Classroom notes

The Bottomless Popcorn Paradox · for teachers, librarians and reading-group leaders

At a glance

Grades	1–3 (ages 6–9). Works as a read-aloud from Grade 1; strongest for independent reading at ages 7–9.
Topic	Salt, thirst and water — how a body asks for what it needs — and the habits of a scientist: noticing, checking a reason, fair tests, data.
Story	Eight short chapters, about 1,700 words — roughly 20 minutes read aloud.
Back matter	Lumi's Secret Lab Notes (pp. 38–49) · Think Like a Scientist (pp. 50–51) · Lumi's Word Lab, 22 words (pp. 53–65) · Jiwoo's "Prove It" Tracker (pp. 66–71) · For the Grown-Up Lab Partner (pp. 72–74)

Big ideas

- Bodies send signals — a dry mouth, a tight head — and a signal can be noticed or missed.
- Blood keeps a just-right mix of salt and water. Thirst is the body asking for water to balance it.
- Noticing is a skill. Some bells are loud, some are quiet, and every scientist can practice listening.
- The first reason you notice is not always the right one. Scientists check a reason before they believe it.
- A blank day and a question mark are real data.

How this book handles food — please keep it this way in class

- No food is called good or bad, and there are no sodium or calorie counts. Please keep it that way in class.
- No one's body is discussed. Keep comments on feelings and signals, never on size or weight.
- Don't collect, display or grade students' food records. The tracker belongs to the child and stays at home.
- Plan activities without food or drink, and don't use snacks as rewards during the unit.
- Praise a blank day and a question mark. Let a wrong reason stand for a minute; ask one question instead of correcting it.

Sensitivity notes

Salt and fluid plans. Some students follow a salt or fluid plan from their doctor — less salt for some kidney or heart conditions, extra salt for others, such as cystic fibrosis. Follow their care plan and their family's lead, and never ask them to explain it to the class.

Water and bathroom breaks. This story turns on thirst and a bathroom emergency. Some students need water or the bathroom more often for medical reasons, and some feel embarrassed about it. Make both easy to get, keep the talk on Jiwoo, and never comment on a particular child's trips.

Headaches. Some students live with headaches or migraines that have nothing to do with salt or water. Treat Jiwoo's headache as one kid's case — the book "never promises a headache" (p. 74) — and point families to the doctor box on the Trackers page.

Food at home. Ramen, pizza, chips and pretzels — foods from Jiwoo's week and the rules page — are everyday food in many homes and cultures, and not every child has snacks to track. Nothing in the book calls a food bad, and a blank day is a real result. Keep every activity food-free.

Different bells. Some children notice body signals early and some late, for many reasons. Use the book's own line, "Neither bell is broken," and never point out a particular child's bell.

Body talk. If a student comments on someone's body, redirect to what bodies do: "In this book we're scientists of how bodies feel and work."

Three short lessons

Lesson 1 · Read & Notice *40 min*

5 min	Cover prediction: what could bottomless mean? Record predictions on the board.
15 min	Read aloud. Stop after Chapter 2 (predict), Chapter 5 (what is Jiwoo's body doing?) and Chapter 8 (Jiwoo's two lessons).
10 min	Talk: choose two or three discussion questions.
7 min	Introduce Think Like a Scientist (p. 50): Notice · Wonder · Test · Report.
3 min	Exit ticket: one thing I noticed, one thing I wonder.

Lesson 2 · Model It *40 min*

10 min	Re-read Lab Notes 1–4 (pp. 41–44): the gap, salt pulls water, the Thirst Department, one attention.
20 min	Activity: the Thirst Department Game (active) or Draw the Gap (seated).
10 min	Debrief: explain the bell in your own words. Vocabulary: balance, dilute, thirst, hypothalamus, attention.

Lesson 3 · Check a Reason *40 min*

15 min	Activity: The Paradox Sort (card sort).
15 min	Data detectives: analyse Jiwoo's filled-in week (pp. 69–70) with the questions below.
10 min	Write a fair test on paper — or check Jiwoo's new reason with Lumi's four questions (p. 47). Optional: send home the blank tracker with the family letter.

Data detectives — Jiwoo's week (pages 69–70)

Jiwoo's week (pages 69–70) is made-up data, which makes it safe to analyse together — no student shares their own food. Ask the questions in order; teacher notes on the right.

Question	Teacher note
On how many days did Jiwoo write something down?	Four — Days 1, 4, 5 and 6. Days 2, 3 and 7 are blank, on purpose (p. 73): a blank day is a real result.
On which two days did she drink water zero times? What did she notice each time?	Day 1, the popcorn bucket: dry mouth and a tight-hat headache — noticed only when Maya asked. Day 5, pretzels and string cheese (she forgot): mouth a little dry by dinner.
On Days 4 and 6 she drank water while she ate, and felt fine. Does that prove water keeps the dry mouth and headache away?	Not yet — one kid, a few days. Look closer: Day 4 came after soccer practice, and on Day 6 Maya passed the pitcher — Jiwoo didn't ask for it. It's a pattern worth testing, one change at a time.
Day 5 is an open case: thirst, or "just… Wednesday"? Why is writing down both smart?	A scientist records every possible explanation, then checks one. ("Just Wednesday" is a joke — ask students how she could rule it out.)
In Jiwoo's own words (p. 70), what made the popcorn day different?	"Salty AND ninety minutes AND a movie so good I forgot I had a body." Her tracker on p. 69 adds a fourth: water 0 times in 90 minutes.
Jiwoo ends her week with two maybes. What are they — and what would she need to do to find out which is true?	"Maybe the bell was always ringing at the same volume. Maybe I'm just getting better at picking up the phone." More weeks, the same notes, one change at a time. Lumi's note on p. 48 says listening can be practiced.

Science background for teachers

Blood keeps a steady mix. Sodium is the main salt in the fluid around our cells, and the body keeps the blood's saltiness within a narrow range. Special cells in the hypothalamus sense when blood gets saltier; the brain then switches on thirst and releases a hormone, ADH, that tells the kidneys to save water.

A salty snack tips the mix a little. In a study of adults, one salty meal nudged blood sodium up slightly. Water moves by osmosis out of cells toward the saltier fluid around them, so cells lose a little water: far less than the drawing on page 42 shows. Blood is never salt-free, which is why the climbing line on Lumi's graph (page 41) tracks the salt Jiwoo ate, not the salt in her blood.

Thirst is the bell; a headache is a different clue. Thirst is the urge to drink, often with a dry mouth. Going without water can bring on a headache in some people, but researchers say the mechanism isn't fully understood, and the international headache classification has no separate "dehydration headache." Headaches have many causes, which is why the book keeps the two apart.

The bell rings early. A 2002 review about adults concluded that thirst starts before the body is short enough of water to count as dehydrated. Experts draw that line in different places, and the review left out hard exercise and hot weather. People differ in how readily they feel thirsty; we found no studies of this in children.

Attention turns body signals down, not off. What we notice depends on where our attention is. People who listened to outside sounds while exercising reported less tiredness, and distraction moderately reduces children's pain during shots and other needle procedures. Sensing the inside of your body is called interoception; in adults, months of practice brought small improvements.

One cause, or several? Kidneys make urine at a fairly steady rate, and the bladder stores it until it is emptied. Jiwoo's bathroom emergency was probably a mix of the water after soccer, a long film and skipping the bathroom beforehand (page 8). In rested adults, most of the extra urine from a big drink comes within a couple of hours, so timing matters too. "What else was true that day?" is the right question.

Standards connections

Short descriptions in our own words — check the official documents for exact wording. An honest note first: in U.S. science standards, the body's inner organs first appear in Grade 4 and energy from food in Grade 5. At Grades 1–3, this book supports the practices of science rather than a body or nutrition standard.

Science practices (Grades K–2 and 3–5)

Practice	What it looks like	Where it shows up
Asking questions	Ask questions you can test — in Grades 3–5, ask what would happen if one thing changed.	The Paradox Sort · My Case Report
Using models	Use a model to show how something works — and notice how the model differs from the real thing.	Thirst Department Game · Draw the Gap
Fair tests	Plan a fair test that changes one thing at a time.	The Paradox Sort · My Case Report
Working with data	Record observations, look for patterns and compare them with predictions.	Data detectives · trackers
Explaining with evidence	Build an explanation from what you observed.	Discussion · Sign Detective
Cause and effect	Things that happen together are not always cause and effect.	The Paradox Sort · Discussion
Systems	The parts of a system work together.	Thirst Department Game

Common Core State Standards — English Language Arts

Code	In short	Where it shows up
RL.1.3 · RL.2.3 · RL.3.3	Describe characters, how they respond to events, and how their actions move the story.	Read-aloud and discussion
RL.2.7 · RL.3.7	Use the pictures to understand characters, setting and plot — and what the art adds to the words.	Read-aloud picture walk
RI.2.3 · RI.3.3	Describe how scientific ideas connect, using sequence and cause-and-effect language.	Lab Notes · Draw the Gap · Thirst Department Game
RI.2.4 · RI.3.4 · L.2.4 · L.3.4	Work out the meaning of subject words and phrases.	Word Lab Workout
SL.1.1 · SL.2.1 · SL.3.1	Take part in conversations about texts with partners and groups.	Discussion · Paradox Sort · Sign Detective

Codes refer to the Common Core State Standards for English Language Arts. © Copyright 2010. National Governors Association Center for Best Practices and Council of Chief State School Officers. All rights reserved.

Health education skills

Skill	What it looks like	Where it shows up
Influences	Notice what influences health choices — including media and labels.	Sign Detective
Checking claims	Ask whether health information and product claims can be trusted.	Sign Detective · Discussion
Asking for help	Say how you feel, and know when to tell a trusted adult.	Discussion · trackers · Lumi Holds Up a Flag
Decisions	Compare options, then reflect on how a choice turned out.	Discussion · Data detectives

IB Primary Years Programme

Theme	Why it fits	Where it shows up
Who we are	An inquiry into the nature of the self, including physical and mental health.	The whole unit

Vocabulary — Lumi's Word Lab

Words for every case: case study · subject · data · observe · hypothesis · experiment

Words from this case: paradox · sodium · salt · balance · dilute · thirst · hypothalamus · body signal · dehydration · hydration · symptom · headache · attention · interoception · misattribution · cause

When a student says...

"So salty food is bad for you."	"What else was true that day?" (the book's own question, p. 72)
"I didn't have anything salty, so my page is empty."	"Good — you left it empty because it was empty. That's the whole job."
"Can we test it in class?"	Not with food or drinks. We test on paper here; at home, it's the family's choice, one week only.
"My head hurts."	"Thank you for telling me." Follow your school's usual care, and don't guess the reason out loud — a headache can have many.
"My grandpa has to eat less salt."	"Thanks for sharing. Bodies work differently, and doctors help people take care of theirs." Move on gently.

Family letter

Copy onto school letterhead, or print the one-page version from the hub.

Dear families,

This week our class read The Bottomless Popcorn Paradox, a story about a girl who learns to hear her body's signals — and to check her own reasons — like a scientist.

Your child may bring home a one-week Salty-Snack Experiment. It is optional and private: nothing is collected, checked or graded. It asks your child to notice when they have something salty, how many times they drink water, and how their mouth and head feel — and it treats a blank day and a question mark as real results.

If you'd like to help: ask, don't check. Praise the blank day. If your child names a reason that sounds wrong, let it stand for a minute and ask one question. And stop after one week.

The book never calls a food good or bad and includes no sodium or calorie counts; we're keeping it that way. If you have questions about your child's health, please talk with your pediatrician.

More for families: lumisnutritionlab.com

References

Every source behind the science in this book — what each one supports, and who was studied. Most of the research is in adults; we say so under each one. Nothing here is medical advice.

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