

GIVE SPARK · HANDS-ON SCIENCE LAB

The Balancing Clown

Can you balance a paper clown on the end of a pencil?

Teacher Guide

Grades 3–5 · Forces and balance · 55 minutes

FREE LAB

OVERVIEW

The lab at a glance

One lesson, one driving question and a clown that will not stay up until the weight is in the right place.

THE DRIVING QUESTION

Can you balance a paper clown on the end of a pencil?

Children try it with no clips first. Then two paper clips change everything.

What children do

Pairs cut out a card clown and try to balance it on a pencil, with the pencil's eraser under the clown's bow tie. It falls. Then they investigate where to place two identical paper clips, mapping the positions where the clown balances and the positions where it does not. They use the pattern they find to make a new shape of their own balance on a point they choose.

What children learn

Adding weight in an unexpected place can make an object balance. The clips change where the clown's center of gravity is. When it sits below the point that holds the clown up, the clown can hang there steadily. Children discover this from their own map before the idea is named.

Success looks like

1. I tried every marked position and recorded the ones that did not work as well as the ones that did.
2. I described what the successful positions have in common.
3. I used that pattern to balance a new shape and explained where I put the clips.

The positions to investigate

POSITION	WHERE THE TWO CLIPS GO	LIKELY OBSERVATIONS
A	One on each hand	The clown balances and swings back upright when nudged.
B	One on each cuff	The clown balances, but less steadily than with the clips on the hands.
C	One on each upper arm	The clown tips over.
D	One on each side of the hair	The clown tips over.

What counts as balancing. The clown stays on the eraser for five seconds after you let go, with no other part touching the stand or the table.

AT A GLANCE

Time: 55 minutes.

Grouping: pairs.

Standards link: supports NGSS 3-PS2-1, investigating the effects of balanced and unbalanced forces on an object.

SESSION PLAN

STAGE	MIN
Introduce the puzzle	5
Cut out and try	8
Map the clip positions	15
Find the pattern	7
Balance a new shape	13
Close	7
Total	**55**

THE STUDENT RESOURCE

A separate two-page PDF. Page 1 is the recording page with a map of the clown. Page 2 is the clown template, to print on card stock.

© GIVE SPARK PTE LTD

PREPARATION

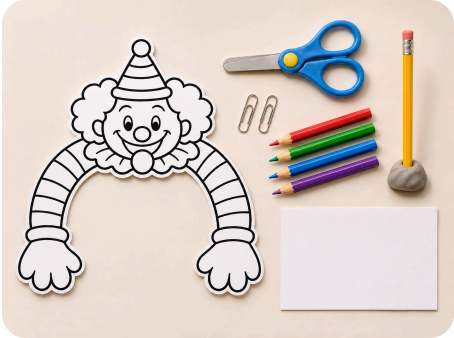
Get ready

What to gather, how to print the template and how to set up a balancing stand.

Materials

For each pair

- The clown template, printed on card stock
- Scissors and coloring pencils
- 2 identical paper clips
- A pencil with a flat eraser on the end, and a lump of modeling clay to stand it in
- A blank piece of card about the size of a postcard, for the new shape
- Student page 1 and a red and a green pencil



One clown, two paper clips, a pencil stand and a blank card for the new shape.

SAFETY

Carry scissors with the blades closed. The pencil stands point down in the clay, so no sharp point faces up.

Print the template

Print page 2 of the student resource on white card stock at 100% or Actual Size, one for each pair. Card stock holds its shape, so the arms stay where they are drawn. Ordinary paper is too floppy for this lab.

The balancing stand

1. Press a lump of clay onto the table.
2. Push the point of the pencil into the clay so the pencil stands straight up with its eraser at the top.
3. The clown balances with the bottom of its bow tie on the eraser. Children can also use a fingertip.

CUTTING OUT

Children cut around the outside of the clown, including the space between the arms and under the chin. They can color the clown first. Neat cutting around the hands matters most, because the clips sit there.

How to add a clip

Slide the clip onto the edge of the card so that it sits over the lettered circle. Both clips go on the same letter, one on the left side of the clown and one on the right. Children take both clips off before they try the next position.

The new shape

Children draw any shape they like on the blank card, such as a bird, a rocket or a letter, and mark the point it will balance on. They cut it out and use the same two clips to make it balance on that point. Shapes with parts that reach below the balance point are the ones that work, and children should find that out for themselves.

© GIVE SPARK PTE LTD

TEACHING SEQUENCE

Run the lesson

A falling clown raises the question. A map of clip positions answers it.

Introduce the puzzle 5 MINUTES

DO Hold up a cut-out clown. Rest its bow tie on your fingertip and let go. It falls. Try once more.

ASK "Can this clown balance here? I am allowed to add two paper clips. Where would you put them?"

Take a few ideas and reasons. Do not show the answer.

Cut out and try 8 MINUTES

DO Pairs cut out their clown and set up the pencil stand. They try to balance the clown on its bow tie with no clips and record what happens on the student page.

Map the clip positions 15 MINUTES

DO Pairs test positions A, B, C and D in any order. For each one they place both clips, set the bow tie on the eraser, let go gently and count to five. On the map they color the circles green if the clown stayed up for the five seconds and red if it fell. Then they try one idea of their own, such as both clips on one hand.

ASK "When it balances, what happens if you give it a gentle nudge?"

Find the pattern 7 MINUTES

ASK

- "Where are the green circles on your map? Where are the red ones?"
- "What is the same about the positions that worked?"

SAY *"The clips change the center of gravity of the whole clown. When it is below the point the clown rests on, the clown can hang steadily and come back after a small nudge. Matching clip positions help it hang straight."*

Balance a new shape 13 MINUTES

DO Each pair draws and cuts out a new shape, marks its balance point and uses the two clips to make it balance there. They may trim the shape if their first idea cannot work.

ASK "Where did you put the clips, and how did the clown help you decide?"

Close 7 MINUTES

DO Children complete the sentences on the student page. "The clown balanced when ___. My new shape balanced / did not balance because ___." Allow a few minutes for cleanup within this stage.

LOOK FOR

Children who record the positions that failed and use them. "The hair and the upper arms are above the bow tie, and those fell" shows they are reading the whole map.

IF THIS HAPPENS

The clown leans to one side with clips on both hands. One clip is sitting higher than the other. Slide them until they match.

It balances but hangs tilted. That still counts. Ask what would straighten it.

It will not balance in position A. The card is heavy for the clips. Use two larger clips, and use that same pair for every position.

A new shape cannot be made to balance. Ask where its weight is compared with the balance point, and what could be trimmed or added below.

LET THE MAP DO THE WORK

Hold back the explanation until the maps are colored. Children who have seen where the green circles are can say the rule themselves.

© GIVE SPARK PTE LTD

The science behind it

Why weight below the balance point keeps the clown up, the ideas children bring and how to adjust the lab.

The science behind it

Every object has a balance point, which scientists call its center of gravity. It is the single point where the weight of the whole object seems to act. If you support an object directly below that point, it tends to topple, like a pencil stood on its tip. If you support it from above that point, it hangs steadily, like a coat on a hook.

With no clips, the clown's center of gravity is in its face, just above the bow tie. The slightest lean lets gravity pull it over. Clips on the hair add weight even higher, so the center of gravity stays above the bow tie.

The hands reach well below the bow tie. Clips on the hands add weight low down, which moves the center of gravity of the whole clown to a spot below the bow tie. How far it moves depends on both the weight of the clips and their distance from the support. Now the clown is hanging from the pencil. When it is nudged, gravity pulls it back to where it started, which is why it rocks and settles. Clips on the cuffs are lower than the bow tie too, but not as low, so the clown is less steady.

Matching clip positions help the clown hang straight. Uneven positions may make it hang at an angle. Two clips on one hand pull the center of gravity to that side, and the clown can still settle with that hand lowest.

Ideas children often bring

A CHILD MIGHT SAY	YOU COULD RESPOND
"It needs to be lighter to stay up."	We added weight and it stayed up. Ask where the weight went.
"The clips are holding on to the pencil."	Look closely. Only the bow tie touches the eraser.
"It works because the arms are long."	Long arms with clips on the upper arms still fell. Ask what matters about the hands.

Support and challenge

Support. Start with positions A and D only, the hands and the hair, so the contrast is as clear as possible.

Challenge. Ask children to make the clown balance leaning to one side on purpose, and to explain how they moved the weight to do it.

ASSESSMENT

Use the student page and the new shape.

Recording: the map shows every position tried, in green or red.

Pattern: says the working positions are below the bow tie.

Applying it: places clips on the new shape for a reason.

TAKE IT FURTHER

Find it in the world. Look at pictures of tightrope walkers and ask why the pole droops at its ends.

Balance a ruler. Find the point where a ruler balances on one finger, then add a clip to one end and find it again.

FINAL EXPLANATION

Ask every pair for the same three things. Tell us what you found, show the evidence, and explain what you think caused it.

© GIVE SPARK PTE LTD

THANK YOU

Terms of use

Thank you for downloading this free lab. It is yours to use with your own students, and these terms keep it free for other teachers too.

You may

- Use this lab with your own class or your own children at home.
- Print or copy the pages for your own students.
- Share the link to the Give Spark store listing with colleagues, so they can download their own copy.

You may not

- Sell this resource or any part of it.
- Post the files on a public website, shared drive or social media page.
- Edit the files or remove the Give Spark name and copyright.
- Give the files to another teacher. Please send them the link.

More from Give Spark

If your class enjoyed this lab, the full Give Spark science units work the same way. Each one is built on hands-on investigations and driving questions, is aligned to NGSS and comes with everything you need to teach it.

Give Spark on TPT
teacherspayteachers.com/store/give-spark
Follow the store to hear about new free labs.

give-spark.com
See every science unit and project in one place.

A rating or a short review on the store listing helps other teachers find this lab, and it is always appreciated.

Vicky Brooks
Give Spark

© GIVE SPARK PTE LTD · ALL RIGHTS RESERVED

The balancing clown

Can you balance a paper clown on the end of a pencil?

Name _____ **Date** _____

1 No clips

Rest the clown's bow tie on the eraser. What happens?

_____

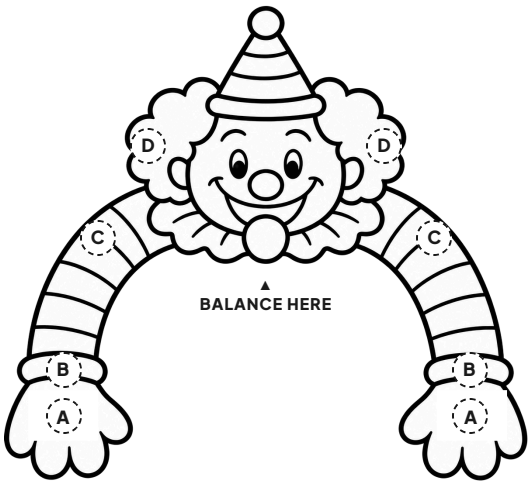
_____

2 Map the clip positions

Put one clip on each side at the same letter. The clown balances if it stays on the eraser for five seconds. Color the circles on the map **green** if it balanced and **red** if it fell.

POSITION	WHAT HAPPENED?
A · hands	
B · cuffs	
C · upper arms	
D · hair	
Our idea	

THE MAP



3 The pattern

What is the same about the positions that worked?

_____

_____

4 My new shape

Draw it. Mark the balance point with an X and show where the clips go.

5 What we found

The clown balanced when

_____

My new shape **balanced** **did not**

because

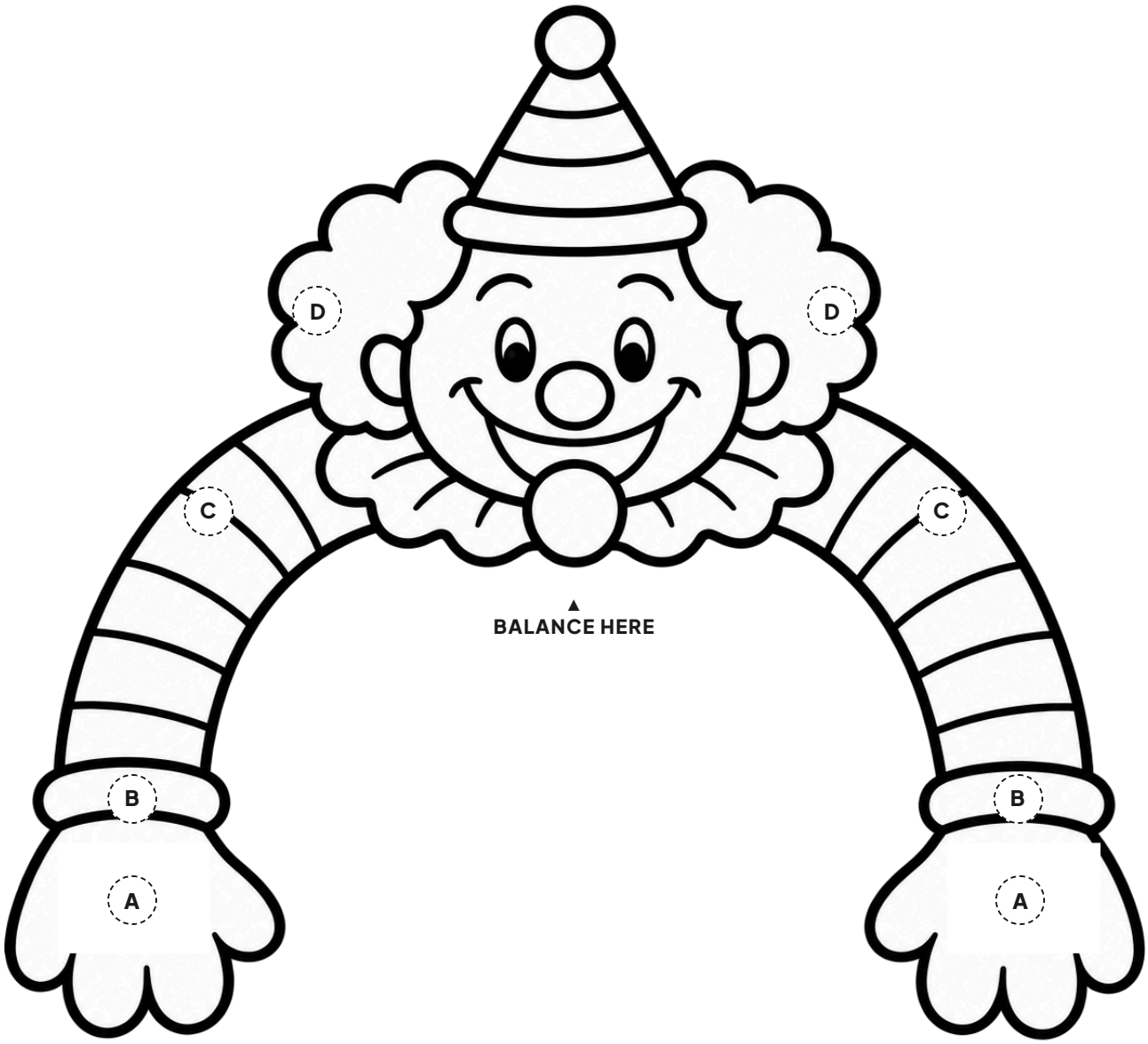
_____

© GIVE SPARK PTE LTD

Clown template

Cut out the clown, then find out how to make it balance.

Print on card stock at 100% or Actual Size. Color your clown. Cut around the outside, including the space between the arms and under the chin. The letters show where the paper clips go. Rest the bottom of the bow tie on the eraser of your pencil.



© GIVE SPARK PTE LTD