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English in Science Textbooks

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Abstract

There is a difference in the kind of English vocabulary and language used in literature and science textbooks. Students in the early classes, generally, learn the English alphabet, rhymes and few new words. As they reach higher classes, they are taught grammar and vocabulary, in terms of multiple meanings and complex sentence structures. But English language in science textbooks is entirely different from English textbooks even at the primary stage. So, children with a limited exposure to English language have to put in an extra effort to understand the terminologies and concepts as elaborated (in English) in the science textbooks. Many experience a 'gap' between the English they learn to speak and write, and that used in science textbooks. So, they need help in understanding the concepts explained in the textbooks, which many a time, they are unable to comprehend. Even if they happen to comprehend a concept, they are unable to articulate it fluently. This paper discusses how a little collaboration between science and English teachers can help the students understand the scientific terms and concepts discussed in the science textbooks better.

Introduction

Most teachers would agree that students with a limited exposure to English language in the early grades have to put in an extra effort to catch up with their peers, who may be proficient in it. However, these students may, gradually, achieve reasonable fluency in the language (both written and spoken), if regular exposure and adequate exercises or practice sessions are ensured. But a number of students would still experience a 'gap' between communicative English and that used in science textbooks, and hence, may not be able to understand many concepts. The main reason behind this is that most students bank on rote learning, irrespective of the subject (Arora and Arora, 2017).

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The unfamiliar concepts and theories in science textbooks add to the confusion. Science teachers are often seen sharing that students face difficulty in comprehending the concepts and theories explained in the textbooks, which are in English. It is, therefore, inferred that the language of science textbooks is new to them and the students need help in understanding the concepts explained therein. Many a time, it is noticed that even if they happen to comprehend a concept, they are unable to articulate it fluently in English or even their native language.

Teacher Collaboration

At the primary stage, the child should be engaged in exploring the world around and harmonising with it. The objectives at this stage are to nurture the curiosity of the child about the world (natural environment, artifacts and people), engage in exploratory and hands-on activities in order to acquire the basic cognitive skills (psychomotor, observation, classification, inference, etc.); emphasise on design and fabrication, estimation and measurement as a prelude to the development of technological and quantitative skills at later stages; and develop basic language skills — listening, speaking, reading and writing not only for science but also through science (*National Curriculum Framework*, 2005).

The scenario, thus, demands collaboration between English and science teachers, which may benefit the students. They must work closely on classroom activities like book reading (reading aloud), etc. As the students participate in such activities, a teacher may identify gaps like mispronunciation, etc. One may also ask the meaning of difficult words or terms to the students and explain those in simple language to ensure comprehension.

At the start of every week, all teachers must chalk out a 'monthly lesson plan', which must include things like chapters to be covered, projects and assignments to be given to the students, etc. A science teacher must share the topics one plans to teach during the week with the English teacher. For example, the science chapter to be taught is 'Water', wherein, the concept of 'hard' and 'soft' water is explained. The English teacher must oneself read the chapter first. In the classroom, one may talk about verbs associated with 'water' like 'boil', 'flow', 'lather', etc., with the students before the science teacher actually takes the class. The English teacher may also ask the students for the equivalents for 'hard' and 'soft' water in their native languages.

The science teacher may introduce certain new words that may occur in the chapter in way of fun exercises. One may start with simple words and, gradually, introduce three to four (relatable) new (scientific) words. The teacher may also ask the students about the things that plants need to survive. One of the things necessary for plant growth and survival is 'water'. Gradually, the teacher may introduce the students to words like

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melt, combine, evaporate, condense, etc. This would ensure that the students do not get perplexed when these words appear in the textbook.

Therefore, the science teacher must first present the subject matter in simple vocabulary and sentence structure. For example, if it is written that "some water is hard", it means that such water has a high mineral content. It reduces the cleansing capacity of soaps and does not lather easily. When hard water is boiled in a pan, a layer of a hard substance called 'fur' gets separated, which may be seen settling to its bottom and sides.

After introducing the chapter like this, the concepts contained, therein, are understandable to the students. The teacher may now proceed with reading the text, which may be somewhat like this — "Some water is said to be 'hard'; it does not lather readily when soap is used. The reason is that it contains traces of Calcium compound, which may have come through rocks in the Earth through which it has flowed. When a pan of hard water is boiled, a layer of hard substance is deposited on the bottom and sides of the pan."

It would further be helpful, if the English teacher has already introduced 'passive voice' to the students a couple of days ago. However, it need not involve teaching the 'Active and Passive Voice' with its range of rules. It could just be as simple as asking the students to notice that these are the two ways of expressing the same idea. The following are a few examples.

1(a) People say that some water is 'hard'. (Everyday language)

1(b) Some water is said to be 'hard'. (Language in science textbooks)

2 (a) You could see steam coming out. (Everyday language)

2 (b) Steam could be seen coming out. (Language in science textbooks)

The next day, the English teacher may ask the students about new words that they have learnt in the science class. One must ensure that the students understand the meaning of words like 'layer' and 'lather', etc.

The English teacher may also introduce the concept of nouns made out of verbs by adding suffixes like 'ment' (as in 'treatment'), 'th' (as in 'growth'), etc.

The teacher may make the students aware that there are some verbs, which remain unchanged when used as nouns, for example, change, shape, supply, deposit, lather, etc.

At some point, the English teacher may introduce the practice of 'omission' in language. As science favours conciseness, omission is practised more in the discipline. Students must be explained that omission of certain (redundant) words does not change or alter the meaning of a senetence but makes it more concise, like the English teacher may write the following on the board.

Chlorine is poisonous to bacteria in water but it is not poisonous to human beings.

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The students may be given a minute or two to read and understand the sentence, and asked if a word or two may be deleted, without changing the meaning. After listening to their responses, the teacher may encircle the words that the students suggest may be deleted. Now, the sentence may somewhat look like this.

> Chlorine is poisonous to bacteria in water but it is not poisonous to humans.

The teacher may give one or two more such examples.

The science teacher may also come up with a simple 'match the following' exercise to make the students recapitulate the concepts learnt. Column A may have new words or terminologies, while Column B may list a short explanation or definition of these. The teacher may write the exercise on the blackboard for the students.

Meanwhile, the English teacher may help the students recall 'Passive Voice' a week later, taking up one or two examples from the science textbook.

Thus, a detailed knowledge of children's early abilities allows optimal adaptation of instruction to their individual needs. Quality teaching is the greatest influence on students' engagement and outcomes in school (Hattie and Yates, 2014).

Conclusion

In all four familiar areas of the school curriculum, i.e., language, mathematics, science and social sciences, significant changes are recommended with a view to making education more relevant to the present day and future needs, and alleviate the stress with which children are coping today (*National Curriculum Framework*, 2005).

These are just a few ideas. If carried out jointly by English and science teachers, these may help the students understand the concepts and terminologies encapsulated in science textbooks in a better way. Therefore, teachers, teaching at the primary stage, must see to it that they work as a team while planning the lessons to be taught and introduce innovative methodology to foster active and participatory learning, which, in turn, would lead to clearer understanding of concepts by the students.

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