REAL-LIFE SCIENCE

Living Things and Our Planet

Teacher guide

For the National 2 Science in the Environment workbook



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Blewis LEARNING

Using the workbooks

The National 2 Science in the Environment workbook **Living Things and Our Planet** covers the required unit **Living Things** and the optional unit **Keeping our Planet Healthy**. Every topic has picture-led learning pages, a hands-on activity with simple steps, a brain break and a check-up.

PRACTICALS

Learners follow picture steps with an adult and record what they see by ticking, circling, drawing or with a photo. Each activity has example results for when there is no kit.

PRACTICAL SAFETY

Every practical has a Stay safe table and a teacher note with hazards and adapted versions. The Stay safe tables and these notes are a starting point, not a complete risk assessment: the teacher or school must risk assess every practical for their own learners, room and kit before use, following their employer's policies and national guidance (in Scotland, SSERC). Always check learners' care plans and medical information. Anything hot, sharp or with chemicals is done by the adult, with the learner watching and recording.

NO LAB, NO KIT, OR A LEARNER ABSENT

Each activity includes example results so learners can still fill in their table and say what they found.

EVIDENCE

Evidence for N2 units is mostly naturally occurring: use the My adult saw me checklists, photos and the learner's own recording in the book. Each teacher note says which outcome the activity gives evidence for. Always check the latest course documents and your centre's arrangements.

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TEACHER NOTES

Topic 1: Parts of my body

Time	Two short sessions: one for the learn pages, one for the body map.
Kit	A roll of lining paper or wallpaper (one length per learner or pair), thick crayons, glue sticks, body part cards (a cut-out page of cards is included in this topic, just before the activity).
Prep	Clear floor space. Cut out the body part cards in advance if scissors are not suitable for the group.
What to expect	Most learners place the outside parts (eyes, ears, nose, tongue) easily. The heart, lungs and stomach often need prompting: "Put your hand on your chest. Can you feel your heart?"

Safety and inclusion

- Some learners dislike lying down or being drawn round. Offer a ready-drawn body outline, a doll or a large picture instead.
- Ask before touching. Learners can point to parts on their own body or on the map.
- Adults do all cutting. Wash hands after using glue.
- Support assistant prompts: "Where is your heart?", "What does it do?", "Show me your ears."

Evidence for the unit

This topic is evidence for the body part of the Living Things unit. Keep the body map (or a photo of it) and the ticked "My adult saw me" checklist. Learners should name and place at least four parts.

No time or no space?

Use a printed body outline on the table instead of a full-size map, or point to the parts on a doll or teddy.

Answers: Topic 1

Topic 1: Parts of my body

Learn 1 1 Learner points to and ticks brain (head), heart and lungs (chest), stomach (tummy). 2 brain. 3 heart and lungs.

Learn 2 1 eyes: help me see; ears: help me hear; nose: help me smell; tongue: help me taste; lungs: help me breathe. 2 brain. 3 skull.

Let's find out 1 Parts placed: brain in the head, eyes, ears, nose and tongue on the face, lungs and heart in the chest, stomach in the tummy, bones in the arms and legs. What I found: chest; head; see the picture.

Check-up 1 heart 3, brain 1, stomach 4, lungs 2. 2 pumps blood. 3 eyes: see; ears: hear; nose: smell.

TEACHER NOTES

Topic 2: My body at work

Time	Two short sessions. The activity takes about 15 minutes.
Kit	A stopwatch or timer, chairs, clear floor space. Optional for the senses page: a drum, a lemon, a flower, an ice cube in a cup, a picture of a rainbow.
Prep	Check care plans for asthma, heart conditions or mobility needs before the activity.
What to expect	Breaths in 30 seconds usually rise from about 8 to 10 sitting still to 14 to 20 after a minute of marching; heartbeats from about 35 to 45 to 50 to 65. Counting breaths is easier with a hand on the tummy. Finding the wrist pulse often needs help: the neck pulse or a hand on the chest also works.

Safety and inclusion

- The movement is gentle: marching on the spot or seated arm waving. Never push a learner to keep going.
- Learners with asthma should have their inhaler to hand. Stop if anyone is dizzy, wheezy or unwell.
- Learners who cannot or do not want to move can time a partner and record the results, or use Kai's sample results.
- Senses activities: check allergies before any tasting or smelling, and never ask a learner to taste anything unknown.
- Support assistant prompts: "Put your hand on your tummy. Count each breath.", "Is it more or less than before?"

Evidence for the unit

This topic is evidence for the body systems part of the Living Things unit. The activity tests two systems, breathing and the heart and blood, so keep the record table (or a photo) and the ticked checklist. A knee-jerk reflex test is a good extra.

No time or no space?

Do the activity seated with arm waving, or use the sample results. A quick knee-jerk reflex test (gentle tap below a crossed knee with the side of the hand) is another simple experiment.

Answers: Topic 2

Topic 2: My body at work

Learn 1 1 faster. 2 running and dancing. 3 wrist.

Learn 2 1 rainbow: see; drum: hear; flower: smell; lemon: taste; ice: touch. 2 reflex. 3 eating fruit, washing my hands, sleeping well.

Let's find out 2 Breaths and heartbeats after moving should both be more than when sitting still (sample: breaths 9 then 16; heartbeats 38 then 55 in 30 seconds). What I found: faster; air; faster.

Check-up 1 lungs and nose. 2 faster. 3 eyes: see; tongue: taste; ears: hear.

TEACHER NOTES

Topic 3: Sorting living things

Time	One session for the learn pages; 20 to 30 minutes outside for the hunt.
Kit	Gloves for each learner, hand lenses, a white tray, clipboards and pencils. Optional: picture cards of animals and plants to sort indoors.
Prep	Check the area first for broken glass, dog mess, stinging plants and poisonous plants or fungi (e.g. foxglove, lords-and-ladies, yew); learners do not pick or taste anything. Place a few logs or stones in a shady spot a week before so minibeasts gather under them.
What to expect	Woodlice, worms, beetles and spiders are most common under logs. Numbers vary with the weather: damp days are best.

Safety and inclusion

- Adults lift heavy logs and stones, towards themselves so anything underneath moves away. Put them back gently.
- Gloves on, no hands near faces, wash hands afterwards. Cover cuts with plasters.
- Learners who dislike minibeasts can be the recorder, or sort picture cards. A wheelchair-friendly spot on a path edge works well.
- Support assistant prompts: "How many legs has it got?", "Is it an insect?", "Where did we find most of them?"

Evidence for the unit

This topic is evidence for the sorting part of the Living Things unit. Keep the sorting answers, the tally (or a photo) and the ticked checklist. Learners should sort at least two living things into the right groups.

No time or no space?

Use the sample results, or sort picture cards of animals and plants into groups on the table.

Answers: Topic 3

Topic 3: Sorting living things

Learn 1 1 dog, tree, fish. 2 food, water, air. 3 yes.

Learn 2 1 owl: bird; dog: mammal; trout: fish; bee: insect. 2 bird.

Let's find out 3 Any honest tally. Sample: the most were woodlice (7). What I found: the group with the biggest tally (sample: woodlice); 8 legs; dark and damp.

Check-up 1 rabbit, flower. 2 cat: mammal; gull: bird; salmon: fish. 3 an insect.

TEACHER NOTES

Topic 4: Plants and food chains

Time	One or two short sessions.
Kit	The cut-out page of food chain cards in this topic (grass, rabbit, fox; corn, mouse, owl; leaf, caterpillar, bird; pondweed, fish, heron), A4 paper, glue sticks. A short film clip of animals feeding helps.
Prep	Cut out the cards in advance. Optional: grow cress in the light and in a dark cupboard a week before, to show plants need light.
What to expect	Learners often put the arrow the wrong way. Model it: "The arrow goes from the food to the animal that eats it."

Safety and inclusion

- Adults do the cutting. Wash hands after glue.
- Learners can order real objects or toys instead of cards, or point to the order for an adult to stick.
- Support assistant prompts: "What does a rabbit eat?", "Who eats the rabbit?", "Which comes first?"

Evidence for the unit

This topic is evidence for the food chain part of the Living Things unit. Keep the two chains (or a photo) and the ticked checklist. Each chain should have at least three links and start with a plant.

No time or no space?

Do the activity as a quick card sort on the table, or draw the chains straight onto the record page.

Answers: Topic 4

Topic 4: Plants and food chains

Learn 1 1 light, water, air. 2 sunlight. 3 it does not grow well.

Learn 2 1 corn 1, mouse 2, owl 3. 2 caterpillar.

Let's find out 4 Any chain of three links that starts with a plant, e.g. grass → rabbit → fox; corn → mouse → owl; leaf → caterpillar → bird; pondweed → fish → heron. What I found: plant; does the eating; food.

Check-up 1 grass 1, rabbit 2, fox 3. 2 a plant. 3 light, water.

TEACHER NOTES

Topic 5: Using the planet's resources

Time	One session for the learn pages; the activity needs 40 minutes including the wait.
Kit	Two identical clear plastic jars, cling film and an elastic band, two identical thermometers (digital or spirit-filled), a sunny window sill. A desk lamp works on a dull day.
Prep	Check both thermometers read the same at the start. Pick a sill learners can reach without leaning out.
What to expect	The covered jar usually ends a few degrees warmer. On a dull day the difference is small; use a lamp or the sample results.

Safety and inclusion

- Use plastic jars, not glass. Adults place and read the thermometers. Keep window openings closed or restricted.
- If using a lamp, the adult positions it and switches it on and off; keep cables tidy and hands off the hot bulb.
- Learners can feel which jar is warmer by holding a hand near each one, or point to the higher reading.
- Support assistant prompts: "Which number is bigger?", "Which jar has the cover?", "What does the cover do?"

Evidence for the unit

This topic is evidence for the harm part of the Keeping our Planet Healthy unit. Keep the learn pages, the jar results (or a photo) and the ticked checklist. Learners should name at least two ways that using resources harms the planet.

No time or no space?

Use the sample results, or make a poster linking pictures of a resource, what it is used for and the harm it causes.

Answers: Topic 5

Topic 5: Using the planet's resources

Learn 1 1 trees: paper; oil: plastic; water: drinking.

Learn 2 1 car fumes: dirty air; plastic in the sea: hurts sea animals; cutting down forests: animals lose homes. 2 walk.

Let's find out 5 The covered jar should warm up more (sample: open 18 → 22 °C, covered 18 → 26 °C). What I found: warmer; cling film; warmer.

Check-up 1 trees: paper; oil: plastic bag. 2 car fumes and plastic in the sea. 3 warmer.

TEACHER NOTES

Topic 6: Reduce, reuse, recycle

Time	One session for the learn pages; 20 minutes for the sort.
Kit	Disposable or washable gloves, a box of clean, dry rubbish (paper, card, rinsed plastic bottles, rinsed cans, crisp packets), three or four labelled bins or boxes, soap and paper towels.
Prep	Rinse and dry everything in advance. Check cans for sharp edges (press lids down or tape them). Leave out glass and anything that held chemicals.
What to expect	Crisp packets and plastic film often go in the wrong bin; use them to talk about what cannot be recycled in your area.

Safety and inclusion

- Gloves on, no eating or drinking, hands washed afterwards. These hygiene steps are part of the evidence.
- Check latex allergies before using gloves.
- Learners can sort by matching colours or pictures on the bins if reading the symbols is hard.
- Support assistant prompts: "Can you see the symbol?", "Is it paper or plastic?", "What could we use it for again?"

Evidence for the unit

This topic is evidence for the reduce, reuse and recycle part of the Keeping our Planet Healthy unit, including working safely and cleanly. Keep the tally (or a photo) and the ticked checklist. A swap shop or a plant pot made from an old bottle works just as well.

No time or no space?

Use the sample results, or sort the classroom paper bin at the end of a lesson.

Answers: Topic 6

Topic 6: Reduce, reuse, recycle

Learn 1 1 fill my old bottle again: reuse; put a can in the recycling: recycle; turn off the light: reduce. 2 use a bag again.

Learn 2 1 newspaper: paper bin; apple core: food waste bin; juice can: can and plastic bin. 2 to save resources.

Let's find out 6 Any honest tally (sample: paper and card was the most, 12). What I found: the biggest tally; resources; washed my hands.

Check-up 1 refill my water bottle, use a bag for life. 2 can: can bin; card: paper bin. 3 switch off the light.

TEACHER NOTES

Topic 7: Energy from nature

Time	One session for the learn pages; 20 minutes for the windmill test.
Kit	Paper windmills (square of card, cut to the centre from each corner, folded in and pinned to a pencil or dowel with a map pin and a small bead), a stopwatch. A desk fan on low for a wet day.
Prep	Make the windmills in advance; adults handle the pins. Mark one blade with a dot so turns are easy to count. Choose two spots: by a wall (sheltered) and an open corner (windy).
What to expect	Many more turns in the windy spot. With a fan, compare low and high settings, or near and far.

Safety and inclusion

- Pins fixed firmly by an adult; check the windmills before use.
- Fans: the adult switches on and off, fingers away from the guard, cable kept tidy.
- Outside: stay in the school grounds with an adult, away from roads and edges.
- Learners who find counting hard can watch and say "fast" or "slow", or a partner counts while they hold the windmill.

Evidence for the unit

This topic is evidence for the renewable energy part of the Keeping our Planet Healthy unit. Keep the windmill results (or a photo) and the ticked checklist. Black and white tiles in the sun, or a small water wheel under a tap, work just as well.

No time or no space?

Use the sample results, or test the windmill in front of a fan in the classroom.

Answers: Topic 7

Topic 7: Energy from nature

Learn 1 1 wind turbine: wind; solar panel: sunlight; hydro dam: moving water. 2 wind and sunshine.

Learn 2 1 faster. 2 sunny. 3 it will not run out.

Let's find out 7 More turns in the windy place (sample: 4 sheltered, 15 windy). What I found: windy place; more turns; renewable.

Check-up 1 solar panel: sunlight; wind turbine: wind. 2 coal. 3 faster.

TEACHER NOTES

Topic 8: Saving energy and water

Time	One session for the learn pages; 30 minutes for the survey and sign.
Kit	Clipboards and pencils, the survey table, paper and crayons for a sign. Optional: a timer and a basin to show how much water runs while brushing teeth.
Prep	Tell staff in advance which rooms you will visit and when. Plan a route that avoids busy times.
What to expect	Lights left on in empty rooms and screens on standby are the most common finds. Put the learners' signs up by the switches.

Safety and inclusion

- Adults use wall and screen switches only; do not unplug or touch sockets; report faults. Learners walk in corridors.
- An adult checks the toilets are empty before learners enter, or survey staff or accessible toilets only.
- A learner with mobility needs can survey rooms on one floor, or be the recorder for the group.
- Learners can show "on" and "off" by pointing or with symbol cards instead of ticking.
- Support assistant prompts: "Is anyone in this room?", "Is the light on?", "What should we do?"

Evidence for the unit

This topic is evidence for the saving resources part of the Keeping our Planet Healthy unit. Keep the survey table, the sign (or a photo of it) and the ticked checklist.

No time or no space?

Use the sample results, or survey just the classroom and corridor at the end of the day.

Answers: Topic 8

Topic 8: Saving energy and water

Learn 1 1 switch off the light; walk to the shop. 2 switch it off.

Learn 2 1 brushing teeth: turn off the tap; shower: keep it short; watering plants: use rainwater. 2 tell an adult.

Let's find out 8 Any honest survey (sample: lights on in the hall and library, a screen on in the library, a tap dripping in the toilets). What I found: hall or library (sample); the toilets wasted water, not energy; switch it off; the planet.

Check-up 1 turn off the tap; use rainwater for plants. 2 switch off the screen. 3 light: switch it off; tap: turn off the tap.

About the author

C. Blewis has taught for 17 years, including 10 years in Additional Support Needs (ASN) provision, teaching sciences, maths, PE and more.

In many schools, especially smaller and specialist settings, teachers are often asked to teach outside their own subject. These books are written for them, and for the young people they teach: clear, practical and ready to use from the first lesson.