

YEAR 2 CHEMICAL SCIENCE UNIT PLAN

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.
Australian Curriculum Science Content Descriptors	Science Understanding – Chemical sciences: • AC9S2U03 – recognise that materials can be changed physically without changing their material composition and explore the effect of different actions on materials including bending, twisting, stretching and breaking into smaller pieces. Science as a Human Endeavour: • AC9S2H01 – explore how scientists use patterns to make predictions and apply their understanding creatively to develop new ideas or propose solutions.
Science Inquiry Skills	• AC9S2I01 – pose questions to explore observed simple patterns and relationships and make predictions based on experiences. • AC9S2I02 – suggest and follow safe procedures to investigate questions and test predictions. • AC9S2I03 – make and record observations, including informal measurements, using digital technologies as appropriate. • AC9S2I04 – sort and order data and information and represent patterns, including with provided tables and visual or physical models. • AC9S2I05 – compare observations with predictions and others' observations, consider if investigations are fair and identify further questions. • AC9S2I06 – write and create texts to communicate observations, findings and ideas, using everyday and scientific vocabulary.
General Capabilities	• Literacy – scientific vocabulary, oral explanations, reading stories and recording findings. • Numeracy – counting linking cubes, informal measurement, comparing quantities and interpreting a class graph. • Critical and Creative Thinking – predicting, designing, questioning, comparing evidence and proposing improvements. • Personal and Social Capability – collaboration, turn-taking, safe group investigation and communicating ideas. • Intercultural Understanding – respectful learning about diverse Aboriginal and Torres Strait Islander material knowledge and practices through approved sources.

Cross-curriculum Priorities	Aboriginal and Torres Strait Islander Histories and Cultures – Lesson 4 uses an approved, specific People/community source to explore physical changes to natural materials for useful purposes, recognising that knowledge and practices are diverse and place-based.
Monitoring	Progress is monitored through teacher questioning, observation of material manipulation and safe investigation behaviours, exit tickets, predictions, journal responses, fair-test planning, recorded measurements, class graph discussion and students' use of scientific vocabulary. Evidence accumulates across the investigation booklet, with Lessons 5–7 providing the strongest inquiry assessment evidence.
Formative Assessment	• Lessons 1–4: observations, before/after drawings, property descriptions, explanations of physical change and usefulness, predictions and teacher questioning. • Lesson 5: fair/unfair classifications, investigation plan, method sequencing, prediction and teacher observation of fair-measurement discussion. • Lesson 6: fair-test procedure, results table, informal measurements, class graph contribution and evidence-based conclusion. • Ongoing: exit tickets, “I notice/I wonder” questions and oral scientific explanations.
Summative Assessment (Final Task)	Lesson 7 – Bridge Engineers Expo / Scientist Assessment. Students use their own bridge investigation evidence to identify and explain their strongest design, explain how the paper was physically changed while remaining paper, evaluate whether the investigation was fair, compare results with another group, propose an improvement, generate a further question and communicate findings using scientific vocabulary.
Success Criteria	• I can explain how paper can be physically changed without becoming a different material. • I can use results and observations as evidence to explain which bridge design was strongest. • I can explain how our investigation was kept safe and fair and suggest an improvement. • I can compare my observations with others and identify a new scientific question. • I can communicate my findings using everyday and scientific vocabulary.
Considerations for teaching and learning in this unit	Use explicit modelling before each hands-on task and keep instructions visually available. Pre-teach vocabulary and use oral rehearsal before writing. Use mixed, purposeful grouping for investigations while preserving individual assessment evidence in Lesson 7. Provide pre-cut materials or fine-motor support where required. Allow drawing, pointing, oral explanation or scribing as appropriate adjustments. Keep the story context engaging but separate fantasy characters from real cultural knowledge. For Lesson 4, use approved sources connected to a specific Aboriginal or Torres Strait Islander People/community where possible and avoid presenting one practice as universal.
Prior Knowledge Students Require	• Everyday objects are made from materials that can be observed and described. • Students can follow simple classroom safety instructions and take turns with equipment. • Students can count small quantities and record simple observations using words, drawings or tables. • Helpful prior vocabulary: material, object, same, different, change, shape, strong.
Investigating Safely	• Use only safe classroom materials; model correct handling before investigations. • Keep floors and work areas clear; add linking cubes carefully and stop tests when a bridge collapses. • Use identical, stable supports on a flat surface; supervise any cutting if used. • Follow school risk-management/CARA requirements and adjust materials/equipment for identified student needs. • No specialised PPE is normally required for the described paper investigations.
Key Vocabulary	material • property • physical change • shape • fold • bend • twist • stretch • scrunch • tear • roll • natural material • fibre • weaving • plaiting • coiling • purpose • suitable • design • strength • structure • prediction • investigation • fair test • measure • method • observation • result • compare • evidence • conclusion • improve
Resources to support knowing and engaging your learners	• Visuals: lesson story visuals, material/property word banks, fair-test model, bridge-design diagrams and class graph. • Stories/texts: The Lost Bridge to Everleaf – Lessons 1–7; approved First Nations resource for Lesson 4. • Hands-on equipment: classroom material samples, paper, paper strips/fibres, identical supports, linking cubes, rulers/tape measures and masking tape. • Recording: Year 2 Chemical Science Investigation Booklet / lesson worksheets. • Accessibility: visual instructions, sentence stems, oral rehearsal, word banks and teacher modelling.

Teaching and Learning Sequence

Lesson	Focus / Big Idea	Pedagogy	Curriculum Links	Learning Intentions	Success Criteria	Differentiation	Hands-On & Adventure Tasks	Science Journal Evidence (Portfolio)	Assessment Links / Evidence Collected	Materials & Resources
Lesson 1 The Valley of Materials	Different materials have different observable properties that influence suitability for a purpose.	Story hook; explicit object → material → property → purpose model; guided material hunt; discussion.	AC9S2U03 AC9S2I01 AC9S2I06	We are learning to identify materials and describe their properties.	I can identify materials. I can describe properties. I can explain why a material may suit a purpose.	Support: real objects, word bank, oral rehearsal. Extension: compare two materials for the same job. Adjust: drawing/scribing/partner talk.	Materials Detective hunt; classify 3 objects; inspect 2 closely; first paper-bridge idea.	Material hunt; property descriptions; first bridge sketch/prediction.	Formative: observation, questioning, worksheet and exit ticket.	Story/visual; classroom objects; worksheet; pencils; optional magnifiers.
Lesson 2 The Paper Forest	Physical actions can change shape/size/form while the material remains the same material.	Story hook; teacher demonstration; before/after model; hands-on manipulation; evidence discussion.	AC9S2U03 AC9S2I03 AC9S2I06	We are learning that materials can be physically changed without becoming a different material.	I can physically change a material. I can describe what changed/stayed the same. I can explain it is still the same material.	Support: action cards and teacher model. Extension: explain which action had greatest effect. Adjust: pre-cut/easier-to-manipulate samples.	Fold, bend, twist, stretch, scrunch, tear and roll; compare flat/folded/rolled/scrunched paper.	Before/after drawing; observations; same-material explanation.	Formative: practical observation, journal evidence and exit ticket.	Story/visual; paper/material samples; worksheet; pencils.
Lesson 3 The Builders' Village	Changing or arranging a material can make it more suitable for a purpose.	Story/problem context; explicit cause-effect model; design construction; prediction from observations.	AC9S2U03 AC9S2H01 AC9S2I01	We are learning that materials can be changed to make them more suitable for a purpose.	I can describe how a material was changed. I can explain how the change helps it do a job. I can make a prediction from observations.	Support: step-by-step design visuals. Extension: justify design using multiple observations. Adjust: partially prepared folds/partner construction.	Make flat, concertina, rolled and folded-beam paper designs; compare forms; predict strongest.	Two purpose examples; prediction and evidence statement.	Formative: design observations, prediction and explanation.	Story/visual; equal A4 sheets; example objects/images; supports; worksheet.
Lesson 4 Wisdom of the Forest Elders	Natural materials can be physically changed and arranged for useful purposes; First Nations knowledge is diverse and place-based.	Story hook plus approved cultural source; explicit respectful context; model one technique; practical investigation.	AC9S2U03 AC9S2H01 AC9S2I03 AC9S2I06	We are learning how Aboriginal and Torres Strait Islander Peoples change natural materials for useful purposes.	I can describe a physical change. I can identify a technique. I can describe what changed and stayed the same.	Support: technique visuals and one guided option. Extension: compare two arrangements. Adjust: larger strips/fibres and peer support.	Choose one classroom model: weaving, twisting, plaiting or coiling; compare before/after.	Before/after drawing; change/same observations; usefulness explanation.	Formative: respectful discussion, observation and worksheet.	Story/visual; approved community/source; paper strips/raffia; technique visuals; worksheet.
Lesson 5 The Scientist's Challenge	Fair investigations change one factor, keep other important conditions the same and measure consistently.	Story dilemma; fair/unfair sorting; explicit variable/control model; guided planning and teacher observation.	AC9S2I01 AC9S2I02 AC9S2I03 AC9S2I05	We are learning how scientists plan safe and fair investigations.	I can suggest steps. I can identify change/same factors. I can explain how to measure strength and work safely.	Support: fair-test checklist and numbered method cards. Extension: identify hidden unfairness. Adjust: oral response/teacher scribe for observation evidence.	Plan "Which paper design will make the strongest bridge?"; standardise paper, supports, gap, cubes and method.	Fair/unfair table; plan; sequenced method; safety; prediction.	Formative/assessment: planning evidence and teacher fair-measurement observation.	Story/visual; identical paper/supports; cubes; ruler; tape; worksheet.
Lesson 6 The Bridge Trials	Fair tests and informal measurements produce evidence that can be recorded, represented and compared.	Story hook; safety/method modelling; collaborative investigation; class graph; evidence-based discussion.	AC9S2U03 AC9S2I02 AC9S2I03 AC9S2I04 AC9S2I05	We are learning to investigate which physical change makes paper strongest.	I can conduct a fair test. I can measure and record observations. I can compare results and use evidence for a conclusion.	Support: assigned group roles and method card. Extension: explain variation between groups. Adjust: adult/peer support for counting/recording.	Test flat, folded, rolled and concertina bridges; add cubes one at a time; record; contribute to class graph.	Results table; observations; strongest design; class graph; conclusion.	Key inquiry evidence: safe/fair procedure, informal measurement, data representation and conclusion.	Story/visual; 4 equal A4 sheets; supports; cubes; ruler/tape; worksheet; class graph.
Lesson 7 The Bridge of Home	Scientific explanations use evidence; scientists compare findings, evaluate fairness, improve methods and ask further questions.	Story conclusion; claim + evidence + science idea model; individual assessment; peer comparison; Expo communication.	AC9S2U03 AC9S2I05 AC9S2I06	We are learning to explain our scientific thinking.	I can explain my discovery using evidence. I can evaluate fairness and compare results. I can suggest an improvement and new question.	Support: sentence stems/word bank/read prompts aloud. Extension: detailed improvement/new variable. Adjust: oral explanation/scribing while preserving student ideas.	Use strongest bridge and results to explain findings; compare another group; Bridge Engineers Expo.	Strongest bridge; physical-change explanation; fairness evaluation; comparison; reflection; new question; final statement.	Summative: individual K&U and inquiry evidence; Expo communication.	Story/visual; completed Lessons 5–6; bridge; class graph; Lesson 7 assessment worksheet.