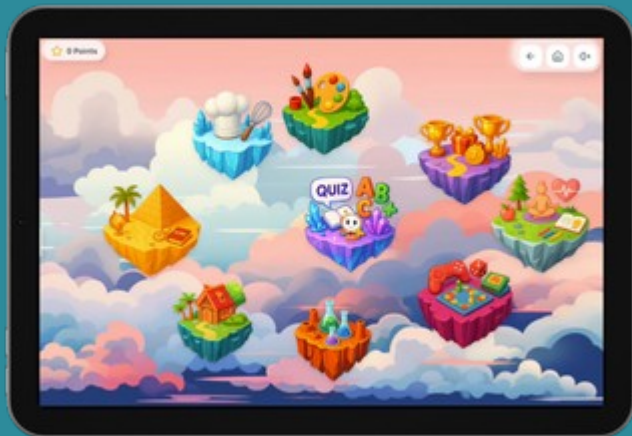




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Changing States - Year 3

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Teacher overview

Changing States – Year 3

Essential question: How does adding or removing heat change solids and liquids?

Ten planned 60-minute lessons cover practical inquiry, state-change models and explanations. The compact route completes the same learning and assessment in eight 60-minute sessions.

Separate editable lesson files and topics:

Changing States – Year 3 – Lesson 01 – Presentation.pptx

Topic: Shape and flow

Changing States – Year 3 – Lesson 02 – Presentation.pptx

Topic: Tricky examples

Changing States – Year 3 – Lesson 03 – Presentation.pptx

Topic: Melting questions

Changing States – Year 3 – Lesson 04 – Presentation.pptx

Topic: Observe melting

Changing States – Year 3 – Lesson 05 – Presentation.pptx

Topic: Removing heat

Changing States – Year 3 – Lesson 06 – Presentation.pptx

Topic: Compare conditions

Changing States – Year 3 – Lesson 07 – Presentation.pptx

Topic: Explain with evidence

Changing States – Year 3 – Lesson 08 – Presentation.pptx

Topic: State-change model

Changing States – Year 3 – Lesson 09 – Presentation.pptx

Topic: Assessment explanation

Changing States – Year 3 – Lesson 10 – Presentation.pptx

Topic: Everyday applications

Each lesson file has a cover, eight teaching slides and a closing slide. The separate editable quiz has eight question/explanation pairs. It supports assessment but does not replace practical inquiry evidence.

Use the lesson pages and compact route for preparation, selected slides, tasks, access choices and assessment. An adult prepares freezing evidence between visits.

Practice values and model answers are examples. Record actual class dates, times and results.

Preparation and participation

Prepare a block, clean flexible sponge, sealed safe thick syrup, water samples, matching transparent cups, shallow trays, equal ice pieces, a timer and an adult-managed safe thermometer. Check material/allergy suitability. Adults pour demonstration water, set up the comfortably warm water bath and handle freezer items. Use suitable freezer containers with expansion space.

No boiling, flames, dry ice, heaters, tasting or unsupervised freezers. Keep observation samples separate from food. Use stable trays, clean spills promptly and wash hands.

Freezing is prepared before class. If dated real stages are unavailable, use clearly labelled model and explain the evidence limit.

Solid: keeps its own shape unless a force changes it. Liquid: flows and takes container shape.

Melting: solid to liquid with heat added. Freezing: liquid to solid with heat removed. State: form of a material. Temperature: how hot or cold something is. Minutes measure time.

Degrees Celsius measure temperature.

A flexible solid remains solid when bent. A thick liquid may flow slowly. Water remains water through melting/freezing. A wider container changes water level, not the amount, when none spills. Particle explanations and gas are outside this Year 3 unit's assessed scope.

Offer fewer samples, picture choices, a vocabulary bank and a guided example where needed. Students may point, gesture, dictate to an adult, use partner-supported choices or a communication device to draw, write or demonstrate. Scribe the student's reasoning without supplying the answer. Encourage another comparison or a justified evidence limitation.

Factual reference for teachers viewing: Australian Academy of Science, Primary Connections, Melting moments <https://primaryconnections.org.au/v84-sequences/melting-moments>. All supplied resource artwork is original.

Lesson 1: Shape and flow

File: Changing States – Year 3 – Lesson 01 – Presentation.pptx

Goal: We will classify safe samples as solid or liquid. We will use shape and flow as evidence.

Before class: Prepare a block, sponge and sealed water; two clear demonstration containers on a tray. Teacher pours the same water without spilling. Ask for predictions before demonstrating.

8 min – Retrieve and question: What happens when we move a sample into a different container? Predict what a wooden block and some water will do.

12 min – Model: A solid keeps its own shape unless a force changes it. A liquid flows and takes the shape of its container.

25 min – Guided then independent task: Safe sample stations: Use a block and a flexible sponge and sealed water. Keep liquids on a tray. Do not open or taste samples. Look at shape and flow. Record on W01.

Your classification: Choose a sample and state your claim. Describe what happened when its container changed. Point, draw, speak, write or use a communication device.

10 min – Evidence explanation: A sound response classifies from shape/flow, not appearance or hardness. Ask the student to cite a particular observed behaviour.

5 min – Exit and cleanup: We need evidence of shape and flow. Colour, size or how full a container looks cannot decide the state. Which sample helped you explain your idea?

Resources: W01, D1/D2 and relevant cards. Use A1/rubric in lessons 9–10.

Access: offer a guided note, speech, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: just a tricky observation, another fair comparison or an evidence limitation.

Lesson 2: Tricky examples

File: Changing States – Year 3 – Lesson 02 – Presentation.pptx

Goal: We will classify a flexible solid and a thick liquid. We will improve a claim when observations disagree with it.

Before class: Prepare a clean sponge and sealed safe thick syrup. Check allergies even though samples are not tasted. Show flow by tilting the closed bottle, and bending a sponge gently.

8 min – Retrieve and question: A student says, “Every solid is hard.” Predict whether a clean sponge supports this claim.

12 min – Model: A sponge can bend or squash when a force acts on it. It keeps its own shape when left alone. It is a solid. Hardness alone does not identify a solid.

25 min – Guided then independent task: Evidence for each claim: Compare the block, sponge, water and thick syrup. Use C1 cards 1–4 and W02. Give a state and an observation for each sample.

Changing an explanation: First idea: every liquid flows quickly. New observation: thick syrup flows slowly. Better idea: liquids flow, but their flow speeds can differ.

10 min – Evidence explanation: Look for an explanation that a force bends a solid and thick liquid still flows. Ask how observations improved the first hard-only or fast-only claim.

5 min – Exit and cleanup: A bent sponge remains a solid. A force changed its shape. We use observations to revise an explanation. Have a tricky example and the evidence that classifies it.

Resources: W02, D1 and relevant C1 cards. Use A1/rubric in lessons 9–10.

Access: offer a guided first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Lesson 3: Melting questions

File: Changing States – Year 3 – Lesson 03 – Presentation.pptx

Goal: We will ask a testable question about ice. We will predict an observable change and plan a safe method.

Before class: Prepare a single ice cup, tray and timer. Agree observations at 0, 2, 4, 6, 8 and 10 minutes. Plan a clear observation question rather than a guaranteed melting time.

8 min – Retrieve and question: Ice is solid water. Water in a cup is liquid water. What might happen when the ice receives heat?

12 min – Model: What changes can we observe as ice melts in a tray? Predict changes in shape, remaining ice and liquid water. Explain your prediction using an earlier observation.

25 min – Guided then independent task: Careful records: Use drawing for notes at 0, 2, 4, 6, 8 and 10 minutes. Record what you see, including any ice that remains. Complete W03. We cannot promise a melting time.

Safe handling: No boiling water, flames, dry ice or testing on the tray and wipe spills promptly. An adult prepares and handles freezer items.

10 min – Evidence explanation: The question has observable changes and the prediction has a reason. The plan includes safe handling, timing and an honest result record.

5 min – Exit and cleanup: We can observe shape, remaining ice and liquid water. Keep the prediction separate from the results. What evidence could change your prediction?

Resources: W03, D1/D2 and relevant cards. Use A1/rubric in lessons 9–10.

Access: offer a guided note template, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: just a tricky observation, another fair comparison or an evidence limitation.

Lesson 4: Observe melting

File: Changing States – Year 3 – Lesson 04 – Presentation.pptx

Goal: We will observe ice at consistent times. We will compare our results with our prediction.

Before class: Use the agreed cup/tray/timer method. Record the actual date, location and starting sample. Adults check any thermometer. Ice still present after ten minutes is a valid result.

8 min – Retrieve and question: Return to W03. What did you predict? Keep the prediction even if today's observations differ.

12 min – Model: Place the ice cup on its tray. Start the timer at 0. Keep the location and cup unchanged. Observe at 0, 2, 4, 6, 8 and 10 minutes.

25 min – Guided then independent task: Our records: Use W04. Draw a picture of the remaining ice and liquid. Record the actual date and conditions. Do not invent values or copy a model as your results.

A result can vary: Some ice may remain after 10 minutes. Record that. One classroom observation cannot prove all ice melts at the same speed. We can continue observing later if the teacher chooses.

10 min – Evidence explanation: Look for consistent timed records, careful units and a comparison with the prediction. Do not require a particular melting pattern.

5 min – Exit and cleanup: Keep observation water away from mouths and food. Wipe spills and dry the workspace. Wash hands. Note change you actually observed.

Resources: W04, D1/D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55, D56, D57, D58, D59, D60, D61, D62, D63, D64, D65, D66, D67, D68, D69, D70, D71, D72, D73, D74, D75, D76, D77, D78, D79, D80, D81, D82, D83, D84, D85, D86, D87, D88, D89, D90, D91, D92, D93, D94, D95, D96, D97, D98, D99, D100, D101, D102, D103, D104, D105, D106, D107, D108, D109, D110, D111, D112, D113, D114, D115, D116, D117, D118, D119, D120, D121, D122, D123, D124, D125, D126, D127, D128, D129, D130, D131, D132, D133, D134, D135, D136, D137, D138, D139, D140, D141, D142, D143, D144, D145, D146, D147, D148, D149, D150, D151, D152, D153, D154, D155, D156, D157, D158, D159, D160, D161, D162, D163, D164, D165, D166, D167, D168, D169, D170, D171, D172, D173, D174, D175, D176, D177, D178, D179, D180, D181, D182, 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Lesson 5: Removing heat

File: Changing States – Year 3 – Lesson 05 – Presentation.pptx

Goal: We will use dated evidence to explain freezing. We will connect removing heat with liquid becoming solid.

Before class: Before teaching, an adult records liquid water, date/time and suitable container. After freezer storage, record the real ice stage and date/time. Retain the same sample identity. Freezing may take hours between visits.

8 min – Retrieve and question: Melting changes ice into liquid water when heat is added. Freezing changes liquid water into ice when heat is removed.

12 min – Model: An adult prepares a labelled water sample before class. The adult records a real date and time before and after freezer storage. Freezing happens between visits, not instantly on request.

25 min – Guided then independent task: Your sequence use W05. Draw and describe both dated stages. Label freezing and heat removed. If no dated evidence is available, mark the sequence as a model.

A limit of our evidence: We have before-and-after stages. They do not tell us the exact instant the whole sample froze. The teacher manages the appliance and avoids overfilled sealed containers.

10 min – Evidence explanation: Look for liquid-to-solid, heat removed, water remains water and dates/time or clear model labels. Before/after stages do not identify the exact freezing instant.

5 min – Exit and clean up: What moved out of the water as it cooled. Liquid water became solid water. Explain what changed and what stayed the same.

Resources: W05, W06, W07, W08, W09, W10, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, W21, W22 and relevant C1 cards. Use A1/rubric in lessons 9–10.

Access: offer a guided first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Lesson 6: Compare conditions

File: Changing States – Year 3 – Lesson 06 – Presentation.pptx

Goal: We will plan and carry out a fair melting comparison. We will measure time and record the method honestly.

Before class: Use equal starting ice pieces and matching cups. One rests in room surroundings and the other in a shallow comfortably warm water bath set up by the adult. Start together and keep intervals alike. No Sun, heaters or boiling water.

8 min – Retrieve and question: Does ice melt differently in two safe conditions? Compare a cup resting in the room with a matching cup in a shallow bath of comfortably warm water. The teacher chooses and checks the safe water temperature.

12 min – Model: Change: the surroundings of the cup. Keep alike: starting ice size, cup type, start time and observing intervals. Keep both cups on trays, no direct sunlight or heaters.

25 min – Guided then independent task: Our method: Start both trials together. Observe every 2 minutes for 10 minutes. Record remaining ice and liquid. W06: Keep the warm bath condition in the method. Do not stir just one cup.

Our measurements: Minutes measure time. A thermometer gives temperature in °C. Record only temperatures actually measured. Our bath can cool, so record this as a limitation.

10 min – Evidence explanation: Look for named changed condition and equal starting size, cups, start and intervals. An accidental difference is recorded as a limit, not concealed.

5 min – Exit and cleanup: A result supports a claim about this comparison. Repeating with fresh equal pieces could be the pattern. Do not claim we repeated a trial unless we did.

Resources: W05, D1/2 and relevant C1 cards. Use A1/rubric in lessons 9–10.

Access: offer a quick first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Lesson 7: Explain with evidence

File: Changing States – Year 3 – Lesson 07 – Presentation.pptx

Goal: We will use tables and a simple graph to explain a result. We will distinguish measured evidence from practice data.

Before class: Bring W06 real records. Use the explicitly illustrative 12-minute/8-minute example only for practising a table and graph. The class trial may give another result or unfinished melting.

8 min – Retrieve and question: Read your W06 record. Compare the cups at the same time. Use a specific observation to support your explanation.

12 min – Model: Practice only: these values are invented for learning. Both trials use equal starting ice pieces. A: all ice melted at 12 min. B: all ice melted at 8 min.

25 min – Guided then independent task: Reading the practice pattern: The practice example shows B took less time. This is consistent with more rapid heat transfer of the ice in the warmer condition. The example is not a classroom measurement.

Heat and temperature: Heat transfers from warmer surroundings to cooler ice. Temperature tells us how hot or cold a sample is. An 8-minute time is not an 8-degree temperature.

10 min – Evidence explanation: Look for an accurate table/column graph, time rather than temperature units, specific evidence for a conclusion and one relevant limitation.

5 min – Exit and cleanup: Use this sentence: “I think ... because at ... min I observed ...”. Explain whether your evidence changed your idea. Name a useful follow-up question.

Resources: W07, D1/D2, evidence, C1 cards. Use A1/rubric in lessons 9–10.

Access: offer guided first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Lesson 8: State-change model

File: Changing States – Year 3 – Lesson 08 – Presentation.pptx

Goal: We will make a model of water in two states. We will show both changes and explain a model's limits.

Before class: Bring genuine melting records and adult dated freezing stages or labelled models. Show D1/D2 as original explanatory models. Help students annotate two state-change arrows on W08.

8 min – Retrieve and question: Ice is solid water. Melted ice is liquid water. The state changes while the material remains water.

12 min – Model: Draw ice and liquid water. An arrow from ice to water says “melting, heat added”. An arrow back says “freezing, heat removed”.

25 min – Guided then independent task: Your annotated model: Use W08. Add the two states and both labelled arrows. Show that both are water. Explain one limitation, such as no real timing shown.

A practical need: A reusable cold pack contains a sealed salt water sample in this model. An adult prepares it in a suitable freezer container. Keeping it cold can slow melting during transport.

10 min – Evidence explanation: Look for both arrow directions, heat added/removed and the same material. A useful model has a limit such as no exact timing.

5 min – Exit and cleanup: The return arrow shows freezing as heat leaves the water. Our model shows relationships, not exact timing. Give one useful use and one limit of the model.

Resources: W08, D1/D2 and relevant C1 cards. Use A1/rubric in lessons 9–10.

Access: offer a guided first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Lesson 9: Assessment explanation

File: Changing States – Year 3 – Lesson 09 – Presentation.pptx

Goal: We will explain states and changes using our own evidence. We will correct a claim and evaluate our investigation.

Before class: Prepare each student's portfolio and A1. Use supported small-group/adult responses during the task block so all students demonstrate the criteria. Avoid requiring a long class presentation.

8 min – Retrieve and question: A student says, "Ice turns into a new substance when it melts." Choose evidence that could help you respond. Practise a short explanation on W09.

12 min – Model: "Ice and liquid water are both water. I observed solid ice become liquid as it received heat. The state changed, while the material stayed water."

25 min – Guided then independent task: Your evidence confidently explain your model to a partner or adult. Point, demonstrate, draw, speak, write or use a communication device. An adult can scribe your explanation without giving the science answer.

Our method and limits: Name what changed and what stayed the same in your comparison.

Refer to an actual record. Explain a limitation. Say how a repeat or another question could strengthen the explanation.

10 min – Evidence explanation: Look for each assessment criterion using the portfolio and accessible explanation, including correcting the new-substance claim and evaluating the method.

5 min – Exit and cleanup: Science explanations can improve when new evidence appears.

Public speaking and handwriting do not decide the science result. Choose one part of your explanation to display.

Resources: W09, W02 and relevant C1 cards. Use A1/rubric in lessons 9–10.

Access: offer a guided first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Lesson 10: Everyday applications

File: Changing States – Year 3 – Lesson 10 – Presentation.pptx

Goal: We will use a state-change explanation to solve a storage problem. We will explain what our advice can and cannot promise.

Before class: Use the fictional sealed frozen water-pack storage choices and the adult water-to-ice tray scenario. No practical storage duration or food-safety guarantee follows from this lesson.

8 min – Retrieve and question: A class carries a sealed frozen water pack to an outdoor activity. They can use an insulated bag or leave it beside a warm window. Which choice would help the pack stay solid for longer?

12 min – Model: Warmer surroundings transfer heat to the cooler pack. An insulated bag can slow that transfer. The pack can still melt eventually.

25 min – Guided then independent task: Your application. Use W10 to recommend a safe storage choice. Explain heat transfer and the change it can slow. Give one limit and a question for further evidence.

A second fictional case: An adult wants a tray of liquid water to become ice. Explain which appliance condition removes heat. An adult needs suitable freezer containers and allows enough time.

10 min – Evidence explanation: Look for a reasoned storage choice, heat-transfer explanation, new freezing application and a useful limit or next question.

5 min – Exit and cleanup: Explain why the frozen pack remains water when it melts. Tell how evidence helped you revise a claim. State one way this science helps a practical decision.

Resources: W10, D102 and relevant C1 cards. Use A1/rubric in lessons 9–10.

Access: offer a guided first response, picture/word choices, practical demonstration or a scribed explanation. Retain the same science expectation.

Challenge: justify a tricky observation, another fair comparison or an evidence limitation.

Compact route: sessions 1-4

Each compact session uses 5 minutes retrieval, 10 minutes model, 30 minutes practical/application, 10 minutes evidence conference and 5 minutes cleanup. Preparation and freezing elapsed time happen outside the 60-minute meeting.

Session 1 combines lessons 1 and 2. Open with lesson 1 slides 1-2. Use lesson 1 slides 3-6 for shape/flow, then lesson 2 slides 3-7 for tricky examples and revising a claim. Compare all samples in one station activity. Use selected W01/W02 evidence without duplicate recording. Close with one shared check/reflection. Collect property-based classification and a changed explanation.

Session 2 uses lesson 3. Teach the question, reasoned prediction and safe observation plan. Use W03. Retain real preparation and observation windows. Collect one openable question and reasoned prediction.

Session 3 uses lesson 4. Observe ice on the agreed intervals and record actual findings on W04. Compare with predictions and discuss safety method limits. A result with ice remaining is valid.

Session 4 uses lesson 5. Sequence the adult's recalled before/after freezing stages on W05, or explicitly label a model when these are unavailable. Teach heat removed and water remaining water. Assess safe preparation and evidence limits.

Use one opening and closing in the combined session, not two complete decks end-to-end. All ten files remain available for the full route.

Compact route: sessions 5-8

Session 5 uses lesson 6 and W06. Conduct the scaffolded fair comparison with equal pieces, matching cups, shared start and intervals. Adults manage the safe warm bath and thermometer. Collect actual records, time/temperature units and a method/fairness trace.

Session 6 uses lesson 7 and W07. Explain the real comparison first. Practise graph reading with the labelled illustrative 12/8-minute example. Collect a representation, evidence-based conclusion, revised explanation and limitation. Never present the practice values as class results.

Session 7 uses lesson 8 and W08. Make the two-state water model with both heat labels. Link each arrow to observation/dated evidence and name a model limit. Apply the science to the frozen water pack. Select the already-collected portfolio evidence for assessment.

Session 8 combines lessons 9 and 10. Open with lesson 9 slides 1-2. Use lesson 9 slides 3-7 to correct the claim and explain portfolio evidence, then lesson 10 slides 1-2 for storage application and adult water-to-ice transfer. Use A to select W09/W10 and the rubric. End with one reflection/closing. No new practical heating, freezing trial or particle requirement. All students show the complete state/change/inquiry assessment by session 8. During the 30-minute task, collect short oral-to-adult, draw, written, demonstrated or device-supported explanations. Combine them with already-observed portfolio evidence. Small-group/adult conferences avoid requiring every student to present publicly within ten minutes.

Teaching trace: questioning/prediction in sessions 1-2; safe fair planning in 2-5; measurements in 2 and representations in 3-7; evaluation in 6-8; practical usefulness in 7-8; communication in 8. The same essential assessment applies to both routes.

Teacher key: cards and game

Case cards are original illustrative models. They support observation and reasoning but are not dated photographs or class results.

C1-01 / challenge 1: solid block, evidence that its shape remains when moved.

C1-02 / challenge 2: a sponge remains solid. A force can change a solid's shape. Hardness alone is not the criterion.

C1-03 / challenge 3: a thick liquid can flow slowly and take container shape. Fast flow is not necessary.

C1-04 and C1-08 / challenge 4: the water shape and level change with the new container. Its amount remains the same in the spill-free comparison.

C1-05 and C1-06 / challenge 5: solid and liquid water are the same material. Melting changes state when heat is added.

C1-07 / challenge 6: freezing needs heat removed. Real before/after evidence needs the adult's actual date/time records. A model cannot simply use observations.

Challenge 7: make equal starting pieces, matching cups, a solid start and intervals. Change surroundings only. Discuss remaining differences, such as cooling bath water.

Challenge 8: an insulated bag may slow heat transfer and melting. The pack can still melt. No exact duration follows from the classroom trial. Accept another safe, scientifically justified storage choice.

Run G1 cooperatively with 2-4 players. No counter or pointing, no speed/competition requirement. At each turn, hear a claim, relevant evidence and one respectful question. Use these criteria to check and advise together. Go through the six board stops and return from Reflect to Notice with another card. Participation mode does not alter the science criterion. Use D2 to show how an observation supports an explanation. The ten red companions give model reasoning, not a required prediction or a real measured result. W04/W06 result cells stay blank for the class's own observations.

Assessment and response guide

Collect diagnostic evidence in lessons 1–2, method/records in lessons 3–6, representation/explanation in lessons 7–8 and concise assessment/application in lessons 9–10. In the compact route collect the equivalent traces across sessions 1–8.

A1 page 1: classify a tricky sample using shape/flow, show both water states and both heat directions, link melting observations and dated freezing stages, and explain that the material remains water. A model is clearly labelled when actual freezing evidence is unavailable. Use only stages actually captured; unused date/time rows stay blank.

A1 page 2: state a question/prediction, safe method and controlled comparison, cite an actual observation, and explain a limit. Apply the science to the new situation: adult water-to-ice tray. Expected reasoning: a suitable freezer removes heat, liquid becomes solid, an adult handles the appliance/container, and freezing takes elapsed time rather than an instant classroom result.

Use R1 for four dimensions: accurate understanding, evidence/process, explanation/use and reflection. Look for independent science contribution while using access supports. Scribing, pictures, gestures or a communication device do not automatically lower achievement. Do not score neatness, writing volume or confidence.

Probe: What is your idea? Which observation supports it? What changed and stayed alike? What can the evidence not tell us? What would help answer a next question?

Quiz anchors: 1 same water/new state/new container shape/same amount if none spills; 3 force can bend a solid; 4 freezing removes heat; 5 unequal pieces confound comparison; 6 B is 4 minutes quicker; 7 illustrative practice data only; 7 insulation can slow heat transfer without promising duration; 8 a model lacks real dated/timed evidence. Accept accurate equivalent explanations.

A quiz score alone cannot replace the practical/portfolio evidence. For a large class, collect accessible short responses during task time and add teacher observations rather than making learning depend on one public conference slot.

Changing States - Key Ideas

Year 3

Solid

Keeps its own shape unless a force changes it.



Solid keeps its shape.

Liquid

Flows and takes its container shape.



Same liquid. Different container shape.

Melt

A solid becomes liquid as heat is added.



Heat changes a solid to liquid.

Freeze

A liquid becomes solid as heat is removed.



Cooling changes a liquid to a solid.

State

The form of a material, such as solid or liquid.



solid

liquid

Same material. Different state.

Temperature

The measure of how hot or cold something is.

Higher temperature is hotter. Lower temperature is colder.



How We Explain Our Evidence Year 3

We can ask a question, collect evidence and explain what it means.

1 Question

Has ice become a different substance when it melts?



This is ice.
It is a solid.

2 Evidence

Solid ice changes into liquid water as heat is added.



The ice is melting.
It is changing from a solid to a liquid.

3 Explanation

The state changed.
Both ice and liquid water are water.



This is liquid water. It is still water.

Think again

A model shows an idea.
Real observations need their own records.

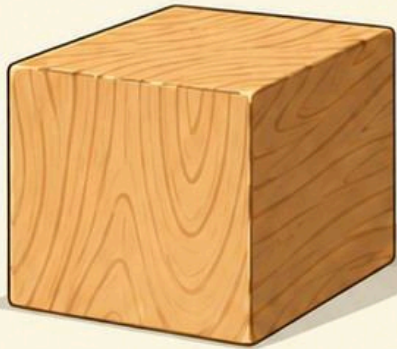
Models help us think, but we still need to observe and record for ourselves.

Case and Source Cards

Original illustrative models - Year 3

C1-01

Block



A wooden block keeps its shape when moved to another container.

What evidence shows it is solid?

C1-02

Sponge



A force can squish a clean sponge. It keeps its own shape when left alone.

Why can a soft object be solid?

C1-03

Thick Syrup



A sealed safe thick liquid flows slowly when tilted.

Is fast flow necessary for a liquid?

C1-04

Water



Water flows into the shape of a new container.

What property helps classify it?

Case and Source Cards

Original illustrative models - Year 3

C1-05

Ice

Ice is solid water.
It keeps its own shape
until it changes.

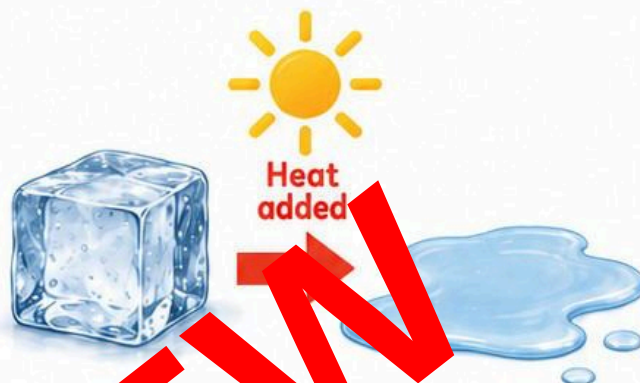


Which state is it?

C1-06

Melting

Heat added can change
solid ice into liquid water.

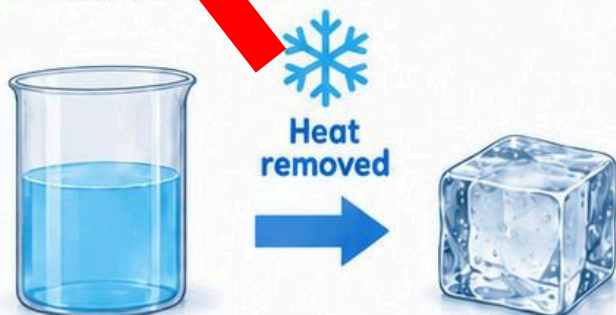


What stays the same?

C1-07

Freezing

Heat removed can change
liquid water into solid ice.
An adult prepares this
between 10 and 15°C.

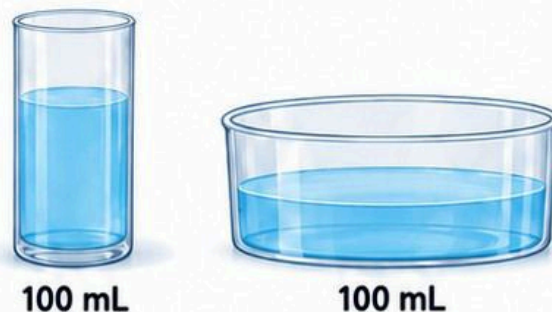


Which evidence would need
dates and times?

C1-08

Amount

The same water is poured without
spilling into a wider container.
Its level changes, but its amount
stays the same.



Why could the level mislead us?



Evidence Trail - Rules

Year 3

Explore. Think. Use evidence. Learn together.



How to play

Players: 2-4.

Use a large counter or point. No race.

- 1 Begin at Notice.**
Draw a challenge card.
- 2 Give a response using evidence.**
Speak, point, draw or use your communication device.
- 3 A partner asks one respectful question.**
- 4 Use the teacher guide to check the science.**
Revise together.
- 5 Move to the next stop.**
After Reflect, choose another card and return to Notice.



Worked turn

Card 2 asks about a sponge.



Response: A sponge can bend under a force and still be solid.

Question: What does it do when left alone?

Evidence: It keeps its own shape.

Remember

- ✓ Everyone can respond at their own pace.
- ✓ Use C1 cards to help.



Evidence Trail

Follow the path together.





Evidence Trail - Challenge Cards

Think. Observe. Give evidence. Explain your ideas.

Small questions.
Big thinking!

- 1** C1-01: Classify the block.
Give evidence.



- 2** C1-02: Explain why a sponge can be solid.



- 3** C1-03: Correct "All liquids flow quickly."



- 4** C1-04 and C1-05: What changes after a spillage pour?
What stays the same?



- 5** C1-05 and C1-06: Has melting made a new substance?



- 6** C1-07: Which change needs heat removed?



- 7** Two ice cups have unequal starting pieces. How could we make the comparison fairer?



- 8** A frozen water pack warms during transport. Suggest a storage choice and one limit.



PREVIEW

Shape and Flow

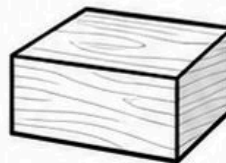


W01 - Year 3

Name: _____ Date: _____

NOTICE:

Predict what each sample will do in a different container.



1. What do you predict the block will do in a different container?

2. What do you predict the water will do in a different container?

RECORD:

Sample	Shape or how observed	Solid or liquid
Block		
Water		

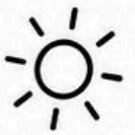
EXPLAIN:

Choose one sample. What observation supports your classification?



Point, draw, speak or write your evidence.

Shape and Flow

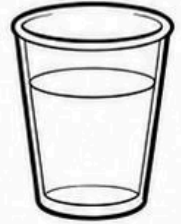
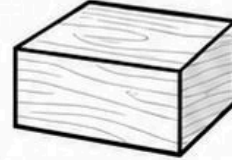


W01 - Year 3

Name: **ANSWERS** Date: _____

NOTICE:

Predict what each sample will do in a different container.



1. What do you predict the block will do in a different container?

It will keep its own shape.

2. What do you predict the water will do in a different container?

It will flow and change to the new container shape.

RECORD:

Sample	Shape or how observed	Solid or liquid
Block	Keeps its own shape.	Solid
Water	Flow and changes to the new container shape.	Liquid

EXPLAIN:

Choose one sample. What observation supports your classification?

Sample reasoning: I classified water as liquid because it flowed to fit the new container.



Point, draw, speak or write your evidence.

Tricky Examples

W02 - Year 3

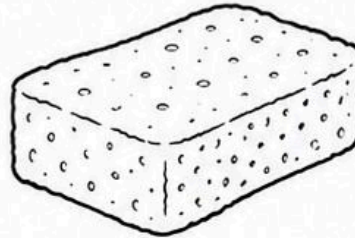
Name: _____

Date: _____

NOTICE: C1-02 and C1-03.

A sponge can squash.

Thick syrup flows slowly.



RECORD:

Sponge

My state and evidence:

Thick Syrup

My state and evidence:

EXPLAIN:

Correct this claim: "Every solid is hard and every liquid flows quickly."

CHALLENGE:

What would you observe if the appearance confused you?

Tricky Examples

W02 - Year 3

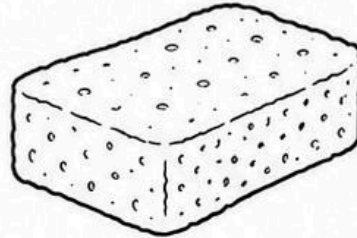
Name: **ANSWERS**

Date: _____

NOTICE: C1-02 and C1-03.

A sponge can squash.

Thick syrup flows slowly.



RECORD:

Sponge

My state and evidence:

Solid; it keeps its shape
unless a force changes it.

Thick syrup

My state and evidence:

Liquid; it flows slowly and
takes its container shape.

EXPLAIN:

Correct this claim: "Every solid is hard and every liquid flows quickly."

A solid can be soft or flexible. A liquid can flow slowly.

CHALLENGE:

What would you observe if the appearance confused you?

Observe shape and flow when the container changes.

Sukindi Year 3

Melting Questions

Name: _____

Date: _____



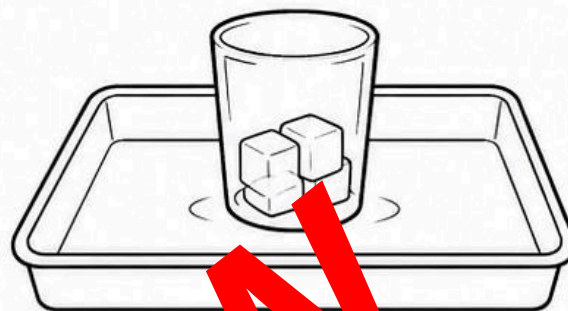
Our question: What changes as ice melts in a tray?

PREDICTION

What do you think will happen?

Why do you think this?

Our safe cup and tray setup.



PLAN

Draw and label how we will set up the investigation.

PREVIEW

RECORD PLAN

Observe at 0, 2, 4, 6, 8 and 10 minutes.
Keep the cup and location unchanged.



Keep the cup and location unchanged for all observations.

EXPLAIN

Which changes will we look for?

Safety reminder



- No tasting or heaters.
- An adult handles freezer items.

Sukindi Year 3

Melting Questions

Name: **ANSWERS**

Date: _____



Our question: What changes as ice melts in a tray?

PREDICTION

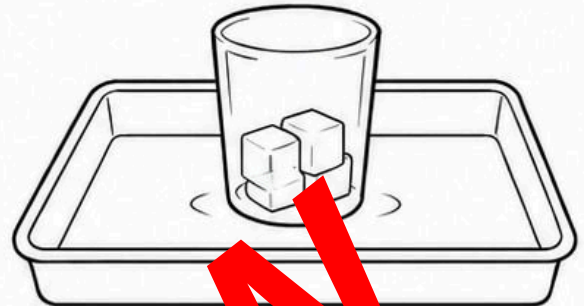
What do you think will happen?

Sample: Smaller ice and liquid water.

Why do you think this?

Heat moves from room air to the ice.

Our safe cup and tray setup.



PLAN

Draw and label how we will set up the investigation.

Model



RECORD PLAN

Observe at 0, 2, 4, 6, 8 and 10 minutes.
Keep the cup and location unchanged.



Keep the cup and location unchanged for all observations.

EXPLAIN

Which changes will we look for?

Remaining ice.

Liquid water.

Shape of the ice.

Safety reminder



- No tasting or heaters.
- An adult handles freezer items.

Observe Melting

W04 - Year 3

Name: _____

Date: _____

Location/conditions: _____

Starting ice description: _____

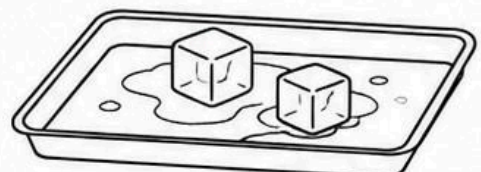
Time (min)	Remaining ice and liquid observed
0	
2	
4	
6	
8	
10	

Teacher-measured temperature (°C) if available: _____

EXPLAIN: How did the observation compare with your prediction?

LIMIT: What can this one observation not tell us?

Actual class observations only.
Ice may remain. Do not taste.



Observe Melting

W04 - Year 3

Name: **ANSWERS**

Date: _____

Location/conditions: _____

Starting ice description: _____

Time (min)	Remaining ice and liquid observed
0	
2	
4	
6	
8	
10	

Teacher-measured temperature (°C) if available: _____

EXPLAIN: How did the observation compare with your prediction?

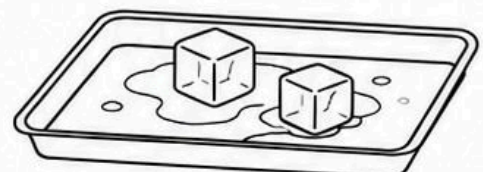
Use your own actual observations.

State whether they matched your prediction and give a record.

LIMIT: What can this one observation not tell us?

One trial cannot tell every melting time.

Actual class observations only.
Ice may remain. Do not taste.



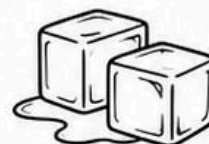
Removing Heat

Name: _____ Date: _____

NOTICE: Use the adult's dated water-to-ice evidence. If it is a model, label it **Model**.**Before**

Date: _____

Time: _____

After

Date: _____

Time: _____

RECORD:State before: _____State after: _____

Heat added or removed? _____

EXPLAIN:

What changed? _____

What stayed the same material? _____

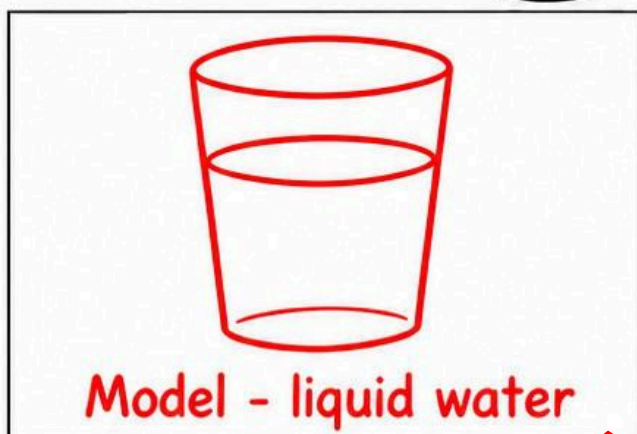
LIMIT:

Can these two stages tell the exact freezing time? Explain.

Removing Heat

Name: ANSWERS

Date: _____

NOTICE: Use the adult's dated water-to-ice evidence. If it is a model, label it **Model**.**Before****Model - liquid water**

Date: _____

Time: _____

After**Model - solid water**

Date: _____

Time: _____

RECORD:State before: liquidState after: solidHeat added or removed? heat removed**EXPLAIN:**What changed? The state changed.What stayed the same material? Both are water.**LIMIT:**

Can these two stages tell the exact freezing time? Explain.

These stages do not show the exact freezing time.

Compare Conditions

Year 3 W06

Name: _____

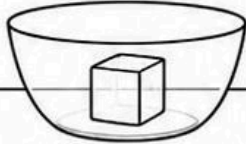
Date: _____

PLAN

Our question: _____

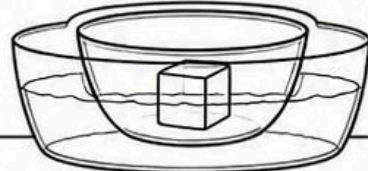
Our prediction: _____

A: room surroundings



Ice in a bowl at room temperature.

B: safe warmer surroundings



Ice in a bowl in a comfortably warm water bath (set up by an adult).

What changes? _____

What stays alike? _____

Time (min)	A: remaining ice	B: remaining ice
0		
2		
4		
6		
8		
10		

Adult-measured temperatures (°C), if available: A: _____ B: _____

EXPLAIN

Compare both at one shared time.

LIMIT

What may make this comparison less fair?

Safety

The adult sets up the comfortably warm water bath. No heaters or tasting.

Compare Conditions

Year 3 W06

Name: **ANSWERS**

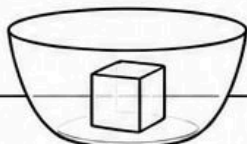
Date: _____

PLAN

Our question: **Does warmth affect melting?**

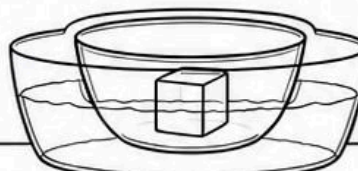
Our prediction: **B may melt sooner as it receives heat faster.**

A: room surroundings



Ice in a bowl at room temperature.

B: safe warmer surroundings



Ice in a bowl in a comfortably warm water bath (set up by an adult).

What changes? **Surroundings.**

What stays alike? **Ice size, cup, start time and intervals.**

Time (min)	A: remaining ice	B: remaining ice
0		
2		
4		
6		
8		
10		

Adult-measured temperatures (°C), if available: A: _____ B: _____

EXPLAIN

Compare both at one shared time.

Use your actual comparison at one shared time.

LIMIT

What may make this comparison less fair?

Unequal ice or a cooling bath can affect fairness.

Safety

The adult sets up the comfortably warm water bath. No heaters or tasting.

Name: _____

Date: _____

Explain with Evidence, W07 - Year 3

ILLUSTRATIVE PRACTICE DATA - NOT CLASS MEASUREMENTS

Ice cubes were left in two different conditions. The table shows the time taken for all the ice to melt.

Condition	Time to all ice melted (min)
A: room surroundings	12
B: safe warmer surroundings	8

1. Draw a column for each time on the graph.



2. **EXPLAIN:** Which took less time? Use the values from the table.

3. **LIMIT:** What can these practice values not prove?

Name: **ANSWERS**

Date: _____

Explain with Evidence, W07 - Year 3

ILLUSTRATIVE PRACTICE DATA - NOT CLASS MEASUREMENTS

Ice cubes were left in two different conditions. The table shows the time taken for all the ice to melt.

Condition	Time to all ice melted (min)
A: room surroundings	12
B: safe warmer surroundings	8

1. Draw a column for each time on the graph.



2. **EXPLAIN:** Which took less time? Use the values from the table.

B took 8 min, which is 4 min less than A in this practice example.

3. **LIMIT:** What can these practice values not prove?

These are illustrative values. They do not prove our classroom result or every melting time.

Name: _____ Date: _____

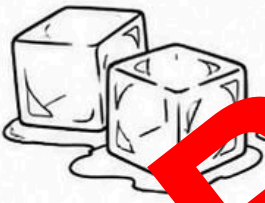
State-Change Model

Use an original model of water in two states.
Both are water.

Draw ice and liquid water.

melting
→
with heat added

freezing
←
with heat removed



EVIDENCE:

Which observation supports each arrow?

LIMIT:

What does your model leave out?

A model is not a photograph or a timed measurement.

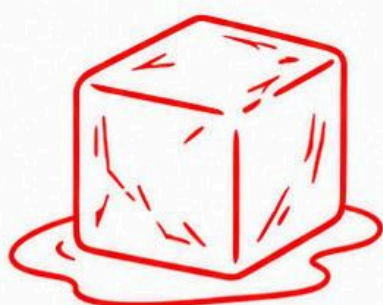
Name: **ANSWERS**

Date: _____

State-Change Model

Use an original model of water in two states.
Both are water.

Draw ice and liquid water.



**solid water
(ice)**

melting
→
with heat added



liquid water

freezing
←
with heat removed

Both are water.



EVIDENCE:

Which observation supports each arrow?

Our ice observation

supports melting.

The adult's dated stages

support freezing.

LIMIT:

What does your model leave out?

The model does not show

actual timing or all conditions.

A model is not a photograph or a timed measurement.

Assessment Explanation

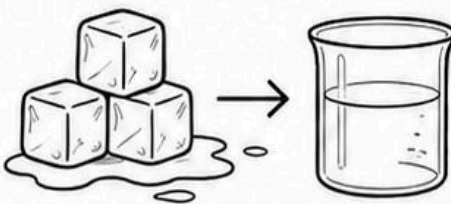
W09 - Year 3

Name: _____

Date: _____

NOTICE:

A student says, "Melting ice creates a new substance."



Do you agree?
What do you think?

1 RECORD: My correction.

Write a clear and accurate correction to the student's statement.



2 My supporting observation or model.

Show your evidence. You can draw, label, or write about what you observed or modelled.
Use the space below.

PREVIEW



Show, point, draw, speak, write or use your device.

3 EXPLAIN: What changed? What stayed the same?

Use your evidence to explain what changed and what stayed the same.



4 REFLECT: One limit of my evidence and one useful further question.

Name one limit and one useful further question.



Assessment Explanation

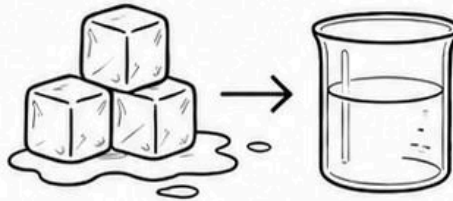
W09 - Year 3

Name: **ANSWERS**

Date: _____

NOTICE:

A student says, "Melting ice creates a new substance."



Do you agree?
What do you think?

1 RECORD: My correction.

Write a clear and accurate correction to the student's statement.



Ice and liquid water are both water.

The state changes, not the material.

2 My supporting observation or model.

Show your evidence. You can draw, label, or write about what you observed or modelled.
Use the space below.

MODEL



Show, point, draw, speak, write or use your device.

3 EXPLAIN: What changed? What stayed the same?

Use your evidence to explain what changed and what stayed the same.



Heat added can melt solid water into liquid water.

4 REFLECT: One limit of my evidence and one useful further question.

Name one limit and one useful further question.



A model cannot show the exact time.

How could we record the change more carefully?

Name: _____

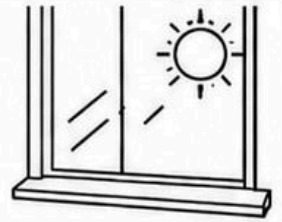
Date: _____

Everyday Applications

W10 – Year 3

FICTIONAL CASE:

A class carries a sealed frozen water pack.
It can use an insulated bag or leave it
beside a warm window.



1 PLAN: My storage choice

What will I do with the frozen water pack? Write your plan.

2 RECORD: How does heat affect the pack?

Draw or describe what happens to the frozen water pack over time.

3 EXPLAIN: Which state change could my choice slow? Why?

Name the state change and explain why your choice might slow it down.

4 LIMIT: What can I not promise about this choice?

What is one thing you cannot be sure about?

5 FURTHER QUESTION: What evidence would help?

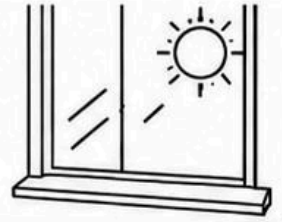
What could you observe or measure to find out more?

Everyday Applications

W10 – Year 3

FICTIONAL CASE:

A class carries a sealed frozen water pack. It can use an insulated bag or leave it beside a warm window.

**1 PLAN: My storage choice**

What will I do with the frozen water pack? Write your plan.

I will put the frozen water pack in an insulated bag.

2 RECORD: How does heat affect the pack?

Draw or describe what happens to the frozen water pack over time.

Sample:

Insulated bag



Sealed frozen water pack

3 EXPLAIN: Which state change could my choice slow? Why?

Name the state change and explain why your choice might slow it down.

Melting (solid to liquid). Insulation can slow heat transfer from warmer surroundings and slow melting.

4 LIMIT: What can I not promise about this choice?

What is one thing you cannot be sure about?

It can still melt. We cannot promise an exact duration.

5 FURTHER QUESTION: What evidence would help?

What could you observe or measure to find out more?

How long does an equal pack remain solid in each safe condition? (Sample reasoning)

Changing States – My Evidence

Name: _____

Date: _____

Task: Explain solid/liquid properties and melting/freezing using your portfolio and a model.

You can: Speak, draw, demonstrate, write or use a communication device.



Speak



Draw



Demonstrate



Write



Use a communication device

1 CLASSIFICATION

Choose a flexible **solid** or a thick liquid.

Name the material: _____

State whether it is a solid or a liquid: _____

What can you observe? (evidence)

1. _____
2. _____
3. _____
4. _____



modelling clay
(flexible solid)



honey
(thick liquid)



playdough
(flexible solid)

You may choose a different material.

2 BOTH CHANGES

Draw or label both changes of water. Show the direction of change for each.

3 MY EVIDENCE

My actual melting record

Date: _____

Adult's freezing stages (actual evidence).

Stage 1 Date: _____ Time: _____

Stage 2 Date: _____ Time: _____

Stage 3 Date: _____ Time: _____

☐

Model (no actual dated stages)

4 SAME MATERIAL

What stays the same when the material melts and freezes?

1. _____
2. _____
3. _____

Think about the material,
not the state.

Changing States – Explain and Apply

Name: _____

Date: _____

1 INVESTIGATION: My question and prediction

Write your investigation question and your prediction.



Safe method and fair comparison.

Describe one safe step, what you changed and what you kept alike.



One real observation supports my conclusion because.

Use one thing you actually observed to explain why it supports your conclusion.



2 TRANSFER CASE

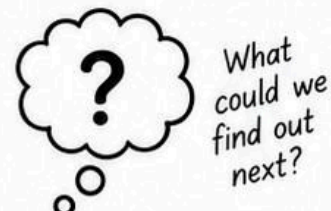
An adult wants liquid water in a suitable way to become ice.

Explain the heat change, one safe adult action and why this takes time.



3 REFLECTION

Write one limitation of your investigation and one useful next question you could ask.

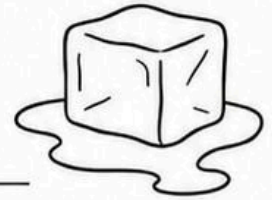


Same criteria apply to all response modes.
Assess evidence, not handwriting or confidence.

Teacher conference (optional)

- ☐ Observed Date: _____
- ☐ Portfolio Date: _____
- ☐ Response Date: _____

Changing States - Rubric



Name: _____ Date: _____

Criterion	Developing	Sound	Transfer
Understanding	Confuses shape-flow or heat/state changes.	Classifies by observable properties and explains melting/freezing while water remains water.	Correctly explains a tricky sample and applies both changes to a new case.
Evidence and process	Claim lacks a usable record or method.	Uses a questionable method, actual record comparison.	Justifies evidence choice and identifies a method limit.
Explanation and use	Explanation does not connect evidence to a claim.	Connects evidence to a clear explanation and useful storage decision.	Justifies a new application without promising unsupported timing.
Reflection	Needs help to identify a limit or next question.	Names a relevant limit and useful next question.	Explains how a repeat or changed method could strengthen the evidence.

Support or a communication choice does not lower the achievement level.

Teacher notes:

Lesson 1: Shape and flow Changing States - Year 3



Our learning

We will classify safe samples as solid or liquid.

We will use shape and flow as evidence.

PREVIEW

A question about shape

What happens when we move a sample into a different container?

Predict what a wooden block and some water will do.

PREVIEW

Solid and liquid

A solid keeps its own shape unless a force changes it.

A liquid flows and takes the shape of its container.

PREVIEW

A spill-free comparison

The teacher pours water between clear containers.

Watch its shape change. The amount stays the same if none spills.

A wider container can make the water level look lower.

PREVIEW

Safe sample stations

Use a block, a clean flexible sponge and sterile water.

Keep liquids on a tray. Do not open or taste samples.

Look at shape and flow. Record on v. 21.

PREVIEW

Your classification

Choose a sample and state your claim.

Describe what happened when its container was changed.

Point, draw, speak, write or use a communication device.

PREVIEW

A check of our evidence

A container looks full. Does that tell us whether contents are solid or liquid?

Which observation would help?

PREVIEW

Our explanation

We need evidence of shape and flow.

Colour, size or how full a container looks cannot decide the state.

Which sample helped you explain your idea?

PREVIEW

Well done!



PREVIEW

Lesson 2: Tricky examples Changing States - Year 3



Our learning

We will classify a flexible solid and a thick liquid.

We will improve a claim when observations disagree with it.

PREVIEW

A claim to test

A student says, “Every solid is hard.”

Predict whether a clean sponge supports this claim.

PREVIEW

The flexible solid

A sponge can bend or squash when a force acts on it.

It keeps its own shape when left alone. It is a solid.

Hardness alone does not identify a solid.

PREVIEW

The thick liquid

The teacher tilts a sealed sample of safe thick soup.

It flows slowly and takes its container shape.

A liquid can be thick. Avoid tasting and check allergies.

PREVIEW

Evidence for each claim

Compare the block, sponge, water and thick syrup.

Use C1 cards 1–4 and W02.

Give a state and an observation for each sample.

PREVIEW

Changing an explanation

First idea: every liquid flows quickly.

New observation: thick syrup flows slowly.

Better idea: liquids flow, but their flow speeds can differ.

PREVIEW

Your reasoning

Would a bent sponge become a liquid?

Explain what changed and what behaviour you would check.

PREVIEW

A check of our evidence

A bent sponge remains a solid. A force changes its shape.

We use observations to revise an explanation.

Give a tricky example and the evidence that classifies it.

PREVIEW

Well done!



Lesson 3: Melting Questions Changing States - Year 3



Our learning

We will ask a testable question about ice.

We will predict an observable change and plan a safe method.

PREVIEW

Water in two states

Ice is solid water. Water in a cup is liquid water.

What might happen when the ice receives heat?

Based on: Australian Academy of Science, Primary Connections – Melting moments (primaryconnections.org.au)

Our investigation question

What changes can we observe as ice melts in a beaker?

Predict changes in shape, remaining ice and liquid water.

Explain your prediction using an equation or conservation.

PREVIEW

A safe observation plan

Use one ice cube, a shallow clear cup, a tray and a timer.

Keep the cup in one safe room location.

Observe at the start, then every 2 minutes for 10 minutes.

PREVIEW

Careful records

Use drawings or words at 0, 2, 4, 6, 8 and 10 minutes.

Record what you see, including any ice that remains.

Complete W03. We cannot provide a melting time.

PREVIEW

Safe handling

No boiling water, flames, dry ice or tasting

Use trays and wipe spills promptly.

An adult prepares and handles frozen items.

PREVIEW

A check of the question

Which can we observe: “Is the ice happy?” or “How does its shape change?”

Explain what we could record

PREVIEW

Our next step

We can observe shape, remaining ice and liquid water.

Keep the prediction separate from the result.

What evidence could change our prediction?

PREVIEW

Well done!



Lesson 4: Observe melting Changing States - Year 3



Our learning

We will observe ice at consistent times.

We will compare our results with our predictions.

PREVIEW

Our prediction

Return to W03. What did you predict?

Keep the prediction even if today's observations differ.

PREVIEW

The observation method

Place the ice cup on its tray. Start the timer at 0 minutes.

Keep the location and cup unchanged.

Observe at 0, 2, 4, 6, 8 and 10 minutes.

PREVIEW

Time and temperature

Minutes measure elapsed time.

Degrees Celsius measure temperature.

An adult checks a safe thermometer. Record °C only if measured.

PREVIEW

Our records

Use W04. Draw or describe the remaining ice and liquid.

Record the actual date and conditions.

Do not invent values or copy answers as your results.

PREVIEW

A result can vary

Some ice may remain after 10 minutes. Record it.

One classroom observation cannot provide all the results at the same speed.

We can continue observing later if the teacher chooses.

PREVIEW

Our conclusion

What changed? Which record supports your answer?

Did the prediction match the evidence?

Show your record to a partner and explain a limitation.

PREVIEW

Safe cleanup

Keep observation water away from mouth and food.

Wipe spills and dry the workspace. Wash hands.

Tell one change you actually observed.

PREVIEW

Well done!



Lesson 5: Removing heat Changing States - Year 3



Our learning

We will use dated evidence to explain freezing.

We will connect removing heat with liquid becoming solid.

PREVIEW

A reverse change

Melting changes ice into liquid water when heat is added.

Freezing changes liquid water into ice when heat is removed.

Based on: Australian Academy of Science, Primary Connections – Melting moments (primaryconnections.org.au)

Teacher-prepared evidence

An adult prepares a labelled water sample before class.

The adult records a real date and time before putting it in freezer storage.

Freezing happens between visits, not instantly on request.

PREVIEW

The evidence sequence

First: liquid water flows and takes its container's shape.

Later: ice keeps its own shape when removed from water.

Read the adult's actual date/time labels.

PREVIEW

Your sequence

Use W05. Draw or describe both dated states.

Label freezing and heat removed.

If no dated evidence is available, make the sequence as a model.

PREVIEW

A limit of our evidence

We have before-and-after stages.

They do not tell us the exact instant the whole can be froze.

The teacher manages the appliance and avoids overfilled sealed containers.

PREVIEW

A check of the change

A student says, “The freezer added cold.”

How can we explain the change using heat?

PREVIEW

Our explanation

Heat moved out of the water as it cooled.

Liquid water became solid water.

Explain what changed and what stayed the same.

PREVIEW

Well done!



Lesson 6: Compare Conditions Changing States - Year 3



Our learning

We will plan and carry out a fair melting comparison.

We will measure time and record the method on a log.

PREVIEW

Our question

Does ice melt differently in two safe conditions?

Compare a cup resting in the room with a melting cup in a shallow bath of comfortably warm water.

The teacher chooses and checks the safe water temperature.

PREVIEW

What changes and stays alike

Change: the surroundings of the cup.

Keep alike: starting ice size, cup type, start time and observing intervals.

Keep both cups on trays. No direct sunlight or heaters.

PREVIEW

Materials and roles

Use two equal ice pieces, identical cups, thermometers and a timer.

The adult sets up the safe warm-water bath and thermometer.

Partners can observe, time, record and report to changes.

PREVIEW

Our method

Start both trials together. Observe every 2 minutes for 10 minutes.

Record remaining ice and liquid on W00

Keep the warm bath condition in the method. Do not stir just one cup.

PREVIEW

Our measurements

Minutes measure time. A thermometer gives temperature in °C.

Record only temperatures actually measured.

Our bath can cool, so record this as a limitation.

PREVIEW

Fairness and evidence

Were the starting pieces equal? Did both start together?

If one difference was accidental, record

Explain which condition showed more remaining ice at one shared time.

PREVIEW

Our next question

A result supports a claim about this comparison.

Repeating with fresh equal pieces could test the pattern.

Do not claim we repeated a trial unless we did.

PREVIEW

Well done!



Lesson 7: Explain with evidence Changing States - Year 3



Our learning

We will use tables and a simple graph to compare results.

We will distinguish measured evidence from practice data.

PREVIEW

Our real comparison

Read your W06 record.

Compare the cups at the same time.

Use a specific observation to support your explanation.

PREVIEW

Illustrative practice data

Practice only: these values are invented for learning.

Both trials use equal starting ice pieces.

A: all ice melted at 12 min. B: all ice melted at 8 min.

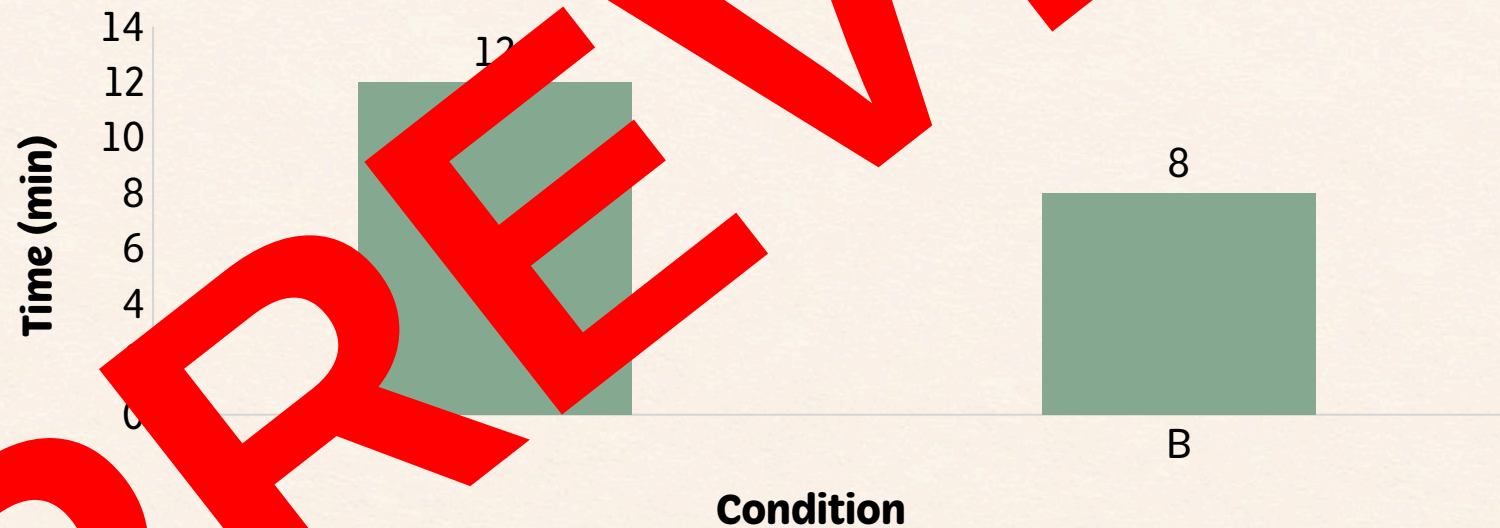
A (room): 12 min. B (safe warmer): 8 min.

PREVIEW

A simple column graph

Illustrative practice data, not classroom measurements

A: room surroundings. B: safe warmer surroundings



Reading the practice pattern

The practice example shows B took less time.

This is consistent with more rapid heat transfer to the ice in the warmer condition.

The example is not a classroom measurement.

PREVIEW

Heat and temperature

Heat transfers from warmer surroundings to cooler ice.

Temperature tells us how hot or cold a sample is.

An 8-minute time is not an 8-degree temperature.

PREVIEW

A useful limitation

One pair of trials may contain unequal starting masses of cooling bath water.

Use W07 to explain a pattern and on a line.

Keep real observations separate from illustrative data.

PREVIEW

A stronger explanation

Use this frame: “I think ... because at ... my observations ...”

Explain whether your evidence changed your first idea.

Name a useful follow-up question.

PREVIEW

Well done!



Lesson 8: State-change model Changing States - Year 3



Our learning

We will make a model of water in two states.

We will show both changes and explain the model's limits.

PREVIEW

Water remains water

Ice is solid water. Melted ice is liquid water.

The state changes while the material remains water.

Based on: Australian Academy of Science, Primary Connections – Melting moments (primaryconnections.org.au)

Our model labels

Draw ice and liquid water.

An arrow from ice to water says “melting, heat added”.

An arrow back says “freezing, heat removed”.

PREVIEW

Evidence for the arrows

Use your melting observations and the ad's mixed freezing stages.

Explain which evidence supports each arrow.

A drawing is a model, not a photograph or a measured record.

PREVIEW

Your annotated model

Use W08. Add the two states and both labelled flows

Show that both are water.

Explain one limitation, such as no reaction shown.

PREVIEW

A practical need

A reusable cold pack contains a sealed sac with a sample in this model.

An adult prepares it in a suitable freezer container.

Keeping it cold can slow melting during transport.

PREVIEW

A check of the model

Which arrow needs heat removed?

Does the diagram show how many minutes freezing took?

Support both answers with your model.

PREVIEW

Our explanation

The return arrow shows freezing as heat leaves the water.

Our model shows relationships, not exact timing.

Give one useful use and one limit of a model.

PREVIEW

Well done!



Lesson 9: Assessment explanation Changing States - Year 3



Our learning

We will explain states and changes using our own evidence.

We will correct a claim and evaluate our investigation.

PREVIEW

A claim to correct

A student says, “Ice turns into a new substance when it melts.”

Choose evidence that could help you respond.

Practise a short explanation or W.O.

PREVIEW

A worked explanation

“Ice and liquid water are both water.

I observed solid ice become liquid as it received heat.

The state changed, while the material stayed water.”

PREVIEW

Your assessment evidence

Use A1 and your W01–W08 portfolio.

Explain one tricky classification and both meaning/sizing.

Show your question, safe method, relevant comparison and conclusion.

PREVIEW

Your evidence conference

Explain your model to a partner or adult.

Point, demonstrate, draw, speak, write or use a communication device.

An adult can scribe your explanation without giving the science answer.

PREVIEW

Our method and limits

Name what changed and what stayed alike in your comparison.

Refer to an actual record. Explain a limitation.

Say how a repeat or another question could strengthen the explanation.

PREVIEW

A check of the explanation

Which part is your claim? Which part is evidence?

Does the evidence actually support the claim?

Use G1 criteria to ask one respectful question.

PREVIEW

Our reflection

Science explanations can improve when new evidence appears.

Public speaking and handwriting do not decide the science result.

Choose one part of your explanation to clarify.

PREVIEW

Well done!



Lesson 10: Everyday applications Changing States - Year 3



Our learning

We will use a state-change explanation to solve the storage problem.

We will explain what our advice can and cannot promise.

PREVIEW

A fictional storage problem

A class carries a sealed frozen water pack to an outdoor activity. They can use an insulated bag or leave it beside a warm window. Which choice would help the pack stay solid for longer?

PREVIEW

Our scientific explanation

Warmer surroundings transfer heat to the cool pack

An insulated bag can slow that transfer

The pack can still melt eventually.

Based on: Australian Academy of Science, Primary Connections – Melting moments (primaryconnections.org.au)

Evidence for advice

Use a relevant observation or your model to support the advice.

A classroom ice trial does not prove a precise storage duration.

Avoid promising a safe food-storage time from this experiment.

PREVIEW

Your application

Use W10 to recommend a safe storage choice.

Explain heat transfer and the change it could allow.

Give one limit and a question for further evidence.

PREVIEW

A second fictional case

An adult wants a tray of liquid water to become ice.

Explain which appliance condition removes heat.

An adult handles suitable freezer containers and allows enough time.

PREVIEW

Our final assessment

Add your short transfer response to A1.

Combine it with your portfolio and confidence evidence.

The eight-session route completes the task in session 8.

PREVIEW

A check of our learning

Explain why the frozen pack remains watery when it melts.

Tell how evidence helped you revise a claim.

State one way this science helped a practical decision.

PREVIEW

Well done!



Changing States - Year 3

Unit Quiz



How to respond

Think about each question before viewing the explanation.

Point, speak, draw, write or use a communication device.

Explain your evidence. The quiz supports your practical assessment.

PREVIEW

Question 1

Has ice turned into a different substance when it melts?

PREVIEW

Explanation I

No. Solid water has become liquid water.

Its state changed. The material remains water.

Based on: Australian Academy of Science, Primary Connections – Melting moments (primaryconnections.org.au)

Question 2

Does a liquid keep the shape of its container and pouring into another?

PREVIEW

Explanation 2

No. It flows to take the shape of the new container.

The amount stays the same when none boils.

PREVIEW

Question 3

A clean sponge bends when pressed. Is it a solid or liquid? Why?

PREVIEW

Explanation 3

It is a solid. A force can change its shape.

When left alone, it keeps its own shape.

PREVIEW

Question 4

Which change needs heat removed: melting or freezing?

PREVIEW

Explanation 4

Freezing. Liquid water becomes solid water as heat leaves it.

Melting needs heat added.

Based on: Australian Academy of Science, Primary Connections – Melting moments (primaryconnections.org.au)

Question 5

Two ice cups have different starting ice sizes. Is this a fair test of their surroundings?

PREVIEW

Explanation 5

No. Starting size could affect melting time

Use equal pieces and identical cups with the same starting time.

PREVIEW

Question 6

Practice data: A melted fully in 12 min and B in 18 min. Which took less time? What is a limit?

PREVIEW

Explanation 6

B took less time in this illustrative example.

The values are practice data, not measured classroom results.

One comparison cannot establish every melting time.

PREVIEW

Question 7

A fictional class puts a frozen water pack in an insulated bag. Why might that help?

PREVIEW

Explanation 7

The bag can slow heat transfer from warmer surroundings.

That can slow melting. The pack can still melt eventually.

It does not prove a precise storage duration.

PREVIEW

Question 8

A water-to-ice drawing has no dates or times. What can it show, and what evidence is missing?

PREVIEW

Explanation 8

The model can show freezing and heat removal.

It cannot tell the actual freezing time.

An adult's dated before-and-after records provide evidence of the observed stages.

PREVIEW

Our reflection

Which explanation became clearer?

Which question needs more evidence?

Use your portfolio and practical observations to explain your learning.

PREVIEW

Well done!

