a place of mind

FACULTY OF EDUCATION

Department of
Curriculum and Pedagogy

Mathematics
Shape and Space:
Measurement (Mass)

Science and Mathematics
Education Research Group

Supported by UBC Teaching and Learning Enhancement Fund 2012-2014

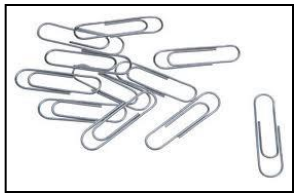
Measurement: Mass II

Measurement: Mass I

What would you choose, from the objects given, to measure the mass of the book?

A. A bag of Unifix cubes

B. Two watermelons



C. Ten paperclips

D. Ten differently shaped Lego blocks

Solution

Answer: A

Justification: The Unifix cubes are a better choice because you can add or take away cubes to find the weight of the book.

Two watermelons would be too heavy. Ten paperclips or ten Lego blocks would not be heavy enough to balance the weight of the book.

Measurement: Mass II

What would you choose, from the given objects, to weigh the mass of a chair?

A. 20 pencils

B. 30 cement blocks

C. 15 shoes

D. 40 crayons

Solution

Answer: C

Justification: The shoes are the best option because they weigh more than the crayons and pencils, but weigh less than the cement blocks. They are able to be manipulated (add more or take away), to balance the weight of the chair more easily.

The cement blocks are not the best option because 30 of them would weigh much more than a chair. 20 pencils and 40 crayons would not weigh enough to balance the weight of a chair.

Measurement: Mass III

What would you choose, from the objects given, to weigh the mass of a recycle bin?

A. 1 kg bag of sugar

B. Ten books

C. Two soccer balls

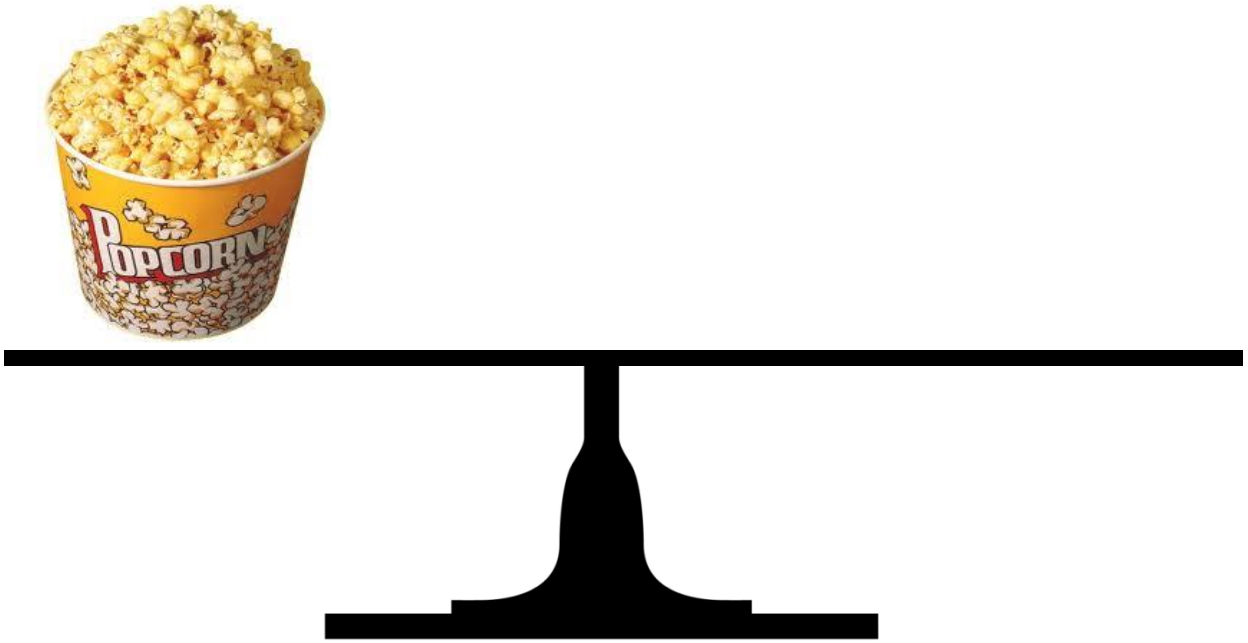
Solution

Answer: B

Justification: The weight of the recycle bin (empty) could best be measured using books. They can be easily manipulated by simply adding one book at a time to balance the weight of the recycle bin.

Measurement: Mass IV

What objects would be a better choice to weigh a tub of popcorn?



A. Unifix cubes

A. A bag of apples

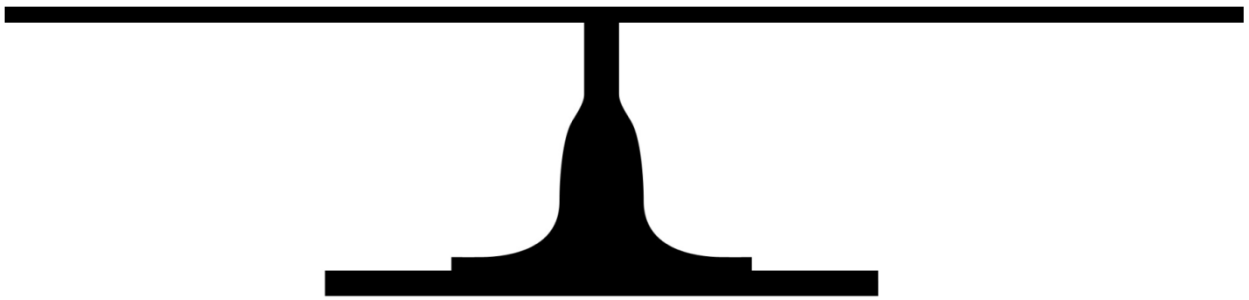
Solution

Answer: A

Justification: The Unifix cubes are a better choice because you can add or take away cubes to find the weight with the popcorn.

Measurement: Mass V

What objects would be a better choice to measure the weight of a tissue box?



A. Tangrams

B. Feathers

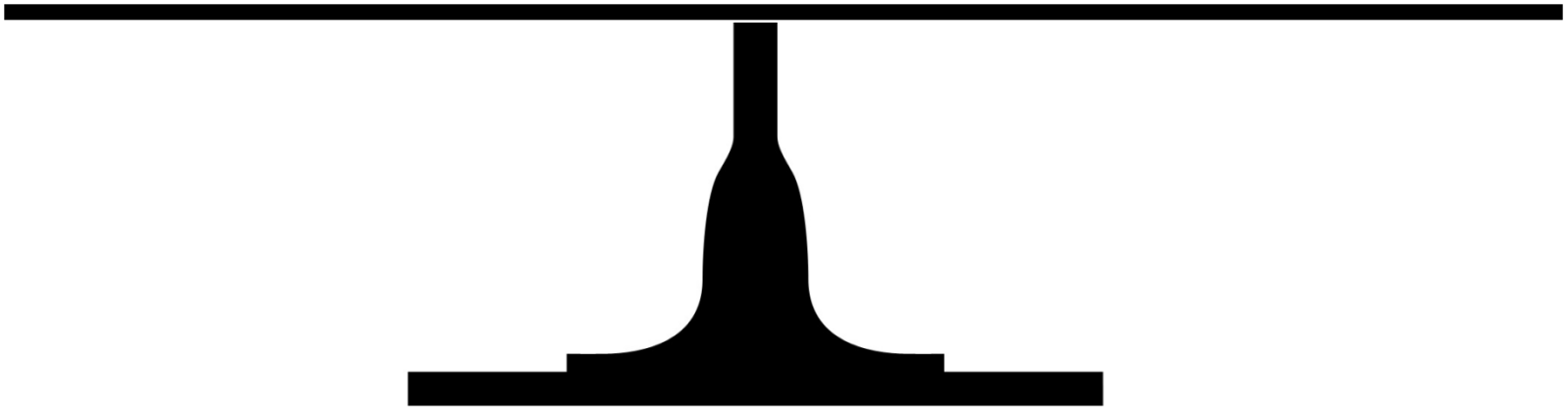
Solution

Answer: A

Justification: The tangrams would be a better choice than feathers because tangrams are heavier. It would take many feathers to balance the weight of the tissue box. Therefore, it is more efficient to measure the tissue box with tangrams.

Measurement: Mass VI

Estimate how many rocks would balance the weight of a shoe?



Solution

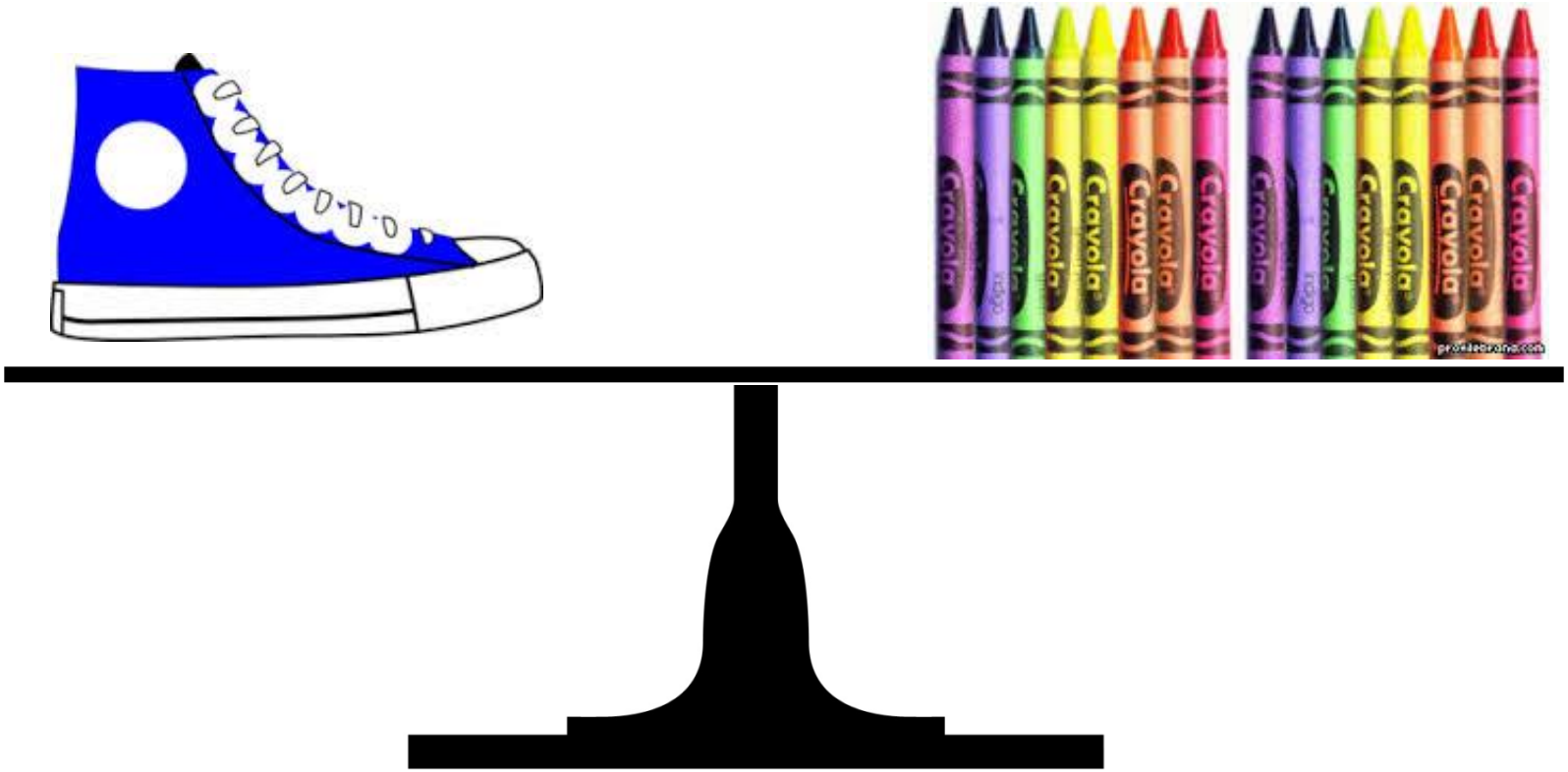
Answer: The size and mass of the shoe will determine the number of rocks needed.

Justification: You can expect a bigger shoe to have more mass, and need more rocks to balance out.

If the rocks were bigger or smaller, how would that change the outcome of the answer?

Measurement: Mass VII

Estimate how many crayons would balance the weight of a shoe? Why is number of crayons different than the number of rocks? *(Hint: Think about previous question)*



Solution

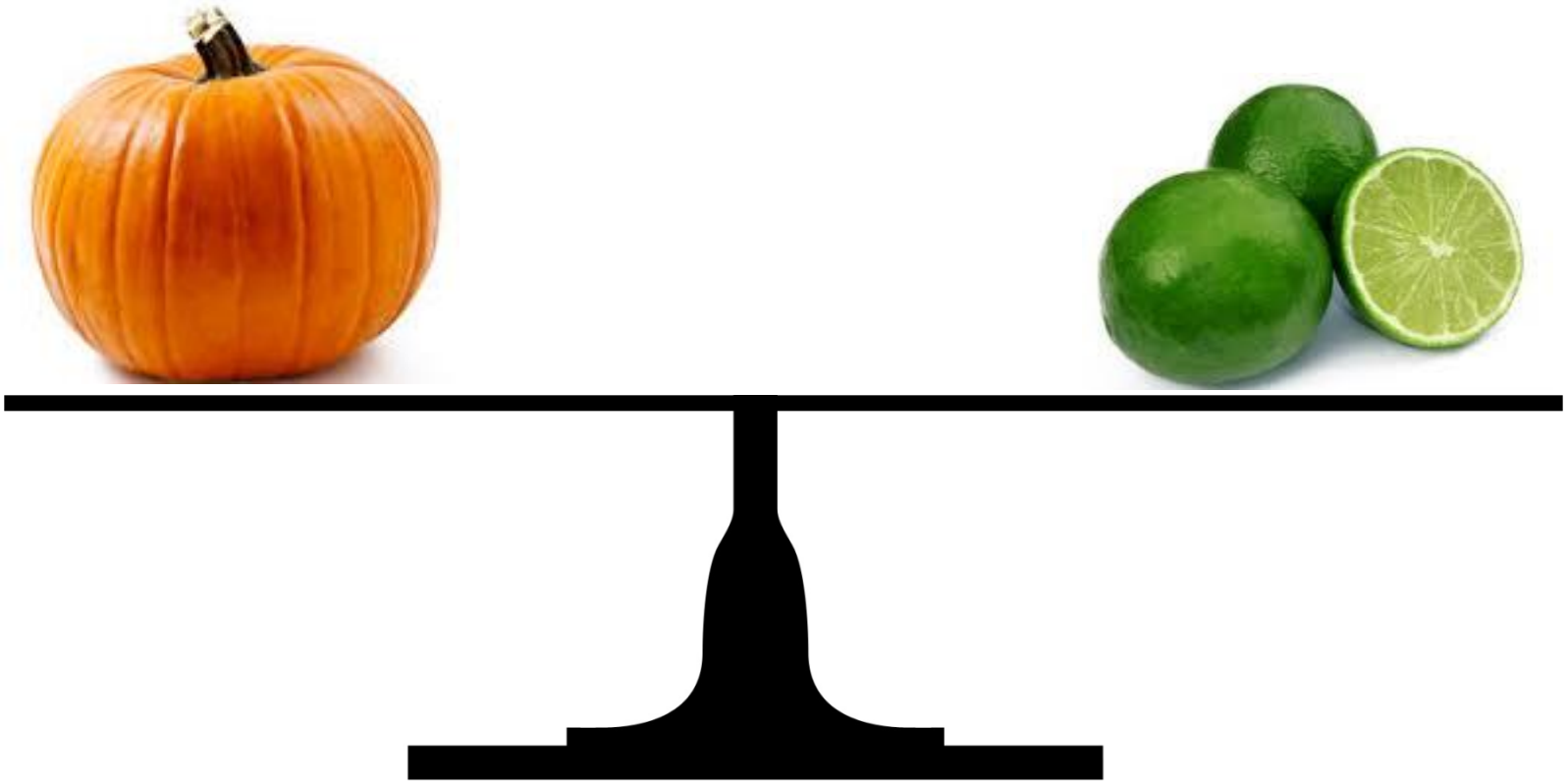
Answer: The size and mass of the shoe will determine the number of crayons needed.

Justification: You can expect a bigger shoe to have more mass, and need more crayons to balance out.

Without knowing the size and mass of the shoe, you know that more crayons will be needed than rocks. This is because crayons weigh less than rocks.

Measurement: Mass VIII

Estimate how many limes would balance the weight of a pumpkin?



Solution

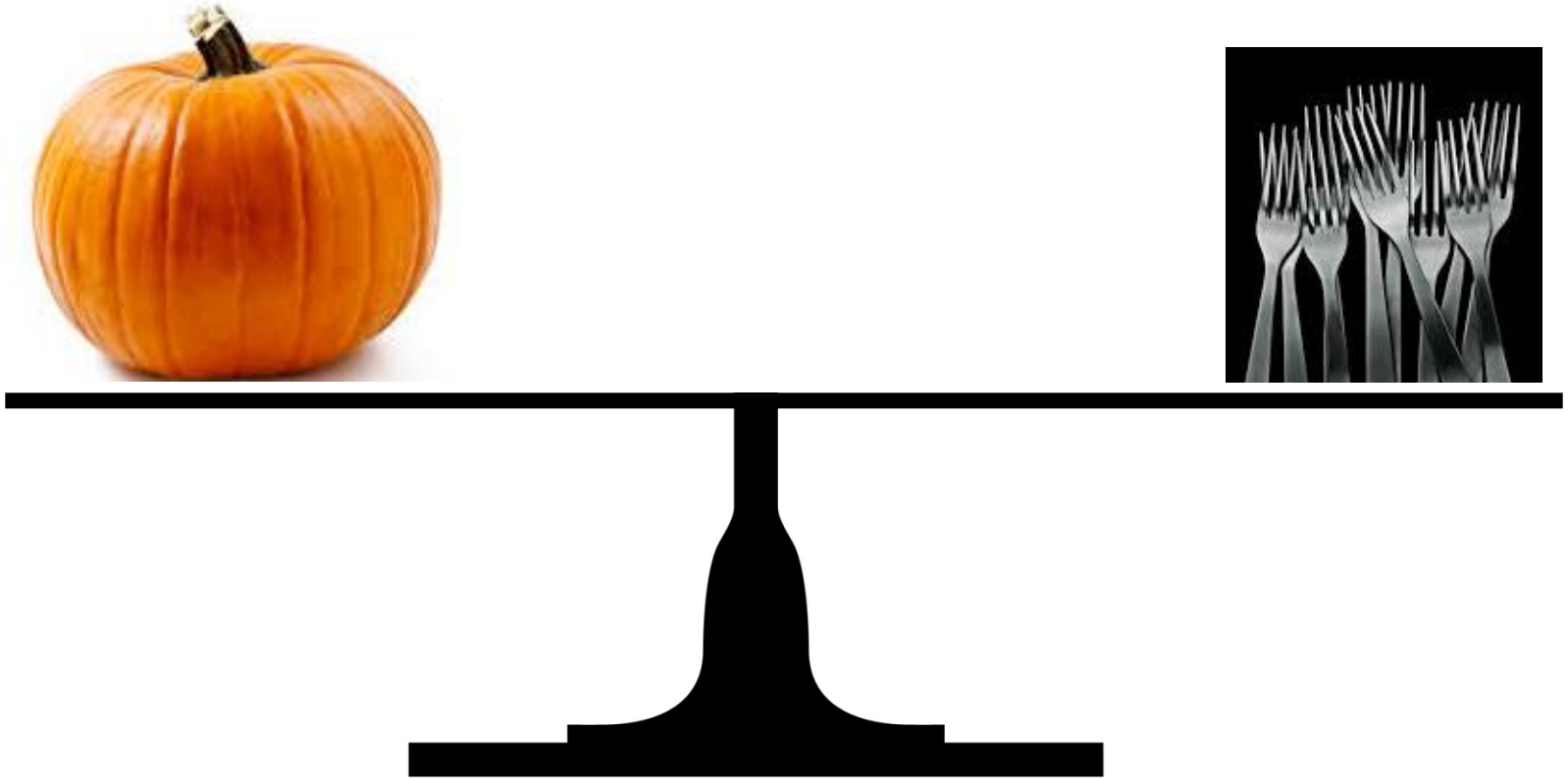
Answer: The size and mass of the pumpkin will determine the number of limes needed.

Justification: You can expect a bigger pumpkin to have more mass, and need more limes to balance out.

If the limes were bigger or smaller, how would that change the outcome of the answer?

Measurement: Mass IX

Estimate how many forks would balance the weight of a pumpkin? Why is the number of forks different than the number of limes? *(Hint: Think about previous question)*



Solution

Answer: The size and mass of the pumpkin will determine the number of forks needed.

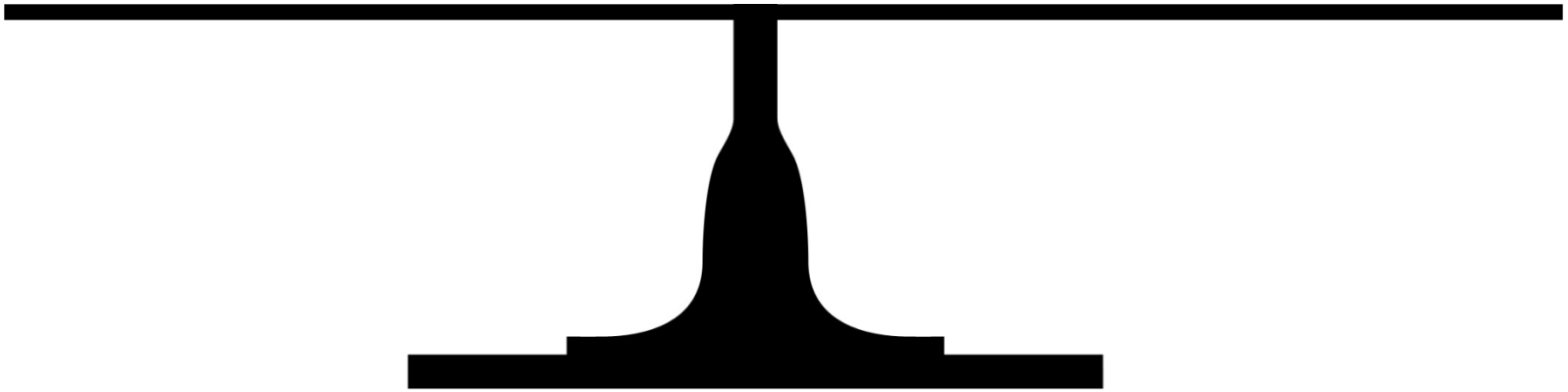
Justification: You can expect a bigger pumpkin to have more mass, and need more forks to balance out.

If the forks were spoons or knives, how would that change the outcome of the answer?

Without knowing the size and mass of the pumpkin, you cannot know whether more forks or limes will be needed. This is because crayons weigh about the same as limes.

Measurement: Mass X

Which object weighs more?



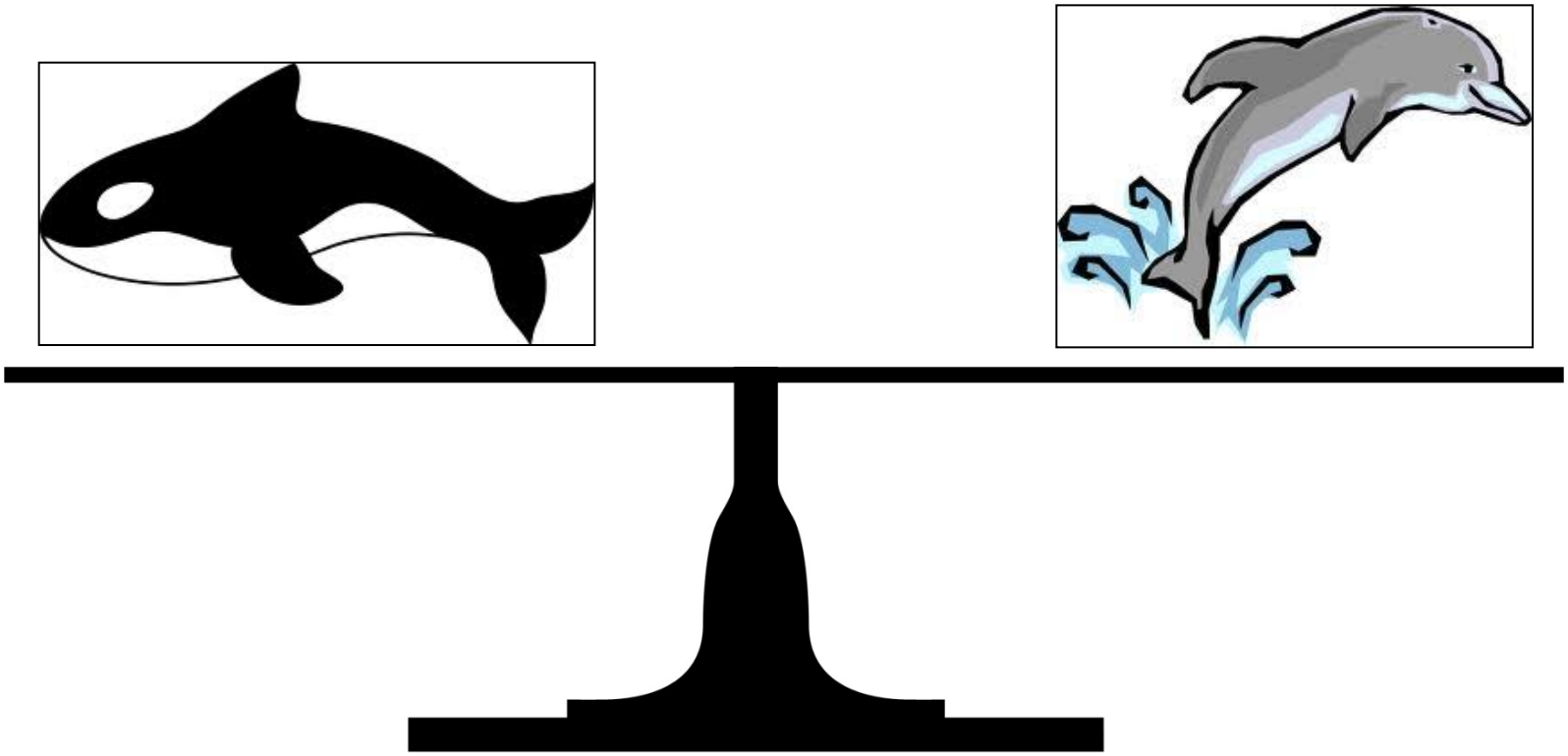
Solution

Answer: The hammer weighs more than the watch

Justification: It can be predicted that the hammer weighs more than the watch because the hammer is larger and made of heavier materials than the watch.

Measurement: Mass XI

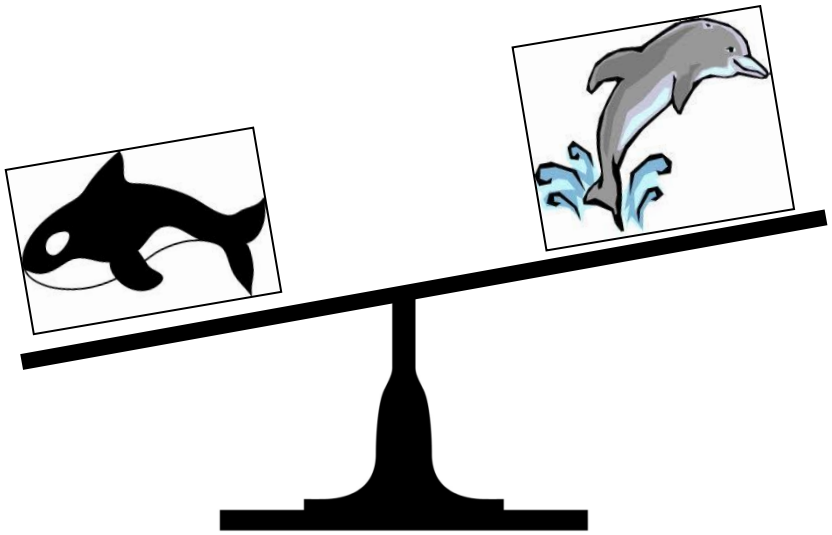
Which object has more mass?



Solution

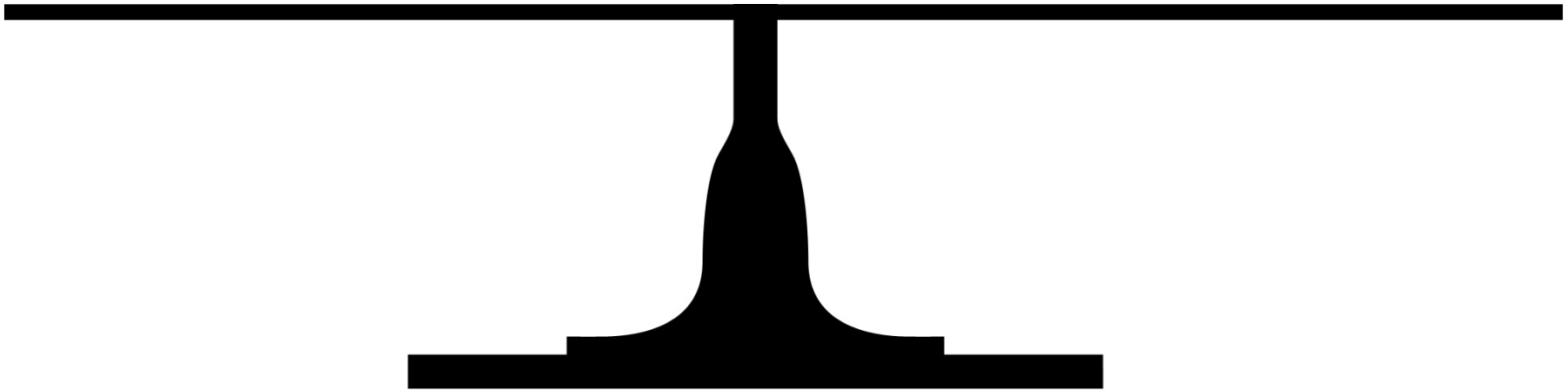
Answer: The whale weighs more than the dolphin.

Justification: A whale weighs approximately 6 tonnes. A dolphin weighs approximately 150-660 kilograms.



Measurement: Mass XII

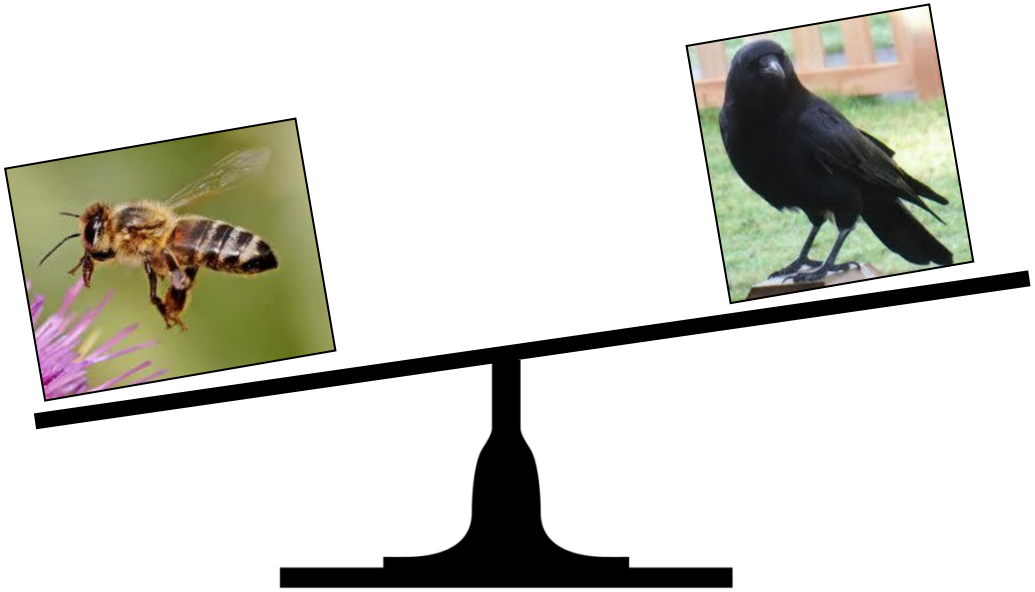
Which object weighs less?



Solution

Answer: The bee weighs less

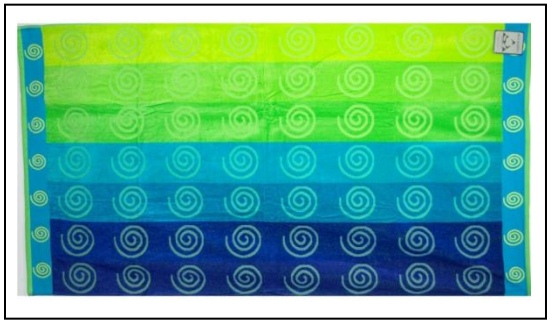
Justification: A bee weighs approximately one tenth of a gram. A crow weighs approximately one pound. Therefore, the bee is the lighter of the two objects.

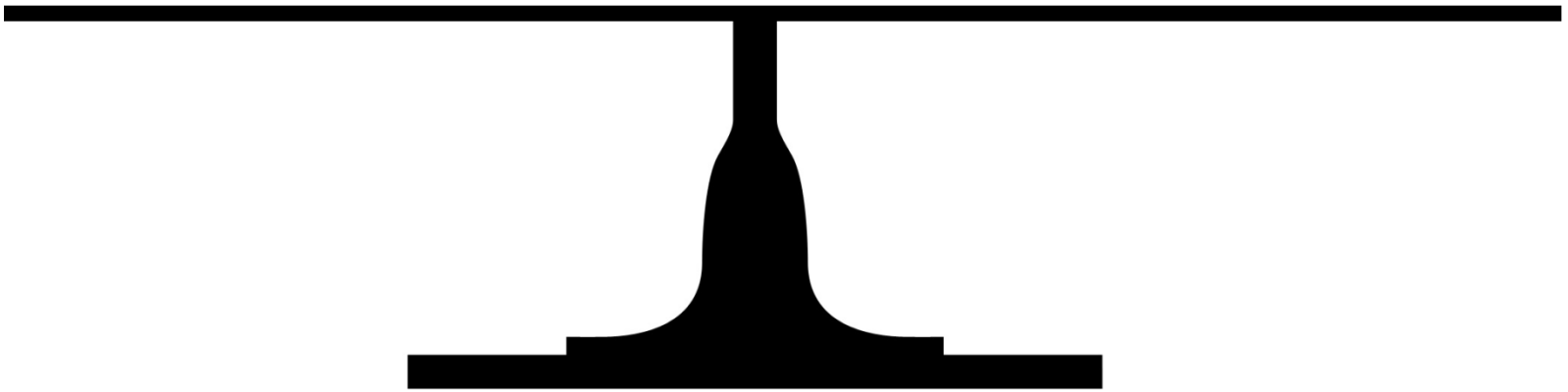


Measurement: Mass XIII

What object has less mass – 4 pool noodles or a beach towel? ?

Would it matter if the towel was wet?



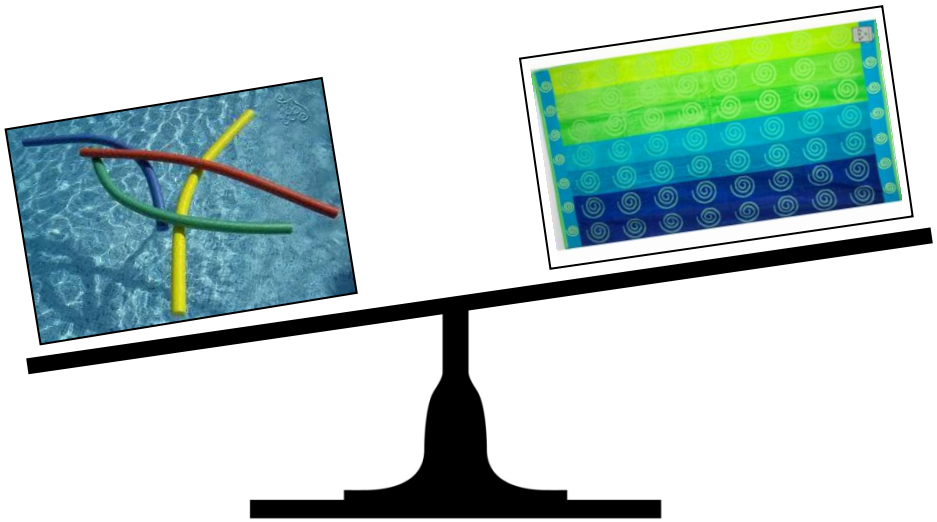


Solution

Answer: The pool noodles probably have less mass than a beach towel.

Justification: Pool noodles are made of foam, therefore, 4 pool noodles would not weigh much. A towel however should be heavier because it is made of cotton.

If the towel was wet, it would be even heavier.



Measurement: Mass XIV

What would you use to measure the weight of each object? Why?

A dog

A hammer

A snail

Solution

Justification: A heavier object would work better for a dog than for a snail. A lighter object would probably be a better measure for a snail than the hammer.

Measurement: Mass XV

What would you use to measure the weight of each object? Why?

An eagle feather

An eraser

A piece of cake

Solution

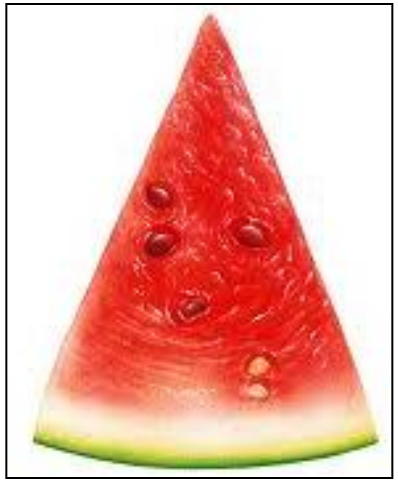
Justification: A heavier object would work better for an eraser than for a feather. A lighter object would probably be a better measure for a feather than the piece of cake.

Measurement: Mass XVI

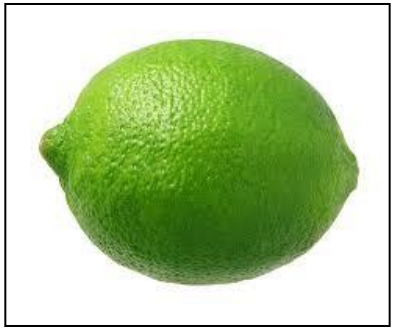
Put the objects in order and explain **why** you put them in that order.

One grape

One slice of watermelon



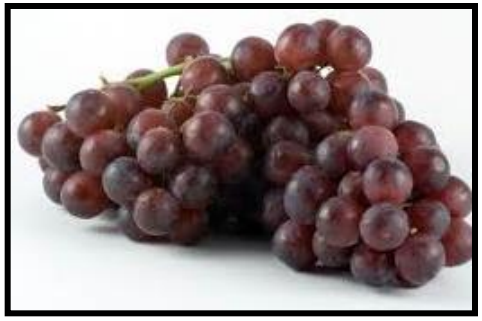
One lime

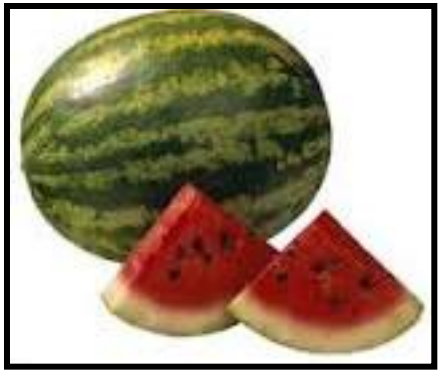


Solution

Answer:
One possible answer: grape, lime, watermelon.

Justification: This answer is based on the weight/size of the fruit. If you have one individual piece of fruit it could be ordered this way. However, if you change the objects to one bunch of grapes, three limes and one watermelon, your answer may change.





Measurement: Mass XVII

Put the objects in order and explain **why** you put them in that order.

Baby chick

Baby elephant

Kitten

Solution

Answer:

One possible answer: Baby chick, kitten, and baby elephant.

Justification: This answer is ordered from lightest to heaviest. However, there could be other possible ways of ordering.

Measurement: Mass XVIII

Put the objects in order and explain **why** you put them in that order.

Solution

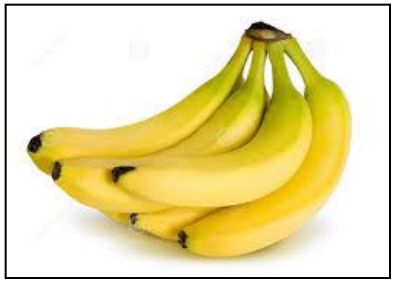
Answer:

One answer: canoe, shovel, lifejacket.

Justification: This answer is ordered from longest to shortest (measuring length). However, there could be other possible ways of ordering.

Measurement: Mass XIX

Put the objects in order and explain **why** you put them in that order.



Solution

Answer:

One answer: Horse, baby, banana, flip flops

Justification: This answer is ordered from heaviest to lightest. However, there could be other possible ways of ordering.