

## Gravity Investigation

# Does a heavier object fall quicker than a lighter object?

### You will need:

- Two or more containers or bags exactly the same size (plastic cups, strong plastic bags, cardboard boxes etc.)
- Sand/stone/something heavy
- Polystyrene balls/tissue paper/something light
- Tape measure
- Weighing scales
- Optional: tablet computer or video camera

Falling objects are also affected by air resistance. Ideally you would do this investigation in a vacuum but having objects of the same size will minimise the impact of air resistance.

You are going to drop the bags/containers at the same time, from the same height and see which hits the ground first.

### Method

1. Fill one container or bag with a heavy filling.
2. Fill another container or bag with a light filling.
3. Weigh each container and make a note of it.
4. Choose somewhere safe from which to drop your objects at the same time.

Things to consider:

- Try and drop from as high as possible without making things unsafe (don't climb up ladders or hang over a railing – check your plans with your teacher). The highest place may simply be standing tall with your arms held as high as they will go.
  - Make sure that the landing area can be clear from people and items.
  - Make sure that the containers are really secure so the containers don't break on landing. Use sticky tape to secure the containers.
  - Dropping on to a soft area, such as grass or a mat, is the safest way for the objects to land.
5. Measure the height of the drop so that it can be the same each time.
  6. You may be able to film the drops and even play them back in slow-motion so you can investigate exactly what happens afterwards.
  7. Before the drop, clear the landing area (stand well away) in case of any spreading of contents.
  8. Count down to the drop so that the objects set off at the same time.
  9. Observe and record your results and what you see.
  10. Repeat the drop three times, record your results and write your conclusions.

# Does a heavier object fall quicker than a lighter object?

## Prediction

(Delete as appropriate.)

I think that the **heavier/lighter** object will land on the ground first.

I think this because \_\_\_\_\_

## Fair Testing

To make this a fair test I will need to keep these things the same:

(List as many as you can think of.)

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The **one** thing that I am going to change is:

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Why do we need to repeat the drop three times?

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## Results

(Draw a table and record your results.)

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Are there any anomalies in your results? If so, can you explain them?

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## Conclusion

My prediction was **right/wrong**.

When we did the investigation, I noticed that \_\_\_\_\_

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# Does a heavier object fall quicker than a lighter object?

## Prediction

(Delete the word in bold which is wrong.)

I think that the **heavier/lighter** object will land on the ground first.

I think this because \_\_\_\_\_  
\_\_\_\_\_

## Fair Testing

To make this a fair test, I will need to keep these things the same:

(List as many as you can but you might think about the height of drop, weights and containers among other things.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The **one** thing that I am going to change is:

(This is the one thing that you are testing.)

\_\_\_\_\_

Why do we need to repeat the drop three times?

\_\_\_\_\_  
\_\_\_\_\_

## Results

(Finish the column headings in this table and record your results – not all the boxes will be filled in with results.)

	Drop 1		Drop 3	Observations
Landed first				
Landed second				
Landed at same time				

Are there any results that do not fit a pattern with the others? If so, which ones are they?

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Results that do not fit a pattern are called anomalies. Sometimes there are reasons for these, ranging from mistakes by the testers, errors with equipment or something else.

If you have an anomaly, can you explain it?

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## Conclusion

My prediction was **right/wrong**.

When we did the investigation, I noticed that \_\_\_\_\_

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# Does a heavier object fall quicker than a lighter object?

### Prediction

(Cross out the word choices in bold that you think are wrong.)

I think that the **heavier/lighter** object will land on the ground first.

I think this because \_\_\_\_\_

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### Fair Testing

To make this a fair test I will need to keep these things the same: (Circle the things you will keep the same.)

the height the objects are dropped

the contents of the containers

The one thing that I am going to change is: (Circle the thing you will change.)

the height the objects are dropped

the contents of the containers

Why do we need to repeat the drop three times?

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## Results

Label your bags or containers with the contents or label them heavy and light.

Put the name of the bags/container in the correct box for each drop in the table below.

	Drop 1	Drop 2	Drop 3	Observations
Landed first				
Landed second				
Landed at same time				

Do all the results follow the same pattern?

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If there are any that don't follow the pattern, can you say why?

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## Conclusion

My prediction was **right/wrong**.

When we did the investigation, I noticed that \_\_\_\_\_

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