Sparkuna
BY EDUVERSAL

EDUVERSAL
Success is the sum of details

A GUIDE FOR PARENTS AND TEACHERS

STEAM Integration

My Island and the Lab Valley: play that teaches real science, engineering, art and mathematics.

S T E A M



Effort counts, not points

Nothing is ever lost

Free, no adverts

WWW.SPARKUNA.COM

ACADEMIC YEAR 2026–2027

WHAT THE ISLAND TEACHES

A world that grows with practice.

My Island is each student's own floating island, built piece by piece through careful practice. A rope bridge leads to the Lab Valley: garden terraces, a rice-fish paddy, a lab bench, a food truck, and animals from across Indonesia that visit at night. Every part teaches something.

S

Science

31 hands-on labs, a lab notebook, animals and habitats.

T

Technology

Models built on real science, charts, a paddy in real time.

E

Engineering

Blueprints with exact rules: a tank, a bridge, a tower.

A

Arts & culture

Island design, crafts and food from across Indonesia.

M

Mathematics

Volume, fractions, ratios, graphs, the best number.



The Lab Valley at dusk: terraces, the rice-fish paddy below the waterfall, the orchard and the lagoon.

Effort is rewarded

Seeds come from **careful runs**: five or more questions answered without rushing. Right answers make a harvest bigger, but never decide whether something grows.

Nothing is ever lost

A ripe crop waits and never wilts. Stars are never spent. The island and the valley never give or take points.

Gentle consequences

Murky water slows the fish but never harms them. Tired soil grows crops more slowly. Fixing the problem is the lesson.

Every part teaches

Each lab asks students to predict, test and explain. Each harvest brings a plant question for their grade; a wrong answer shows why.

Free for every student

No shop, no money, no adverts. Everything in the valley is earned by practising.

A short daily visit

Crops ripen in about 18 hours and the truck leaves once a day: a few minutes after practice is enough.

One valley, five levels of language: the Leaf lab's first question

GRADES 1–3

"If the lamp comes closer, what will the plant do?" (read aloud)

GRADES 4–6

"If the lamp comes closer, what do you think will happen to the bubbles?"

GRADES 7–8

"As the lamp moves closer, the rate of photosynthesis will…"

GRADES 9–10

"From 50 cm to 10 cm with very little carbon dioxide, the rate will…"

GRADES 11–12

"At 10 cm the light is how many times as bright as at 20 cm?"

S

SCIENCE

31 labs on their own island.

The lab bench stands on the garden terraces: 31 investigations (twenty-four more on the next three pages), at least one in every zone. Each follows the steps scientists use: predict, test, then explain. The models are simple and say so. A lab takes 10 to 15 minutes; the first finish gives two garden seeds.



🌿 Leaf lab

TERRACES · PHOTOSYNTHESIS

Pondweed under a lamp gives off bubbles of oxygen. Students move the lamp (10–50 cm), add carbon dioxide and warm the water, then count the bubbles. Limiting factors and the inverse square law. Grades 1–3 change only the light.



🫘 Soil lab

TERRACES · THE NITROGEN CYCLE

Seven steps of the nitrogen cycle, then the nitrogen in the student's own beds. Each harvest takes some out. Peanuts put 30 back (bacteria in their root nodules fix nitrogen from the air) and compost adds 20.



💧 Oxygen lab

PADDY · DAY AND NIGHT

A 24-hour model of the oxygen in a rice-fish paddy. Students change the fish, the rice, fresh water and the weather, and find when oxygen is lowest: around dawn, after a night of respiration with no photosynthesis.



🐝 Pollinator lab

ORCHARD · BEES AND FRUIT

Students change the kinds of flowers, add a bee hotel, spray insecticide or make it rain. Then they compare the bee visits and the fruit from 20 flowers. Pollination, and why insecticides harm bees.



🌞 Solar lab

ENERGY YARD · POWER FROM THE SUN

Students tilt a solar panel (0–90°) and add cloud, dust or an air gap under it. They compare the power at midday and the fans it runs. A hot panel is less efficient; Grades 9–12 work out the efficiency.



🌊 Mangrove lab

MANGROVE COAST · ROOTS AND WAVES

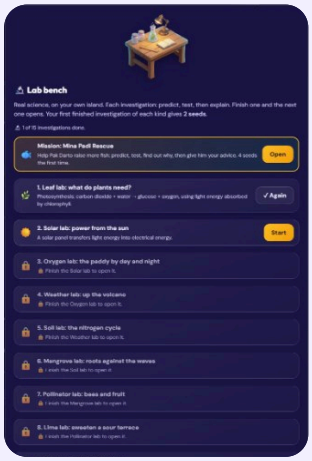
Students change the width of a mangrove forest (0–300 m), add a storm or a high tide, or plant new trees. They compare the waves at the village with the young fish in the roots.



🌧️ Weather lab

VOLCANO · UP THE VOLCANO

Students carry a weather station up a volcano (0–3000 m), move it to the rain-shadow side or choose the dry season. They compare the midday temperature and the rain in a typical month.



🔒 One lab opens the next

Labs do not open with their valley zone, and they do not follow a school's pacing. Each grade band has its own order (pages 7–9). The first lab is open from the start. Finishing a lab opens the next one.

Later labs show their name with a lock: "Finish the Solar lab to open it." Finished labs stay open, to run again just to learn.

The picture: the bench of a Grade 8 student. The gold row at the top is the mission *Mina Padi Rescue* (page 12).

SCIENCE · EIGHT MORE LABS, OCTOBER 2026

Chemistry joins the lab bench.

Added on 19 October 2026 to fill gaps in the syllabus map. They come after the first seven in every chain, so no lab a student already had open is locked.



Lime lab

TERRACES · ACIDS AND RATES

Lime on an acid terrace: more or less, chips or powder, a hot week, acid rain. Soil pH and the rice. Neutralisation and rates.



Rust lab

ENERGY YARD · CORROSION

A scratched gate after two years: bare iron, paint or zinc; sea spray or a roof. Why zinc protects even at a scratch.



Turbidity lab

PADDY · CLEAR OR SAFE?

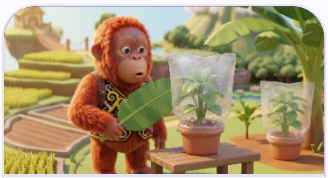
Paddy water: add mud, filter, boil or add chlorine. How clear it is against the germs left. Clear is not the same as safe.



Kitchen lab

TERRACES · ENZYMES

Amylase from saliva turns rice starch into sugar. Temperature, lime juice, a boiled enzyme, more time. Optimum and denaturation.



Thirsty-leaf lab

TERRACES · TRANSPIRATION

A shoot in a potometer: warmer, dark, a fan, damp air. Water taken up and how open the stomata are.



Rice Breeding

TERRACES · SELECTION

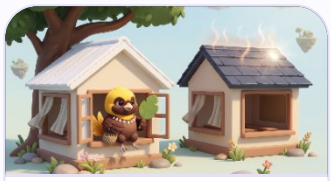
Keep seed from the best rice plants: how many, on even or uneven soil, for five or ten generations. Selective breeding.



Cable lab

ENERGY YARD · ELECTRICITY

A cable to 12 fans: length, thickness, copper or aluminium, transformers. Resistance, wasted heat, why the grid uses high voltage.



Cool Classroom

ENERGY YARD · HEAT TRANSFER

A hot classroom: white or shiny roof, insulation, shade trees, a breeze. Radiation, conduction, convection.

Animals come for their habitat, never for food

29 animals from across Indonesia can visit the valley at night: 26 wild species, each shown with its real IUCN Red List status, and three farm animals. An animal comes only when the student's world has every habitat it needs. The paddy brings a pond and a river, the orchard brings fruit trees and tall forest, Lantern Cove brings a beach and a coral reef. Each animal has facts written for the student's grade band.

Plant variety brings more visitors. How many come in a night depends on how many different kinds of crops are growing:

1 kind	3 kinds	5 kinds
of crop: 1 visitor	2 visitors, and rarer animals can come	3 visitors, and the rarest of all

Wild animals are never fed. In real life, feeding wild animals harms them. In Sparkuna nobody feeds them: they come because the student made a place they can live.



Javan rhinoceros

Critically Endangered



Maleo

Critically Endangered



Komodo dragon

Endangered

More than half of the 26 wild species are Endangered or Critically Endangered (IUCN Red List).

SCIENCE · EIGHT MORE LABS, 22 OCTOBER 2026

Sound, tides and things from home.

Added on 22 October 2026. They come after the first fifteen in every chain, so no lab a student already had open is locked. Several start from things students know: the sasando of Rote Island, a jukung fishing canoe, a batik dye, a kitchen stove.



🎶 Sasando lab

ORCHARD · SOUND

A sasando string: shorter, tighter or thinner, plucked harder, heard from further away. Pitch and frequency, loudness and amplitude.



🌙 Tide lab

MANGROVE COAST · THE MOON

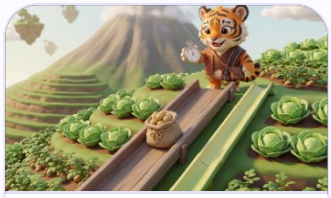
Through the Moon's month at the mangrove, with the Moon at its closest or a strong wind from the sea. Phases, spring and neap tides.



🚤 Jukung lab

MANGROVE COAST · FLOATING

A fishing canoe with its catch: a wider hull, heavy ironwood, fresh river water. How deep it sits. Upthrust and density.



🥔 Harvest slide

VOLCANO · FORCES

Sacks down a slope: steeper, smooth bamboo, a heavier sack, a longer slide. Speed and time at the bottom. Friction and gravity.



🔥 Stove lab

TERRACES · FUELS

Wood, charcoal, biogas or LPG under a pot; a lid, a wind shield, half-closed vents. Heat reaching the water and the carbon monoxide made.



🧪 Fertiliser lab

PADDY · NITROGEN AND PH

Urea on paddy water: the pH, a hot or windy week, urea pressed into the mud. Nitrogen lost to the air against nitrogen kept for the rice.



🫧 Hydrogen lab

ENERGY YARD · ELECTROLYSIS

A solar panel splits water: more current, a longer run, salt water or pure water. The gas at each electrode stores the sun's energy.



🎨 Batik dye

ORCHARD · CHROMATOGRAPHY

A green batik dye on paper: another solvent, a big blob, an ink start line, stopping early. How many colours come apart.

From the screen to the classroom bench

Every lab has a real version a teacher can run (the Lab Valley Teachers' Handbook gives one page per lab). Four of the new ones need only simple things:

🎶 Sasando

A rubber band over a box, a pencil as the bridge to shorten it, then tighten it. A free tuner app shows the frequency.

🌙 Tide

A Moon diary for a month, with the high-tide heights of a nearby harbour beside it. A ball and a torch in a dark room for the phases.

🚤 Jukung

A foil tray floating in water: add washers one by one and mark the waterline, then dissolve salt and repeat.

🎨 Batik dye

A dot of felt-tip ink on a pencil line on filter paper, standing in a little water. Watch the colours separate in ten minutes.

The stove, fertiliser and hydrogen labs are teacher demonstrations in real life (or Grades 9–12 with supervision): the handbook gives the safety steps.

SCIENCE · EIGHT MORE LABS, 24 OCTOBER 2026

Shadows, circuits and the body at work.

Added on 24 October 2026. They come after the first twenty-three in every chain, so no lab a student already had open is locked. Several start from places students know: the Equator in Pontianak, a night market, a village micro-hydro plant, salted fish drying on the coast.



🌞 Sundial lab

ENERGY YARD · THE SUN

A 1 m pole in Pontianak, on the Equator: the time of day, 21 June, Jakarta, a taller pole. How long the shadow is and where it points.



💡 Night market lab

ENERGY YARD · CIRCUITS

Lamps on a stall from one battery: more lamps, parallel or series, four cells, a long thin cable. How bright each lamp is and how long the battery lasts.



🌀 Micro-hydro lab

TERRACES · GENERATORS

A water wheel spins a coil by a magnet: more turns, a stronger magnet, faster water. The peak voltage and how often the current changes direction.



🎣 Fisher's lamp lab

MANGROVE COAST · REFRACTION

A fish under calm water, seen from another angle, deeper, through polarised glasses or by lamp at night. Where it seems to be, and the glare.



❤️ Heart lab

VOLCANO · HEART AND BREATHING

A 14-year-old on the volcano path: sitting to running, eight weeks of training, 2000 m up, a 10 kg pack. Heart rate and breaths a minute.



🐟 Salted fish lab

MANGROVE COAST · OSMOSIS

Fish slices in brine from 0% to 26% salt, sugar instead, a thicker slice, a warm day. The water drawn out and the germs that grow.



☢️ Radon lab

VOLCANO · HALF-LIFE

Soil gas from the volcano in a sealed jar: wait some days, paper or aluminium in between, the counter further away. The count rate and the radon left.



🌴 Palm oil lab

ENERGY YARD · FUEL FROM OIL

Palm oil and methanol with a catalyst: more methanol, warmer, longer, wet oil, no catalyst. The biodiesel made and the soap formed.

From the screen to the classroom bench

The Lab Valley Teachers' Handbook gives every lab a real version. Four of the new ones need only simple things:

🌞 Sundial

A pencil upright on paper in the school yard. Mark the tip of its shadow every hour from 8:00 to 15:00. Never look straight at the Sun.

💡 Night market

Two 1.5 V cells and three torch bulbs, wired in series, then in parallel. Unscrew one bulb in each and compare.

🐟 Salted fish

Potato pieces in water and in 5%, 10% and 20% salt. Weigh them before and after an hour and work out the change.

❤️ Heart

A step test: resting pulse, two minutes of stepping, then the pulse every minute until it is back. Never a race.

The radon and palm oil labs stay on the screen: in class, 100 dice model half-life, and oil, water and soap show the layers. The handbook gives the safety steps.

SCIENCE · EVERY LAB, EVERY GRADE BAND

One bench, five chains.

Each lab is written for five grade bands, and each band has its own order. Gold number = the lab's place in that band's chain; codes = the Cambridge learning objectives it supports.

Lab	Grades 1–3 Primary Science	Grades 4–6 Primary Science	Grades 7–8 Lower Secondary	Grades 9–10 IGCSE	Grades 11–12 AS & A Level
🌿 **Leaf lab** Photosynthesis	1 1Bp.03 · 3Bp.03	1 4Bp.03	1 9Bp.06 · 9Bp.07	1 0610 6.1.7 · 6.1.8 · 6.1.11	1 9700 13.2.1 · 13.2.2 · 13.2.4
🫘 **Soil lab** Nitrogen cycle	7 3Bp.03	6 6ESp.03 · 6ESp.04	5 7Be.01	4 0610 19.3.2 · 19.3.3 · 20.1.1	6 no code
💧 **Oxygen lab** Day and night	6 3Be.01	7 6Be.01 · 6Be.03	3 8Bp.04 · 8Bp.05 · 9Bp.07	2 0610 12.2.1 · 6.1.8 · 20.3.4	3 9700 13.2.2
🐝 **Pollinator lab** Bees and fruit	2 3Bs.01	2 5Bp.03 · 5Be.02 · 6Be.02	7 no code	5 0610 16.3.5 · 16.3.7 · 16.3.10	7 no code
☀️ **Solar lab** Solar power	5 1ESs.02	4 4Pf.01 · 4Pf.02 · 4Pf.03 · 4Pf.04	2 7Pf.01 · 7Pf.02 · 8ESp.02 · 9Pf.03	3 0625 1.7.3.3 · 1.7.3.7	2 9702 5.1.3
🌊 **Mangrove lab** Roots and waves	3 2Be.01 · 2Be.02	5 4Be.01 · 4SIC.05	6 8Be.01 · 9Be.01 · 9ESc.02	7 0610 20.2.4 · 20.4.4	4 9700 18.3.2
🌧️ **Weather lab** Up the volcano	4 2Be.03	3 5ESc.01 · 5Cc.01 · 4ESp.02	4 7ESc.01 · 8ESc.03 · 7ESp.02	6 0625 2.1.2.3 · 2.2.3.3	5 9702 16.2.2
🪨 **Lime lab** Acids and rates	15 1ESp.02 · 2Cc.01	14 4Cc.03 · 6Cc.04 · 6Cc.05 · 6ESp.04	8 7Cp.02 · 7Cp.03 · 7Cc.04 · 9Cc.03 · 9Cc.04	8 0620 7.1.1 · 7.1.7 · 6.2.1	8 9701 7.2.5 · 8.1.2 · 8.2.3
🔩 **Rust lab** Corrosion	12 1Cm.01 · 2Cp.02 · 2Cc.01	13 4Cc.03 · 6Cc.05	11 7Cc.01 · 8Cc.01 · 8Cc.03	11 0620 9.5.1 · 9.5.2 · 9.4.1 · 6.4.2	11 9701 24.2.6 · 6.1.1
🚿 **Turbidity lab** Clear or safe?	10 3Cp.04 · 2Bp.01	8 5ESp.02 · 5ESp.03 · 6Bp.03	14 8Cp.01 · 8Cm.04 · 7Cm.04	14 0620 10.1.4 · 10.1.7 · 0610 10.1.5	14 9702 24.2.3 · 9700 10.1.3
🍣 **Kitchen lab** Enzymes	9 1Bp.02 · 3Bs.03	10 5Bs.04 · 5Bp.01	12 8Bp.01 · 8Bp.02 · 7Cc.01 · 9Cc.04	10 0610 5.1.5 · 4.1.3 · 7.4.3	10 9700 3.2.1 · 3.1.1 · 2.1.1
🍃 **Thirsty-leaf lab** Transpiration	11 1Bs.01 · 3Bs.01 · 1Bp.03	12 5Cc.01 · 4Bp.03	10 9Bs.01 · 7Bs.03 · 9Pf.06	12 0610 8.3.1 · 8.3.3 · 8.2.3 · 3.1.1	12 9700 7.2.3 · 7.2.4

Continued on the next two pages: labs 13 to 31, and the syllabus units they touch.

Labs 13 to 24, band by band.

Lab	Grades 1–3 Primary Science	Grades 4–6 Primary Science	Grades 7–8 Lower Secondary	Grades 9–10 IGCSE	Grades 11–12 AS & A Level
🌾 **Rice Breeding** Selection	14 2Bp.04	15 5Bp.02	15 9Bp.03 · 9Bs.03 · 9Bp.01 · 7Bp.03	15 0610 18.3.2 · 18.3.3 · 18.1.4	15 9700 17.2.6 · 17.2.7 · 17.1.1
🔌 **Cable lab** Resistance, power	13 1Pe.01 · 2Pe.01	9 4Pe.03 · 4Pe.04 · 6Cp.03	9 7Pe.01 · 7Pe.02 · 7Pe.03 · 9Pe.03	9 0625 4.2.4.3 · 4.2.5.2 · 4.5.6.2 · 4.5.6.4	9 9702 9.3.6 · 9.2.3
🏫 **Cool Classroom** Heat transfer	8 2Ps.01 · 1Cp.02	11 6Cp.03 · 4Ps.02	13 9Pf.05 · 9Pf.04 · 8Ps.04	13 0625 2.3.3.3 · 2.3.1.1 · 2.3.4.1	13 9702 14.1.1 · 14.1.2
🎶 **Sasando lab** Sound	16 1Ps.01 · 1Ps.02 · 1Cc.01	17 5Ps.01 · 5Ps.02 · 5Ps.03	16 7Ps.01 · 9Ps.01	19 0625 3.4.1 · 3.4.7 · 3.1.4	19 9702 8.1.2 · 7.1.5
🌙 **Tide lab** The Moon and tides	20 3ESs.01 · 3ESs.02 · 1ESp.01	20 5ESs.03 · 6ESs.01 · 6ESs.02	21 7ESs.03 · 7ESs.02	23 0625 6.1.1.3 · 6.1.2.3	23 9702 13.2.2 · 13.3.2
🚤 **Jukung lab** Floating	17 1Pf.03 · 2Cp.02	16 5Pf.01 · 5Pf.02 · 6Pf.05	19 9Pf.01 · 9Cp.02 · 9Cp.03	21 0625 1.4.3 · 1.8.3 · 1.8.4	21 9702 4.3.5 · 4.3.6 · 4.2.2
🥔 **Harvest slide** Forces on a slope	18 1Pf.01 · 2Pf.03 · 3Pf.03 · 3Pf.04	19 5Pf.01 · 5Pf.03 · 6Pf.04	17 8Pf.01 · 8Pf.03 · 7Pf.01	17 0625 1.2.9 · 1.5.1.6 · 1.5.1.11 · 1.7.1.3	17 9702 2.1.7 · 3.1.2 · 5.2.2
🔥 **Stove lab** Fuels, combustion	21 2Cc.01 · 2Cp.02	22 6Cc.04 · 6Cc.05 · 4Pf.04	20 8Cc.02 · 8ESp.02 · 9ESc.01 · 9Pf.02	16 0620 5.1.1 · 10.3.2 · 11.3.7 · 0625 2.2.2.3	20 9701 5.1.7 · 9702 14.3.1
🧪 **Fertiliser lab** Nitrogen and pH	23 2ESp.03	23 5ESp.03 · 6ESp.04 · 5Cm.02	23 7Cp.02 · 8Cc.01	20 0620 6.3.1 · 6.3.4 · 10.2.1	18 9701 7.1.4 · 7.1.5 · 25.1.3 · 12.1.3
🫧 **Hydrogen lab** Electrolysis	22 3Cm.01 · 2Pe.01	21 5Cm.02 · 4Pe.04 · 6Cc.04	22 7Cp.04 · 7Cm.04 · 8Cc.01 · 9Cm.02	18 0620 4.1.3 · 4.1.4 · 4.2.1 · 0625 4.2.2.5	16 9701 24.1.3 · 24.1.4 · 9702 9.1.3
🎨 **Batik dye** Chromatography	19 3Cm.02 · 3Cp.02 · 3Cc.01	18 5Cp.01 · 5Cc.03	18 8Cp.02 · 8Cm.04 · 7Cm.04	22 0620 12.3.1 · 12.3.2 · 12.3.4 · 2.1.1	22 9701 37.1.1 · 37.1.3 · 25.2.3
🌞 **Sundial lab** Shadows, the Sun	24 2ESs.01 · 3Ps.02 · 3Ps.03	25 4ESs.01 · 5ESs.02 · 4Ps.01	31 7TWSm.01 · 8TWSa.02	31 0625 6.1.1.1 · 6.1.1.2	31 9702 12.1.1 · 12.1.2 · 12.1.3

Continued on the next page: labs 25 to 31, and the syllabus units they touch.

Labs 25 to 31, band by band.

Lab	Grades 1–3 Primary Science	Grades 4–6 Primary Science	Grades 7–8 Lower Secondary	Grades 9–10 IGCSE	Grades 11–12 AS & A Level
💡 **Night market** Series, parallel	29 2Pe.01 · 2Pe.02 · 2Pe.03	24 4Pe.03 · 6Pe.01 · 6Pe.02	26 7Pe.04 · 9Pe.01 · 9Pe.02 · 9Pe.03	25 0625 4.3.2.1 · 4.3.2.5 · 4.3.2.7 · 4.2.3.1 · 4.3.1.1 · 4.4.3	24 9702 10.1.5 · 10.2.1 · 10.2.2 · 10.2.6
🌀 **Micro-hydro lab** Generators	25 3Pe.01 · 3Pe.02 · 1Pe.01	28 5Pe.02 · 5Pe.03	25 8Pe.01 · 8ESp.02	26 0625 4.5.1.1 · 4.5.1.3 · 4.5.2.1 · 4.5.2.2 · 4.1.5	25 9702 20.1.1 · 20.5.2 · 20.5.3 · 20.5.5 · 21.1.1 · 21.1.4
🎣 **Fisher's lamp** Refraction, glare	26 2Ps.01 · 2Ps.02 · 3Ps.01	27 4Ps.02 · 4Ps.03 · 6Ps.01 · 6Ps.02	27 8Ps.01 · 8Ps.02	28 0625 3.2.1.3 · 3.2.2.1 · 3.2.2.3 · 3.2.2.4 · 3.2.2.7	28 9702 7.4.1 · 7.5.1 · 7.5.2
❤️ **Heart lab** Heart and breathing	28 3Bs.03	26 4Bs.02 · 6Bs.01 · 6Bs.02	24 8Bs.02 · 8Bs.03 · 8Bs.04	27 0610 9.1.1 · 9.2.3 · 9.2.4 · 9.2.12 · 9.4.3 · 11.1.5 · 11.1.10 · 12.3.4 · 12.3.6	27 9700 8.1.1 · 8.2.1 · 8.3.3 · 9.1.7 · 12.2.10
🐟 **Salted fish** Osmosis	30 2Cp.03 · 3Cp.02	30 4Cm.03 · 5Cp.01 · 5ESp.02	28 8Cp.01 · 7Bs.03	29 0610 2.1.4 · 3.2.2 · 3.2.5 · 3.2.7 · 3.2.8	29 9700 2.4.1 · 4.2.1 · 4.2.5 · 4.2.6
📟 **Radon lab** Half-life	31 1ESp.02 · 3ESp.01	31 4ESp.02 · 5ESp.01	29 7ESp.02 · 8Cm.01 · 8Cm.02	24 0625 5.1.2.5 · 5.2.1.1 · 5.2.1.2 · 5.2.1.5 · 5.2.2.2 · 5.2.3.1 · 5.2.4.1 · 5.2.4.2 · 5.2.5.3	26 9702 11.1.7 · 23.2.1 · 23.2.3 · 23.2.5 · 23.2.6
🌴 **Palm oil** Fuel from oil	27 2Cm.01 · 2Cp.02	29 4Cm.02 · 4Cp.01	30 7Cp.01 · 9Cm.02 · 8ESp.02	30 0620 11.1.3 · 11.1.4 · 11.7.3 · 6.2.1 · 6.2.2 · 6.3.4 · 3.3.8	30 9701 13.2.1 · 18.2.1 · 18.2.2 · 26.1.11 · 8.2.3

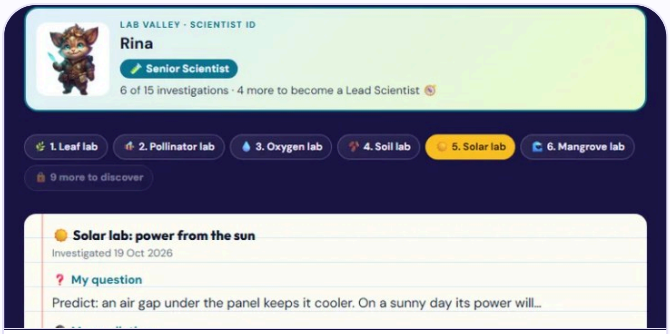
Syllabus units the 31 labs touch Grades 1–3 **31/32** 4–6 **33/34** 7–8 **33/36** 9–10 **77/168** 11–12 **58/210**

Example: a Grade 2 student starts with the Leaf lab, then Pollinator, then Mangrove. Codes follow the Cambridge stage (some Stage 9 objectives are taught in Grade 8). IGCSE 0610 / 0620 / 0625, AS & A Level 9700 / 9701 / 9702. An alignment aid, not an endorsement. More labs come in batches of about eight, aiming at nine in ten units in every band.

SCIENCE · NEW ON 19 OCTOBER 2026

Work like a scientist, keep the record.

Scientists write down what they tried, and they collect data every day. The lab bench now does both: a notebook page for every investigation, a field station with today's readings from the student's own valley, a scientist rank and two pieces of scientist gear. None of them gives points.



My lab notebook

Every finished investigation becomes a page: on the lab bench, or "See my page" on the finish card. Each page has the date and:

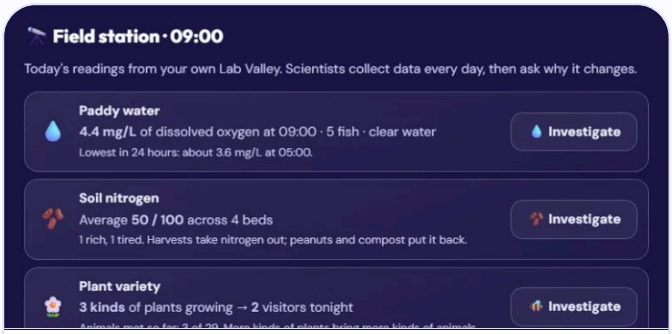
❓ **My question** and 🧐 **My prediction**

📊 **My tests:** every set-up tried, with its result, as a table and a chart (the Soil lab lists the nitrogen-cycle steps followed)

💡 **What I found out:** the conclusion chosen, with the reason

A stamp: "Explained like a scientist" or "Worth another look"

It is the same on any device. Only the student sees it. Labs finished before 19 October say "Do it again and this page fills in".



Field station

Today's readings from the student's own valley, worked out by the same models as the labs. Nothing is stored.

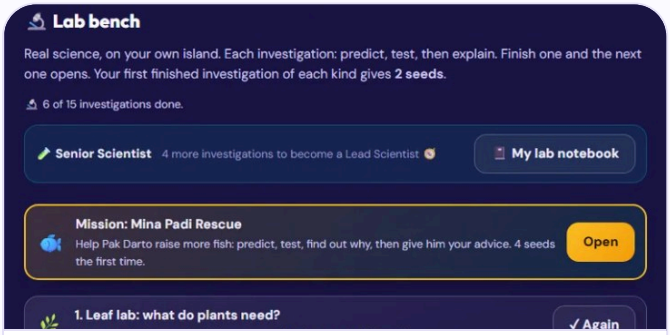
💧 **Paddy water:** dissolved oxygen now, and the lowest in 24 hours

🫘 **Soil nitrogen:** the average across their beds; how many are rich or tired

🌷 **Plant variety:** kinds of plants, visitors tonight, animals met (of 29)

🌋 **Weather** · 🌞 **Solar** · 🌿 **Mangrove:** as each zone opens: about 6.5 °C cooler per 1000 m up, watts at midday, waves at the village

Investigate opens the lab that explains a reading, once that lab is open in the student's chain.



Scientist rank

Counted from investigations **finished**, never from right answers. It shows on the lab bench and on the Scientist ID card: the companion, first name, rank and how many investigations are done. Investigations finished for each rank:

🔎 Lab Visitor	0	🧪 Senior Scientist	6
🥼 Junior Researcher	1	🧭 Lead Scientist	10
🔬 Field Scientist	3	🏅 Chief Scientist	15



Scientist gear



Lab Safety Goggles (hat): open with the first finished investigation.



Young Scientist's Lab Coat (rare): opens with three, at Field Scientist.

Worn in the Character Studio. Never in the daily chest, and once open never locked again.

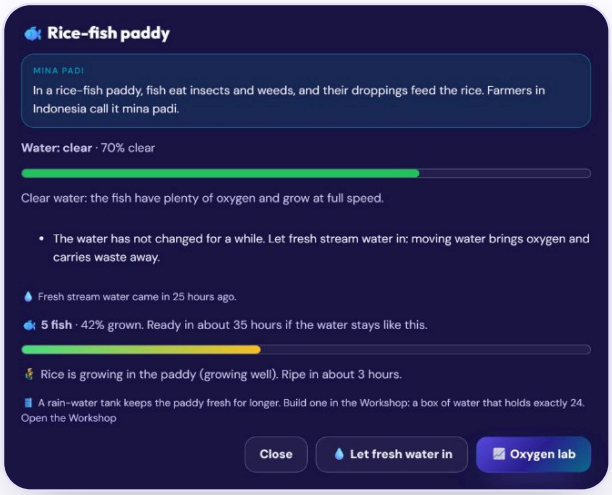
T

TECHNOLOGY

Models to test, data to read.

Students work like scientists with a computer model: change one thing, read the chart, explain what happened. The garden, the paddy and the visitors run in real time, so the valley carries on while the student is at school.

1. **Predict**
   Before testing, the student chooses what they think will happen. A wrong guess is fine.
2. **Test**
   Change one thing at a time: a fair test. At least three trials, each a point or a line on a chart.
3. **Explain**
   A conclusion question checks the idea. A wrong answer shows why.
4. **Use it**
   The lab answers real valley questions: when to let fresh water in, what to plant next, how many fish to keep.



The paddy panel says how clear the water is, why, and what would help.

🐟 The rice-fish paddy: a living system

Farmers in Indonesia call it *mina padi*: fish and rice in one field. The paddy opens at Level 3 or after 10 careful runs. Students put in 1 to 8 young fish and keep the water clear. Two things cloud it.

Crowding. The water carries 3 fish well, 5 while rice grows (its roots take up fish waste) and one more with a rain-water tank. Each extra fish clouds it.

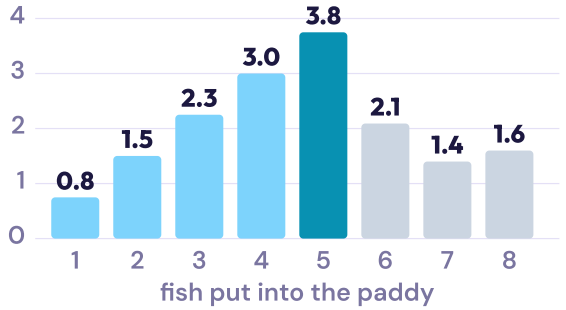
Stale water. It clouds a little every hour until fresh stream water comes in. The tank slows this down by half.

Clear	Cloudy	Murky
full speed: fish grow in about 30 hours	half speed	a quarter of the speed

Fish never die: murky water only slows them, and it clears again. Rice in the paddy gives an extra crop when fish lived with it, because their droppings feed it.

The best batch is the right number, not the most

Fish caught per day for each batch size, from the paddy's own rules: rice growing, fresh water once a day, no tank.



Five fish fit the water while rice grows, so five give the most fish per day. Six or more crowd the water: it turns cloudy or murky and every fish grows slowly.

THE RECORDS EACH STUDENT KEEPS

📓 Lab notebook

A page for every finished investigation: question, prediction, tests and findings (page 10). Any lab can be run again.

📖 Visitors book

Every animal met and how many times it came, with outlines of the others and the habitats they still need.

🌾 Garden records

Harvests, the nitrogen in each bed, the fish caught in the paddy and the stars from the food truck.

THE FIRST LAB VALLEY MISSION · GRADES 7–12

Mina Padi Rescue: a full investigation.

Pak Darto, a neighbour, keeps fish in his rice field. With lots of fish, the water goes cloudy and they stay small. Students find out how many fish he should keep and what could help, then give him advice their own results back up. It is the gold row at the top of the lab bench and opens with the rice-fish paddy (Level 3 or 10 careful runs).

1 Brief

Pak Darto asks for help, and the student reads what success looks like.

2 Research

Three short source cards, then four sentences to sort: observation or opinion?

3 Predict

3, 5 or 8 fish: which gives the most fish ready to eat? The choice locks once testing starts.

4 Test

Each number twice; trials A and B have different weather. 10 days run in seconds.

5 Analyse

Work out the mean, read the bars and the oxygen line. A missed prediction: "Surprise!"

6 Improve

ONE change: rice or fresh stream water. Two at once, and you can't tell which one worked.

7 Explain

Build the advice from sentence parts and tick the trials that show it.

8 Poster

Label four arrows on a poster of how the paddy breathes, by day and by night.



Analyse: the means as a bar chart and a table, and the oxygen on the worst day. Shaded = night.

Fair by design

- **Sparkuna runs every trial** on one paddy model: results cannot be typed in.
- **The advice is checked** against the student's own trials: a claim they don't back up gets a hint, never a penalty.
- **No fish ever dies:** in bad water they just grow slowly.
- **First finish:** 4 garden seeds and the Mina Padi stamp, no points or streak. Play again any time; download the data as CSV.

For teachers: a science lesson

- **Before:** the class predicts 3, 5 or 8 fish and says why. Then each student runs the mission.
- **After:** compare means across the class. Why is oxygen lowest just before sunrise? Open the CSV in a spreadsheet.

Grade 7: ecosystems, food chains and decomposers, aerobic respiration, the mean, results tables and charts. **Grade 8:** photosynthesis (word equation), minerals for plants, presenting results, patterns in data. Grades 9–12: the same steps for now.

For parents: ask about it

- What did Pak Darto ask you to find out?
- How many fish did you predict, and what did your test show?
- Which one change did you try, and how do you know it worked?

There is no wrong way to start: a prediction that misses is part of the science.

E

ENGINEERING

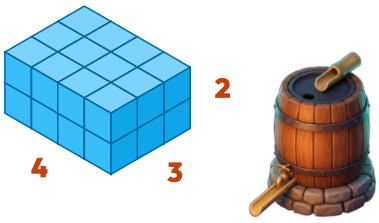
Build it to a brief.

In the Workshop (Grades 4–12), students build with blocks on a plot 16 wide, 16 deep and 12 high. Blueprints are briefs with exact rules, checked on Eduversal's server. A build that passes changes the student's world.

Rain-water tank

LAB VALLEY BLUEPRINT

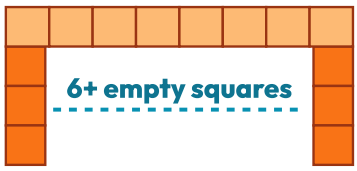
A box of water blocks that holds exactly 24, with walls all round and a floor under it. Any length × width × height that makes 24 works. Once built, the tank stands in the valley: the paddy water carries one more fish and goes stale half as fast.



Bridge to Lantern Cove

ISLAND PROJECT

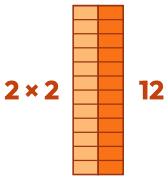
A long bridge with a support at each end and at least 6 empty squares under the middle. Passing it opens the next island, Lantern Cove, sooner.



Sky tower to Starlight Peak

ISLAND PROJECT

A tower 2 blocks wide and 2 deep that reaches the top of the plot: 12 blocks tall, every column from the ground, with no gaps. It opens Starlight Peak sooner.



Feedback that teaches

A build that does not pass yet gets a precise hint, never just "wrong". The tank's own messages:

- "Your tank holds 4 × 3 × 3 = 36. Change it so it holds exactly 24."
- "Your water is 20 blocks but not a box shape. Make every layer of water the same rectangle, so it is a cuboid."
- "4 × 3 × 2 = 24, but the water would run out. Build walls of any block (not water) all round it, and a floor under it."

🌰 Terraces against erosion

The garden grows on terraces cut into the hill. Flat steps hold the rain, so it soaks into the soil instead of running downhill and washing the soil away.

🧱 Room grows with effort

Room for 80 blocks to start, and 20 more for every careful run, up to five a day. Teachers can set weekly Workshop challenges for their group.

⚙ Engineering and Energy Yard

Power from the sun, the wind and water. Its Solar, Rust, Cable, Cool Classroom and Hydrogen labs are at the lab bench; Workshop machines are still to come. The zone opens at Level 10 or after 45 careful runs.

The engineering design cycle, inside the Workshop

1 · Ask
Read the brief: what must the build do?

2 · Plan
Choose the numbers: which three make 24?

3 · Build
Place the blocks on the plot.

4 · Test
Press "Check my build": the server measures it.

5 · Improve
Follow the hint, change one thing, test again.

A

ARTS AND CULTURE

Design, craft and Nusantara.

The arts in the valley are design choices and culture. Students arrange their islands, paint their pieces and dress their character in crafts from across Indonesia, each with its region and its story.

ELEVEN NUSANTARA GIFTS



Caping
Java and rice areas



Lurik
Central Java, Yogyakarta



Sasirangan
South Kalimantan



Noken
Papua



Dayak bead bag
Kalimantan



Ulos
North Sumatra



Tenun ikat
East Nusa Tenggara



Sasando
Rote Island



Sape'
Kalimantan



Tapis
Lampung



Songket
Palembang

An animal's first visit leaves its gift for the Character Studio, with a short note on how the craft is made.

🎨 Island design

Students decide where every piece stands, on the island and in the valley, and earn new paints for the pieces they own: four for each piece, the golden one last. There are 240 paints in all. The island is theirs to design, and visiting schoolmates (from Grade 4) see it as they made it.

🐯 Heritage Companions

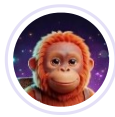
Six of the eleven companions come from the islands of Indonesia, and their forms carry the crafts, music and boats of their regions.



Rimba



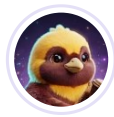
Kancil



Utan



Tasi



Cendra

🚚 From the market

The food truck takes the student's dishes to restaurants across Indonesia. Stars from deliveries bring rare pieces from Indonesian street and market life:



Ladle trophy
3 stars



Bakso cart
8 stars



Becak
15 stars



Market stall
25 stars



Lantern arch
40 stars



Pinisi ship
60 stars

🍛 Indonesian food from the student's own harvest



Nasi jagung



Tumis kangkung



Pecel



Sup labu



Rujak buah



Pepes ikan



Kolak ubi

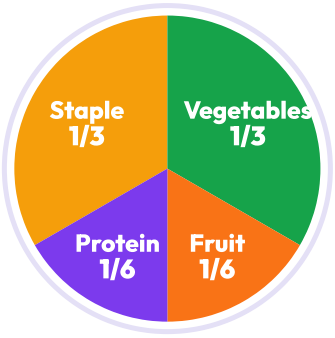
MATHEMATICS

Numbers with a job to do.

Mathematics in the valley is never a worksheet. It is the number a student needs right now: to build the tank, to balance the plate or to choose a batch of fish.

🍽 Fractions: the Isi Piringku plate

Isi Piringku, Indonesia's guide to a balanced meal, is the plate in the island kitchen. Each dish fills its part of the plate, and a full plate in one day opens a warung for the island.



1/3 + 1/6 = 1/2

Vegetables and fruit fill half the plate, with more vegetables than fruit. Staple food and protein fill the other half.

📦 Volume: the rain-water tank

The tank must hold exactly 24 water blocks. Students look for three numbers that multiply to 24 and fit inside walls on the plot.

4 × 3 × 2 = 24 · 6 × 2 × 2 = 24 · 8 × 3 × 1 = 24

Extension: which of these needs the fewest wall blocks around it? The question turns volume into surface area.

RATIO

Recipes and a 2 : 1 build

Corn rice needs 2 rice to 1 corn; pecel needs 1 water spinach, 2 peanuts and 1 chilli. In the Workshop, "Two to one" asks for twice as much grass as sand, with at least 4 sand.

SQUARES

The inverse square law

Light falls with the square of the distance from the lamp. At 10 cm the light is four times as bright as at 20 cm, and nine times as bright as at 30 cm.

$(20 \div 10)^2 = 4$

GRAPHS

Reading a chart

Bubbles against distance in the Leaf lab; oxygen hour by hour in the Oxygen lab, with the lowest point marked. Students read the minimum, the maximum and the moment it changes.

BEST VALUE

Optimising a batch

More fish is not always more food. With rice growing, 5 fish give the most fish per day (page 11). Finding the best number is the first step towards optimisation.

RATES AND TIME

Growing in real time

A crop ripens in about 18 hours, fish in about 30 hours in clear water and twice as long when it is cloudy. On a real farm a crop takes months; the island is quicker, and says so.

COUNTING

Stars and milestones

Each dish delivered is a star, and a balanced order earns one more: up to 4 stars a day. How many days, at least, to reach the 60-star pinisi ship?

60 ÷ 4 = 15 days

FOR TEACHERS · CURRICULUM LINKS

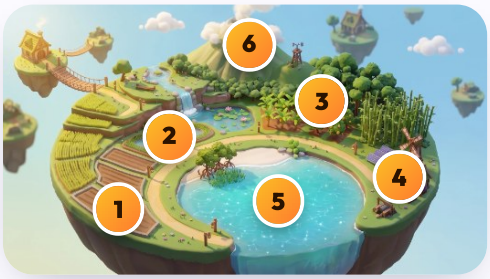
Where it meets the syllabus.

Only what the valley actually covers. Each harvest's plant question also comes from these chapters.

Grades	Cambridge programme and topics	In the valley
Grades 1–3 Primary Science	Stages 1–3: living things; environments and habitats; plants are living things that need light and water.	31 labs in simple words; habitats. Lines read aloud.
Grades 4–6 Primary Science	Stages 4–6: habitats; life cycles of flowering plants; food chains and food webs; rocks and soil; energy; the water cycle.	Fair tests in 31 labs; compost; habitats; the plate.
Grades 7–8 Lower Secondary Science	Ecosystems; photosynthesis (Grade 8 practises the Stage 9 chapter); acids and rates; metals; electricity; heat; variation; weather and climate.	Word equations; pH; rates; rusting; circuits; heat; the nitrogen cycle; sound.
Grades 9–10 IGCSE Biology 0610, Chemistry 0620, Physics 0625	Biology **6.1** photosynthesis · **12.2** respiration · **16.3** pollination · **19.3** nutrient cycles · **20.4** conservation · **5.1** enzymes · **8.3** transpiration · **18.3** selection · **9.2** the heart · **3.2** osmosis · Chemistry **6.2** rates · **7.1** acids · **9.5** corrosion · **10.1** water treatment · **4.1** electrolysis · **12.3** chromatography · Physics **1.7.3.3** efficiency · **2.3** heat transfer · **4.2.4** resistance · **4.5.6** transformers · **1.4** density · **3.4** sound	All 31 labs; compost and decomposers; visitors and their IUCN status.
Grades 11–12 AS & A Level 9700, 9701, 9702	Photosynthesis; enzymes; transport in plants; selection; conservation; rates (Boltzmann); electrode potentials; resistivity; attenuation; thermodynamics.	Inverse square law, $\cos\theta$, e^{-kx}, $\Delta U = q + W$, $R = h^2S$, $E\ominus$.

Codes: Cambridge IGCSE syllabuses, 2026–2028; other topics follow Sparkuna's chapters. Every lab's codes: pages 7–9.

SIX ZONES, OPENED BY EFFORT



A zone opens at a level **or** after a number of careful runs, whichever comes first, so slower and younger students get there too.

Labs are different: every zone has at least one lab, but labs open in each band's chain (pages 7–9), not with their zone. Each card names the zone's IGCSE Environmental Management (0680) theme.

1 Garden Terraces
Beds, compost and eight labs. Soils, farming, erosion.
Open from the start

2 Stream and Rice-Fish Paddy
Mina padi, the mission, three labs, a rain tank. Water and its management.
Level 3 or 10 careful runs

3 Orchard and Rainforest Edge
Three labs; habitats. Ecosystems and biodiversity.
Level 6 or 25 careful runs

4 Engineering and Energy Yard
Solar and seven more labs. Energy and the environment.
Level 10 or 45 careful runs

5 Mangrove Coast and Lagoon
Five labs; habitats. Coasts, oceans and fisheries.
Level 15 or 70 careful runs

6 Volcano Lookout and Weather Station
Four labs; habitats. Natural hazards, weather and climate.
Level 20 or 100 careful runs

FOR STUDENTS, AND THE GROWN-UPS BESIDE THEM

Your week in the Lab Valley.

This is how one week can go. Every step starts with practice, and nothing you earn is ever taken away.

MON		**Practise, then plant.** Each careful run gives you a seed, up to five a day, and opening your island gives one more. Plant rice and corn on the terraces.
TUE		**Harvest.** About 18 hours later your crops are ripe. Your right answers since planting were sunshine: 5 give you 2 crops, 10 give you 3. Then answer the plant question.
WED		**Cook.** 2 rice and 1 corn make nasi jagung, the staple food on your plate. The peels and leftovers go to the compost bin.
THU		**Test.** At the lab bench, predict first, then move the lamp and count the bubbles. Your first Leaf lab gives you 2 seeds, a notebook page and the next lab.
FRI		**Care for the soil.** The corn used nitrogen, so add compost from your scraps. Then plant rice, corn and water spinach. Later, peanuts will feed the soil too.
SAT		**Send the food truck.** Load up to 3 dishes. Each dish is a star; dishes from 3 parts of the plate in one order earn one star more.
SUN		**Meet your visitors.** Three kinds of crops are growing, so 2 animals came in the night. A village chicken came for the grassland and left a lurik vest.

For teachers: talk prompts for class

- **Leaf lab.** Why did moving the lamp from 20 cm to 10 cm give about four times the light? What stopped the bubbles rising after that?
- **Soil lab.** A bed is tired after two harvests. What would you do, and which living things do the work?
- **Oxygen lab.** Why is the oxygen lowest at dawn and not at midnight?
- **Paddy.** Why did 8 fish give fewer fish per day than 5?
- **Mangrove lab.** Why is protecting an old mangrove forest better than planting a new one?
- **Tank.** Find three tanks that hold 24. Which needs the fewest wall blocks?

Ask students to bring one result: a notebook page, a field-station reading or a batch size. Teachers Hub, **Sparkuna → Lab Valley**, has lesson ideas for every lab.

For parents: five questions at home

- What did you plant this week, and which part of the plant do we eat?
- Which animal visited, and what habitat did it need?
- Is your soil rich or tired? How can you fix it?
- Show me your plate. Which part is still missing?
- Show me your lab notebook. What did you predict?

You do not need to know the science. Your questions help your child explain it, and explaining is how it sticks.

VALLEY CHALLENGES FOR YOU

- ☐ **Meet five different visitors**
- ☐ **Make one bed rich: 70 or more**
- ☐ **Fill the whole plate in one day**
- ☐ **Find the dawn minimum in the Oxygen lab**
- ☐ **Finish 3 labs: Field Scientist**
- ☐ **Build a 24-block tank (Grades 4–12)**

SAFE AND SIMPLE

A quiet valley, built for learning.

🛒 Free, no adverts

Nothing to buy and no adverts. Seeds, stars and gifts cannot be bought: they are earned by practising.

🤐 No chat with strangers

No chat, comments or posts anywhere. The Lab Valley is private: schoolmates who visit an island never see it.

🦏 Wild animals are never fed

Animals come because the student made a habitat for them. In Sparkuna nobody feeds wild animals.

📘 Not part of grades

Nothing from the island or the valley goes into report cards or school assessments, and it never gives or takes points.

The student

Everything in their own valley: beds, paddy, labs, the lab notebook, visitors.

Schoolmates

From Grade 4, on a visit: the islands and Workshop builds. Never the valley.

Parents

The Family card, if the student shares it: that week's effort, including the island.

Teachers and leaders

Practice, and which labs each student finished (leaders: counts only).



GETTING THERE

1. **Sign in at www.sparkuna.com**
   With the Google account the school gave the student.
2. **Practise carefully**
   Five or more questions, without rushing. Each careful run brings the valley closer.
3. **Cross the bridge**
   Open My Island and choose the Lab Valley tab, or tap the signpost on the home island.

Scan to see the valley

Pictures and every guide

sparkuna.com/tour

Open to everyone at sparkuna.com

- **/tour** the Lab Valley, short videos and the guides for parents, teachers and school leaders
- **/stats** Sparkuna in numbers, updated every day
- **/wallpapers** companion wallpapers and classroom posters