



STEM By The Book

Code Name Bananas David Walliams

Experiences and Outcomes

By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects. [SCN 2-07a](#)

I can design and construct models and explain my solutions. [TCH 1-09a](#)

I can extend and enhance my design skills to solve problems and can construct models. [TCH 2-09a](#)

I have explored a variety of ways in which data is presented and can ask and answer questions about the information it contains - [MNU 1-20a](#)

Having discussed the variety of ways and range of media used to present data, I can interpret and draw conclusions from the information displayed, recognising that the presentation may be misleading. [MNU 2-20a](#)

Resources

- Bin bag
- Scissors
- 30 cm ruler,
- Sewing thread or thin string
- A small empty pringles tub with lid
- A stopwatch or phone
- 15 pringles



Activity – Parachute Investigation

In “Code Name Bananas” Eric and Gertrude make their escape using parachutes - can you make a parachute that enables a safe landing? Think about what a parachute does - parachutes are designed to slow the descent of the parachutist as they fall through the atmosphere, allowing them to reach the ground at a slow enough speed to avoid injuries on landing.

We are going to use Pringles-type snacks to represent the parachutist and to assess the success of the parachute design. Before starting, remove the Pringles from the tub and set them to one side.

Cut open and unfold your bin bag so that you have just one layer then, using your ruler, cut out a square from the bin bag measuring 30cm x 30cm (Figure 1).

Measure and cut out 4 lengths of thread each measuring 30cm. Tie one piece of thread to each of the corners of your bin bag square, or tape them in place (Figure 2). If using tape try to always use the same amount to keep the test as fair as possible. What must you keep the same?

Taking care not to get in a tangle, tape each thread to the Pringles tube (about 2 cm from the top) making sure the threads are equally spaced around the tub (Figure 3).

Place one Pringle crisp in the tub (this represents your parachutist). Each parachute must now be dropped from the same height to make it a fair test. Decide on a height and record it. You could ask someone tall to do this by reaching up to their full height.

Get ready with a stopwatch or timer. Start the stop-watch when the parachute is released and stop it when the parachute hits the ground. Record the time on the timer. Repeat this experiment two more times. You might want to video the drop too.



Figure 1



Figure 2



Figure 3



Activity – Parachute Investigation

Calculate an average time it takes for this parachute to fall.

It is also important to record if your parachutist (or Pringle in this case) survived the fall in one piece.

Repeat these steps using different sized squares of bin bag, we recommend 25x25cm, 20x20cm, 15x15cm and 10x10cm.

Record all the results in a table.

Which parachute had the longest fall time?

Which parachutist had the slowest descent.

Is it the parachute that you expected?

Give reasons to justify your answer.

What is happening?

When a parachutist jumps from the plane his/her weight is pulling them towards the ground. At first this is the only force acting, so their speed increases. As their speed increases the force of air resistance increases in the opposite direction. When the force of air resistance up is equal to their weight there is no unbalanced force so their speed stays the same. This speed is called their terminal velocity. It is far too fast to hit the ground at so a parachute is used to slow down their speed of falling.

Once the parachute is opened the force of air resistance is increased due to the parachute having a larger surface area than the parachutist. There is now a larger upward force than downward force, so the speed of the parachutist decreases. This causes the force up due to air resistance to decrease.

When air resistance force up is equal to their weight, the parachutist's speed stays the same. This new terminal velocity is much smaller and means the parachutist can land safely.

Read about the parachutes that NASA developed for the next manned mission to the moon in, The Artemis Plan. https://www.nasa.gov/sites/default/files/atoms/files/artemis_plan-20200921.pdf

What next?

- What other changes could you make to your parachute which might affect the speed at which it falls?
- Identify all the variables you can for this investigation .
- Select one of the variables to change for your investigation e.g. size of canopy. You then must keep all the other variables the same, e.g. length of string, type of string, parachute material, drop height, number of Pringles in the tub...

To find out more about fair testing and for other examples we recommend the book– [It's not fair, or is it?](#)

For more information on this investigation and other ideas relating to forces visit our [Primary Bulletin – issue 85](#)

