Rika-chan bungee: Content-based instruction in mathematics

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Quick guide

- **Keywords:** ESP, mathematics, task-based, group work
- **Learner English level:** High beginner to advanced
- **Learner maturity:** High school to adult
- **Preparation time:** 1-2 hours
- **Activity time:** 1-2 class periods
- **Materials:** Plastic toy dolls, rubber bands, meter sticks, string, activity worksheets, window with no obstructions below

In this task, adapted from a mathematics activity for native English speakers (Zordak, n.d.), the students will compete to give Rika-chan the thrill of her life. Linked skills and problem solving tasks within this activity allow the students to use language as a means for information transfer and task completion rather than simply as a knowledge goal with no clear practical applications, an important distinction within content-based instruction.

**Preparation**

**Step 1:** Seek out a suitable window for the activity and measure the distance to the ground using string and meter sticks. A 20-30 meter drop is ideal.

**Step 2:** Obtain enough rubber bands for the class to use (100-200 bands per group should be more than sufficient, but a pilot test would give a more specific estimate).

**Step 3:** Procure one Rika-chan doll (or another similar toy doll) for each group.

**Step 4:** Create a worksheet with a data table (2 columns x 15 rows), an x-y graph to plot the results, and room for calculations.

**Procedure**

**Step 1:** Explain the task to the students using simple English and demonstrate how to tie the first rubber band to the doll’s feet, which will serve as the anchor for the subsequent bands.

**Step 2:** Have the students tie one rubber band to the anchor band and drop the doll from a fixed point on the wall. Marking with a pencil on paper taped to the wall, measure the distance to the lowest point reached after three drops. The students should write their results in the data table on their worksheet, recording the number of bands and the distance fallen. Continue adding one band at a time and record the results for up to 15 rubber bands.

**Step 3:** While the students should be familiar with the mathematical concepts, it is helpful to pre-teach the following English vocabulary: graph, slope, point, line, x-axis, y-axis, y-intercept, and best-fit line. The students will need to plot their data onto an x-y graph, with the x-axis representing the number of rubber bands and the y-axis representing the distance fallen. They will then draw a best-fit line on their graphs, measuring its slope (m) and y-intercept (b). Using these measurements, they can use the slope-intercept equation \(y=mx+b\) to predict how many rubber bands \((x)\) are necessary for the doll to safely bungee-jump from the height of the window \((y)\).

**Step 4:** After the students discuss and write their predictions in groups, have them tie the appropriate number of rubber bands to the doll and move to the window. With students at ground level judging, the groups should drop their dolls one by one. Give a prize to the group that drops the doll closest to the ground without impact.

**Step 5:** As a post-activity, have the students summarize the experience and report their results orally or in writing as a linked-skills activity.

**Variations**

1. To avoid inter-group collaboration, adding varying amounts of weight to the dolls using coins and tape will give each group a unique result and force them to make independent predictions. In addition, the increased weight of the coins should give each doll a more dynamic and exciting bounce.

2. Expansion using more elaborate pre-task scaffolding activities to practice the required vocabulary and mathematical concepts could be helpful for lower level students.
Conclusion
The group that allows the doll to fall closest to the ground without impact walks away the winner, but all students walk away smiling as they practice their mathematical knowledge through meaning-focused language activities. With English as the primary means of teacher explanations and accountability through assessed reporting on group progress, the students, who would normally rely on Japanese communication, can be pushed to consider and use English throughout the task.

References

BOOK REVIEWS

This month’s column features Anna Husson Isozaki’s evaluation of ELI Graded Readers: Teen and Young Adult Readers.

ELI Graded Readers: Teen and Young Adult Readers

Reviewed by Anna Husson Isozaki, Gunma JALT

ELI teen and young adult graded readers include original stories, adapted classics, and unabridged classics; currently there are approximately thirty-five titles paired with audio. They are CEFR-graded and range from 600 headwords to 2500 for adapted classics, and choices are increasing (e.g., a new adaptation of the Soseki classic Botchan). Most books include CDs and, notably, free downloads of the audiobooks online. All titles in the collection include background sections supplying relevant cultural or historical information to help learners situate the story. All titles also contain exercise sections, and glossary definitions at the bottom of pages. The paper editions are FSC-certified and e-book versions are now available as well.

These graded readers and audiobooks were piloted with university and adult students in a semester project during which learners were asked to choose something fun for at-home English practice. Other genres and series were competing options but ELI’s attractive collection was clearly appealing. Weekly class meetings began with brief sharing of students’ choices with partners. The pace of borrowing the ELI readers picked up over the semester, indicating positive word-of-mouth, which was corroborated both in students’ verbal and anonymous written feedback. Short books (Val’s Diary, or The Egyptian Souvenir) students could complete in a day, while longer ones (Pride and Prejudice,