

1. 科学英語(Science English)

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1.1. Basic Information on Research and Development/Practice (Timing, Target, Hypothesis, Self-Evaluation, Next Goals, Related Files)

時期/年組(学年毎参加数) 平成31年4月～令和4年2月/総合理学科 1年(40名)																	
	1a	1b	1c	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b
本年度当初の仮説				◎	◎				◎	◎	◎	◎	◎	◎	◎		
本年度の自己評価				4	4				3	4	3	4	4	4	4		
次のねらい(新仮説)				◎	◎				◎	◎	◎	◎	◎	◎	◎		
関連 file	方針:年間授業計画.pdf 内容:Science English Survey result 2021(英語4技能の伸長).pdf Annual Comparison of Science English Survey Results(2016-2021).pdf 特別講義アンケート.pdf : サイエンスダイアログ「特別講義」実施後に行った生徒アンケート結果 英語ポスター.pdf : 「科学英語プレ課題研究英語ポスター発表会」用生徒作成ポスター 教材:教材パワーポイント.pdf 教材ワークシート.pdf																

1.2. Background of Research and Development and Issues at the Beginning of This Year

Background and Issues:

In order to become a person who can play an active role in the world of science and mathematics, a high level of proficiency in English, the language most commonly used in the world of science and mathematics, is required. The ability to “understand” and “communicate” in English is essential not only to obtain information that can be used as reference for one’s own research, such as leading-edge research, but also to disseminate one’s research results and obtain support for one’s research. The purpose of the “English for Science” class is to help students acquire English vocabulary and expressions related to natural science, deepen their understanding of scientific content, and develop the ability to express themselves in English through the study of science in English. The class is taught by two English teachers, two science teachers, and two ALTs specializing in science, and uses a science textbook (GCSE science FOUNDATION) that was actually used in England. The main pillars of the class are “understanding” and “communicating”, and the students’ abilities are to understand scientific content by reading and listening to it in English, and to acquire what they have understood and to communicate what they have learned about scientific content by speaking and writing about it. This year, as in the previous year, due to the Coronavirus, the number of opportunities to communicate with others was drastically reduced, and the difficulty level of each activity must be adjusted because it is difficult for first-year high school students to understand and communicate the content.

1.3. R&D Practices (with Clear Distinction between Methods, Content, Results, and Discussion)

Objectives: Develop and expand the ability to understand scientific content in English and to communicate in English what they have learned and what they have learned through their research.

Methods and Contents:

① Science classes in English by ALTs & science experiments

The class was conducted entirely in English with ALTs. The lessons are based on the textbook (GCSE science FOUNDATION) with worksheets and power point presentations. Students listen to the ALT’s explanations, develop their reading and listening skills, fill in worksheets, do pair work, and answer questions to develop their speaking and writing skills.

In the science experiments (Banana DNA Extraction, Slime Making Experiment, Egg Drop Experiment), we used English manuals and gave all instructions in English. At first, it was difficult to understand the familiar equipment and movements of the experiments in English, but the students were able to master them. There is a lot of unknown vocabulary and expressions used in scientific English, and it is hard to understand the content, but the teachers help with this by adding explanations when needed.

② Individual English presentations on scientific content

The students were asked to choose a scientific theme that they were interested in, and to give a presentation in English. The students were asked to choose a scientific topic of their interest and to make a presentation in English.

③ Group poster presentation in English on the research results of the pre-project research (Due to the Coronavirus, cancelled in 2020, held in March 2021, scheduled to be moved to April in 2022)

All the students in the Science Class in the first year are conducting pre-project research, which will be presented in Japanese at the joint presentation with three schools in late January (online format at Coronavirus this year), and in English at Kobe High School in late March (scheduled to be held after April this year). We will ask ALTs from our school, ALTs from neighboring schools (about 10), and foreign engineers who work for neighboring companies such as Sysmex to give feedback on the poster presentations in English.

④ Special lectures in English for Science by foreign researchers (using JSPS Science Dialogues, from 2015)

This year, a German researcher gave a lecture on the field of biochemistry. The purpose of the lecture was to develop students’ ability to understand the contents of highly specialized scientific fields in English, to increase their knowledge, to

summarize the lectures they heard in English on the premise of asking questions, and to develop their ability to ask questions in English. Because of the highly specialized nature of the subject matter, the outline of the lecture was introduced with a worksheet prepared in advance to aid understanding. In the Q&A session after the lecture, the students actively asked and answered questions despite the difficult content.

⑤Exchange with students from overseas sister schools (Singapore, UK)

We were not able to implement this program as last year due to the Coronavirus.

Results and Discussions:

The results of the April (before taking the course) and February (after taking the course) questionnaires show that this year's first-year students had fewer classes during their junior high school years due to the prolonged absence of school due to the Coronavirus, which reduced their amount of input, and the results of the April questionnaire was the lowest in the past six years. The April survey was the lowest in the past six years. In the February survey, there was a comparable improvement compared to other years, but the scores for reading and writing remained low. We will try to provide more opportunities to increase the amount of input, since scientific English requires a lot of knowledge and difficult vocabulary.

1.4. Self-Evaluation of the "Development of the Eight Skills" and Future Issues that Emerged from This Year's Efforts

(2a) 挑戦: 自らの課題に意欲的努力(Motivated to work on their own tasks)・・・

4 Students were seen to be proactive in all activities.

(2b) 挑戦: 問題の関連から取組む順序を検討(Considering the order in which to tackle problems based on their relationship)・・・

4 Students were able to see the whole picture and work out the order of experiments.

(4b) 解決: 問題解決の理論・方法論の知識(Knowledge of problem solving theories and methodologies)・・・

3 Students were able to gain a wide range of knowledge through science textbooks written in English.

(5a) 交流: 積極的コミュニケーション(Proactive Communication)・・・

4 Students actively interacted with the lecturers in English, even when the content was difficult, such as in special lectures.

(5b) 交流: 発表会・協同学習等で「責任・義務」の自覚(Awareness of "responsibility and duty" through presentations, cooperative learning, etc.)・・・

3 Students collaborated with their peers to create and present a poster presentation.

(6a) 発表: 必要な情報を抽出・整理した発表資料作成(Preparation of presentation materials with necessary information extracted and organized)・・・

4 Students well summarized the necessary information in posters in English.

(6b) 発表: 発表効果を高める工夫(Improvements in presentation effectiveness)・・・

4 Students did an effective job with their individual presentations.

(7a) 質問: 疑問点を質問前提にまとめる(Summarizing your questions into a question premise)・・・

4 Students were able to organize their questions and ask them during the special lecture.

(7b) 質問: 発言を求める(Request for remarks)・・・

4 Students were able to organize their questions and ask the lecturer to speak appropriately.

Future issues (to be developed and continued):

①In order to understand the scientific content, it is not enough to listen to the English explanations of ALTs in class. In order to provide more opportunities, special lectures were given by foreign researchers. The foreign researchers are from Japanese universities and research institutes, and their lectures on the latest research are very stimulating for the students.

②The students have few opportunities to write in English. We increased the opportunities for them to write by having them write scripts for individual presentations, making posters in groups, and increasing the number of writing questions in the regular examinations. We also tried to encourage them to write in English by having them work on worksheets in class.

③We have increased the number of activities in which students work in pairs or groups and discuss with each other. There are still few students who can do both writing and speaking activities smoothly.

④There are two types of presentations: individual presentations and group poster presentations. For the group presentations, since 2004, we have asked ALTs from other schools and outside personnel to help us broaden the audience and make the presentations more fulfilling. As a result, more students have gained confidence in presenting their research results in English. (Due to the Coronavirus, the event had to be cancelled in 2019, but we managed to implement it in 2020. This year, we plan to implement it in April.)

⑤We made a vocabulary list of the subjects to be covered in the class and special lectures, and presented pictures, diagrams and graphs in PowerPoint to make it easier to understand. Although the level of understanding of the content has increased, there are many points that need to be improved.

⑥We are using a science textbook that has been used in the UK, and the students need to read difficult English texts. It is necessary to teach them how to read (skimming, scanning).

⑦It is very difficult for many students to give presentations and posters in English. We would like to provide more opportunities for them to improve their presentations.

1.5. Special Note on the Use of External Human Resources

With the help of local foreign researchers and ALTs from neighboring schools, we managed to maintain the same level of exchange activities as last year.