

Science F-2

Chapter 6 — Asking, predicting and investigating safely

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Posing questions and making predictions from what we have observed

Read aloud. A grown-up reads this topic to the children. Children answer by pointing, saying, circling, matching or drawing. There is no long writing.

VC2S2I01 — experiences can be used as a basis for posing questions to explore observed patterns and relationships, and to make predictions

Victorian Curriculum 2.0 — Science F–2, Questioning and predicting

Evidences: Students pose questions about observed patterns or relationships and make predictions related to familiar objects and events.

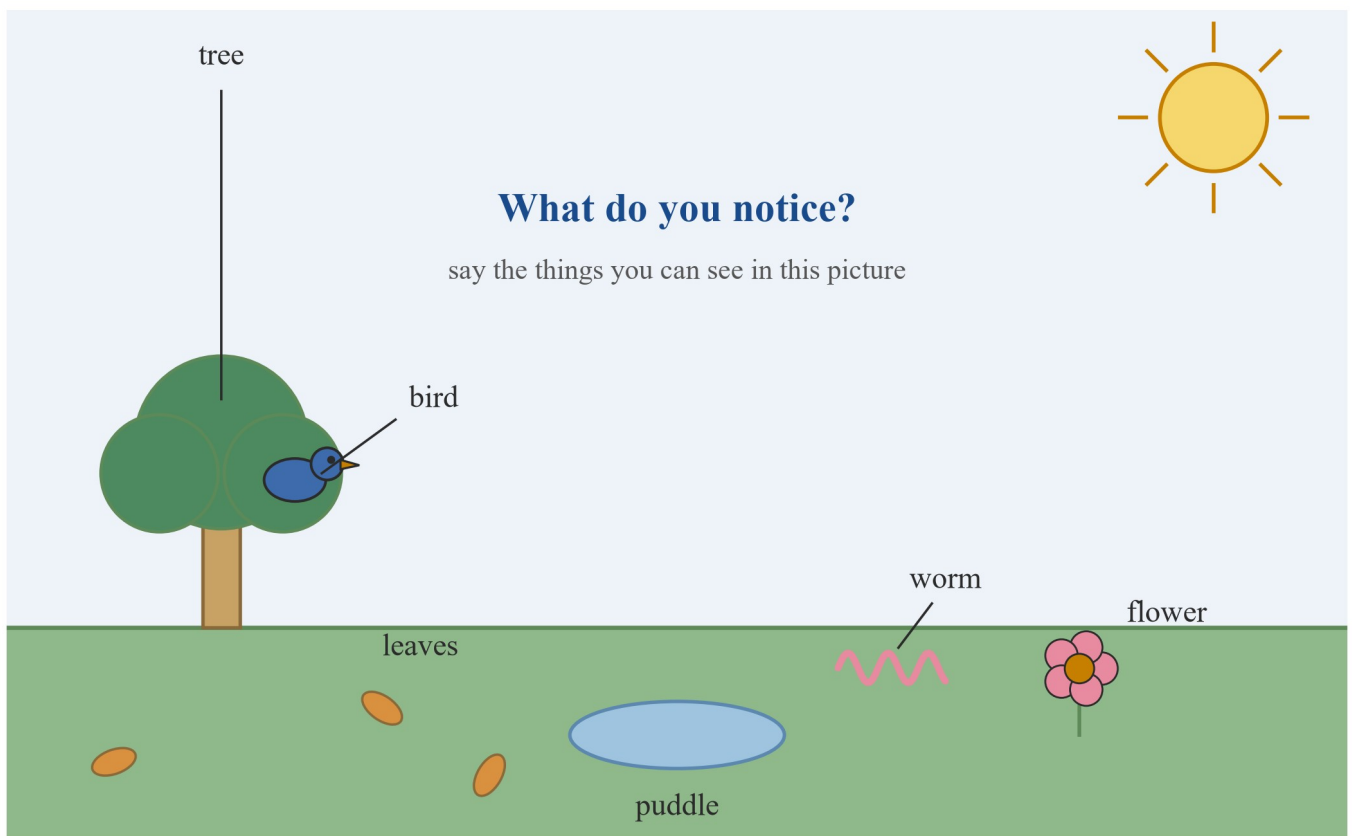
In this topic we will:

- turn what we notice into a question about things and what they are made of (E01)
- ask questions we can explore about the animals we see (E02)
- wonder about the Moon in the night sky (E03)
- make a prediction before we go out and before we try, and say what it is based on (E04, E05, E06)

Theory

We notice, we wonder, we ask

Look at the picture of the schoolyard. Say the things you can see.

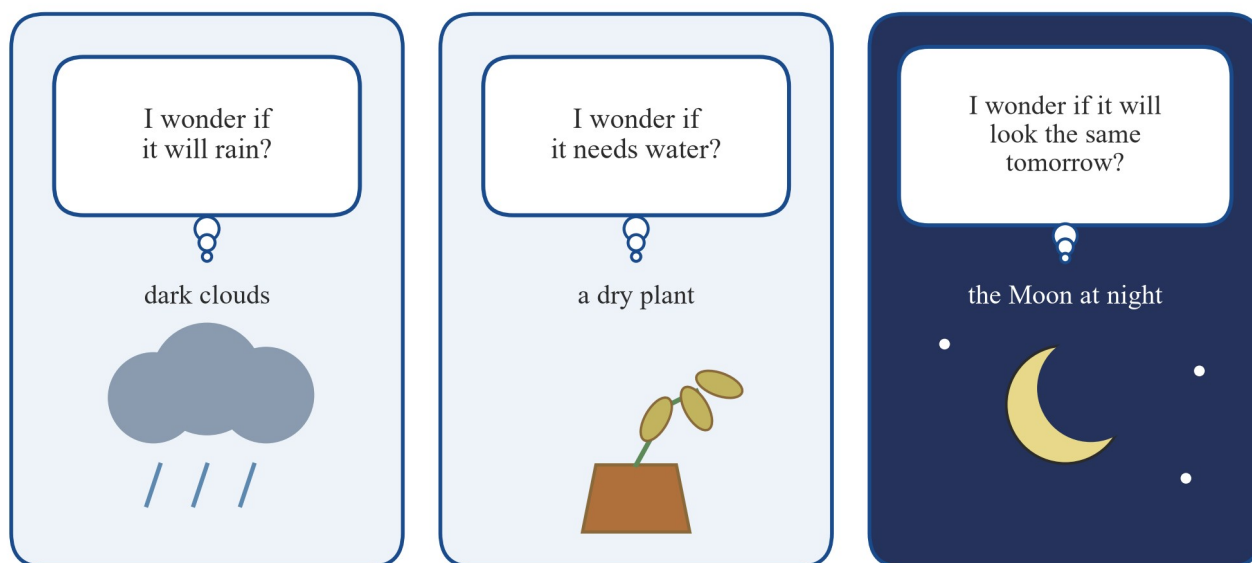


A schoolyard: a tree with a bird in it, fallen leaves, a puddle, a worm and a flower under the sun. Labels name the tree, bird, leaves, puddle, worm and flower. The title asks, What do you notice?

When we look and say what we see, we **notice**. Noticing comes first.

Every day we see things: dark clouds, a dry plant, the Moon at night. When we notice a thing, we can **wonder** about it. We say “I wonder if...?”

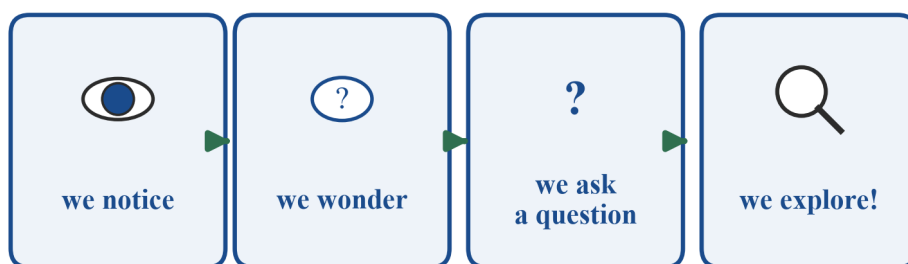
we notice things — then we wonder



Three cards. Dark clouds with rain: I wonder if it will rain? A dry plant in a pot: I wonder if it needs water? The Moon in the night sky: I wonder if it will look the same tomorrow?

A wonder we say out loud is a **question**. “I wonder if it will rain?” becomes “Will it rain?” Then we can go and find out.

from noticing to exploring



a wondering we say out loud is a question

Four boxes in a row with arrows between them: we notice (an eye), we wonder (a bubble with a question mark), we ask a question (a big question mark), we explore! (a magnifying glass).

We notice. We wonder. We ask a question. Then we **explore** — we look, we watch, we try.

Questions we can explore

Not every question is one we can explore. A question we can explore has an answer we can find out by looking, watching or trying.

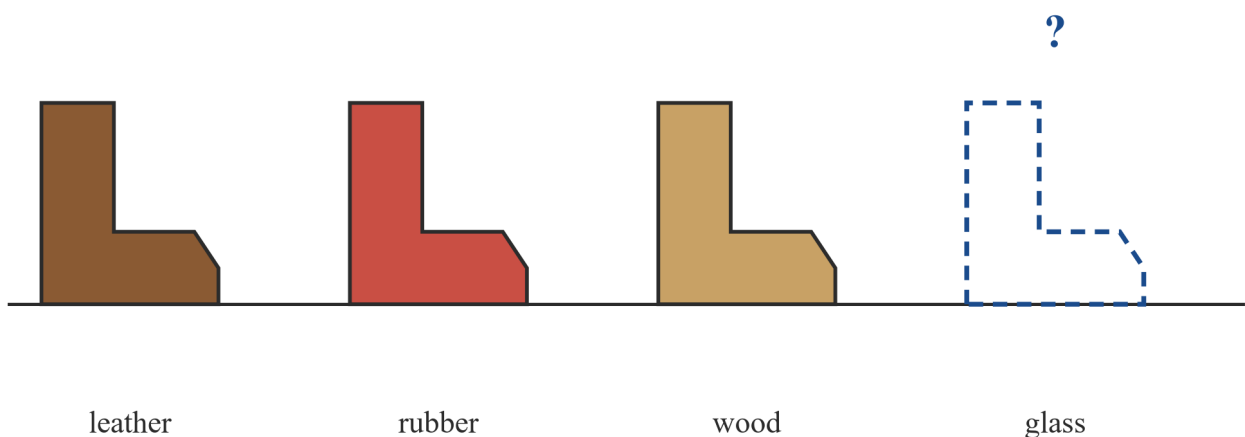
can we explore it?

 What can shoes be made from? We can look at shoes and find out. a question we can explore	 Is blue the best colour? This tells what someone likes. There is nothing to find out. not a question we can explore
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Two cards. A green tick card: What can shoes be made from? We can look at shoes and find out — a question we can explore. A red cross card: Is blue the best colour? This tells what someone likes; there is nothing to find out — not a question we can explore.

“What can shoes be made from?” is a question we can explore. We can look at shoes and find out. “Is blue the best colour?” tells what someone likes. There is nothing to find out, so it is not a question we can explore.

What can shoes be made from?



People make shoes from leather, rubber, wood and other materials.

Could a shoe be made of glass? Why not?

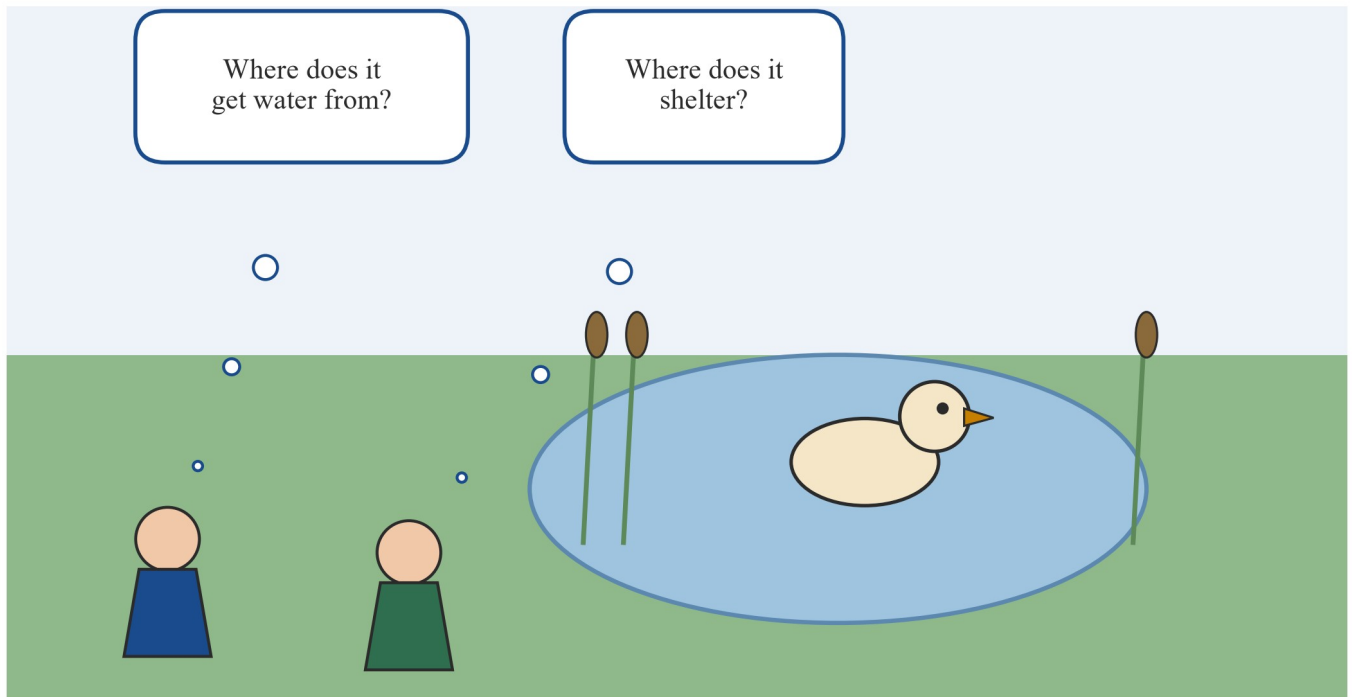
Four boots in a row on a line: a leather boot, a rubber boot, a wood boot, and a dotted glass boot with a question mark over it. The words below ask, Could a shoe be made of glass? Why not?

People make shoes from leather, from rubber, from wood and from other materials. We can look at real shoes and see. Could a shoe be made of glass? Glass breaks, so glass is not good for shoes. We found that out by looking and thinking. That is exploring.

Questions about animals

A duck lives at the pond. We can watch it and ask questions we can explore.

questions we can explore about the duck



Two children on the grass by a pond watch a duck on the water. Their question bubbles ask, Where does it get water from? and Where does it shelter?

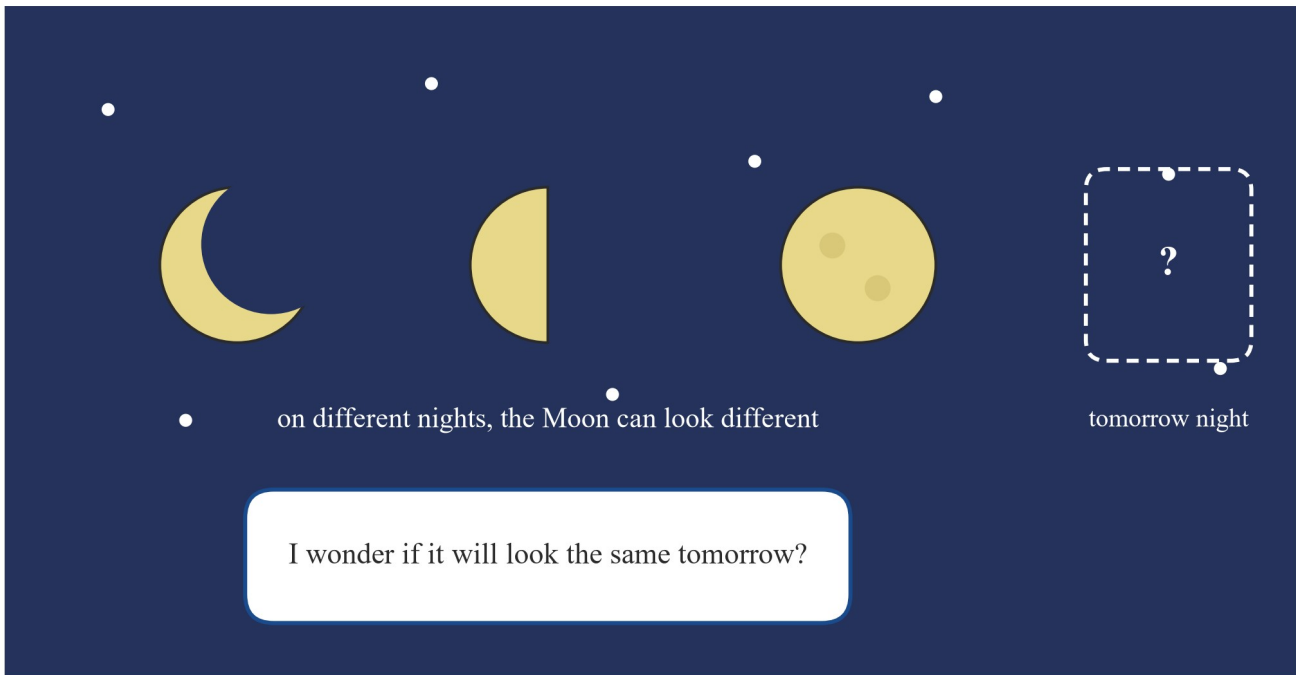
- Where does it get water from? We can watch and see it drink and swim.
- Where does it shelter? A **shelter** is a safe place to live. We can watch and see where it goes to rest.

Both are questions we can explore, because we can find out by watching.

The Moon in the night sky

At night we can look at the Moon. On different nights, the Moon can look different: a thin shape, a half shape, a round shape.

the Moon in the night sky



The night sky with stars. The Moon in three shapes on different nights: a thin shape, a half shape and a round shape. A dotted box with a question mark is labelled tomorrow night. A bubble asks, I wonder if it will look the same tomorrow?

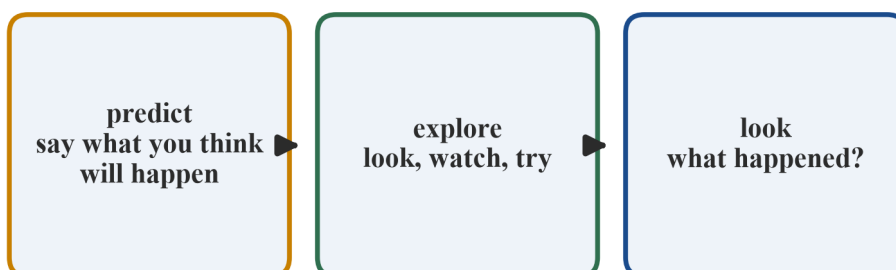
We can wonder: *I wonder if it will look the same tomorrow?* Then, tomorrow night, we look again and see. Looking again is how we explore this question.

Safety. The Moon is safe to look at. The Sun is not. Never look straight at the Sun.

We predict, and we say why

A **prediction** is saying what you think will happen, before it happens. To **predict** is to make a prediction. We predict first. Then we explore. Then we look at what happened.

predict first!



we can say why we think so — what we know, and what we have seen

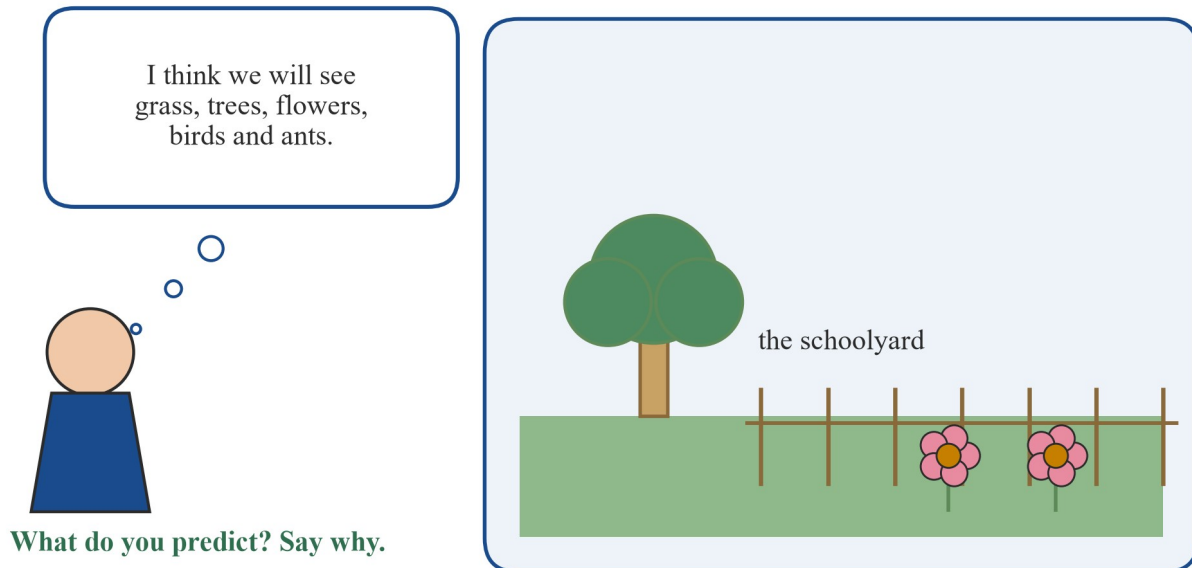
Three boxes with arrows between them. Predict: say what you think will happen. Explore: look, watch, try. Look: what happened?

When we predict, we also say what our prediction is based on: what we know, and what we have seen before.

Before we go out

Before we go out to the schoolyard, we predict what we will see.

before we go out, we predict what we will see



A child with a thought bubble: I think we will see grass, trees, flowers, birds and ants. Next to the child is the schoolyard, with a tree, a fence and flowers.

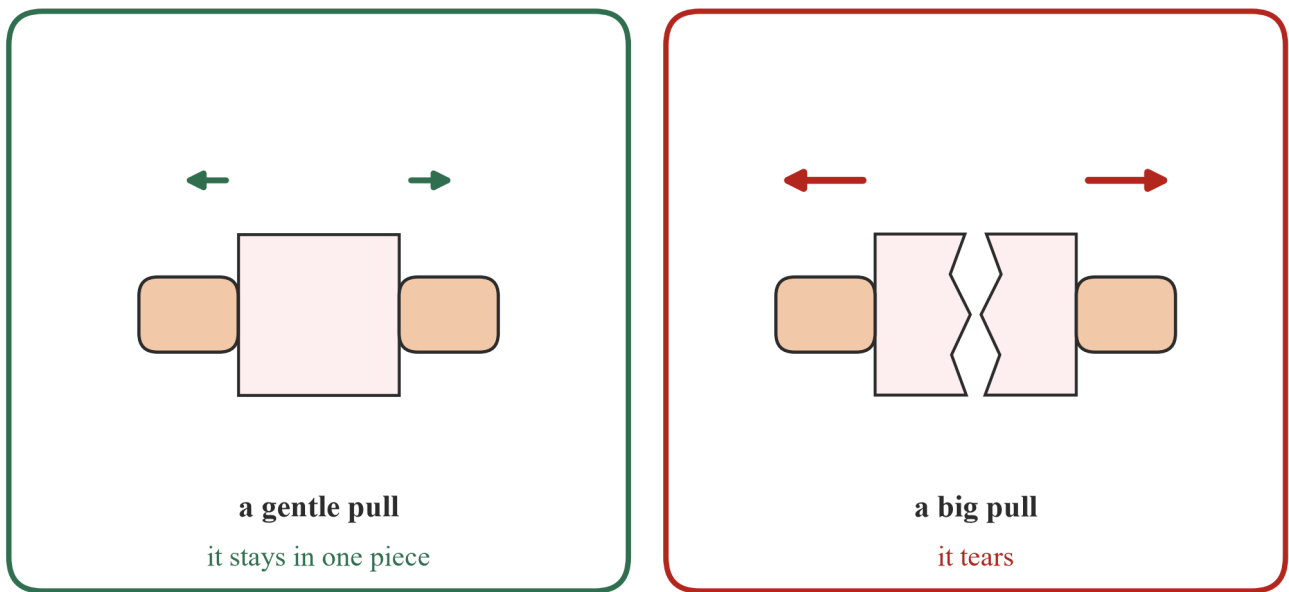
I think we will see grass and trees, because we have seen them there before. The part after “because” is what the prediction is based on.

Safety. Outside, stay with your class. Look — do not taste. Wash your hands after touching soil, plants or animals.

Before we try

Tissue paper is very thin paper. We hold it with two hands and pull.

tissue paper is very thin paper



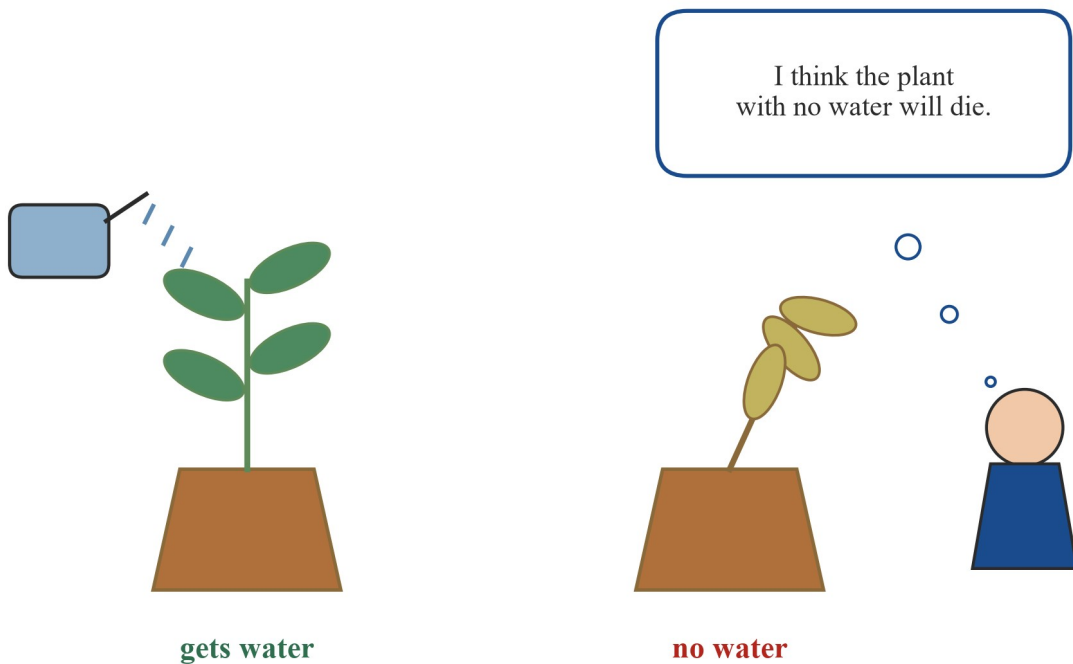
Two cards. Small green arrows pull a sheet of tissue paper: a gentle pull — it stays in one piece. Big red arrows pull two torn halves: a big pull — it tears.

We predict: a gentle pull — it stays in one piece. A big pull — it tears. What is that based on? It is based on what we know: tissue paper is very thin.

Safety. Gentle pulls only. Hold the paper down low, away from faces.

Two plants in pots. One gets water. One gets no water.

two plants — what do you predict?

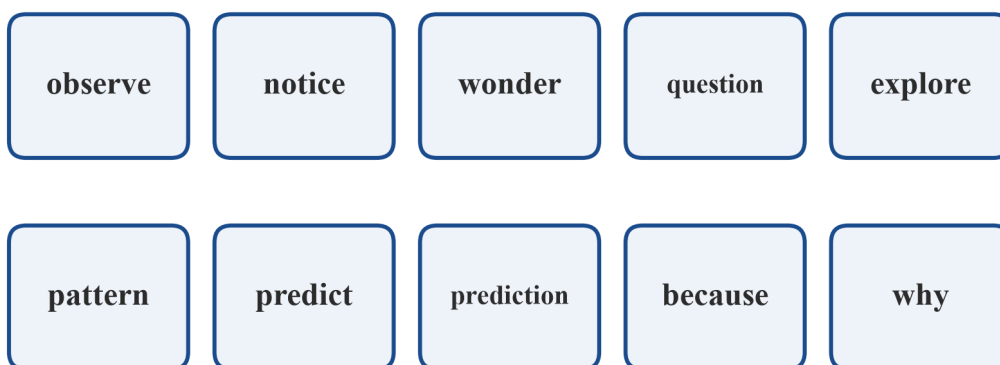


Two potted plants. One gets water from a watering can and stands tall with green leaves. One gets no water and its dry leaves hang down. A child thinks, I think the plant with no water will die.

We predict: *I think the plant with no water will die.* Why? Because plants need water to stay alive. That is what the prediction is based on.

Words for this topic

words for this topic



Ten word cards in two rows: observe, notice, wonder, question, explore, pattern, predict, prediction, because, why.

- **observe** — to look and notice
- **notice** — to see and say what you see
- **wonder** — to think “I wonder if...?”
- **question** — a wonder we say out loud, to find out

- **explore** — to look, watch and try, to find out
- **pattern** — something we see again and again, in the same way
- **predict** — to say what you think will happen, before it happens
- **prediction** — the thing you say when you predict
- **because** — the word that says what something is based on
- **why** — the word we ask for a reason

Worked examples

Example 1 — turn a noticing into a question (E01)

We notice that shoes are made from different things. Turn it into a question we can explore.

Working	Say why
We notice shoes: one is leather, one is rubber, one is wood.	name what we see
We wonder: “I wonder what shoes can be made from?”	noticing + wonder
We say it out loud: “What can shoes be made from?”	a wonder out loud is a question
We can look at shoes and find out.	we can explore it
∴ “What can shoes be made from?” is a question we can explore.	a noticing turned into a question

Example 2 — can we explore it? (E02)

Sort the two questions: “Where does the duck shelter?” and “Is blue the best colour?”

Working	Say why
A shelter is a safe place to live.	what the word means
We can watch the duck and see where it goes to rest.	find out by watching
∴ “Where does the duck shelter?” is a question we can explore.	we can find out
“Is blue the best colour?” tells what someone likes.	it is about likes
There is nothing to look at, watch or try.	nothing to find out
∴ it is not a question we can explore.	say it together

Example 3 — predict before we go out, and say why (E04)

Before we go out to the schoolyard, make a prediction and say what it is based on.

Working	Say why
We have seen grass and trees in the schoolyard before.	what we have seen
I think we will see grass and trees.	the prediction
...because we have seen them there before.	what it is based on
∴ a prediction is based on what we know and what we have seen.	say it together

Example 4 — predict the tissue pull, and say why (E06)

Hold tissue paper with two hands. Predict what a gentle pull and a big pull will do, and say what your predictions are based on.

Working	Say why
Tissue paper is very thin paper.	what we know
A gentle pull: I think it stays in one piece.	prediction one

A big pull: I think it tears.

prediction two

What is it based on? Tissue paper is very thin.

the basis

∴ we predict a big pull tears it, based on what we know about tissue paper.

then try it gently and check

Practice questions

Teacher — notice, question, predict. Children answer by pointing, saying, circling or drawing; you write their words down. For the questions marked *try it*, children say what they think will happen, then try, then say what happened. Have ready: a view of the schoolyard, tissue paper, and the record sheet below, printed or drawn. Outside: stay together, look — do not taste, wash hands after.

Here is the sheet we use. You say your question and your prediction. The teacher writes your words.

my question and my prediction

I wonder _____

I think _____

because _____

the teacher writes your words

A sheet titled my question and my prediction, with lines for I wonder, I think and because. A note at the bottom says the teacher writes your words.

Q1 [F] Look at the schoolyard picture. Say three things you notice.

Q2 [F] Look at the wonder picture. Point to the dark clouds. Say the wondering about the clouds.

Q3 [F] Circle yes or no: “What can shoes be made from?” is a question we can explore. (yes / no)

Q4 [L1] Look at the boot picture. Circle the things shoes can be made from: leather · rubber · wood · glass. Say why not glass.

Q5 [L1] Look at the duck picture. Ask two questions we can explore about the duck.

Q6 [L1] Look at the Moon picture. Draw how you think the Moon will look tomorrow night. Say what your drawing is based on.

Q7 [L1] Before we go out to the schoolyard: predict two things we will see. Say because.

Q8 [L2] Circle one for each: A gentle pull on tissue paper (stays in one piece / tears). A big pull (stays in one piece / tears). Say what your predictions are based on.

Q9 [L2] Look at the two plants. Say your prediction about the plant with no water. Say what it is based on.

Q10 [L2] *Try it.* A gentle pull and a big pull on tissue paper. Say what you think will happen, then try it, then say what happened. Were you right?

Q11 [L2] Your turn. Look out the window. Notice one thing. Ask one question we can explore about it. Make one prediction, and say what it is based on. The teacher writes it on the sheet.

Answers

1. Any three of: a tree, a bird, leaves, a puddle, a worm, a flower, the sun.
2. *I wonder if it will rain?*
3. yes.
4. leather, rubber, wood. Glass breaks, so glass is not good for shoes.
5. Any two of: Where does it get water from? Where does it shelter? What does it eat?
6. Any drawing, with a saying: *because it looked like that today* or *because it changes*.
7. Any two, with *because we have seen them there before*.
8. A gentle pull: stays in one piece. A big pull: tears. Based on: tissue paper is very thin.
9. *I think it will die, because plants need water to stay alive*.
10. Predictions first; after trying: a gentle pull stays in one piece, a big pull tears.
11. Any noticing, one question we can explore, and one prediction with a *because*. (For example: noticing a cloud; asking *Will the cloud be there in one hour?*; predicting *I think it will be gone, because clouds move*.)

Fully-worked solutions

Q1 Noticing is seeing and saying what you see. The picture has a tree, a bird, leaves, a puddle, a worm and a flower. ∴ say any three of these.

Q2 The first card shows dark clouds with rain. The wondering on that card is *I wonder if it will rain?* ∴ point to the clouds and say it.

Q3 We can look at shoes and find out what they are made of. ∴ yes — it is a question we can explore.

Q4 People make shoes from leather, rubber and wood, so we circle those. Glass breaks, so a glass shoe would break too. ∴ circle leather, rubber, wood; not glass, because glass breaks.

Q5 A question we can explore has an answer we can find out by watching. We can watch the duck drink and swim, and see where it rests. ∴ ask *Where does it get water from?* and *Where does it shelter?*

Q6 Any drawing is right if you can say what it is based on. On different nights the Moon can look different, so we look again tomorrow night to find out. ∴ draw a thin, half or round shape, and say *because that is how it looked today* or *because the Moon changes*.

Q7 A prediction says what you think will happen, and the *because* says what it is based on. ∴ for example: *I think we will see grass and trees, because we have seen them there before*.

Q8 Tissue paper is very thin paper. That is what our predictions are based on. A gentle pull is small, so the thin paper holds. A big pull is too much for the thin paper, so it tears. ∴ gentle: stays in one piece; big: tears; based on: tissue paper is very thin.

Q9 Plants need water to stay alive. The plant with no water does not get what it needs. ∴ I predict it will die, based on: plants need water to stay alive.

Q10 Say your predictions first: a gentle pull stays in one piece, a big pull tears. Then try it with gentle and big pulls. ∴ after trying: the gentle pull stayed in one piece and the big pull tore, so the predictions were right.

Q11 Notice one thing, for example a cloud. Turn it into a question we can explore, for example *Will the cloud be there in one hour?* We can look again and find out. Predict, for example *I think it will be gone, because clouds move*. ∴ any noticing, one question we can explore and one prediction with a *because* is right.

Following a safe procedure with steps in order

Read aloud. A grown-up reads this topic to the children. Children answer by pointing, saying, circling, matching or drawing. There is no long writing.

VC2S2I02 — scientific questions and predictions can be investigated safely by following procedures that have sequenced steps

Victorian Curriculum 2.0 — Science F–2, Planning and conducting

Evidences: They suggest steps to be followed in an investigation, and follow safe procedures to make and record observations, including informal measurements.

In this topic we will:

- talk about steps, and say why the order of the steps matters (E02)
- set up our work space, and pack it away when we finish (E03)
- follow the same steps each week to watch a bean plant (E01)
- follow the steps of a push and pull test (E03)
- follow safe steps to watch shadows in the Sun (E05)
- follow the steps to make a rattle, and test it (E04, E06)

Theory

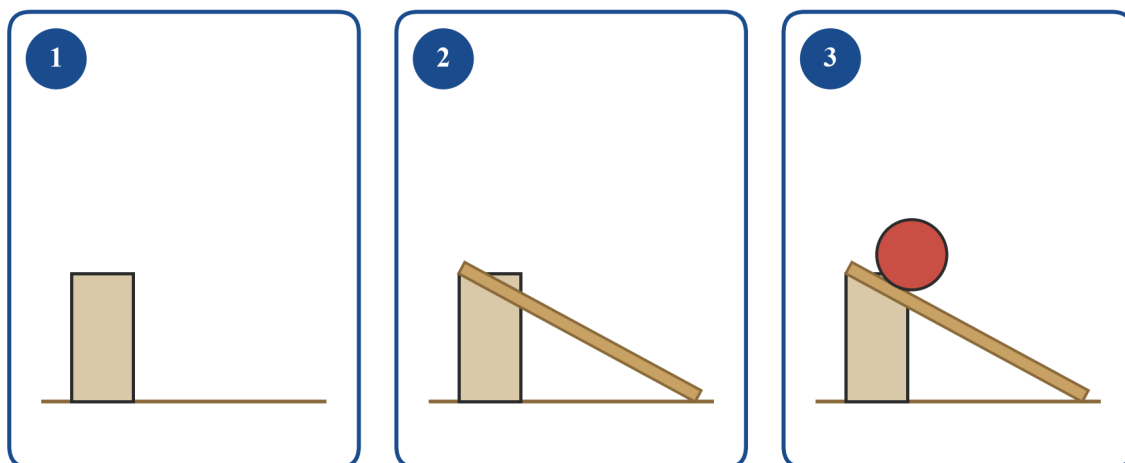
Steps in order

A **step** is one thing to do.

The **order** is how the steps go. Which step is **first**? Which step is **next**? Which step is **last**?

A **procedure** is a set of steps in an order. We do the steps in order, one by one. Then the job works.

steps in order: set up the slope



first — put the box down

next — put the board on the box

last — put the ball at the top

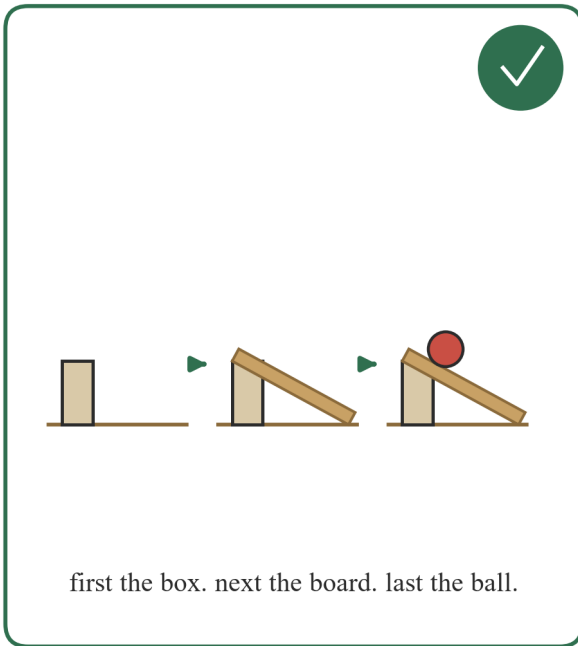
Three numbered cards show how to make a slope in order. Card 1: put the box down. Card 2: put the board on the box. Card 3: put the ball at the top of the slope.

Say the steps in order: *first the box, next the board, last the ball.*

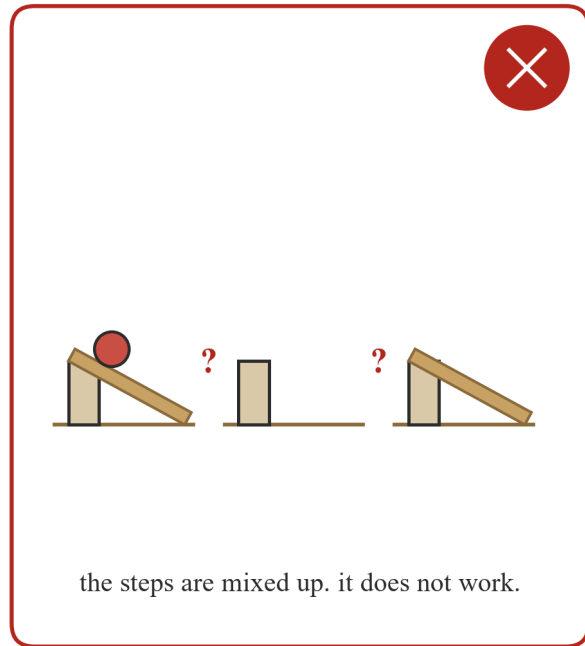
Why the order matters

If the steps are mixed up, the job does not work.

in order — it works



out of order — it cannot work



Two pictures. The left picture has a tick: the steps in order — the box, then the board on the box, then the ball at the top — and it works. The right picture has a cross: the same steps mixed up, and it does not work.

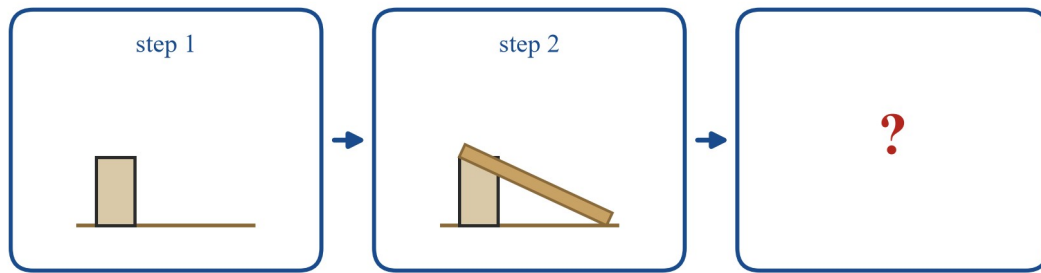
Look at the right picture. The ball comes first. But the slope is not made yet, so the ball has nowhere to sit. That step cannot come first.

The order matters.

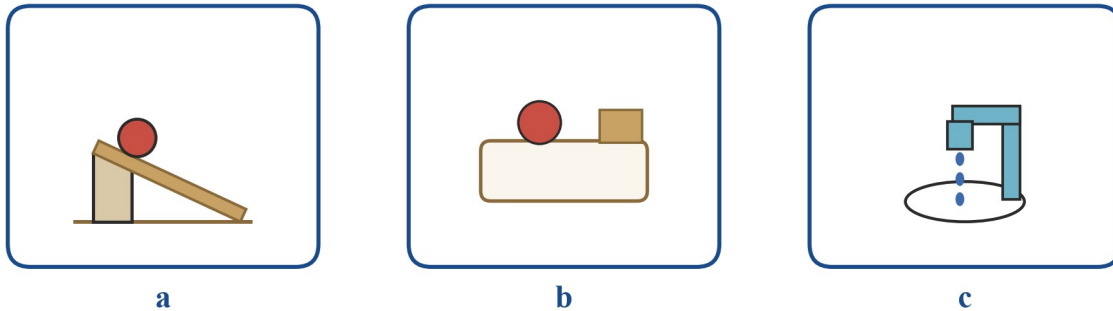
What comes next?

When we know the order, we can say what step comes next.

what comes next?



which card is step 3?



point to the card that comes next

Top row: step 1 is the box, step 2 is the board on the box, then a card with a question mark. Bottom row: three cards to choose from — a, the ball at the top of the slope; b, a tray of toys; c, washing hands.

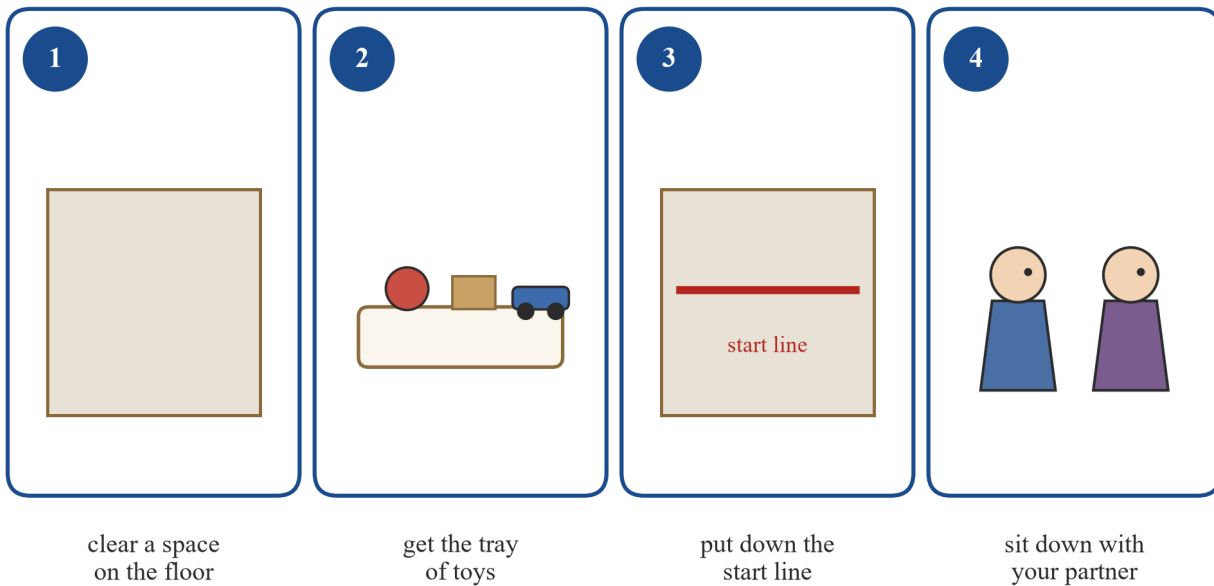
Step 1 is the box. Step 2 is the board on the box. What is step 3? Point to the card that comes next.

Setting up

Before a test, we set up. To **set up** is to get everything ready, in order.

Here are the steps to set up for the push and pull test.

set up for the push and pull test



Four numbered cards for setting up: 1 clear a space on the floor, 2 get the tray of toys, 3 put down the start line, 4 sit down with your partner.

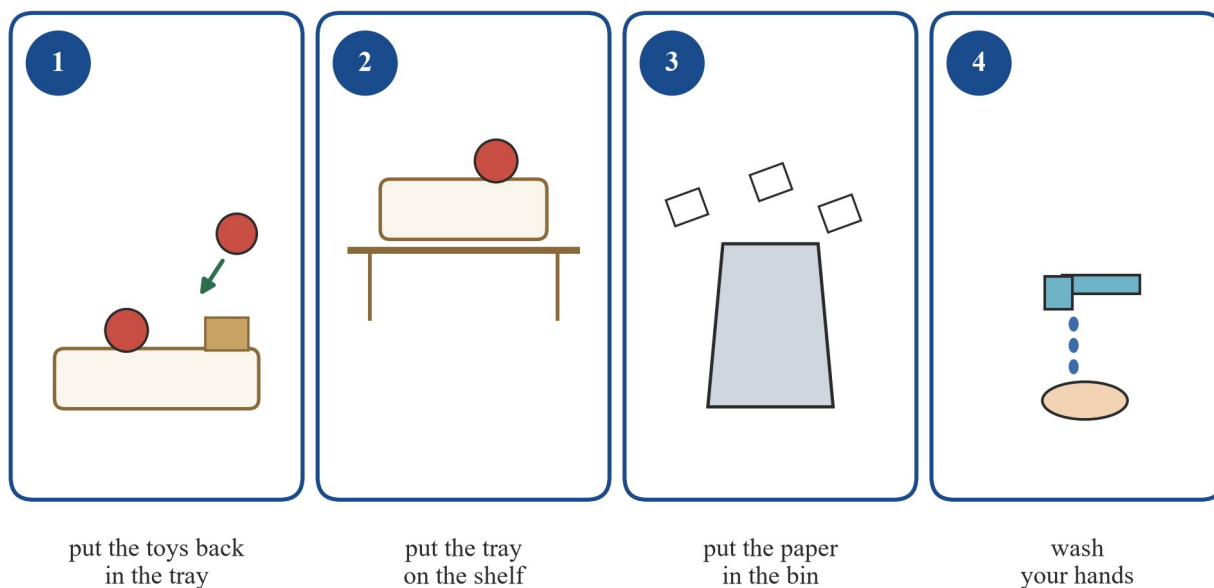
Say the four steps in order.

Safety. Walk in our work space. Keep the floor clear so nobody slips.

Packing away

When we finish, we pack away. To **pack away** is to put everything back, in order.

pack away after the test



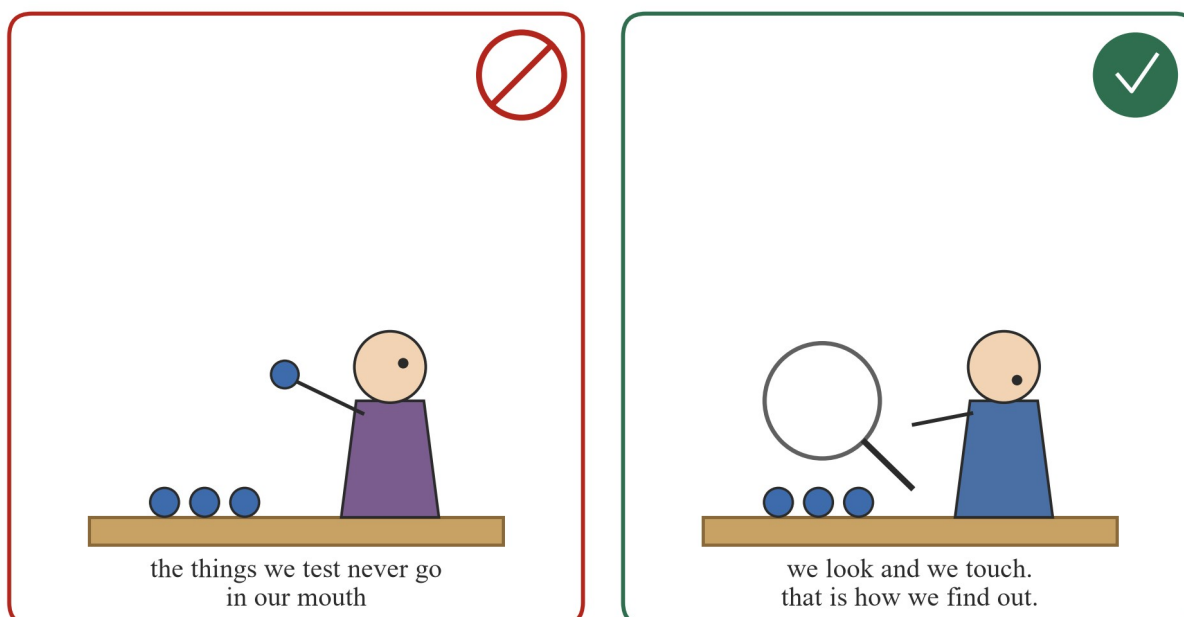
Four numbered cards for packing away: 1 put the toys back in the tray, 2 put the tray on the shelf, 3 put the paper in the bin, 4 wash your hands.

Say the four steps in order. Washing our hands at the end is part of the procedure.

The two standing rules

These two rules are always on in science.

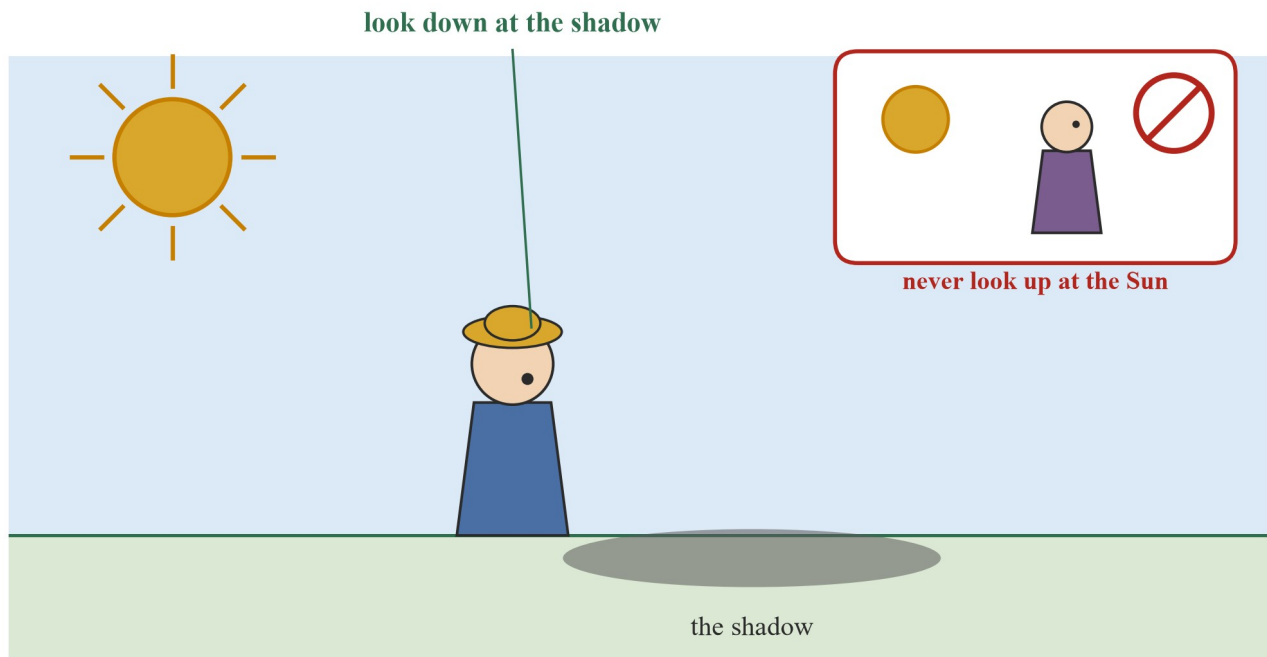
standing rule 1 — we never taste



Two pictures. Left, with a no-sign: a child holds a bead up near their mouth — the things we test never go in our mouth. Right, with a tick: a child looks at the beads on the table — we look and we touch.

Rule 1 — we never taste. The things we test never go in our mouth. We look and we touch. That is how we find out.

standing rule 2 — never look straight at the Sun



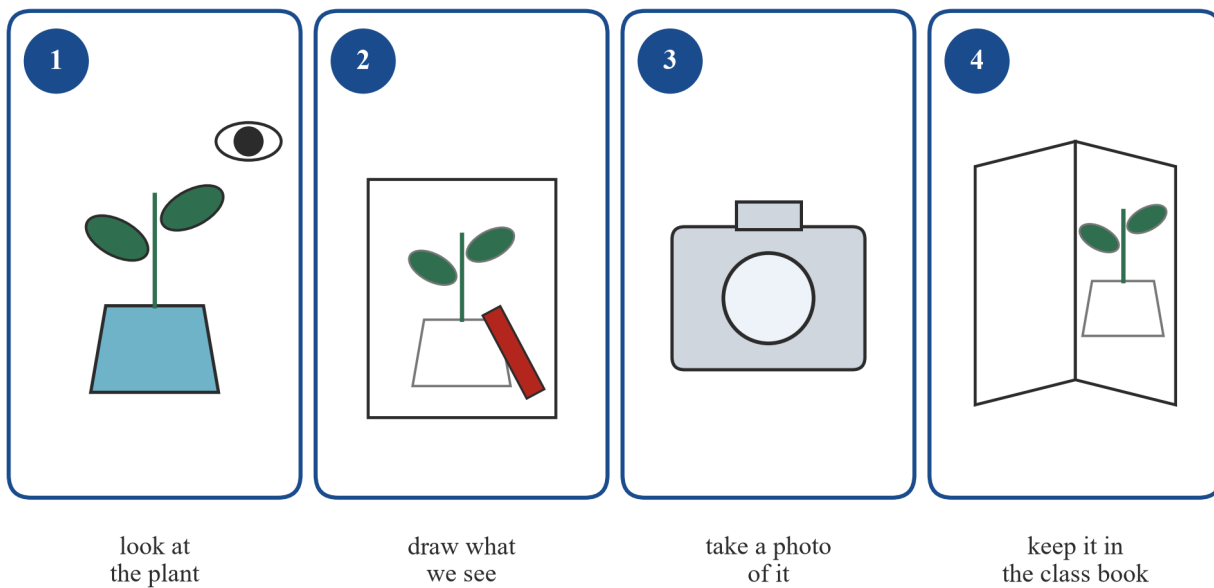
The Sun is high at the top left. A child in a hat looks down at their shadow on the ground. A small card with a no-sign says: never look up at the Sun.

Rule 2 — we never look straight at the Sun. The Sun is very bright. It can hurt our eyes. We look at the ground, at the things, and at shadows. Never up at the Sun.

Follow the steps: watch a plant

We watch a bean plant over some weeks. We do the same steps, in the same order, each week. Then our drawings and photos show how the plant changes.

watch the bean plant: same steps each week



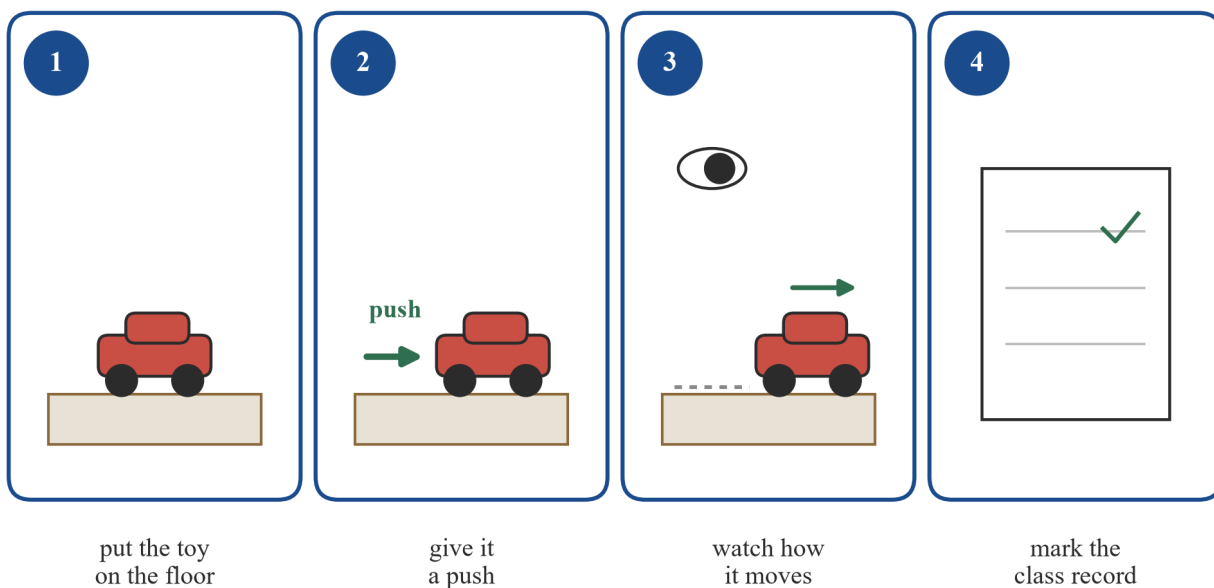
Four numbered cards: 1 look at the plant, 2 draw what we see, 3 take a photo of it, 4 keep it in the class book.

Safety. Wash your hands after touching the plant or the soil.

Follow the steps: the push and pull test

A push moves a thing away from us. A pull moves a thing towards us.

the push and pull test



Four numbered cards: 1 put the toy car on the floor, 2 give it a push, 3 watch how it moves, 4 mark the class record.

We give the toy a push. We watch how it moves. The teacher marks the class record with a tick.

Safety. Small toys never go in our mouth. Keep the floor clear. Wash your hands when we finish.

Safe steps for shadows

On a sunny day we can watch shadows. Our shadow falls on the side away from the Sun.



The Sun is at the top left. A child in a hat stands still and looks at the ground while a friend draws around the shadow with chalk. Numbered steps: 1 wear a hat, 2 look at the ground, 3 stand still, 4 your friend draws around the shadow. A no-sign says: never look at the Sun.

Next week we stand in the same place and do the same steps. The chalk line shows if the shadow changed.

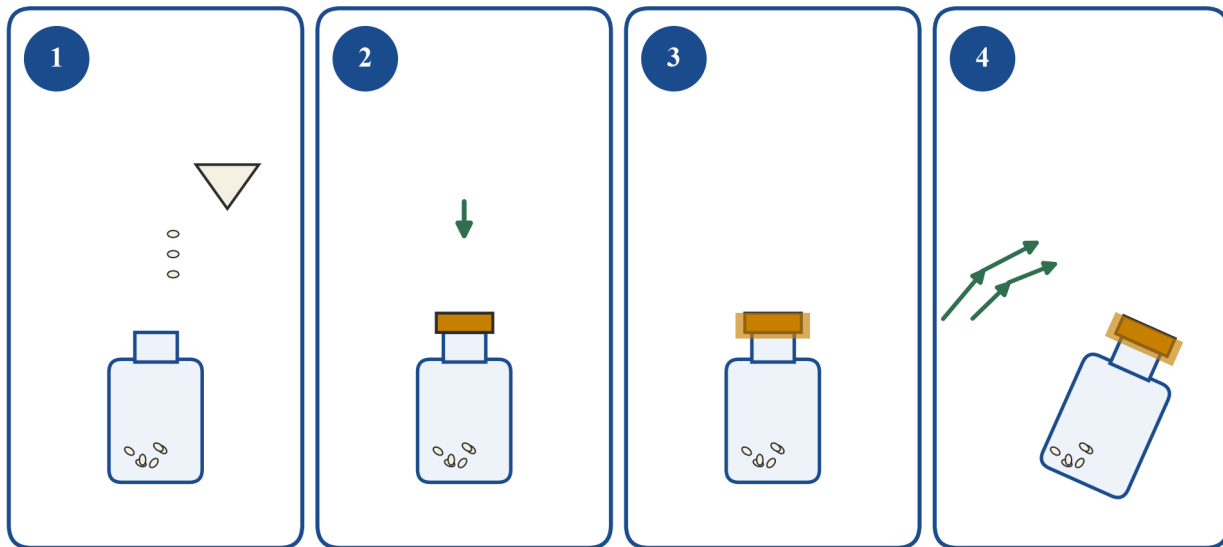
Safety. Never look at the Sun. Stay with your class.

Follow the steps: make a rattle

We can make a rattle. A rattle is a musical instrument we make ourselves. It makes a sound when we shake it.

First we suggest the things we need: a small bottle with a lid, some rice, and tape.

make a rattle: follow the steps



put some rice
in the bottle

close
the lid

tape the lid on
(a grown-up helps)

shake it!
soft, then hard

shake softly — a quiet sound. shake hard — a loud sound.

Four numbered cards: 1 put some rice in the bottle, 2 close the lid, 3 tape the lid on (a grown-up helps), 4 shake it, soft then hard. At the bottom: shake softly — a quiet sound; shake hard — a loud sound.

Shake softly — a quiet sound. Shake hard — a loud sound.

Safety. The rice never goes in our mouth. A grown-up helps with the tape. Wash your hands when we finish.

Words for this topic

words for this topic

step

order

first

next

then

last

safe

procedure

set up

pack away

Ten word cards in two rows: step, order, first, next, then, last, safe, procedure, set up, pack away.

- **step** — one thing to do
- **order** — how the steps go: which is first, next and last
- **first, next, then, last** — words that tell the order

- **safe** — done so nobody gets hurt
- **procedure** — a set of steps in an order
- **set up** — to get everything ready before we start
- **pack away** — to put everything back when we finish

Worked examples

Example 1 — put the steps to set up in order (E03)

These three steps are mixed up. Put them in the right order.

put down the start line · get the tray of toys · clear a space on the floor

Working	Say why
The first step is: clear a space on the floor.	we need a clear space before anything else
The next step is: get the tray of toys.	the toys come after the space is clear
The last step is: put down the start line.	the line goes down just before we start
∴ the order is: clear a space, get the tray, put down the start line.	the steps now go in an order that works

Example 2 — what comes next? (E01)

We are watching the bean plant. We looked at the plant. We drew what we saw. What step comes next?

Working	Say why
The steps go in the same order each week.	same steps, same order
Step 1 was look. Step 2 was draw.	we did these two
Step 3 is: take a photo of it.	it comes next in the order
∴ the next step is: take a photo of the plant.	we follow the steps in order

Example 3 — find the unsafe move (Rule 1)

A child holds a bead near their mouth to see it better. Is this safe? What should the child do?

Working	Say why
The bead is a thing we test.	we look at beads in science
Rule 1: the things we test never go in our mouth.	we never taste
Holding it near the mouth is not safe.	it is too close to the mouth
The child should look at the bead on the table instead.	we look and we touch
∴ not safe. The child puts the bead on the table and looks at it there.	Rule 1 keeps us safe

Example 4 — suggest the pack-away steps (E03)

The test is done. Suggest the steps to pack away.

Working	Say why
First: put the toys back in the tray.	the toys go together
Next: put the tray on the shelf.	the tray has a home
Next: put the paper in the bin.	the paper is rubbish
Last: wash your hands.	clean hands keep us safe
∴ toys in the tray, tray on the shelf, paper in the bin, wash our hands.	we packed away in order

Practice questions

Teacher — predict and check. For the question marked *try it*, the children first say what they think will happen, then shake the rattle, then say what they heard. Things to have ready: a small bottle with a lid, some rice, tape, chalk, a hat, and a tray of small toys (beads, balls, blocks).

Q1 [F] Look at the steps-in-order picture. Point to the card that comes next after the box. Say the word *next*.

Q2 [F] Say the two standing rules of our science class.

Q3 [F] Circle the safe way to move in our work space: walk / run

Q4 [F] Look at the word cards. Point to the card that says *safe*. Say the word.

Q5 [L1] These three steps to set up are mixed up. Say which is first, which is next and which is last: put down the start line · get the tray of toys · clear a space on the floor

Q6 [L1] Look at the plant-steps picture. We looked at the plant and drew what we saw. Circle the step that comes next: take a photo of it / put the plant in the bin

Q7 [L1] Draw a line to match each thing to where it goes when we pack away: toys · tray · paper → the shelf · the bin · the tray

Q8 [L1] Circle the safe way to look at a bead: hold it near your mouth / look at it on the table

Q9 [L1] Look at the shadow-steps picture. Point to two things that keep us safe.

Q10 [L1] We watch the plant with the same steps each week. Circle why: so we can see how the plant changes / so we finish quickly

Q11 [L2] These rattle steps are mixed up. Put them in order. Say first, next, then, last: tape the lid on · put some rice in the bottle · shake it · close the lid

Q12 [L2] We will do the push and pull test. Suggest two steps to set up. Say them. The grown-up writes them down.

Q13 [L2] Suggest two safe steps for watching shadows outside.

Q14 [L2] A child put the ball at the top first, before the board was on the box. Say why this order does not work.

Q15 [L2] *Try it.* Make the rattle with a grown-up. Shake it softly. Shake it hard. Say which shake makes the loud sound.

Q16 [L2] Draw step 3 of the push and pull test. Point to the toy in your drawing and say what it is doing.

Answers

Q1 The second card (the board on the box). *next*

Q2 Rule 1: the things we test never go in our mouth. Rule 2: we never look straight at the Sun.

Q3 walk

Q4 The card that says *safe*.

Q5 First: clear a space on the floor. Next: get the tray of toys. Last: put down the start line.

Q6 take a photo of it

Q7 toys → the tray. tray → the shelf. paper → the bin.

Q8 look at it on the table

Q9 Any two of: wear a hat; look at the ground (not the Sun); stand still; a friend draws around the shadow (we do not move into the road or away from the class).

Q10 so we can see how the plant changes

Q11 First: put some rice in the bottle. Next: close the lid. Then: tape the lid on. Last: shake it.

Q12 Any two steps to set up, in an order that works. e.g. clear a space on the floor; get the tray of toys; put down the start line; sit down with your partner.

Q13 Any two of: wear a hat; look at the ground; stand still; stay with the class; never look at the Sun.

Q14 The slope is not made yet, so the ball has nowhere to sit. The ball step cannot come first.

Q15 Shaking hard makes the loud sound. Shaking softly makes a quiet sound.

Q16 Any drawing of step 3: the toy moving along after the push, e.g. the car with an arrow to show it moves.

Fully-worked solutions

Q1 The steps go: box, board, ball. After the box comes the board on the box. ∴ point to the second card and say *next*.

Q2 The two standing rules are always on. ∴ Rule 1: the things we test never go in our mouth. Rule 2: we never look straight at the Sun.

Q3 Walking keeps the floor safe. Running can knock things over or make someone slip. ∴ circle *walk*.

Q4 The word *safe* is on its own card. ∴ point to it and say *safe*.

Q5 We need a clear space before anything else, so that step is first. The toys come after. The start line goes down just before we start. ∴ first: clear a space. next: get the tray. last: put down the start line.

Q6 The plant steps go in the same order each week: look, draw, photo, class book. We did look and draw. ∴ the next step is: take a photo of it. (The plant is never put in the bin.)

Q7 When we pack away: the toys go back in the tray, the tray goes on the shelf, and the paper goes in the bin. ∴ toys → the tray, tray → the shelf, paper → the bin.

Q8 Rule 1 says the things we test never go in our mouth. A bead on the table is safe to look at. ∴ circle *look at it on the table*.

Q9 The hat keeps the Sun off us. Looking at the ground means we never look at the Sun. Standing still lets our friend draw around the shadow. ∴ point to any two of these and say how they keep us safe.

Q10 Same steps, same order, each week — then our drawings and photos show how the plant changes. ∴ circle *so we can see how the plant changes*.

Q11 The rice goes in before the lid. The lid is closed before the tape. The tape is on before we shake. $\therefore$ first: rice in the bottle. next: close the lid. then: tape the lid on. last: shake it.

Q12 To set up, we get the space and the things ready before the test. $\therefore$ any two of: clear a space on the floor; get the tray of toys; put down the start line; sit down with your partner.

Q13 Safe steps for shadows follow Rule 2 and keep us with the class. $\therefore$ any two of: wear a hat; look at the ground; stand still; stay with the class; never look at the Sun.

Q14 The ball sits at the top of the slope. But in this order the slope is not made yet. $\therefore$ the ball has nowhere to sit, so the order does not work.

Q15 Say your idea first, then try it. A soft shake makes a quiet sound. A hard shake makes a loud sound. $\therefore$ shaking hard makes the loud sound.

Q16 Step 3 of the push and pull test is: watch how it moves. $\therefore$ draw the toy car along the floor after the push, with an arrow to show it moves, and say *it moves along*.

Making and recording observations, including informal measurements

Read aloud. A grown-up reads this topic to the children. Children answer by pointing, saying, circling, matching or drawing. There is no long writing.

VC2S2I03 — observations are made using the senses and recorded, including informal measurements, using digital tools as appropriate

Victorian Curriculum 2.0 — Science F–2, Planning and conducting

Evidences: They suggest steps to be followed in an investigation, and follow safe procedures to make and record observations, including informal measurements.

In this topic we will:

- use our senses to make observations, and say what an observation is (E01)
- safely record the touch, smell, sight and sound of materials, and say why we never taste (E02)
- use a magnifying glass or binoculars to observe plants and animals, and record with numbers, dots or drawings (E03)
- measure with handspans, blocks, pencil lengths and string, and learn the rules for measuring (E04)
- use digital tools — a clap-o-meter app, slow-motion video and time-lapse photos — to make and record observations (E05)

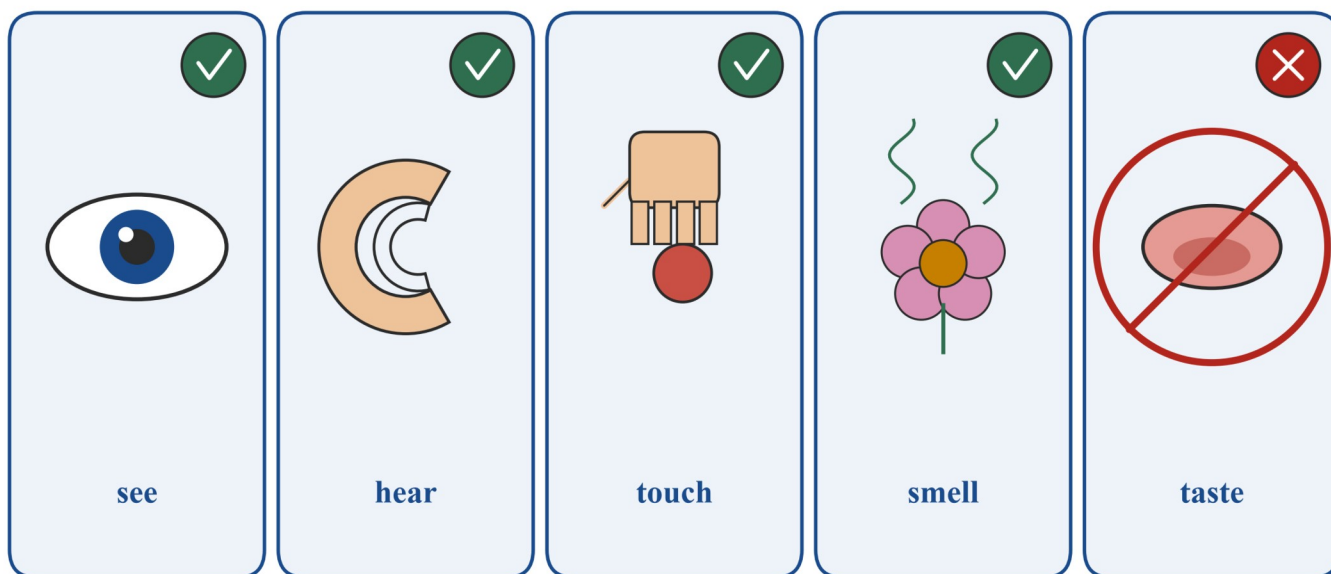
Theory

What is an observation?

An **observation** is something we find out using our **senses**.

We see with our eyes. We hear with our ears. We touch with our hands. We smell with our nose.

We observe with four senses



In science we look, listen, feel and smell. We never taste.

Five cards. Four cards have a green tick: see (an eye), hear (an ear), touch (a hand on a ball), smell (a flower). One card has a red cross: taste (a tongue with a no sign over it). The caption says: in science we look, listen, feel and smell; we never taste.

In science we look, listen, feel and smell. We **never** taste.

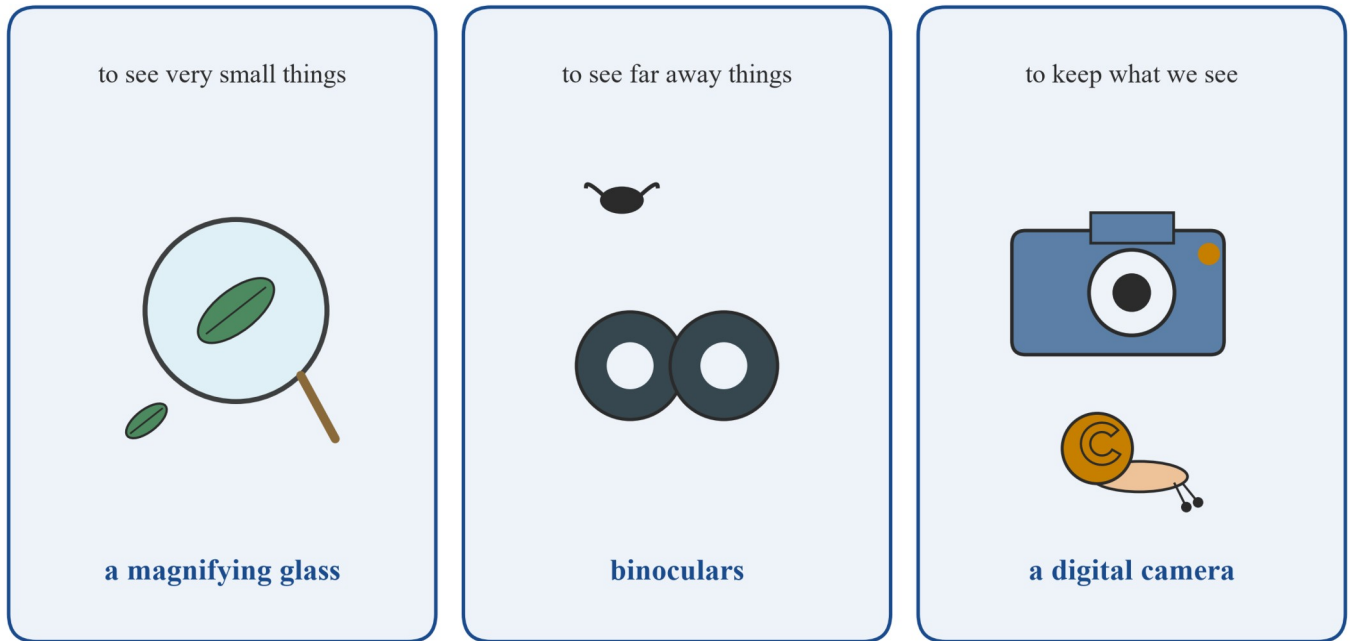
Why do we never taste? We may not know what a thing is. Some things are not safe to eat. Some things can make us sick. So in science we do not taste the things we observe.

Safety. We never put the things we test in our mouth.

Tools that help us observe

Sometimes our senses need help. A **tool** can help us observe.

Tools that help us observe



Three cards. A magnifying glass over a small leaf makes the leaf look big, to see very small things. Binoculars under a bird far away, to see far away things. A digital camera over a photo of a snail, to keep what we see.

- A **magnifying glass** makes very small things look big.
- **Binoculars** make far away things look near.
- A **digital camera** keeps what we see, so we can look again.

With these tools we can observe plants and animals: a tiny bug on a leaf, or a bird far away in a tree.

Recording what we observe

To **record** means to keep what we found out. We can record in three ways: with a **number**, with **dots**, or with a **drawing**.

We observe 4 leaves on the ground.

We observe 4 leaves on the ground.



with a number

4

with dots



with a drawing



One observation, three ways to record it.

At the top, 4 green leaves. Below, three cards. With a number: the number 4. With dots: 4 black dots. With a drawing: 4 small drawings of leaves. The caption says: one observation, three ways to record it.

All three records show the same thing: 4 leaves.

The teacher gives us a record sheet. We fill in our row.

Our observation record		
draw it	dots	number
		3

The teacher gives us the sheet. We fill in our row.

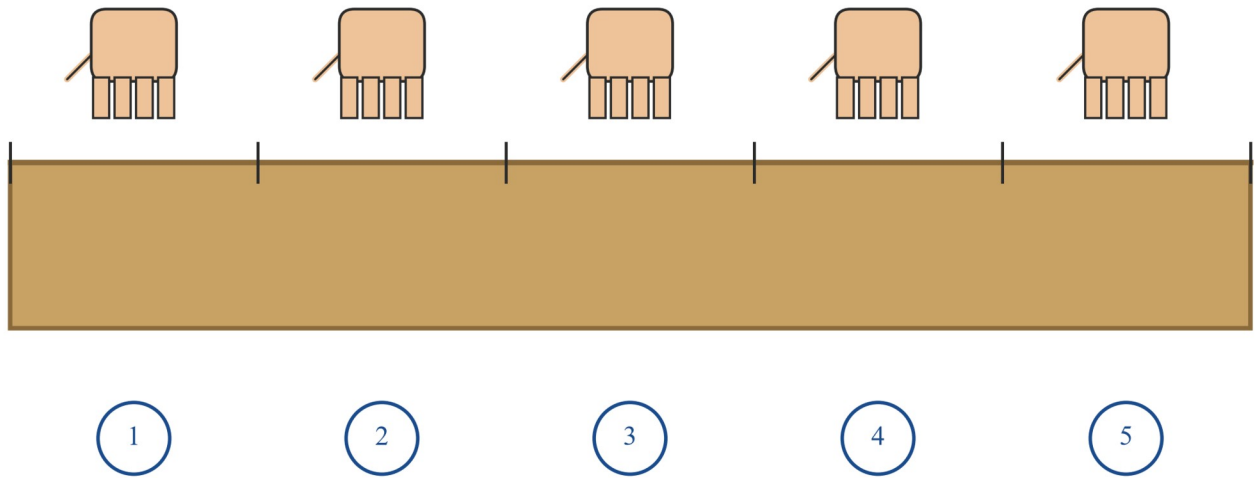
A record sheet titled Our observation record, with three columns: draw it, dots, number. The first row is filled in: 3 leaf drawings, 3 dots, the number 3. The next row is empty for us to fill in.

Measuring with handspans and blocks

To **measure** means to find out how long a thing is by counting **units**. A **unit** is the one thing we use to measure.

One hand put-down is one **handspan**. We put our hand down at the edge and count 1. We put it down again where it ends, and count 2. And so on.

The desk is 5 handspans long.



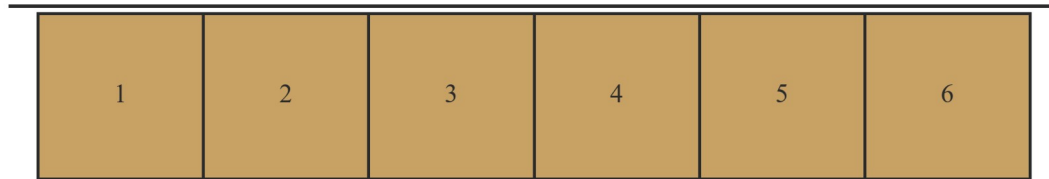
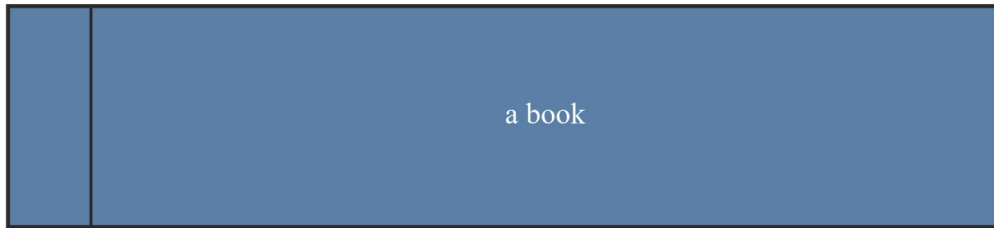
Start at the edge. Each hand starts where the one before it ends.

A desk edge with 5 hand shapes in a row along it, each hand starting where the one before it ends. Tick marks and the numbers 1 to 5 count the handspans. The caption says: the desk is 5 handspans long; start at the edge; each hand starts where the one before it ends.

The desk is 5 handspans long.

Blocks can be units too. We lay them end to end and count them.

The book is 6 blocks long.

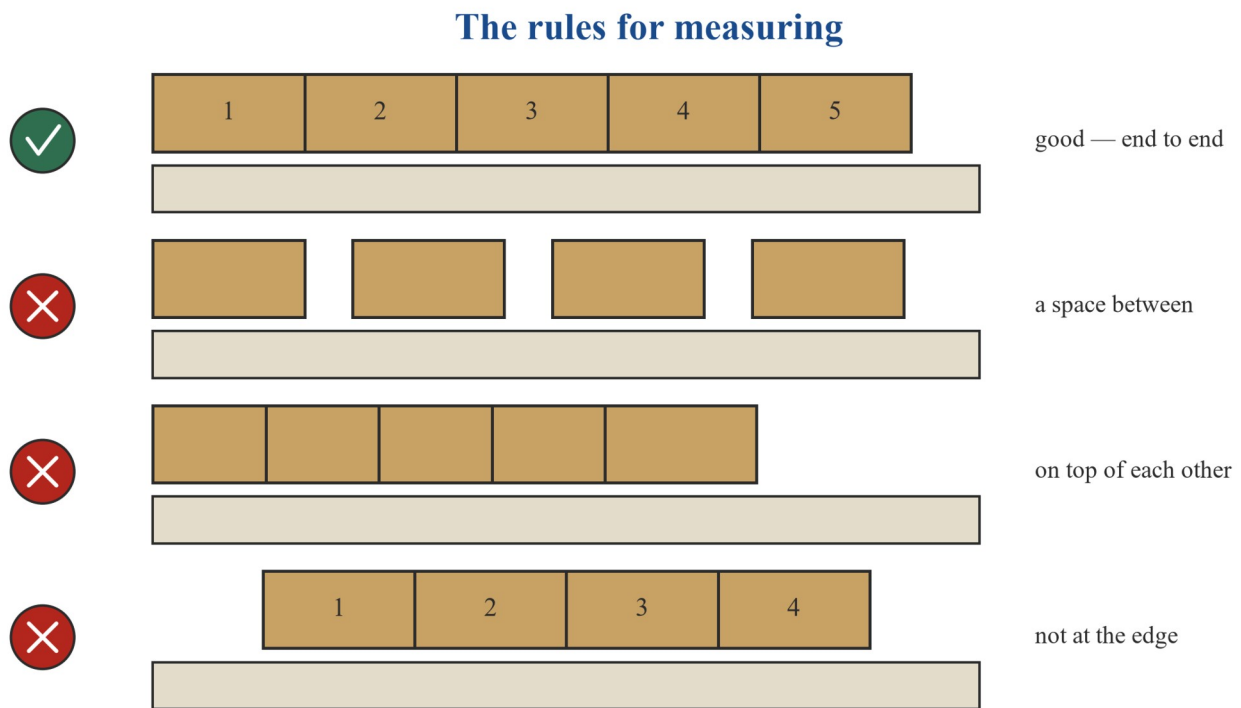


Each block starts where the one before it ends.

A blue book at the top. Below it, 6 wood blocks in a row, end to end, numbered 1 to 6, spanning the same length as the book. The caption says: the book is 6 blocks long; each block starts where the one before it ends.

The book is 6 blocks long.

The rules for measuring



Four rows of blocks along a strip. Row one has a tick: 5 blocks end to end, starting at the edge — good. Row two has a cross: spaces between the blocks. Row three has a cross: blocks on top of each other. Row four has a cross: blocks not starting at the edge.

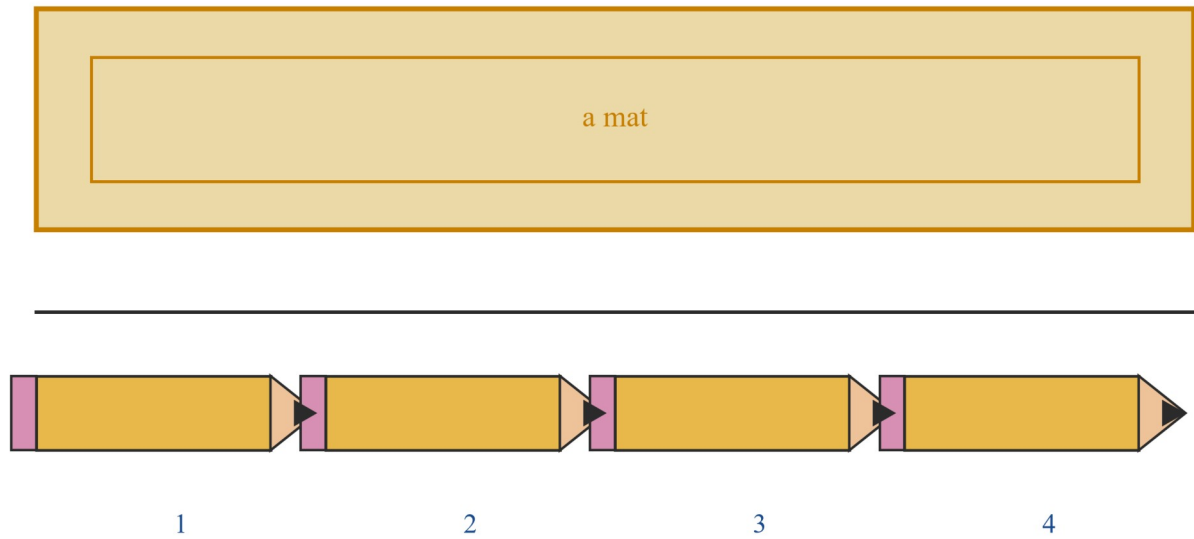
- Start at the edge.
- No spaces between the units.
- Do not put one unit on top of another.
- Each unit starts where the one before it ends — **end to end**.

If there is a space, the count is wrong. If one unit sits on top of another, the count is wrong. If we do not start at the edge, the count is wrong.

More units: pencils and string

A pencil can be a unit. We lay the same pencil end to end.

The mat is 4 pencils long.



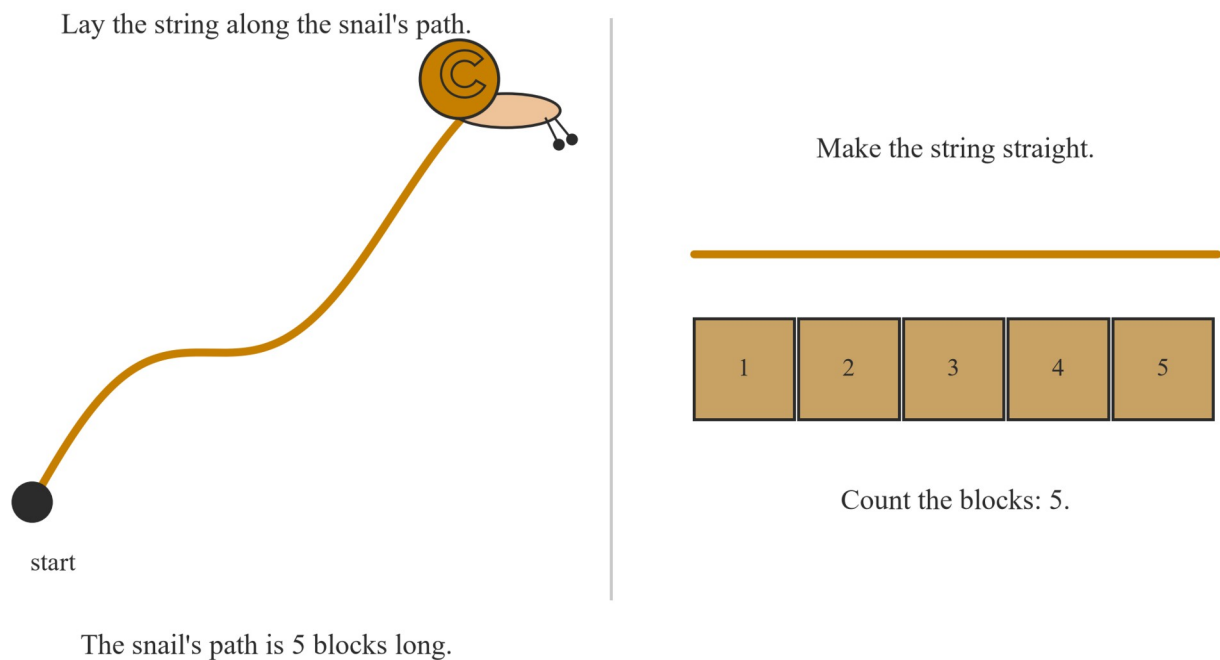
The pencils go end to end, starting at the edge.

A mat at the top. Below it, 4 pencils end to end, tip to eraser, numbered 1 to 4, spanning the same length as the mat. The caption says: the mat is 4 pencils long; the pencils go end to end, starting at the edge.

The mat is 4 pencils long.

String can measure a **wiggly** path. We lay the string along the path. Then we make the string straight and lay blocks along it.

String can measure a wiggly path



Left: a snail with a wiggly string line behind it, from a start dot to the snail. Right: the same string made straight, with 5 blocks in a row along it, numbered 1 to 5. The captions say: lay the string along the snail's path; make the string straight; count the blocks: 5; the snail's path is 5 blocks long.

The snail's path is 5 blocks long.

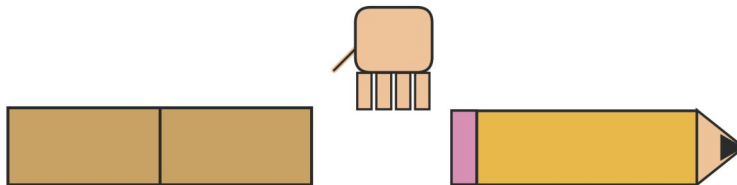
The same unit all the way

One measurement uses one kind of unit, all the way along.

Use the same unit all the way



all blocks



blocks, a hand
and a pencil



One measurement uses one kind of unit, all the way along.

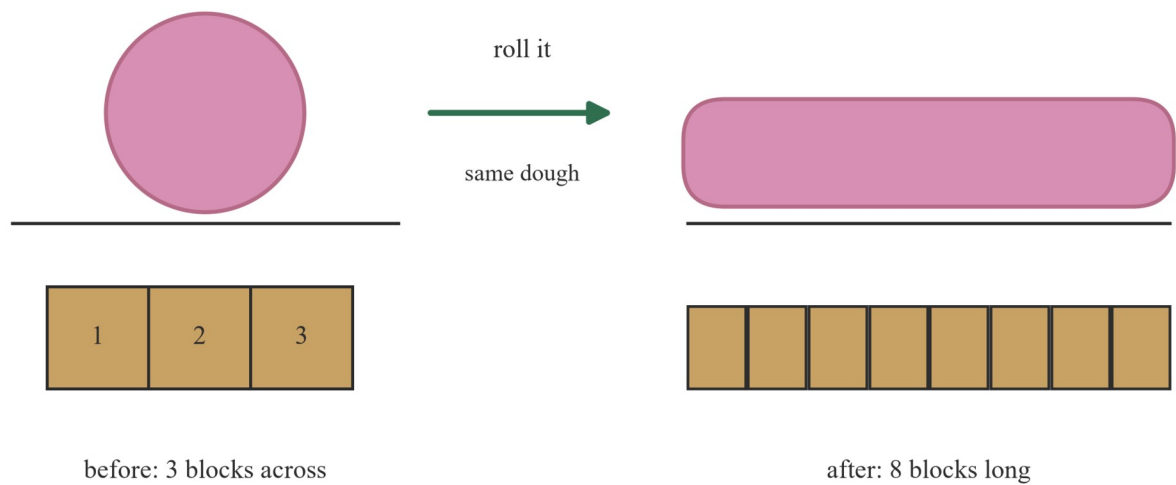
Two rows along a strip. Top row has a tick: 5 of the same blocks, end to end — all blocks. Bottom row has a cross: 2 blocks, then a hand, then a pencil — blocks, a hand and a pencil. The caption says: one measurement uses one kind of unit, all the way along.

All blocks — good. Blocks, then a hand, then a pencil — not good. Those units are different sizes, so the count is not fair.

Measuring a change

We can measure a **change** in shape.

We can measure a change in shape



Left: a pink dough ball on a line, with 3 blocks in a row under it — before: 3 blocks across. An arrow says roll it, same dough. Right: the dough rolled into a long snake, with 8 blocks in a row under it — after: 8 blocks long.

The dough ball is 3 blocks across. We roll it into a snake. The snake is 8 blocks long. The shape changed, and our measurement shows the change.

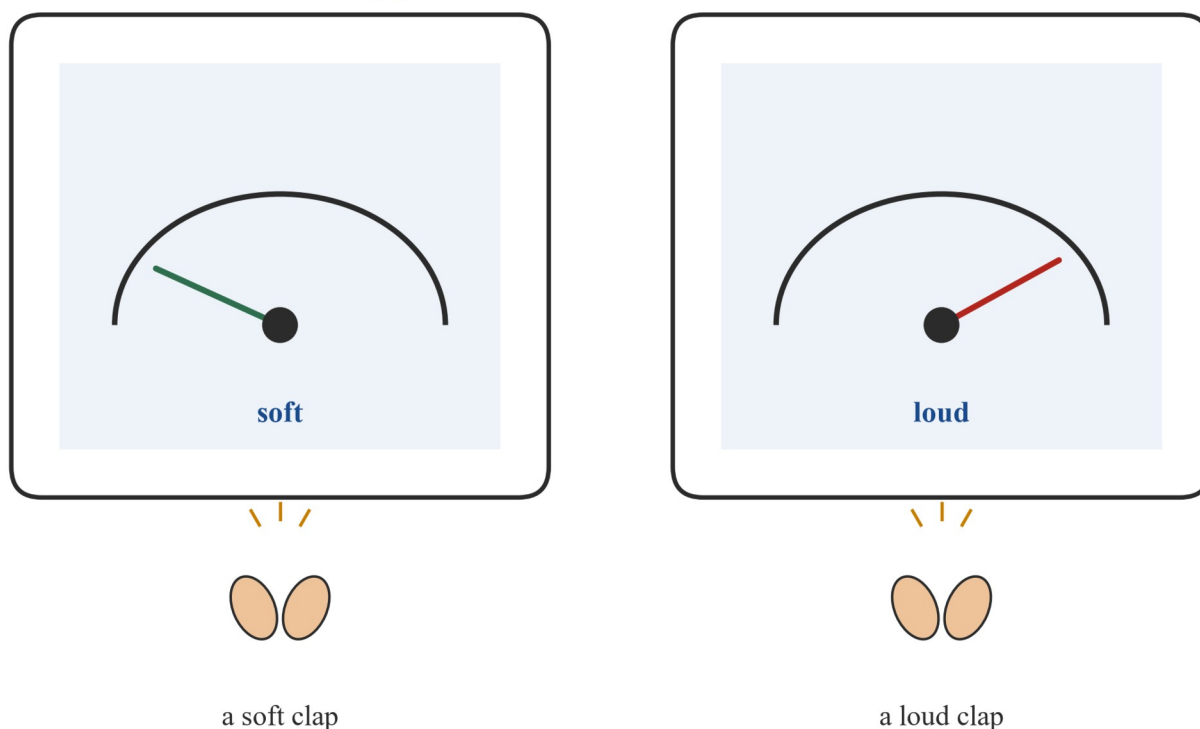
We can measure a change in **movement** too. A toy car moves along the floor. We lay blocks along its path. First time: 2 blocks. Next time: 5 blocks. The car went a longer way the next time.

Digital tools that help us observe

A **digital tool** can help us make and record observations.

A **clap-o-meter app**. We clap. The app shows how loud the sound is.

An app can show how loud a sound is

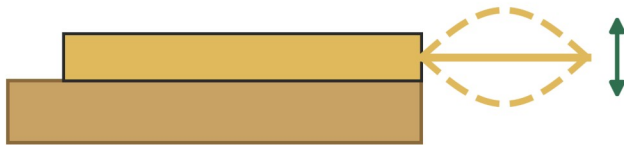


Two tablet screens with a meter. Under a soft clap the needle moves a little way and the screen says soft. Under a loud clap the needle moves a long way and the screen says loud. The title says: an app can show how loud a sound is.

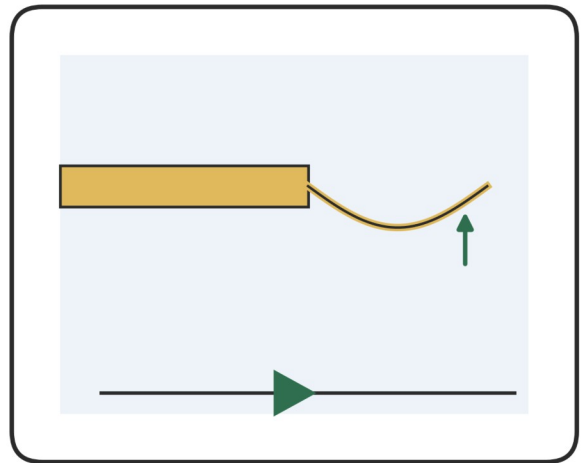
A soft clap moves the needle a little way. A loud clap moves the needle a long way. The app records what our ears hear.

Slow-motion video. Some things move too fast to see. The end of a ruler **vibrates** — it moves back and forth very fast. We take a slow-motion video. Now we can see each move.

Fast things are hard to see



the end of the ruler vibrates fast



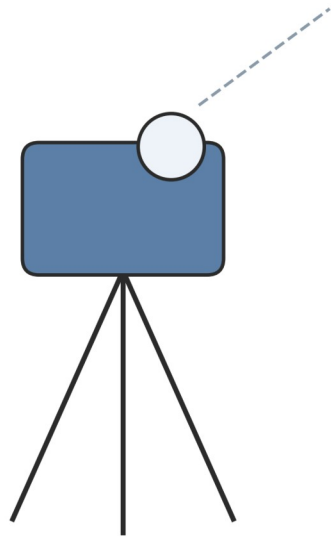
slow-motion video shows each move

Left: a ruler on a desk with its free end shown as a blurred wobble, captioned: the end of the ruler vibrates fast. Right: a tablet playing a slow-motion video of the ruler end bending up and down, captioned: slow-motion video shows each move.

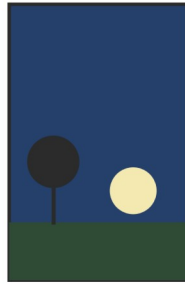
Time-lapse photos. Some things move too slowly to see. The Moon seems to move across the sky. The camera stays in one place and takes a photo again and again. The photos show the movement.

Time-lapse photos of the evening sky

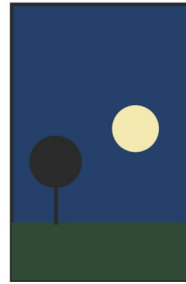
The Moon seems to move across the sky.



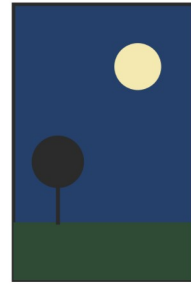
the camera stays in one place



early



later



much later

The camera takes a photo from the same place, over and over.

Left: a camera on a tripod that stays in one place. Right: three photos of the same night sky, labelled early, later, much later; the Moon is low in the first photo and high in the last one. The captions say: the Moon seems to move across the sky; the camera takes a photo from the same place, over and over.

Words for this topic

observe

record

measure

unit

handspan

string

end to end

loud

tool

same

Ten word cards in two rows: observe, record, measure, unit, handspan, string, end to end, loud, tool, same.

- **observe** — to use our senses to find out about a thing

- **record** — to keep what we found out, with a number, dots or a drawing
- **measure** — to find how long a thing is by counting units
- **unit** — the one thing we use to measure, like a block or a handspan
- **handspan** — one hand put-down, used as a unit
- **string** — we lay it along a wiggly path, then make it straight to measure
- **end to end** — each unit starts where the one before it ends
- **loud** — a big sound; the opposite of soft
- **tool** — a thing that helps us do a job, like a magnifying glass
- **same** — not different; we use the same unit all the way

Worked examples

Example 1 — record one observation three ways (E03)

We observe 3 shells on the sand. Record it three ways.

Working	Say why
With a number: write 3.	we counted 3 shells
With dots: draw 3 dots, one for each shell.	one dot for each shell
With a drawing: draw the 3 shells.	a drawing keeps what we see
∴ number: 3 · dots: 3 dots · drawing: 3 shells.	all three records show the same observation

Example 2 — measure the desk with handspans (E04)

We measure a desk with handspans. We start at the edge. We count 5 hand put-downs, end to end. How long is the desk?

Working	Say why
Start at the edge of the desk.	the first rule
Each hand starts where the one before it ends.	end to end
Count: 1, 2, 3, 4, 5.	count the units
∴ the desk is 5 handspans long.	we counted 5 of the same unit

Example 3 — find what is wrong (E04)

Sam measures a book with blocks. He leaves spaces between the blocks. He counts 4. Is his measurement right?

Working	Say why
Sam's blocks have spaces between them.	that breaks the rules
The spaces are part of the book, but they are not counted.	missing length
Measured again, end to end, the book is 6 blocks.	the right way
∴ no — Sam must put the blocks end to end, with no spaces.	no spaces, end to end

Example 4 — measure a change in shape (E04)

A dough ball is 3 blocks across. We roll it into a snake. The snake is 8 blocks long. How much longer is the snake than the ball?

Working	Say why
Before: 3 blocks across.	measure with blocks
After: 8 blocks long.	the same blocks
Count on from 3 to 8: 4, 5, 6, 7, 8 — that is 5 more.	8 is 5 more than 3

∴ the snake is 5 blocks longer than the ball.

the change in shape is measured

Example 5 — pick the right digital tool (E05)

Match each job to the right tool.

- (a) How loud is our clap?
- (b) How does the end of the ruler move when it vibrates fast?
- (c) How does the Moon seem to move across the sky at night?

Working

Say why

(a) A clap is a sound. A clap-o-meter app shows how loud a sound is.

the app

(b) The ruler vibrates too fast to see. Slow-motion video shows each move.

slow-motion video

(c) The Moon moves too slowly to see. Time-lapse photos from the same place show the movement.

time-lapse photos

∴ (a) the app · (b) slow-motion video · (c) time-lapse photos.

the right tool for each job

Practice questions

Teacher — observe and measure together. For the questions marked *try it*, the children observe or measure first, then record. Things to have ready: a desk, a book and a mat to measure; same-size blocks; a pencil; a piece of string; dough; shells or leaves to count; a tablet with a clap-o-meter app, slow-motion video and time-lapse photos if you can. Safe procedures only — nothing is tasted.

Q1 [F] Look at the four-senses picture. Point to the four senses we use in science.

Q2 [F] Say: do we taste the things we test, or not?

Q3 [F] Look at the tools picture. Point to the tool that makes very small things look big.

Q4 [F] We observe 4 leaves. Circle the number: 3 / 4 / 5

Q5 [F] Look at the record-ways picture. Point to the record with dots.

Q6 [L1] The desk is 5 handspans long. Draw 5 dots, one for each handspan.

Q7 [L1] Look at the rules picture. Put a tick next to the good way to measure. Say what is wrong with each of the other rows.

Q8 [L1] Look at the blocks picture. How many blocks long is the book? Circle: 5 / 6 / 7

Q9 [L1] Look at the pencils picture. How many pencils long is the mat? Say the number.

Q10 [L1] Circle the thing that can measure a wiggly path: string / block

Q11 [L2] Look at the same-unit picture. Why is ‘all blocks’ the good way? Say why.

Q12 [L2] *Try it.* Measure your book with blocks, end to end, starting at the edge. Record it with a number and with dots.

Q13 [L2] *Try it.* Roll dough from a ball into a snake. Measure the ball and the snake with blocks. Say the change.

Q14 [L2] Look at the sound-app picture. Which clap moves the needle a long way: a soft clap or a loud clap?

Q15 [L2] We want to see how the Moon seems to move across the sky at night. Circle the best tool: slow-motion video / time-lapse photos

Q16 [L2] Sam measures with blocks and leaves spaces. Say how to fix his measurement.

Answers

1. see, hear, touch, smell — the four cards with a tick.
2. Not — we never taste the things we test.
3. The magnifying glass.
4. 4
5. The middle card (4 dots).
6. 5 dots, one for each handspan.
7. The top row (end to end). The other rows: spaces between the blocks; blocks on top of each other; not starting at the edge.
8. 6
9. 4
10. string
11. The units are all the same size, so the count is fair.
12. Check: blocks end to end, starting at the edge; the dots match the count.
13. Any two measurements, e.g. ball 3 blocks, snake 8 blocks — the snake is longer.
14. The loud clap.
15. Time-lapse photos.
16. Put the blocks end to end with no spaces, start at the edge, then count again.

Fully-worked solutions

Q1 The four cards with a tick are see, hear, touch and smell. The taste card has a cross. $\therefore$ point to see, hear, touch, smell.

Q2 Some things are not safe to eat, so in science we do not taste the things we test. $\therefore$ not — we never taste.

Q3 A magnifying glass makes very small things look big. $\therefore$ point to the magnifying glass.

Q4 We counted 4 leaves. $\therefore$ circle 4.

Q5 The record with dots shows 4 black dots, one for each leaf. $\therefore$ point to the middle card.

Q6 One dot stands for one handspan. The desk is 5 handspans long. $\therefore$ draw 5 dots.

Q7 The top row starts at the edge and sits end to end, with no spaces and no overlaps. $\therefore$ tick the top row. The other rows are wrong because of spaces, overlaps, or not starting at the edge.

Q8 Count the blocks under the book: 1, 2, 3, 4, 5, 6. $\therefore$ circle 6.

Q9 Count the pencils along the mat: 1, 2, 3, 4. $\therefore$ the mat is 4 pencils long.

Q10 A block is straight and cannot follow a wiggly path. String can. $\therefore$ circle string.

Q11 In 'all blocks' every unit is the same size, so the count is fair. The other row mixes blocks, a hand and a pencil — different sizes. $\therefore$ the same unit all the way makes the count fair.

Q12 Lay the blocks end to end along the book, starting at the edge. Count them. Write the number and draw that many dots. $\therefore$ the number and the dots must match the count.

Q13 Measure the ball with blocks. Roll it into a snake. Measure the snake with the same blocks. $\therefore$ say the change, e.g. 3 blocks across became 8 blocks long, so the snake is longer.

Q14 On the app, the loud clap moves the needle a long way and the screen says loud. $\therefore$ the loud clap.

Q15 The Moon seems to move very slowly. Slow-motion video is for fast things. Time-lapse photos from the same place show slow movement. $\therefore$ circle time-lapse photos.

Q16 Spaces make the count wrong. Put the blocks end to end with no spaces, start at the edge, and count again. $\therefore$ measure again, end to end.