本書は、CLIL (Content and Language Integrated Learning: 内容と言語を統合した学習)の教育理念を基盤としています。どの学群や学部の学生にも対応できるよう、自分の身のまわりにある事柄を中心に、学習者たちが興味関心を持ちそうな内容や、日常生活を活気あるものにし、幸せに生きる上で必要な要素(例えば、食事・睡眠・運動などから、脳・免疫・遺伝学などの科学的分野、また健康に関わる環境・心・食料問題まで)を題材として取り上げ、それらに関して英語で思考し、その知識を学ぶことにより、英語の力をつけることを意図しています。

本書では、CLIL の 4C (content, cognition, communication, culture) を、各 Task のなかに意図的に、そして有機的に組み合わせ、内容 (content) に関して、思考 (cognition) しながら、学習者同士が英語を使って意味のあるやりとり (communication) をし、多様な社会においてお互いを理解し合うこと (culture) を学びます。

宮城大学食産業学群の三石誠司教授、日渡祐二教授に専門知識に関して、アドバイスを 受けています。

This book is based on the educational principles of CLIL (Content and Language Integrated Learning). It covers topics of common interest to students and essential for enlivening everyday life, such as nutrition, sleep, and exercise, as well as scientific fields like brain function, immunity, genetics, and environmental, psychological, and food-related health issues. The intention is for learners to think about these topics in English and acquire language skills through understanding this knowledge.

The book intentionally integrates the 4Cs of CLIL (content, cognition, communication, culture) within each unit. While thinking (cognition) about content, learners learn to use English to communicate meaningfully and understand each other (culture) in a diverse society.

Regarding the content of this book, guidance on specialized knowledge has been provided by Professor Seiji Mitsuishi and Professor Yuji Hiwatashi of the Food Industry Faculty at Miyagi University.

### 各Taskについて Guideline for each task

#### Check your knowledge



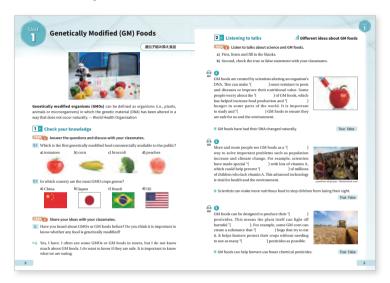
基礎知識について、答えを予測し、考え、話し合いをす る。学習前に自分が知っていること、思っていることを 話す。 Predict, think about, and discuss answers about basic knowledge. Talk about what you know and think before learning.

## 2 Listening to talks TASK 3



聞いて、内容に関する知識を深め、それについて 興味を持つ。

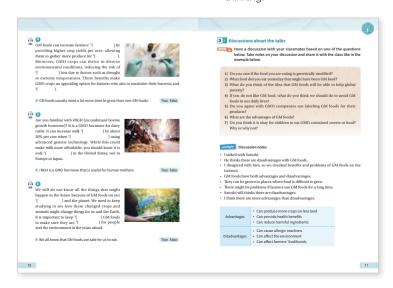
Listen, deepen your knowledge of the content, and be curious about it.



#### **Discussions about the talks**



2と関連する内容に関して、興味を持った内容を選び、 それについて英語で考え、ペアまたはグループで話し 合い、知識や思考を発展させる。 Choose a topic of interest from task 2 and think about it, discuss it in pairs or groups to develop your knowledge and thinking.





内容について、話し合う(日本語に訳すことに焦点をおかない)。

Read and talk about the content, rather than focusing on translating it into Japanese.



## 5 Language use



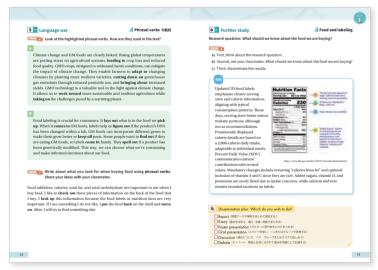


## 6 Further study TASK 8



文法が文脈でどのように使われている のか考え、文を作る。 Think about how grammar is used in context and try to make sentences based on the grammar.

ユニットで学んだ内容の中で興味を持った内容に関して、さらに発展 させ、自分で調べ、まとめてクラスで共有する。 Further develop the content you have learned in each unit that interests you, do research, summarize, and share your results with the class.



#### CLILで大切な点 What is important in CLIL?

- 英語の誤りは気にせず、言いたいことを伝える
- ② 互いの英語の誤りを許容し、協力し、学び合う環境を大切にする
- ③ 興味のある関連する内容をさらに自分で調べてみる
- △ 英語と母語の両方を自然に使う
- ⑥ 簡単な英語(知っている単語)で言いたいことを表現する
- 日本語に訳すことにこだわらずに、内容に焦点を当て考える
- ② 学んだ内容に関して、実際に使ってみる

Unit	<b>Genetically</b>	Modified (GM) Foods 遺伝子組み換え食品	8
	Listening to talks Reading Language use Further study	Different ideas about GM foods Labeling GM foods Phrasal verbs 句動詞 Food and labeling	
Unit 2	Agriculture a	and Human Health 農業と健康	16
	Listening to talks Reading Language use Further study	Agriculture and human life Water for agriculture Conjunctions 1 (because, so, etc.) 接続詞 1 Meat consumption	
3	Food and Nu	trition 食事と栄養	24
	Listening to talks Reading Language use Further study	MyPlate Relative clauses 関係詞	
Unit 4	The Brain: L	anguage and Sleep 脳:言語と睡眠	32
	Listening to talks Reading Language use Further study	Things that affect the brain Stages of sleep Adverbs 1 (enough, too) 副詞 1 Your brain	
5 Unit	Animals and	Humans 動物と人間	40
	Listening to talks Reading Language use Further study	How animals benefit human health Zoonosis Conjunctions 2 (when, if, before, etc.)接続詞2 Deadly animals	
6 Unit	Humans and	Their Environments 人間と環境	48
	Listening to talks Reading Language use Further study	Humans and their environments Colors in our home Adjectives 形容詞 Humans and their environments	

Unit 7	Health and F	Fitness 健康と運動	56	
	Listening to talks Reading Language use Further study	Benefits of exercise Too much exercise may decrease immunity Comparatives 比較級 Benefits and drawbacks of exercise		
Unit 8	Drugs and th	ne Human Body 薬と身体への影響	64	
	Listening to talks Reading Language use Further study	The advantages and disadvantages of drugs Herbal and over-the-counter (OTC) medicines The passive voice 受動態 Drug side effects		
Unit 9	The Human	Immune System 免疫系	72	
	Listening to talks Reading Language use Further study	Human immunity Improving your immune system Simple present tense 現在時制 Flu prevention		
Unit 10	Genetics 遺伝	<b>运学</b> 80		
	Listening to talks Reading Language use Further study	Heredity, genes, and DNA Collecting DNA for crime evidence Infinitives 不定詞 Observable inherited traits		
Unit	Mind and Bo	<b>dy</b> 心と体	88	
	Listening to talks Reading Language use Further study	Mind and body Benefits of a healthy mind and body Adverbs 2 副詞2 Mind and body		
Unit 12	Food Proble	Food Problems and Human Health 食の問題と健康		
	Listening to talks Reading Language use Further study	A variety of food problems Food loss, food waste, and hunger Participles 分詞 Food problems and human health		
	How to Make S Glossary References	ilides	104 106 114	

Unit

# **Genetically Modified (GM) Foods**

遺伝子組み換え食品



**Genetically modified organisms (GMOs)** can be defined as organisms (i.e., plants, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that does not occur naturally. — World Health Organization

## 1 Check your knowledge

## TASK 1 Answer the questions and discuss with your classmates.

- Q1 Which is the first genetically modified food commercially available to the public?
  - a) tomatoes
- b) corn
- c) broccoli
- d) peaches









- Q2 In which country are the most GMO crops grown?
  - a) China



b) Japan



c) Brazil



d) US



- TASK 2 Share your ideas with your classmates.
- Q Have you heard about GMOs or GM foods before? Do you think it is important to know whether any food is genetically modified?
- e.g. Yes, I have. I often see some GMOs or GM foods in stores, but I do not know much about GM foods. I do want to know if they are safe. It is important to know what we are eating.

## **2** Listening to talks

### Different ideas about GM foods

TASK 3 Listen to talks about science and GM foods.

- a) First, listen and fill in the blanks.
- b) Second, check the true or false statement with your classmates.





GM foods are created by scientists altering an organism's DNA. This can make ¹( ) more resistant to pests and diseases or improve their nutritional value. Some people worry about the ²( ) of GM foods, which has helped increase food production and ³( ) hunger in some parts of the world. It is important to study and ⁴( ) GM foods to ensure they are safe for us and the environment.



GM foods have had their DNA changed naturally.

True False





More and more people see GM foods as a <sup>1</sup>( ) way to solve important problems such as population increase and climate change. For example, scientists have made special <sup>2</sup>( ) with lots of vitamin A, which could help prevent <sup>3</sup>( ) of millions of children who lack vitamin A. This advanced technology is vital for health and the environment.



@mehmet ali poyraz / Shutterstock.com

Scientists can make more nutritious food to stop children from losing their sight.

True False





GM foods can be designed to produce their <sup>1</sup>( ) pesticides. This means the plant itself can fight off harmful <sup>2</sup>( ). For example, some GM corn can create a substance that <sup>3</sup>( ) bugs that try to eat it. It helps farmers protect their crops without needing to use as many <sup>4</sup>( ) pesticides as possible.



GM foods can help farmers use fewer chemical pesticides.

True False



4

GM foods can increase farmers' <sup>1</sup>( ) by providing higher crop yields per acre, allowing them to gather more produce for <sup>2</sup>( ). Moreover, GMO crops can thrive in diverse environmental conditions, reducing the risk of <sup>3</sup>( ) loss due to factors such as drought or extreme temperatures. These benefits make



GMO crops an appealing option for farmers who aim to maximize their harvests and 4( ).

Mark GM foods usually need a lot more time to grow than non-GM foods.

True False





Are you familiar with rBGH (recombinant bovine growth hormone)? It is a GMO hormone for dairy cattle. It can increase milk ¹( ) by about 20% per cow when ²( ) using advanced genetic technology. While this could make milk more affordable, you should know it is only ³( ) in the United States, not in Europe or Japan.



rBGH is a GMO hormone that is useful for human mothers.

True False





We still do not know all the things that might happen in the future because of GM foods on our <sup>1</sup>( ) and the planet. We need to keep studying to see how these changed crops and animals might change things for us and the Earth. It is important to keep <sup>2</sup>( ) GM foods to make sure they are <sup>3</sup>( ) for people and the environment in the years ahead.



We all know that GM foods are safe for us to eat.

True False

## 3 Discussions about the talks



Have a discussion with your classmates based on one of the questions below. Take notes on your discussion and share it with the class like in the example below.

- 1) Do you care if the food you are eating is genetically modified?
- 2) What food did you eat yesterday that might have been GM food?
- 3) What do you think of the idea that GM foods will be able to help global poverty?
- 4) If you do not like GM food, what do you think we should do to avoid GM foods in our daily lives?
- 5) Do you agree with GMO companies not labeling GM foods for their products?
- 6) What are the advantages of GM foods?
- 7) Do you think it is okay for children to eat GMO-contained sweets or food? Why or why not?

#### example Discussion notes

- · I talked with Satoshi.
- · He thinks there are disadvantages with GM foods.
- I disagreed with him, so we checked benefits and problems of GM foods on the internet.
- GM foods have both advantages and disadvantages.
- They can be grown in places where food is difficult to grow.
- There might be problems if farmers use GM foods for a long time.
- Satoshi still thinks there are disadvantages.
- I think there are more advantages than disadvantages.

Advantages	<ul><li>Can produce more crops on less land</li><li>Can provide health benefits</li><li>Can reduce harmful ingredients</li></ul>
Disadvantages	<ul><li>Can cause allergic reactions</li><li>Can affect the environment</li><li>Can affect farmers' livelihoods</li></ul>

## 4 Reading





Part 1 Would you like GM foods to have a label saying they are GMOs?

When you go shopping for food, do you usually look at the labels on the packaging? Some people might not pay attention to the labels, while others might use them to decide what to buy. The more you understand about these labels, the more likely you will change how you shop for food in the future.



In the United States, a large portion of the corn, canola, soybeans, and sugar beets have been GM (genetically modified). Many food ingredients are derived from these crops. For instance, high fructose corn syrup, which comes from corn, is one example of GM foods. It is used in various products like candy, soft drinks, cakes, salad dressings, and ketchup.

However, not many people are aware of this, and there are a couple of reasons for that. Firstly, GM material in high fructose corn syrup has had its DNA removed, making it impossible to detect, so there is no requirement to put it on the label. Secondly, the USDA (the United States Department of Agriculture) has set a 5 percent threshold for "unintentional" GMO ingredients in food. It means that if a product

has less than 5 percent of such ingredients by accident, it does not need to be labeled as GM food. In the European Union, the standard is much stricter, setting a 0.9 percent threshold. Moreover, even if an animal has eaten GM feed, their products, like milk or eggs, are not considered GM foods. These factors make the matter more complex.



Labeling foods with GM foods is a challenging topic, and it varies from one country to another. When you are buying groceries, it is important to pay close attention to the labels and understand GMO regulations in your country.

### TASK 5-1 Questions

- 1) What is the threshold of "unintentional" GM ingredients in food in your country?
- 2) What is the difference between GM foods and genome edited / gene edited foods?



## Part 2

#### Do you know if the food you are buying is in season or out of season?

Do you prefer consuming fruits and vegetables that are in season? Or do you lean towards having apples and potatoes available all year around? Seasonal produce not only boasts enhanced flavor but is also naturally full of essential nutrients, freshness, and affordability.

Moreover, seasonal produce offers superior nutritional value by delivering what

your body requires throughout the changing seasons. In summer, for instance, tomatoes and cucumbers provide hydration and cooling effects. Autumn vegetables are packed with vital vitamins and minerals to counter summer fatigue, dietary fiber for digestive health, and nutrients to fortify you for the winter. Numerous winter foods like *komatsuna* and tangerines are rich in vitamins and support the immune system, combating tiredness. In spring, the bitterness in foods aids in



detoxification and intake of crucial vitamins and minerals. Spring vegetables contain antioxidants such as chlorophyll and carotenoids, aiding the production of new cells.

Opting for seasonal produce promotes local agriculture and environmental sustainability. It is typically grown nearby, reducing the need for long-distance transportation, lowering CO<sub>2</sub> emissions, and lessening its environmental impact. Choosing seasonal produce also allows you to explore local food culture, support local products, and contribute to the revitalization of your community.

## TASK 5-2 Questions

- 1) What are seasonal foods in your country?
- 2) What are the other benefits of eating seasonal foods?

## 5 Language use

Phrasal verbs 句動詞

TASK 6 Look at the highlighted phrasal verbs. How are they used in the text?

Climate change and GM foods are closely linked. Rising global temperatures are putting stress on agricultural systems, leading to crop loss and reduced food quality. GMO crops, designed to withstand harsh conditions, can mitigate the impact of climate change. They enable farmers to adapt to changing climates by planting more resilient varieties, cutting down on greenhouse gas emissions through reduced pesticide use, and bringing about increased yields. GMO technology is a valuable tool in the fight against climate change. It allows us to work toward more sustainable and resilient agriculture while **taking on** the challenges posed by a warming planet.

В

Food labeling is crucial for consumers. It lays out what is in the food we pick up. When it comes to GM foods, labels help us figure out if the product's DNA has been changed within a lab. GM foods can incorporate different genes to make them grow better or **keep off** pests. Some people want to **find out** if they are eating GM foods, so labels **come in** handy. They **spell out** if a product has been genetically modified. This way, we can choose what we're consuming and make informed decisions about our food.

Write about what you look for when buying food using phrasal verbs. Share your ideas with your classmates.

Food additives, calories, total fat, and total carbohydrate are important to me when I buy food. I like to **check out** these pieces of information on the back of the food that I buy. I **look up** this information because the food labels or nutrition facts are very important. If I see something I do not like, I put the food back on the shelf and move on. After, I will try to find something else.

## **6** Further study

## Food and labeling

Research question: What should we know about the food we are buying?

## TASK 8

- a) First, think about the research question.
- b) Second, ask your classmates: What should we know about the food we are buying?
- c) Third, disseminate the results.

## TIPS

Updated US food labels emphasize clearer serving sizes and calorie information, aligning with typical consumption patterns. These days, serving sizes better mirror realistic portions, although not as recommendations. Prominently displayed calorie details are based on a 2,000-calorie daily intake, adaptable to individual needs. Percent Daily Value (%DV) communicates nutrient contributions with revised



https://www.fda.gov/media/135197/download?attachment

values. Mandatory changes include removing "calories from fat" and optional inclusion of vitamin A and C since they are rare. Added sugars, vitamin D, and potassium are newly listed due to intake concerns, while calcium and iron remain essential nutrients on labels.

Dissemination plan: Which do you wish to do?
Report (調査データや事実をまとめて報告する)
Essay (論点を決めて、導入·本論·結論でまとめる)
Poster presentation (ポスターに図や表を入れてまとめる)
Oral presentation (スライドを使い、一人またはグループ
Discussion (論点について、ペア、グループまたはクラスで話
Debate(ディベート:賛成と反対に分かれて論点を明確にして