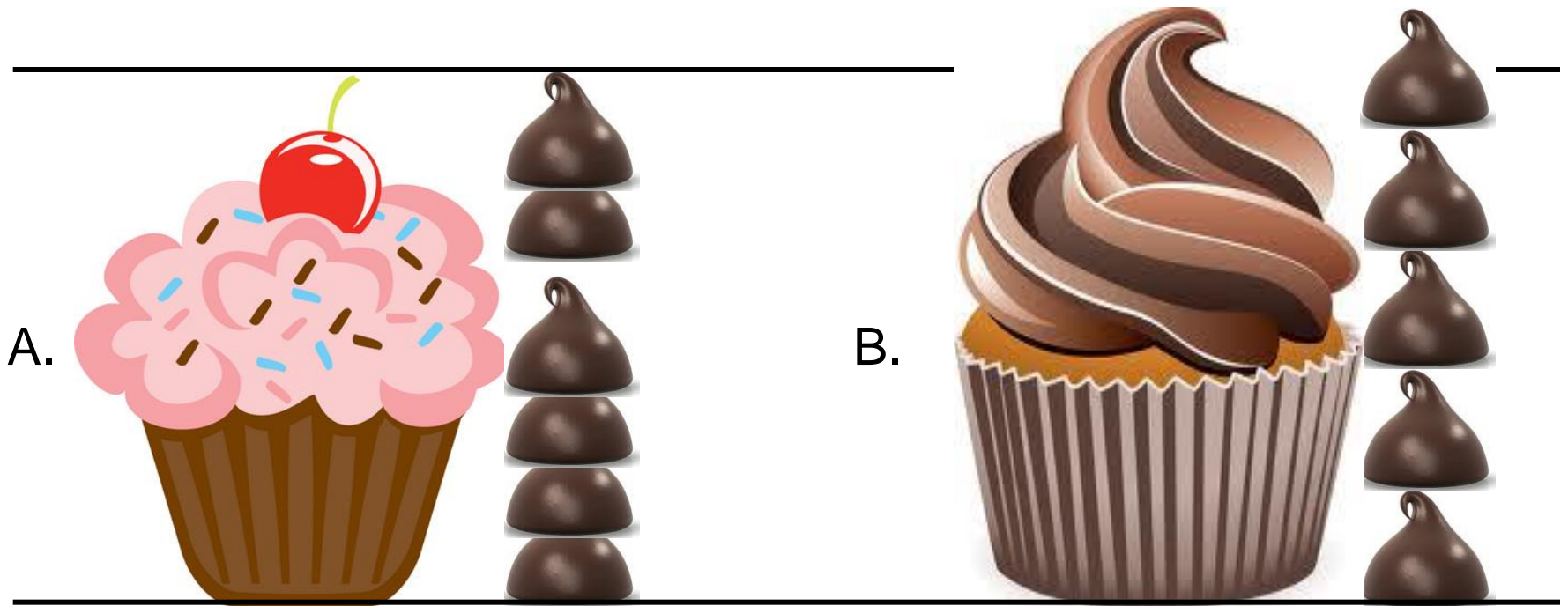

A.

B.

Solution

Answer: B

Justification: The objective is to accurately measure and compare with non-standard units. Although the height of Cupcake A has more chocolate candies than Cupcake B, there are gaps and overlaps between candies, so it is not a good measurement.
If we compare using the pair of parallel lines, the height of Cupcake B reaches above the line and is taller.

Which cupcake is taller? Explain your answer.

A.

B.

C. Cannot tell

Solution

Answer: C

Justification: Although the height of Cupcake A has more chocolate chips than Cupcake B, they cannot be compared because the unit of measurement is not the same. The chocolate chips used to measure Cupcake A are smaller than the ones used for Cupcake B.

Because the unit of measure is different, we cannot tell which cupcake is taller than the other.

Image References

http://www.how-to-draw-cartoons-online.com/image-files/pencil_drawing.gif

https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcSsgLsr1AHXWiJfTpfh__i7PxCuJqctt1Wk17GPFf2iGMmdc12_gQ

www.clipartguide.com

www.how-to-draw-funny-cartoons.com

https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcSsgLsr1AHXWiJfTpfh__i7PxCuJqctt1Wk17GPFf2iGMmdc12_gQ

www.illustrationsof.com

www.mycutegraphics.com

www.dragoart.com

theminiaturespage.com

host.nacdnet.org

www.mycutegraphics.com

www.adogslife.com.au

webclipart.about.com

https://twitter.com/Cupcake_Design