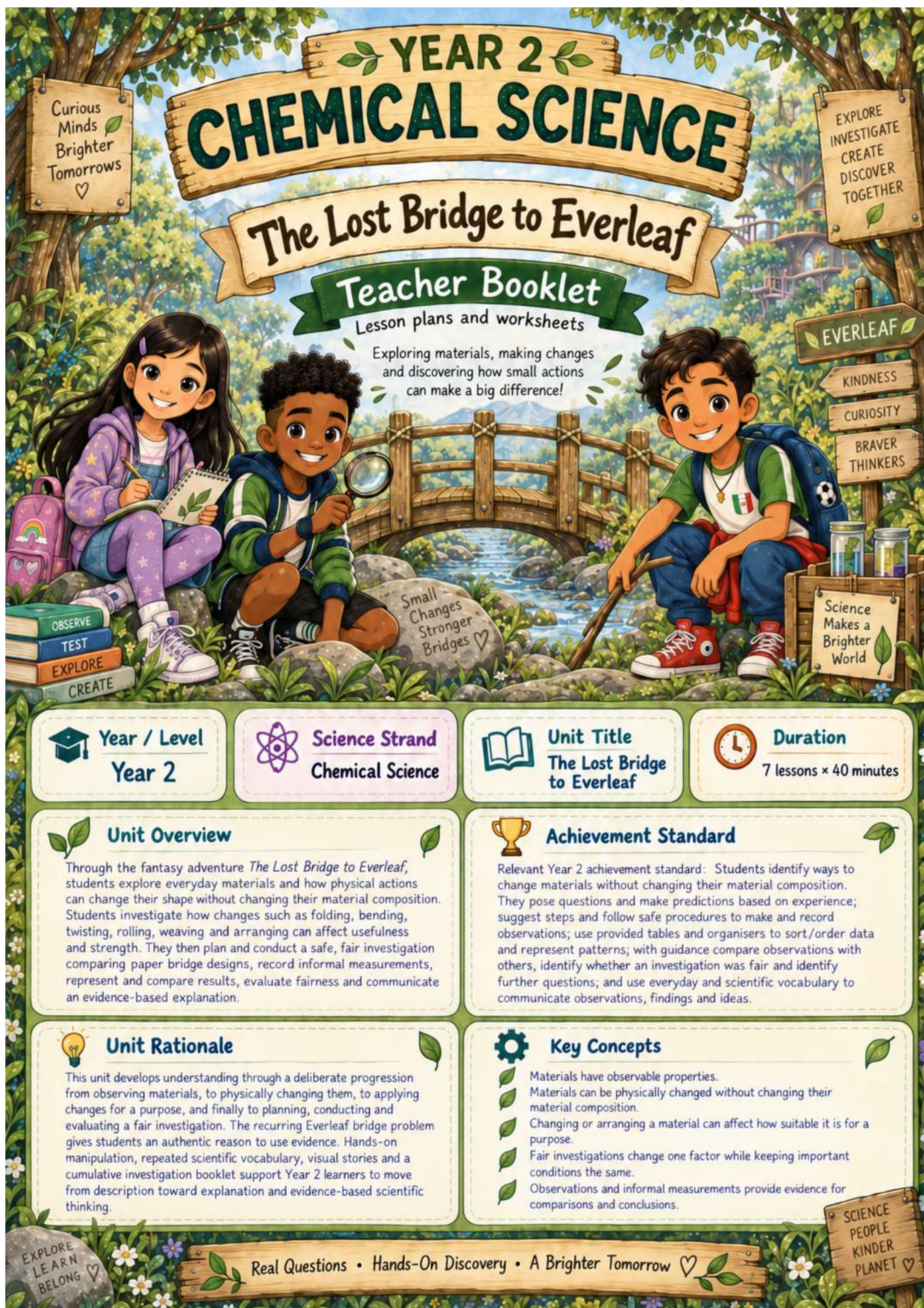




Year / Level
Year 2



Science Strand
Chemical Science



Unit Title
The Lost Bridge to Everleaf



Duration
7 lessons × 40 minutes



Unit Overview

Through the fantasy adventure *The Lost Bridge to Everleaf*, students explore everyday materials and how physical actions can change their shape without changing their material composition. Students investigate how changes such as folding, bending, twisting, rolling, weaving and arranging can affect usefulness and strength. They then plan and conduct a safe, fair investigation comparing paper bridge designs, record informal measurements, represent and compare results, evaluate fairness and communicate an evidence-based explanation.



Achievement Standard

Relevant Year 2 achievement standard: Students identify ways to change materials without changing their material composition. They pose questions and make predictions based on experience; suggest steps and follow safe procedures to make and record observations; use provided tables and organisers to sort/order data and represent patterns; with guidance compare observations with others, identify whether an investigation was fair and identify further questions; and use everyday and scientific vocabulary to communicate observations, findings and ideas.



Unit Rationale

This unit develops understanding through a deliberate progression from observing materials, to physically changing them, to applying changes for a purpose, and finally to planning, conducting and evaluating a fair investigation. The recurring Everleaf bridge problem gives students an authentic reason to use evidence. Hands-on manipulation, repeated scientific vocabulary, visual stories and a cumulative investigation booklet support Year 2 learners to move from description toward explanation and evidence-based scientific thinking.



Key Concepts

- Materials have observable properties.
- Materials can be physically changed without changing their material composition.
- Changing or arranging a material can affect how suitable it is for a purpose.
- Fair investigations change one factor while keeping important conditions the same.
- Observations and informal measurements provide evidence for comparisons and conclusions.

EXPLORE
LEARN
BELONG

Real Questions • Hands-On Discovery • A Brighter Tomorrow

SCIENCE
PEOPLE
KINDER
PLANET

Lesson 1

The Valley of Materials

Year 2
Science
Chemical Sciences



Duration:
40 minutes



Lesson Focus:
Identifying common materials, describing their observable properties and considering why materials are useful for particular purposes.



Resources



YouTube Story: Lesson 1 – The Valley of Materials (from Banjo Education Support YouTube Channel.)



Material Valley visual/poster and real classroom objects made from paper, plastic, metal, wood, glass and fabric



Year 2 Chemical Science Investigation Booklet – Lesson 1: Materials Detectives



Pencils and coloured pencils; optional magnifying glasses

Resource Purpose

The story introduces the materials mystery. Real objects and the journal allow students to observe, classify and describe materials, then use those observations to begin thinking about a strong paper bridge.

Success Criteria

- ✓ I can identify different materials.
- ✓ I can describe properties of materials.
- ✓ I can explain why a material might be useful for a particular purpose.

Learning Intention



We are learning to identify materials and describe their properties.



Key Vocabulary

material • property • plastic
metal • wood • glass • fabric
paper • flexible • rigid

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–7 min	Story / Engage	Read The Valley of Materials. Pause when the children notice different materials. Ask: "What materials can you spot? What is each material like?" Do not explain all answers yet.	Listen to the story, observe the materials and share initial ideas.
7–10 min	Introduce the Mission	Read the Learning Intention and Success Criteria. Explain that students are Materials Detectives who will identify what objects are made from and describe their properties.	Listen and identify what they will be learning.
10–15 min	Explicit Teaching	Model: object → material → property → purpose. Example: metal spoon → metal → hard/smooth → useful because it keeps its shape. Explicitly teach property words.	Observe the model and practise describing one shared object using scientific vocabulary.
15–20 min	Guided Material Hunt	Show several contrasting objects. Ask students to identify the material and justify their choice using observable evidence.	Identify materials, compare properties and explain evidence.
20–32 min	Activity + Worksheet	Students complete Lesson 1 Parts 1–2: find 3 objects made from different materials; choose 2 and record their properties. Then begin Part 3 by sketching a first paper-bridge idea.	Investigate classroom objects, record observations and draw a first bridge idea.
32–36 min	Analyse and Discuss	Compare objects made from different materials. Ask why one material may be better for a job than another.	Share findings and explain how properties relate to purpose.
36–39 min	Science Inquiry / I Wonder	Model: "I notice paper is flexible. I wonder what happens if we fold it?" Record 1–2 class questions to carry into Lesson 2.	Suggest questions about changing materials.
39–40 min	Exit Ticket	Prompt: "Name one material, one property it has, and one job it is useful for."	Give an individual oral or written response.



Explicit Teaching

Scientific Idea: Objects are made from different materials. Materials have observable properties, and these properties can make a material more or less suitable for a particular purpose.

Board Model:



Student Investigation

- Find 3 objects made from different materials.
- Identify what each object is made from.
- Describe properties of 2 selected objects.
- Use observations to suggest how paper might be changed for a bridge.

Investigation Prompt:

What do the properties of materials tell us about what they might be useful for?



Teacher Questioning

- What is this object made from?
- What can you observe that supports your answer?
- How would you describe this material?
- Why might this property be useful?
- Would another material work as well? Why?



Expected Big Idea

Different materials have different properties, and those properties help determine what the materials are suitable for.



Curriculum Links – Year 2 Science (AC v9)

AC9S2U03	Identify and describe the observable properties of different materials and explore how they are used for particular purposes.
AC9S2I01	Pose and respond to questions, and make predictions about familiar objects and events.
AC9S2I02	Plan and conduct simple investigations, recording and comparing observations.
AC9S2I03	Use observations and evidence to suggest explanations.



Connection to the Next Lesson

Today we discovered:
Different materials have different properties, and those properties help determine what the materials are suitable for.

Next scientific question:
If paper is flexible and can change shape, what happens when we fold, bend, twist, scrunch or roll it?



Lesson 1 – Materials Detectives

Exploring
Materials



Part 1 – Material Hunt

Find 3 objects made from different materials.

Material	Object I Found	Draw It
_____	_____	
_____	_____	
_____	_____	

Materials you
might find:

- plastic
- metal
- wood
- glass
- fabric
- paper

Part 2 – Materials Scientist

Choose 2 objects from your hunt.

Property Word Bank: rough • smooth • hard • soft • shiny • dull • flexible • rigid

My Object	Material	Properties
_____	_____	_____ _____ _____
_____	_____	_____ _____ _____



Part 3 – The Bridge Challenge

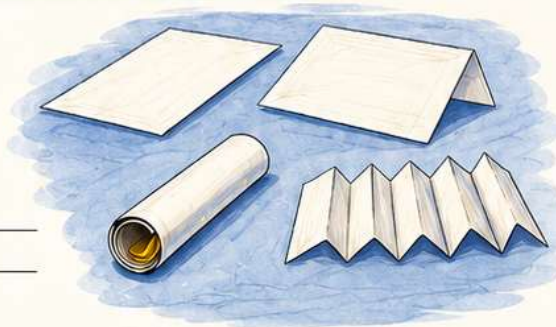
Professor Quill needs a strong paper bridge.

How could we change paper to make it stronger?

MY FIRST BRIDGE IDEA

I think we could
change the paper by:

I think this could make
it stronger because:



Materials Detective Discovery

Complete the sentences.

Different materials have different _____.

Materials can be chosen because they are suitable for
different _____.

TOP 5 VOCABULARY

- material
- property
- strength
- flexible
- rigid

Lesson 2

The Paper Forest

Year 2
Science
Chemical Sciences



Duration:
40 minutes



Lesson Focus:

Exploring physical changes to materials and recognising that changing shape does not necessarily create a different material.



Resources



YouTube Story: Lesson 2 – The Paper Forest (from Banjo Education Support YouTube Channel.)



Paper Forest visual/poster



Paper plus safe samples of flexible materials suitable for folding, bending, twisting, stretching or tearing



Lesson 2 worksheet: Can We Change Materials?



Pencils / coloured pencils

Resource Purpose

Hands-on manipulation makes physical change visible. The worksheet prompts students to compare before and after and distinguish a change in shape from a change in material.

Success Criteria

- ✓ I can physically change a material.
- ✓ I can describe what changed.
- ✓ I can identify what stayed the same.
- ✓ I can explain that it is still the same material.

Learning Intention



We are learning that materials can be physically changed without becoming a different material.



Key Vocabulary

physical change • material • shape
fold • bend • twist • stretch
scrunch • tear • roll

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–7 min	Story / Engage	Read The Paper Forest. Emphasise moments where paper is folded, bent, twisted or rolled. Ask: "Did the paper stop being paper?"	Listen, observe and predict.
7–10 min	Introduce the Mission	Introduce the Learning Intention and Success Criteria. Explain that students will change materials and compare before and after.	Listen and identify the investigation goal.
10–15 min	Explicit Teaching	Demonstrate fold, bend, twist, scrunch, tear and roll. Establish: a physical change can alter shape/size/form while the material remains the same material.	Observe and use action vocabulary.
15–20 min	Before / After Model	Model one example with paper. Record: before, action, after, what changed, what stayed the same. Ask for evidence that it is still paper.	Compare before and after and explain what remained the same.
20–32 min	Activity + Worksheet	Students complete Lesson 2: change 3 materials (one must be paper), then choose one for a before/after drawing. Test flat, folded, rolled and scrunched paper and record quick observations.	Safely manipulate materials, observe changes and record evidence.
32–36 min	Analyse and Discuss	Compare different actions. Ask which changes affected shape most and whether any action changed what the material was made from.	Share observations and justify ideas.
36–39 min	Science Inquiry / I Wonder	Model: "I notice folded paper keeps its shape differently. I wonder whether changing paper shape can make it stronger?" Record 1–2 class questions to carry into Lesson 3.	Develop a question about how a physical change affects paper.
39–40 min	Exit Ticket	Prompt: "I changed paper by _____. It was still paper because _____."	Complete the sentence independently.



Explicit Teaching

Scientific Idea: A physical change can alter a material's shape, size or form without changing what the material is made from.

Board Model:



Student Investigation

- Apply different physical actions to materials.
- Observe before and after.
- Identify what changed and what stayed the same.
- Compare flat, folded, rolled and scrunched paper.

Investigation Prompt:

What evidence shows that a material can change shape but remain the same material?



Teacher Questioning

- What changed?
- What stayed the same?
- How do you know it is still the same material?
- Which action changed the shape most?
- What might this new shape allow the material to do?



Expected Big Idea

Materials can be physically changed in ways such as folding, bending, twisting, stretching, tearing, scrunching and rolling without becoming a different material.



Curriculum Links – Year 2 Science (AC v9)

AC9S2U01	Identify and describe the observable properties of different materials and explore how they are used for particular purposes.
AC9S2U02	Explore how objects can be changed and how this affects their properties and use.
AC9S2I01	Pose and respond to questions, and make predictions about familiar objects and events.
AC9S2I02	Plan and conduct simple investigations, recording and comparing observations.



Connection to the Next Lesson

Today we discovered:

Materials can be physically changed in ways such as folding, bending, twisting, stretching, tearing, scrunching and rolling without becoming a different material.

Next scientific question:

If changing shape changes what paper can do, can we deliberately change materials to make them better for a particular job?



Lesson 2 – Can We Change Materials?



Physical Changes



Part 1 – Changing Materials

Choose 3 materials. One must be paper.

Actions: fold • bend • twist • stretch • scrunch • tear • roll

Material	What did you do?	What happened?	Same material?
Paper			Yes / No
			Yes / No
			Yes / No

Part 2 – Before and After

Choose one material.

My material: _____

I will: ☐ Fold ☐ Bend ☐ Twist ☐ Stretch ☐ Scrunch ☐ Tear ☐ Roll



BEFORE

Draw it before.

AFTER

Draw it after.



What changed?

What stayed the same?

Is it still the same material?

☐ Yes ☐ No

How do you know?

Part 3 – Change the Paper

Try each change and make a quick observation.

Paper	What do you notice?
Flat	
Folded	
Rolled	
Scrunched	



My Science Discovery

When I changed the shape of the material, _____

It was still _____ because _____



Remember

A material can be physically changed without becoming a different material.



Lesson 3

The Builders' Village

Year 2
Science
Chemical Sciences



Duration:
40 minutes



Lesson Focus:

Changing and arranging materials to make them more suitable for a purpose, and using observations to predict a strong bridge design.



Resources



YouTube Story: Lesson 3 – The Builders' Village (from Banjo Education Support YouTube Channel.)
Builders' Village visual/poster



Equal-sized A4 paper sheets



Examples/images: rolled paper tube, folded fan, rope, folded cardboard, woven fabric



Lesson 3 worksheet: Materials Have Jobs



Small blocks/supports for quick demonstrations

Resource Purpose

Students connect physical changes to function. Making four paper forms gives concrete evidence they can use to predict which design may be strongest.

Success Criteria



I can describe how a material has been changed.



I can explain how the change helps it do a job.



I can use an observation to make a prediction.

Learning Intention



We are learning that materials can be changed to make them more suitable for a purpose.



Key Vocabulary

purpose • suitable • design
fold • roll • concertina • beam
structure • strength • prediction

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–7 min	Story / Engage	Read The Builders' Village. Ask students to notice how builders change or arrange materials to help them do a job.	Listen and identify examples of materials changed for a purpose.
7–10 min	Introduce the Mission	Introduce the Learning Intention and Success Criteria. Present the challenge: prepare different paper forms that could become bridge designs.	Listen and identify the design problem.
10–15 min	Explicit Teaching	Show examples such as a rolled tube, folded fan, rope and woven fabric. Model cause and effect: changing/arranging material → changes form → may make it more useful for a purpose.	Observe and explain how a change helps an object do its job.
15–22 min	Make the Designs	Model and students make four equal-paper designs: flat, concertina/zigzag, rolled and folded beam. Keep paper size/type consistent.	Construct the four designs carefully.
22–32 min	Activity + Worksheet	Complete Lesson 3 Parts 2–3. Choose 2 real examples and explain how the change is useful. Predict which paper design will hold the most weight using prior observations as evidence.	Record explanations and make an evidence-based prediction.
32–36 min	Analyse and Discuss	Compare the four designs without formally testing them. Ask what structural differences students notice.	Compare shapes and justify predictions.
36–39 min	Science Inquiry / I Wonder	Model: "I notice the designs have different shapes. I wonder which shape can support the most weight?"	Suggest investigable questions about paper design and strength.
39–40 min	Exit Ticket	Prompt: "Changing the shape of a material can make it more useful because _____."	Complete an individual explanation.



Explicit Teaching

Scientific Idea: Materials can be changed or arranged to make them more suitable for a purpose. A change in shape can change what a material can do.
Board Model:



Student Investigation

- Make flat, concertina, rolled and folded-beam paper designs.
- Compare how the designs hold their shape.
- Explain how changed materials can suit a purpose.
- Predict which design may hold the most weight.

Investigation Prompt:

What does the shape of a material tell us about how useful it may be for a particular purpose?



Teacher Questioning

- How was the material changed?
- What job does the changed material need to do?
- How does the change help?
- What evidence supports your bridge prediction?
- What would we need to test to know for sure?



Expected Big Idea

Changing the shape or arrangement of a material can make it more suitable for a particular purpose.



Curriculum Links – Year 2 Science (AC v9)

AC9S2U01	Identify and describe the observable properties of different materials and explore how they are used for particular purposes.
AC9S2U02	Explore how objects can be changed and how this affects their properties and use.
AC9S2I01	Pose and respond to questions, and make predictions about familiar objects and events.
AC9S2I02	Plan and conduct simple investigations, recording and comparing observations.



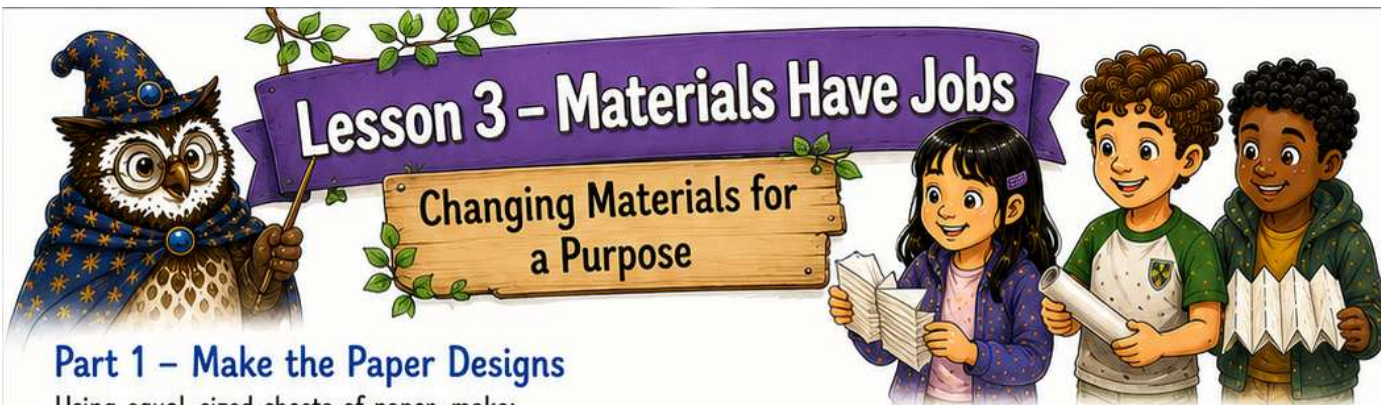
Connection to the Next Lesson

Today we discovered:

Changing the shape or arrangement of a material can make it more suitable for a particular purpose.

Next scientific question:

People have changed and arranged natural materials for useful purposes for a very long time. What can we learn from Aboriginal and Torres Strait Islander Peoples' material practices?



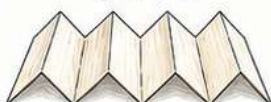
Part 1 – Make the Paper Designs

Using equal-sized sheets of paper, make:

☐ Flat paper



☐ Concertina / zigzag paper



☐ Rolled paper



☐ Folded beam



★ This section is practical — you do not need to write about every design.

Part 2 – Materials Have Jobs

Choose 2 examples.

Object	How was the material changed?	Why is the change useful?

Choose from:

- rolled paper tube
- folded fan
- rope
- folded cardboard
- woven fabric



Part 3 – The Paper Bridge Challenge

Which design do you predict will hold the most weight?

☐ Flat ☐ Concertina / zigzag ☐ Rolled ☐ Folded beam

I predict the _____ design will hold the most weight.

Use evidence from what you have already explored.

Something I noticed about changing paper was:

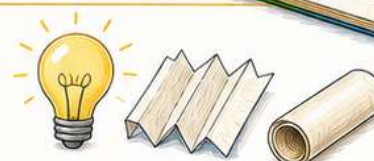
This makes me think my design will be strong because:



★ Science Discovery

Materials can be changed to suit a _____.

Changing the _____ of a material can change what it can do.



Lesson 4

Wisdom of the Forest Elders

Year 2
Science
Chemical Sciences



Duration:
40 minutes



Lesson Focus:

Exploring how Aboriginal and Torres Strait Islander Peoples physically change and arrange natural materials for useful purposes.



Resources



YouTube Story: Lesson 4 – Wisdom of the Forest Elders (from Banjo Education Support YouTube Channel.)



Lesson 4 visual/poster and teacher-selected approved resource connected to a specific Aboriginal or Torres Strait Islander People/community



Paper strips, raffia or other safe classroom fibres for modelling techniques



Visual instructions for weaving, twisting, plaiting and coiling



Lesson 4 worksheet: Learning from First Nations Peoples

Resource Purpose

The story and approved cultural resource establish respectful context. The practical model lets students observe how arranging fibres changes form and usefulness while the material remains the same.

Success Criteria

- ✓ I can describe how a natural material can be changed.
- ✓ I can identify a technique used to change or arrange materials.
- ✓ I can describe what changed and what stayed the same.

Learning Intention



We are learning how Aboriginal and Torres Strait Islander Peoples change natural materials for useful purposes.



Key Vocabulary

natural material • fibre • weaving
• twisting • plaiting • coiling
• flexible • arrange • purpose
• technique

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–7 min	Story / Engage	Read Wisdom of the Forest Elders. Explain that the fantasy story introduces an idea, while real learning about Aboriginal and Torres Strait Islander practices comes from the specific approved community/source selected by the teacher.	Listen and distinguish the story context from real cultural knowledge.
7–11 min	Introduce the Mission	Read the Learning Intention and Success Criteria. Introduce the specific People/community/source being used. Reinforce that Aboriginal and Torres Strait Islander Peoples have diverse knowledge and practices.	Listen respectfully and identify the learning focus.
11–17 min	Explicit Teaching	Show the approved example. Identify the natural material, the technique used and the useful purpose. Demonstrate one or more classroom modelling techniques: weave over/under; twist strands; plait three strips; coil a long strip.	Observe, name techniques and describe visible changes.
17–28 min	Practical Investigation	Students choose ONE technique: weaving, twisting, plaiting or coiling. Model safely with classroom materials, not as a claim of reproducing a specific cultural object.	Manipulate/arrange the material and compare before and after.
28–34 min	Activity + Worksheet	Complete Lesson 4: identify the material and initial property, draw before/after, describe what changed and stayed the same, and explain whether the change made it more useful.	Record observations and explanations.
34–37 min	Analyse and Discuss	Compare techniques. Ask how arranging strands can change strength, shape, flexibility or usefulness while the material remains the same.	Share evidence and compare results.
37–39 min	Science Inquiry / I Wonder	Model a question such as: "How does the way fibres are arranged affect how well they hold together?"	Suggest respectful scientific questions about material properties and arrangement.
39–40 min	Exit Ticket	Prompt: "The material was changed by _____. It was still _____, because _____."	Complete an individual response.



Explicit Teaching

Scientific Idea: Aboriginal and Torres Strait Islander Peoples use deep knowledge of natural materials and techniques such as twisting, twining, plaiting, knotting, weaving and coiling to make materials useful for particular purposes. Practices differ between Peoples and communities.

Board Model:



Student Investigation

- Observe an approved example from a specific source.
- Choose one classroom technique to model.
- Compare the material before and after.
- Explain what changed, what stayed the same and how the change affected usefulness.

Investigation Prompt:

What does the evidence show about how changing or arranging natural materials can make them useful for a purpose?



Teacher Questioning

- What natural material is being used?
- How has it been changed or arranged?
- What stayed the same?
- How does the technique affect what the material can do?
- What evidence can you observe?



Expected Big Idea

Natural materials can be physically changed and arranged in useful ways. Aboriginal and Torres Strait Islander Peoples hold diverse, place-based knowledge about materials and their uses.



Curriculum Links – Year 2 Science (AC v9)

AC9S2U01	Identify and describe the observable properties of different materials and explore how they are used for particular purposes.
AC9S2U02	Explore how objects can be changed and how this affects their properties and use.
AC9S2I01	Pose and respond to questions, and make predictions about familiar objects and events.
AC9S2I02	Plan and conduct simple investigations, recording and comparing observations.



Connection to the Next Lesson

Today we discovered:

Natural materials can be physically changed and arranged in useful ways. Aboriginal and Torres Strait Islander Peoples hold diverse, place-based knowledge about materials and their uses.

Next scientific question:

To decide which paper bridge design is strongest, how can we plan a test that is safe and fair?



Lesson 4 – Learning from First Nations Peoples

Materials Investigation

Your teacher will show you examples connected to a specific Aboriginal or Torres Strait Islander People, community or source where possible. Aboriginal and Torres Strait Islander Peoples have diverse knowledge and practices.

Choose ONE Experiment

☐ Weaving

– weave strips over and under.



☐ Twisting

– twist strands together.



☐ Plaiting

– plait three strips together.



☐ Coiling

– wind a long strip into a coil.



Before

My material: _____

It is: ☐ flexible ☐ rigid ☐ smooth ☐ rough ☐ soft ☐ other: _____

BEFORE

Draw it.

AFTER

Draw it after your experiment.



What Changed?



What Stayed the Same?

Did changing or arranging it make it more useful?

☐ Yes

☐ No

How? _____



My Discovery

The _____ changed, but it was still _____.

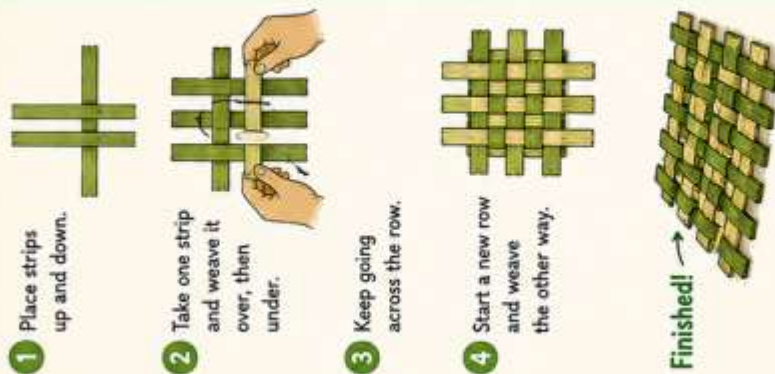


How to Change and Arrange Materials

Different ways we can weave, twist, plait and coil natural materials.

1 WEAVE

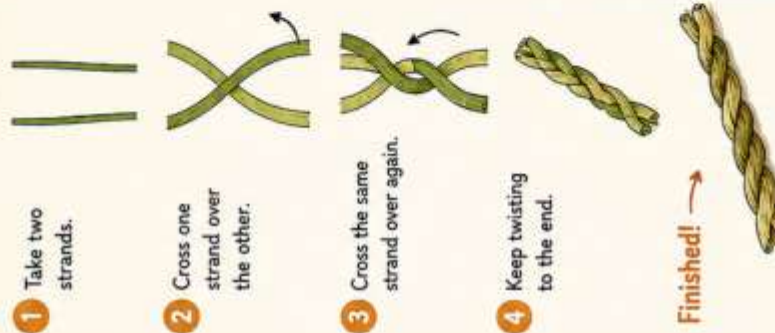
weave strips over and under.



Weaving makes a strong and flexible surface.

2 TWIST

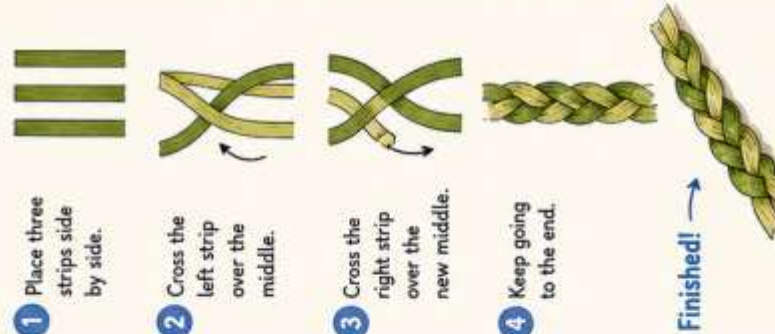
twist strands together.



Twisting makes materials stronger and tighter.

3 PLAIT

plait three strips together.



Plaiting makes a neat and strong braid.

4 COIL

wind a long strip into a coil.



Coiling creates strong baskets and bowls.

These techniques have been used by Aboriginal and Torres Strait Islander Peoples for thousands of years to make useful and beautiful everyday objects.

Lesson 5

The Scientist's Challenge

Year 2
Science
Chemical Sciences

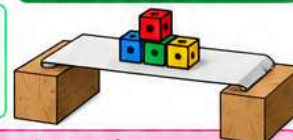


Duration:
40 minutes



Lesson Focus:

Planning a safe and fair investigation to compare the strength of different paper bridge designs.



Resources



YouTube Story: Lesson 5 – The Scientist's Challenge (from Banjo Education Support YouTube Channel.)



Scientist's Challenge / fair testing visual



Identical A4 paper, two identical supports per group, linking cubes, ruler/tape measure, masking tape



Lesson 5 worksheet: Planning a Fair Investigation



Resource Purpose

The story frames the need for fairness. The equipment and worksheet support students to identify the variable being changed, controls, an informal measure of strength, a safe method and a prediction.

Success Criteria

- ✓ I can suggest investigation steps.
- ✓ I can identify what changes and what stays the same.
- ✓ I can explain how we will measure strength.
- ✓ I can work safely.

Learning Intention



We are learning how scientists plan safe and fair investigations.



Key Vocabulary

investigation • fair test • change keep the same • measure strength • linking cube • method prediction • evidence

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–7 min	Story / Engage	Read The Scientist's Challenge. Stop after Professor Quill's unfair example. Ask: "Why would those results be difficult to compare?"	Listen and identify why inconsistent tests are unfair.
7–10 min	Introduce the Mission	Introduce the Learning Intention and Success Criteria. State the investigation question: "Which paper design will make the strongest bridge?"	Identify the investigation question and goal.
10–15 min	Explicit Teaching: Fair / Unfair	Use worksheet Part 1 scenarios. Model the rule: change ONE thing; keep other important things the SAME.	Classify examples as fair or unfair and justify choices.
15–21 min	Plan Variables	Establish CHANGE = paper design. KEEP SAME = paper type/size, support gap, supports, linking cubes, placement and method. Demonstrate a consistent support gap (e.g. 15 cm) and centre placement.	Identify what changes and what must stay the same.
21–25 min	Measure Strength	Demonstrate adding one linking cube at a time and counting how many the bridge successfully holds before collapse. Discuss fair measurement.	Suggest how strength can be measured and explain why consistency matters.
25–33 min	Worksheet / Method	Complete Lesson 5 Parts 2–6: plan the investigation, number method steps, check safety and make a prediction. Teacher records observation evidence during discussion.	Record the fair-test plan and prediction.
33–36 min	Analyse and Discuss	Review the plan as a class. Ask students to identify any hidden unfairness and improve the method.	Critique the plan and suggest improvements.
36–39 min	Science Inquiry / I Wonder	Ask: "What result would support your prediction? What else might affect bridge strength?"	Develop questions about factors that could affect results.
39–40 min	Exit Ticket	Prompt: "To make our bridge test fair, we will change _____ and keep _____ the same."	Complete an individual response.



Explicit Teaching

Scientific Idea: A fair investigation changes the factor being tested while keeping other important conditions the same. Measurements must also be taken in the same way.

Board Model:



Student Investigation

- Classify fair and unfair testing examples.
- Identify the paper design as the factor changed.
- Identify important conditions to keep the same.
- Plan how to measure bridge strength using linking cubes.
- Sequence the method and identify safety expectations.

Investigation Prompt:

What must we do so the evidence from each bridge can be compared fairly?



Teacher Questioning

- What are we changing?
- What must stay the same?
- How will we measure strength?
- Why must cubes be added in the same place and way?
- How will we know when to stop counting?
- Is our method safe and repeatable?



Expected Big Idea

Scientists make comparisons fair by changing one factor, keeping other important factors the same and measuring each test in the same way.



Curriculum Links – Year 2 Science (AC v9)

AC9S2U01	Identify and describe the observable properties of different materials and explore how they are used for particular purposes.
AC9S2I01	Pose and respond to questions, and make predictions about familiar objects and events.
AC9S2I02	Plan and conduct simple investigations, recording and comparing observations.



Connection to the Next Lesson

Today we discovered:

Scientists make comparisons fair by changing one factor, keeping other important factors the same and measuring each test in the same way.

Next scientific question:

Now that we have a fair plan, what evidence will we collect when we test each bridge?

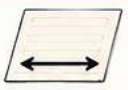
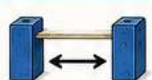
Lesson 5 – Planning a Fair Investigation



Which Paper Bridge Will Be Strongest?



Part 1 – Fair or Unfair?

What happened?	✓ Fair	✗ Unfair
 Every bridge uses the same size paper.	☐	☐
 One bridge is made from cardboard.	☐	☐
 Every bridge crosses the same gap.	☐	☐
 One bridge has a shorter gap.	☐	☐
 We use the same linking cubes.	☐	☐
 We push one bridge but use cubes on the others.	☐	☐

★ A Fair Test

We change **ONE** thing and keep other important things the **SAME**.

Safety First!

- ✓ Work calmly.
- ✓ Use materials carefully.
- ✓ Keep hands and objects to yourself.
- ✓ Ask for help if needed.

Part 2 – Plan Our Investigation



Our Question

Which paper design will make the strongest bridge?



What will we CHANGE?

The shape/design of the paper.

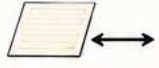
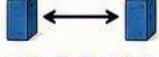
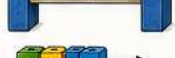
We will test:

- | | |
|---|--|
|  | ☐ Flat |
|  | ☐ Folded beam |
|  | ☐ Rolled |
|  | ☐ Concertina / zigzag |



What will STAY THE SAME?

Tick the things we need to keep the same.

- | | |
|---|--|
|  | ☐ Size of paper |
|  | ☐ Type of paper |
|  | ☐ Distance between supports |
|  | ☐ Type of weights |
|  | ☐ Where weights are placed |
|  | ☐ How weights are added |



Remember! ★

A fair test helps us find the best answer to our question.



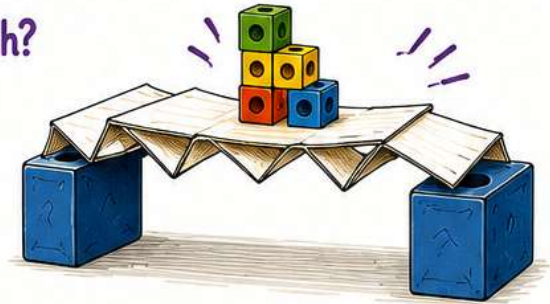


Part 3 – How Will We Measure Strength?

We will add **one** linking cube at a time.

We will measure:

How many linking cubes the bridge holds before it collapses.



Teacher Observation – Fair Measurement Discussion

- ☐ Student suggested how bridge strength could be measured.
- ☐ Student identified something that should stay the same.
- ☐ Student explained why keeping it the same helps make the comparison fair.

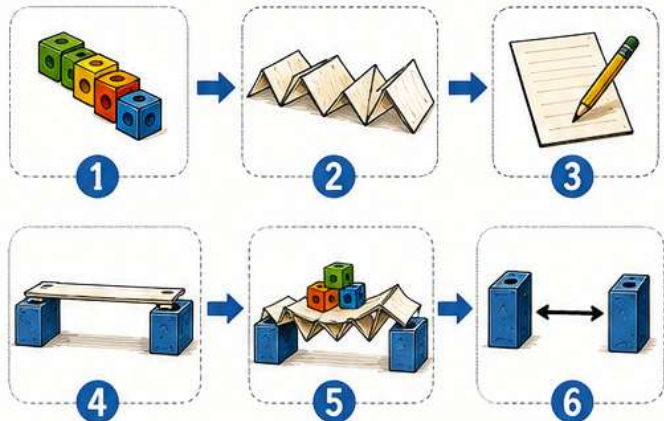
Teacher note: _____



Part 4 – Our Method

Number the steps 1–6.

- ☐ Add linking cubes one at a time.
- ☐ Make the paper design.
- ☐ Record the number of cubes held.
- ☐ Place the bridge across the supports.
- ☐ Stop when the bridge collapses.
- ☐ Set the supports the correct distance apart.



Students do NOT need to rewrite the method.



Part 5 – Work Safely

- ☐ Keep the work area tidy.
- ☐ Add cubes carefully.
- ☐ Follow the investigation steps.
- ☐ Use materials correctly.
- ☐ Tell the teacher if something becomes unsafe.



Part 6 – My Prediction

I predict the:

- ☐ Flat ☐ Folded ☐ Rolled ☐ Concertina

bridge will be strongest.

I think this because:



Lesson 6

The Bridge Trials

Year 2
Science
Chemical Sciences

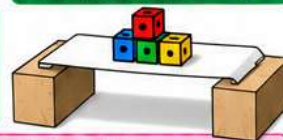


Duration:
40 minutes



Lesson Focus:

Conducting a fair investigation, recording informal measurements and observations, comparing results and using evidence to reach a conclusion.



Resources



YouTube Story: Lesson 6 – The Bridge Trials (from Banjo Education Support YouTube Channel.)



Bridge Trials visual/poster



Four equal A4 paper sheets per group: flat, folded beam, rolled, concertina



Two identical supports, ruler/tape measure, masking tape and linking cubes



Lesson 6 worksheet: Bridge Builder Investigation



Class graph/chart

Resource Purpose

Standardised equipment allows students to carry out the fair test they planned. The journal and class graph support recording, comparing and interpreting evidence.

Success Criteria

- ✓ I can conduct a fair test.
- ✓ I can measure and record observations.
- ✓ I can compare results.
- ✓ I can use evidence to make a conclusion.

Learning Intention



We are learning to investigate which physical change makes paper strongest.



Key Vocabulary

fair test • physical change
strength • measure • observation
result • compare • evidence
design • conclusion

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–6 min	Story / Engage	Read The Bridge Trials. Ask students to listen for what the characters keep the same and what they measure.	Listen and identify fair-testing features.
6–9 min	Introduce the Mission	Review the Learning Intention and Success Criteria and the Lesson 5 plan. Reinforce: same paper, gap, supports, cubes and testing method.	Prepare to follow the agreed method.
9–14 min	Explicit Teaching / Safety	Model the complete test once: position supports, place bridge, add one cube at a time at the centre, count, stop at collapse, record result. Clarify that the recorded number is the number successfully held before collapse.	Observe and rehearse the sequence orally.
14–28 min	Student Investigation	Groups test flat, folded beam, rolled and concertina designs. Students rotate roles such as builder/setter, cube adder, counter/checker and recorder. Teacher monitors fair procedure.	Conduct tests, make observations and record cubes held.
28–33 min	Worksheet + Class Graph	Complete Lesson 6 Parts 2–3. Add group results to a class graph titled Which Paper Bridge Was Strongest?"	Record results and contribute data to the class representation.
33–37 min	Analyse and Discuss	Compare group and class results. Identify patterns and discuss possible reasons for variation. Complete the conclusion using evidence.	Compare data and make an evidence-based conclusion.
37–39 min	Science Inquiry / I Wonder	Model: "I notice some groups got different numbers. I wonder what could have caused that?"	Suggest questions about variation, fairness or future tests.
39–40 min	Exit Ticket	Prompt: "The strongest design in my test was _____ because it held _____ cubes."	State a conclusion supported by measured evidence.



Explicit Teaching

Scientific Idea: A fair investigation produces evidence that can be recorded and compared. Changing the shape of paper can change how much weight it supports while it remains paper.

Board Model:



Student Investigation

- Test four paper bridge designs using the agreed fair method.
- Count linking cubes as an informal measure of strength.
- Record quick observations and results.
- Represent class results on a graph.
- Use evidence to identify the strongest design.

Investigation Prompt:

What does our evidence tell us about how changing the shape of paper affects its strength?



Teacher Questioning

- Are we testing each design in the same way?
- What do you observe as cubes are added?
- Which design held the most?
- What pattern can you see in the class graph?
- Why might groups have different results?
- What evidence supports your conclusion?



Expected Big Idea

Changing paper's shape can change its strength. Scientists use fair tests, observations and measurements to gather evidence and compare designs.



Curriculum Links – Year 2 Science (AC v9)

AC9S2U01	Identify and describe the observable properties of different materials and explore how they are used for particular purposes.
AC9S2I01	Pose and respond to questions, and make predictions about familiar objects and events.
AC9S2I02	Plan and conduct simple investigations, recording and comparing observations.
AC9S2I03	Use observations and evidence to suggest explanations.



Connection to the Next Lesson

Today we discovered:

Changing paper's shape can change its strength. Scientists use fair tests, observations and measurements to gather evidence and compare designs.

Next scientific question:

We have evidence. How can we use it to explain why our bridge worked, judge the fairness of our investigation and suggest what we would investigate next?

Lesson 6 – Bridge Builder Investigation

Test Your Bridges



Part 1 – The Fair Test



Remember

CHANGE: paper design

KEEP THE SAME:

paper • paper size • gap • supports • linking cubes • testing method



Test each bridge

1

Place the bridge across the supports.



2

Add one linking cube at a time.



3

Count carefully.

1, 2, 3...



4

Stop when the bridge collapses.



5

Record your result.



6

Repeat for each design.



Part 2 – Record Your Results

Bridge Design	Cubes Held	Quick Observation
 Flat	_____	_____
 Folded	_____	_____
 Rolled	_____	_____
 Concertina	_____	_____

Investigate • Measure
Compare • Conclude

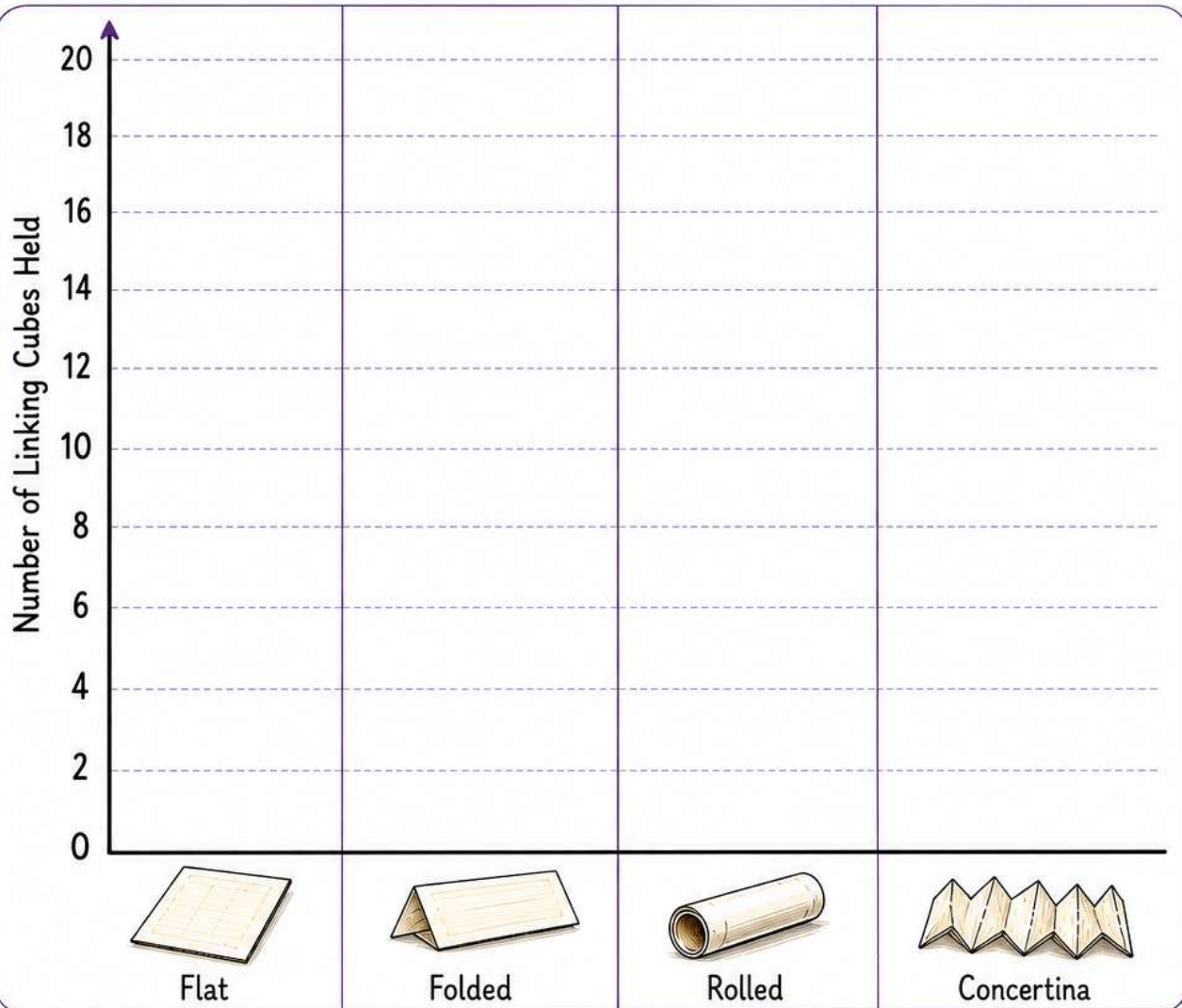
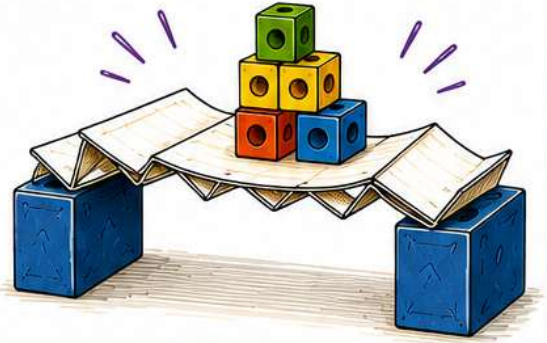


Part 4 – Class Graph

As a class, create a graph:

Which Paper Bridge Was Strongest?

Use your class graph to compare the different designs.



My Conclusion

The _____ design was the strongest because it held _____ cubes.

My evidence shows that changing the _____ of paper can change its _____.



Lesson 7

The Bridge of Home

Year 2
Science
Chemical Sciences



Duration:
40 minutes



Lesson Focus:

Communicating scientific explanations using evidence, evaluating fairness, comparing results, reflecting on improvements and proposing a new investigation question.



Resources



YouTube Story: Lesson 7 – The Bridge of Home (from Banjo Education Support YouTube Channel.)



Bridge of Home visual/poster



Students' completed Lesson 5 and 6 results and class graph



Students' strongest paper bridge/design where available



Lesson 7 worksheet: Bridge Engineers Expo



Pencils/coloured pencils

Resource Purpose

The final story brings the investigation together. Students use their own recorded evidence to explain physical changes, compare findings, evaluate fairness and communicate scientific thinking.

Success Criteria

- ✓ I can explain what I discovered and use evidence.
- ✓ I can explain whether my investigation was fair and suggest an improvement.
- ✓ I can compare my results with others.
- ✓ I can ask a new scientific question.

Learning Intention



We are learning to explain our scientific thinking.



Key Vocabulary

evidence • conclusion • compare
fair test • material • physical change
strength • result • improve
investigate

40-Minute Lesson Sequence

Time	Lesson Stage	Teacher Actions	Student Actions
0–7 min	Story / Engage	Read The Bridge of Home. Emphasise the final question: "Why did your bridge work?" Ask students what evidence the characters would need to answer.	Listen and identify evidence needed for an explanation.
7–10 min	Introduce the Mission	Introduce the Learning Intention and Success Criteria. Explain that students are completing their final Scientist Assessment using their own investigation evidence.	Prepare journals/results and identify assessment expectations.
10–15 min	Explicit Teaching: Evidence-Based Explanation	Model a short structure: claim + evidence + science idea. Example: "The _____ design was strongest. It held _____ cubes. Changing the shape helped it support more weight, but it was still paper." Do not supply students' individual answers.	Observe the model and identify claim, evidence and explanation.
15–27 min	Individual Assessment – Parts 1–3	Students complete My Bridge, Explain Your Scientific Thinking and Was Our Investigation Fair? Teacher reads prompts/clarifies wording without giving answers.	Independently use personal results to explain the physical change and evaluate fairness.
27–32 min	Compare – Part 4	Students compare with another group and record whether results were similar or different and one observation from the comparison.	Compare evidence respectfully and record a finding.
32–36 min	Reflect + New Question – Parts 5–6	Students identify what they discovered, one improvement and a new science question for a future investigation.	Reflect and propose a new investigable question.
36–39 min	Bridge Engineers Expo	In pairs/small groups, students use their bridge and booklet to briefly explain the investigation using the Expo Checklist and Scientist Word Bank.	Communicate findings using scientific vocabulary and evidence.
39–40 min	Exit Ticket / Final Statement	Prompt: "Changing the _____ of paper changed its _____. I know this because my evidence showed _____."	Complete the individual final statement.



Explicit Teaching

Scientific Idea: Scientific explanations use observations and results as evidence. Scientists also compare findings, consider whether a test was fair, suggest improvements and ask new questions.

Board Model:



What happened? What did I measure? Why does it matter?



Student Investigation

- Identify and explain the strongest bridge using personal data.
- Explain that changing shape did not create a different material.
- Evaluate fairness and suggest an improvement.
- Compare results with another group.
- Reflect and generate a new scientific question.
- Communicate findings at the Bridge Engineers Expo.

Investigation Prompt:

How does our evidence help us explain what happened in the bridge investigation?



Teacher Questioning

- What is your claim?
- What evidence supports it?
- How did the paper change?
- Why was it still paper?
- What made the test fair?
- How did another group's results compare?
- What would you improve?
- What could you investigate next?



Expected Big Idea

Scientists explain what they discovered by using evidence. They evaluate how fair their investigation was, compare results, suggest improvements and ask new questions.



Curriculum Links – Year 2 Science (AC v9)

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Connection to the Next Lesson

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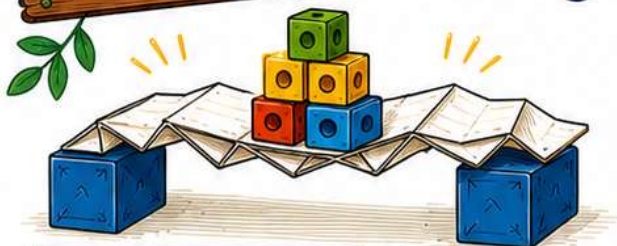
Scientists explain what they discovered by using evidence. They evaluate how fair their investigation was, compare results, suggest improvements and ask new questions.

Next scientific question:

The Everleaf investigation is complete. Which new question from our class could become our next science investigation?

Lesson 7

Bridge Engineers Expo



Part 1 – My Bridge

My strongest design was:

☐ Flat ☐ Folded ☐ Rolled ☐ Concertina

It held _____ linking cubes.

I changed the paper by:



MY STRONGEST BRIDGE



Part 2 – Explain Your Scientific Thinking

How did changing the paper make it stronger?

The _____ design

made the paper stronger because _____

Did changing its shape turn it into a different material?

☐ Yes ☐ No

Explain how you know.

Even though the _____ changed,

it was still _____ because _____



Part 3 – Was Our Investigation Fair?

☐ Yes ☐ Mostly ☐ No

One thing we kept the same was:

This helped make our test fair because:

To make it even fairer next time, I would:

VOCABULARY

material



What something is made from.

change



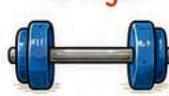
To make something different.

design



A plan or idea for making something.

strength



How much weight something can hold.

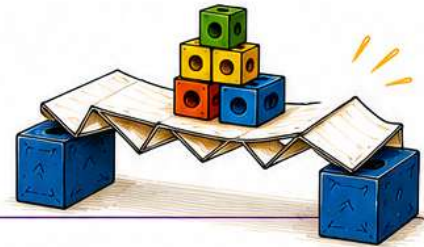
evidence



Facts or observations that prove something.

Lesson 7

Bridge Engineers Expo



★ Part 4 – Compare With Another Group

Another group's strongest design: _____

It held: _____ cubes

Our results were:

☐ Similar ☐ Different

One thing I noticed when I compared our results was:



Comparing helps us learn more!

★ Part 5 – Scientist Reflection

What did you discover about changing paper? _____

What would you improve next time?



★ Part 6 – My Next Investigation

What would you investigate next?

☐ Would cardboard be stronger? 

☐ Which fold is strongest? 

☐ What if the bridge was longer? 

☐ Would thicker paper change the results? 

 My own idea

My new science question is:

I wonder _____?



Bridge Engineers Expo



Use your bridge and booklet to explain your investigation.

Expo Checklist

- ☐ I showed my bridge.
- ☐ I explained how I changed the paper.
- ☐ I shared my results.
- ☐ I used evidence.
- ☐ I explained how our test was fair.
- ☐ I compared my results with another group.
- ☐ I shared an improvement.
- ☐ I shared a new science question.



Scientist Word Bank



material • property • shape • physical change • strength

fair test • investigation • prediction • observation

result • compare • evidence • improve



★ Final Scientist Statement

Changing the _____ of paper changed its _____.

I know this because my evidence showed _____

