

Designing an Instructional Package for English for Science Students: A Home Approach for Plus One Learners

Pavithra S (pavithrakav26@gmail.com)

Research Scholar, Mar Theophilus Training College, Nalanchira, Thiruvananthapuram, India



Copyright: © 2026 by the authors. Licensee [JRSP-ELT \(2456-8104\)](http://www.jrspelt.com). This article is an open access article distributed under the terms and conditions of the **Creative Commons Attribution Non-Commercial 4.0 International License**. (<https://creativecommons.org/licenses/by-nc/4.0/>). **Crossref/DOI:** <https://doi.org/10.54850/jrspelt.10.54.001>

1

Abstract: This research paper presents the design, implementation, and evaluation of a 10-week instructional package for teaching English for Science to Plus One student in home-based tuition settings. Delivered in small groups (4-6 students) at tutor's homes in Palakkad, Kerala, the package integrates simplified science readings (short, levelled texts with key vocabulary highlighted), interactive glossaries (hands-on activities like matching games, flashcards, and group quizzes), and practical activities (simple home-based experiments or models using everyday materials) on topics like human anatomy and chemical reactions. Tested with 24 students, pre- and post-assessments indicated a 24% improvement in science-specific reading comprehension and terminology mastery ($p < 0.05$). The home tuition model enhances accessibility and personalization, providing a practical framework for supplementary English for Science and Technology (EST) education. Each week focuses on one core topic, building from human anatomy to chemical reactions, with 2-3-hour sessions twice weekly. Sessions emphasize reading comprehension, science terminology, and speaking/writing in English. The package is designed for tutors in Palakkad, Kerala, using low-cost resources (printouts, household items). Pre/post-assessments track progress via reading quizzes (e.g., true/false on texts) and terminology tests.

Keywords: English For Science, EST Pedagogy, Home Approach, Instructional Package, Plus One Students

Article History: Received: 15 March- 2026; Accepted: 20 March-2026; Published/Available Online: 30 March- 2026

Introduction

English-medium instruction poses significant challenges for Plus One science student in Kerala, where technical terminology and procedural language in textbooks often hinder comprehension (Kerala SCERT, 2024). Home tuition classes, a common supplementary practice in Indian education, provide intimate, flexible settings for targeted language intervention beyond school hours. This study addresses a critical gap in English for Specific Purposes (ESP) pedagogy by designing, implementing, and evaluating a 10-week instructional package tailored for home-based tuition.

The package focuses on EST skills—reading comprehension, vocabulary mastery, and oral/written application—for science topics like human anatomy and chemical reactions. Drawing from ESP principles (Hyland, 2006), it uses simplified texts, interactive glossaries, and low-cost home experiments to make abstract concepts accessible.

Research Objectives

- Develop a replicable 10-module package for small-group home tuition.
- Assess its impact on students' science-specific reading comprehension and terminology via pre/post-tests.
- Explore implications for scalable EST education in resource-limited settings like Palakkad, Kerala.

This paper aligns scope on practical language teaching innovations, contributing a low-cost model for Kerala's tuition ecosystem.

Literature Review

English for Specific Purposes (ESP) literature underscores the need for domain-specific materials in EST, featuring passive structures, nominalizations, and precise lexicon (Hyland, 2006). Supplementary home tuition has proven effective for language gains in small groups, yet few studies target Plus One science students. This package bridges that gap with learner-centered, home-adapted resources.

Methodology

Participants: Twenty-four Plus One science students (aged 16 years, M=16.2, 12 male, 12 female) from government-aided schools in Palakkad, Kerala, participated voluntarily. They were divided into three home tuition groups (4-6 students each) at tutor's residence, with parental consent obtained.

Instructional Package

The 10-module package was delivered in 75-minute bi-weekly sessions over 10 weeks (total 20 sessions). Components integrated EST pedagogy:

- Simplified texts: 300–400-word readings per module (e.g., "The Digestive System"),
- Visual glossaries: 30 key terms/module (e.g., "enzyme," "photosynthesis"), using flashcards and matching games.
- Home-friendly tasks: Role-plays of lab procedures, DIY demos (e.g., lemon battery explained in English), and mobile quizzes via Quizizz.

Module	Topic	Key Terms (Examples)	Tasks
1-2	Digestive System	oesophagus, enzymes	Balloon digestion model, role-play
3-4	Respiratory System	alveoli, diaphragm	Straw breathing demo, quiz
5-6	Circulatory System	arteries, plasma	Pulse relay, lemon battery
7-8	Acids & Bases	pH scale, neutralize	Cabbage indicator, role-play
9-10	Chemical Reactions	oxidation, exothermic	Rust demo, mobile quiz

Table 1: Instructional Package Overview. Note: Each module covers 30 key terms.

Design and Analysis

A pre-post design assessed science-specific reading comprehension and terminology mastery. The 20-item pre-test featured a science passage with vocabulary/multiple-choice questions (alpha, $\alpha = 0.82$). The identical post-test followed intervention. Data were analyzed using paired t-tests in SPSS (v.27), with significance at $p < 0.05$.

Results

The home tuition setup fostered high engagement, yielding significant outcomes.

Component	Pre-Test Mean (%)	Post-Test Mean (%)	Improvement (%)	t-value	p-value
Vocabulary Retention	48	73	25	-5.62	<0.001
Comprehension	50	74	24	-5.41	<0.001
Application in Tasks	52	77	25	-5.78	<0.001
Overall	50	74	24	-7.89	<0.001

Table 2: Pre-Post Outcomes by Component (n=24)

Note: Paired t-tests, $df = 23$; negative t-values indicate pre-to-post gains. Effect sizes (Cohen's d) > 0.8 across components confirm high practicality. Overall scores improved 24% ($t(23) = -7.89, p < 0.001$).

Discussion

The 24% improvement in EST skills (Table 2) confirms the instructional package's efficacy in home tuition settings. Small groups (4–6 students) minimized distractions while parental oversight—hallmarks of Kerala's tuition culture (Sharma, 2018)—fostered engagement. Visual glossaries and hands-on tasks (e.g., lemon battery demos) addressed ESP challenges like procedural language and technical lexicon, aligning with Hyland's (2006) principles for domain-specific materials. These gains exceeded classroom benchmarks (15–20%; Johns, 2018), underscoring home tuition's personalization advantage for Plus One science student.

Practical Implications for ELT Practitioners and Future Research

Tutors can replicate this low-cost model (<₹100/week) using household items and free apps like Quizizz. The 10-module structure supports flexible pacing, ideal for Kerala's after-school ecosystem. Digital PDFs would enable wider adoption in rural areas. Future studies might compare hybrid (home +online) formats or larger cohorts.

Limitations include the regional Palakkad sample (n=24), potentially limiting generalizability. Short-term effects warrant longitudinal follow-up.

Conclusion

This study validates a 10-week home tuition package for English for Science among Plus One students, achieving 24% gains in comprehension and terminology ($p < 0.001$). By using simplified texts, interactive glossaries, and home-friendly tasks, it addresses ESP gaps in Kerala's tuition ecosystem. The model offers educators, professionals and readers a replicable, low-cost framework amid rising English-medium science demands. Widespread adoption, potentially via open-access digital resources, could transform supplementary EST nationwide.

References

- Dudley-Evans, T., & St. John, M. J. (1998). *Developments in English for specific purposes: A multi-disciplinary approach*. Cambridge University Press.
- Hyland, K. (2006). *English for academic purposes: An advanced resource book*. Routledge.
- Hyland, K. (2015). *Teaching and researching language learning strategies*. Routledge.
- Kerala SCERT. (2024). *Plus One science textbook guideline*. Government of Kerala.
- Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge University Press.

Conflicts of Interest: The author declares “No conflict of interest”.

APPENDIXES

Appendix A: Instructional Package

Week 1-2: Human Anatomy – The Digestive System

Objective: *Build vocabulary and comprehension for body systems.*

Simplified Reading (20 mins):

Title: How Food Travels in Your Body

Food enters your mouth. Teeth chew it into small pieces. Saliva makes it wet. Then, it goes down the oesophagus – a tube like a slide. Next, the stomach mixes food with acids and enzymes. These break it down like a blender. Finally, the small intestine takes out nutrients. Waste leaves via the large intestine. (Without enzymes, digestion slows – like old machines!)

Comprehension Q: What does the stomach do? (Ans: Mixes food with acids/enzymes.)

Interactive Glossary (20 mins): Cards: Front – Oesophagus (image of tube); Back – "Muscular tube from mouth to stomach." Game: Match 10 cards, then quiz – "Name the enzyme tube!"

Practical Activity (40 mins):

1. Fill balloon (stomach) with water/food colouring.
2. Squeeze to mimic mixing (add vinegar as "enzymes" – bubbles!).
3. Pour through stocking (intestines) – see "nutrients" strain out.

Script: "Watch the bubbles! Enzymes speed up breakdown.

Say: "Peristalsis pushes food down."

Homework: Diagram with labels: Mouth → Oesophagus → Stomach.

Sentences: "Enzymes break proteins. My stomach hurts if I eat too fast."

Week 3-4: Human Anatomy – The Respiratory System

Interactive glossary: Alveoli – "Tiny air sacs like grapes in lungs."

Practical Example: Breathe through thin straw (blocked nose sim). "Feel the effort? Diaphragm pulls air in!"

Week 5-6: Human Anatomy – Circulatory System

Reading Snippet Example: "Arteries carry oxygen-rich blood from heart (fast like highways). Veins return used blood (slower)."

Activity: Jump 10 times, check wrist pulse. "Heart pumps faster – why?"

Role-Plays: Blood Circulation Check

Setup: String (arteries/veins), balloon (heart).

Script: "Pump the balloon – blood flows fast in arteries. Feel the pulse!" Rotate; end with "Why do veins have valves?"

Mobile Quizzes: Use free apps like Kahoot/Quizizz on one shared phone (or WhatsApp polls). 10 quick Qs on readings/glossaries; instant feedback.

Hosted on Quizizz (join code shared).

1. What pushes food down oesophagus? (A: Peristalsis)
2. Multiple choice: Alveoli function? (Oxygen exchange)
3. Image: Label heart's "atria."
4. Video clip: "Describe this digestion animation." (Voice response.)

Scoring: Top scorer picks next role-play. Weekly leaderboards motivate.

Week 7-8: Chemical Reactions – Acids and Bases

Interactive Glossary: pH 7 – Neutral (water); pH 2 – Acid (lemon juice).

Practical Example:

Boil red cabbage → purple juice.

Add vinegar → pink (acid); soap → green (base).

Script: "Pink means low pH. It neutralizes with base!"

Demos: Baking Soda Volcano

Materials: Bottle, dough/clay, baking soda, vinegar, food colour.

Demo Script: "Mix soda (base) + vinegar (acid) = carbon dioxide gas! Exothermic reaction bubbles like a volcano in Palakkad hills."

Role-Plays of Lab Procedures: Testing pH of Kerala Fruits

Students act out science steps in English, rotating roles (scientist, narrator, safety officer). Builds procedural vocabulary like "measure," "observe," "record."

Setup: Cabbage juice indicator + lemon/lime/tamarind.

Roles:

Scientist 1: "First, boil cabbage leaves in water for 10 minutes to make indicator."

Narrator: "Now, add lemon juice – it turns pink! pH is low, so acidic."

Safety Officer: "Wear gloves! Acids can sting."

English Focus: Narrate 5 steps aloud; group votes "best clear explanation."

Home Twist: Use kitchen pots; record on phone for playback.

Week 9-10: Chemical Reactions – *Everyday Changes*

Reading Snippet: "Rust is oxidation: Iron + oxygen + water = rust (brown flakes on bikes)."

Activity: Rub steel wool with vinegar → heat/brown rust in 10 mins. "Exothermic reaction releases heat!"

DIY Demos (e.g., Lemon Battery)

Hands-on builds with narration in English. Emphasize safety, observations.

Materials: 4 lemons, copper coins, zinc nails, wires, small LED. (₹50 total.)

Steps (Narrate in English):

1. "Squeeze lemon slightly – acid inside reacts."
2. "Insert copper coin (positive) and zinc nail (negative) into each lemon."
3. "Connect wires in series – electrons flow!"
4. "LED lights up – chemical energy to electrical!"

Discussion: "Why multiple lemons? Voltage adds up ($V=IRV=IR$)."

Home Twist: Test with potato/apple; write "My Battery Journal" (3 sentences).

Mobile Quizzes:

1. pH of soap? (A: >7, base)
2. Lemon battery: Acid provides? (Electrons)

Home Twist: Offline version – tutor reads questions; students write/say answers.

Integration: End each session with one task (e.g., role-play → DIY → quiz). Track English gains: Pre-record speaking, post-review fluency. Total added cost: <₹100/week.

Appendix B: Pre- and Post-Assessment Instrument

Title: Science English Proficiency Quiz (20 Items)

Purpose: Measures reading comprehension, terminology mastery, and task application for Plus One EST learners. Administered before/after 10-week intervention.

Format: 45 minutes; mix of matching, true/false, multiple-choice, and application questions.

Scored 0-100%.

Section 1: Vocabulary Matching (8 items, 40%)

Match each term to its definition/function:

Terms	Definition/Function
1. Enzymes	A. Speed up chemical reactions in digestion
2. Oesophagus	B. Muscular tube carrying food to stomach
3. Alveoli	C. Tiny air sacs for oxygen exchange in lungs
4. Arteries	D. Blood vessels carrying oxygen-rich blood from heart
5. pH scale	E. Measure of acid/base strength (0-14)
6. Oxidation	F. Reaction of metal with oxygen forming rust
7. Diaphragm	G. Muscle aiding breathing by expanding chest cavity
8. Neutralize	H. Make acid + base combine to form salt/water

6

Section 2: Reading Comprehension True/False (6 items, 30%)

1. T/F Enzymes in the stomach break down food like a blender. (True)
2. T/F Alveoli are located in the heart for blood cleaning. (False – lungs)
3. T/F Arteries carry oxygen-poor blood back to the heart. (False – veins do)
4. T/F pH 7 indicates a neutral solution like pure water. (True)
5. T/F Lemon juice + baking soda produces an endothermic reaction. (False – exothermic)
6. T/F Lemon battery works because citric acid conducts electricity. (True)

Section 3: Application Questions (6 items, 30%)

1. **Procedure:** List 3 steps to test pH of tamarind using cabbage indicator:
(Sample: 1. Boil cabbage for purple juice; 2. Add tamarind extract; 3. Pink = acidic)
2. **Lab Explanation:** Why does vinegar on steel wool produce heat?
(Sample: Exothermic oxidation reaction releases energy)
3. **Role-play Script:** Write 2 sentences explaining "peristalsis" to a group:
(Sample: "Peristalsis is wave-like muscle squeezing that pushes food down the oesophagus. Without it, food would get stuck.")
4. **Diagram Label:** Label: heart → artery → lungs → vein → heart
5. **Problem-solving:** Your lemon battery LED won't light. Name 2 possible fixes:
(Sample: 1. Connect more lemons for voltage; 2. Clean coins/nails)
6. **Compare:** How is breathing through a straw like asthma?