

◇ 口頭発表プレゼンテーション要旨

口頭発表1番（1年国際コース）

テーマ： Solutions to Climate Change

発表者： 上田奏、小林理華子、谷本萌春姫、吉田萌恵

要旨

近年深刻化する気候変動の重要性に目を向け、SDG13「気候変動に具体的な対策を」を研究した。今後生産量と栽培面積の増加が予想されていることから、農業分野における気候変動の主原因を稲作の過程で土壌から発生するメタンであるとし、生産量・消費量共に上位を占める東南アジアの国々のうち、大水田地帯を持つベトナムに注目して解決策を考えた。稲作が盛んなベトナムでメタン排出を抑えるために、農機具のレンタル、水引きという新しい農業スタイルを教える指導員と整備士を派遣する会社を現地に設立する。水引きや農機具によって、土の中のメタン生成菌を酸素に触れさせ死滅させることができる。また機械の修理を行う整備士の育成ができれば、持続的にメタン排出を抑えることができる。また農機具の導入は生産量と収入の増加につながり、ベトナムでの稲作のさらなる発展が見込める。

口頭発表2番（1年国際コース）

テーマ： 農業面からの窒素使用と気候変動との関わり

発表者： 伊藤桃香、加藤雄星、小柳昌子、中島杏樹

要旨

近年、世界中で気候変動の影響が感じられるようになった。SDG13では、気候変動による影響を少しでも減らすための早急な対策が求められている。農業は、収穫量や降水量などによって大きく変動するため、気候変動による影響を最も受ける産業だと言える。多くの人にとって温室効果ガスとして一番に思い浮ぶのは、その排出量の多さから二酸化炭素だと思われるが、農業による排出の割合が最も大きい気体は亜酸化窒素という気体である。この気体は約60%が窒素肥料から発生しており、地球温暖化を二酸化炭素の300倍促進させる効果がある。私達はこのような農業が気候変動に与える影響、またどのようにして亜酸化窒素の発生を抑えられるかについて考えた。

口頭発表3番（1年特進ADVANCEDコース）

テーマ： The Effects Of Lightening Radish Sprouts Upward on the Root Growth

発表者： 堤絢音、梅原侑理沙、大川ゆうか、川端咲莉、成田実樺子、林ちはな

要旨

一般的に植物の根は、光を避ける方向または重力方向に伸長するとされている。しかし、光を下から照射した場合、あるいは植物を上下逆転させて重力の受ける方向を変化させると、生育にどのような変化が出るのかについて興味をもち、研究に取り組んだ。結果、重力方向よりも光の照射方向の影響をより強く受けている可能性が示唆

された。今後は、根端に存在する重力を感知する部分(コルメラ細胞)や、光受容体を有する葉を切断することで、重力方向と光照射方向のいずれの方がより強く根の伸長方向に影響を及ぼしているかを調査しようと考えている。

口頭発表4番 (2年特進 ADVANCED コース)

テーマ： How to make slow-melting ice cream

発表者： 清水款士、松本京、山崎佳朋、山本鈴々夢

要旨

夏の気温の高い場所でも溶けにアイスクリームを作りたいと考え、溶けにくいアイスクリームの開発とその原理を追求する研究を行った。はじめに着目したのは、ポリフェノールである。これをアイスクリームに入れると水分と空気の微細な泡が乳脂肪によって囲まれる状態になることで、アイスの内部が固くなり、溶けにくくなる考えた。ポリフェノール含有量が多い、イチゴ、ブドウ、固形チョコレートを生乳にそれぞれ加えて作製したアイスと、何も添加せずに作製したアイスの計4種類を準備し、それぞれの溶け方を比較した。さらに牛乳を豆乳に変えた場合のポリフェノールによる影響や、食物繊維を含むおからを添加したアイスの溶け方も調べ、食物繊維とポリフェノールによって形成される水素結合が溶け方に影響していると結論付けた。

口頭発表5番 (2年特進 BASIC コース)

テーマ： School trip in U.S.

発表者： 竹中ひなた、高橋声

要旨

10月11日～18日の6泊8日で行ったアメリカ研修旅行で、自分たちの耳で聞き、目で見て、体感してきたことを紹介します。ホストファミリーと過ごした休日、ホストブラザー・ホストシスターや受け入れてくれたクラスメイトとの交流、アーモンド畑や牧場への研修。サンフランシスコでは、ケーブルカーに乗り、街の様子も見て回りました。見るもの、耳に入る音、食べたことのない味に驚き、『世界的視野を持つ』ことの大切さを実感できた、私たちの研修旅行について報告します。

口頭発表6番 (2年進学コース)

テーマ： 私たち17歳が肌で感じたアメリカ合衆国

発表者： 植山聖月、松尾颯太

要旨

アメリカ研修旅行を通じて得た驚きや発見について、かつて10代で渡米した創立者・辻本光楠先生と近い心境を持つ「17歳が肌で感じた」という視点を織り交ぜながら報告したいと思います。また、同じ英語圏であるイギリスとの違いも比較しながら、アメリカという国が有する文化・言語・生活世界の独自性について振り返っていきます。

Solutions to Climate Change

Solutions to Climate Change

KyotoGakuen
International Course 1st year

Kanade Ueda
Rikako Kobayashi
Hiyomi Tanimoto
Moe Yoshida



Image source : Where Women Work, The United Nations

Global Problems



1

Climate Change

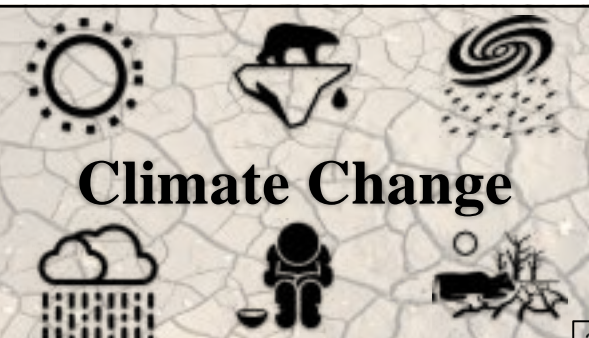


Image sources: Noah Project

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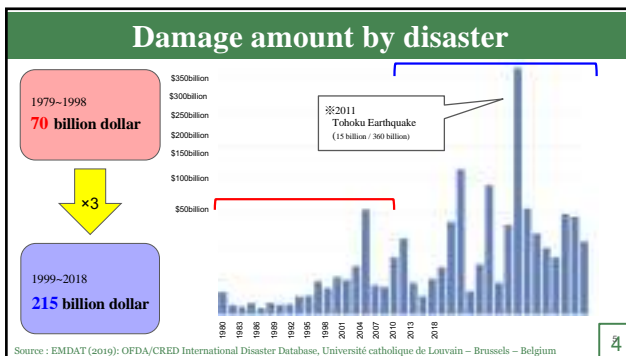


Image Source : BUSINESS INSIDER (2019)

**YOU WILL
DIE OF OLD
AGE**

**I WILL
DIE OF
CLIMATE**

3



13 CLIMATE ACTION



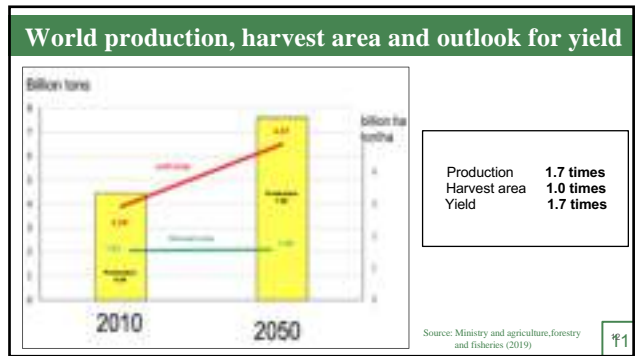
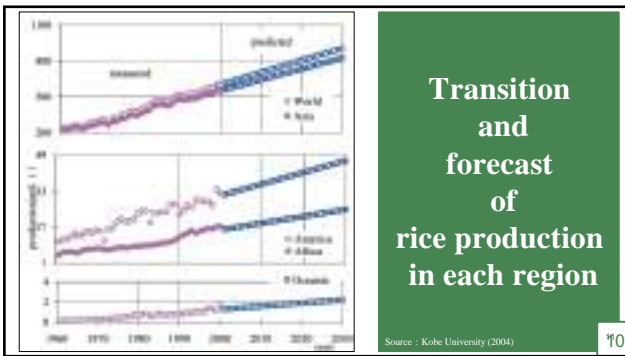
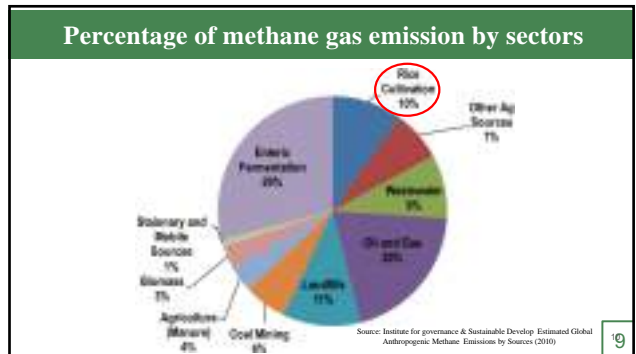
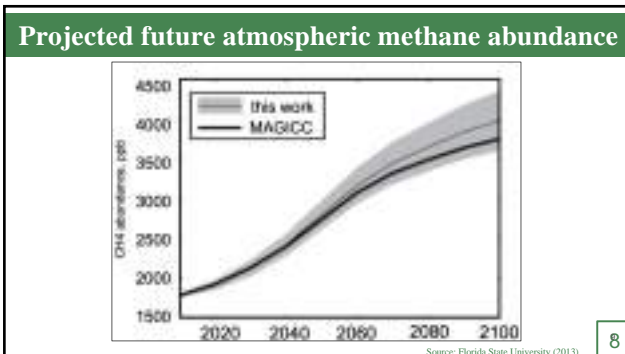
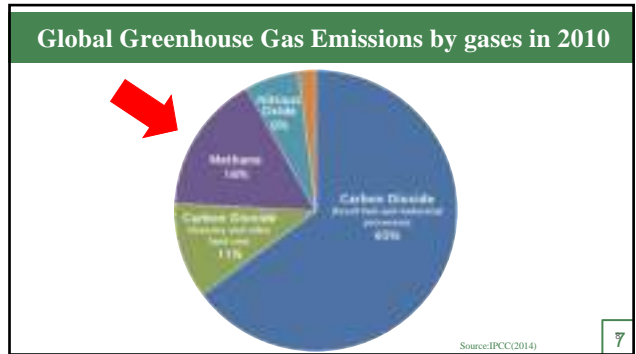
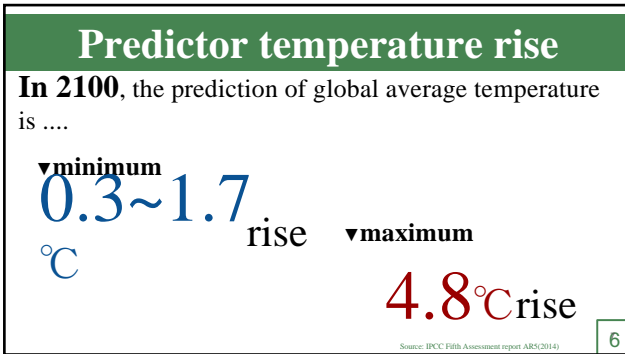
SDG 13 Climate Action

Mechanical solutions
to
climate change

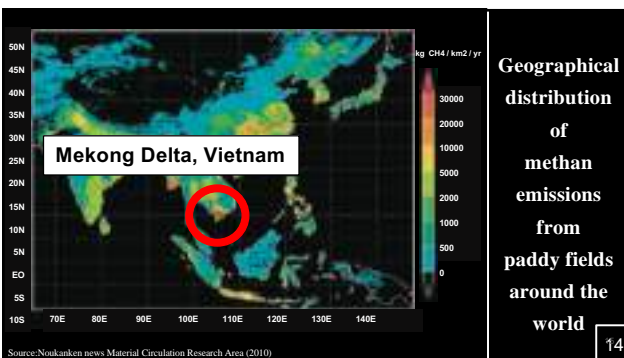
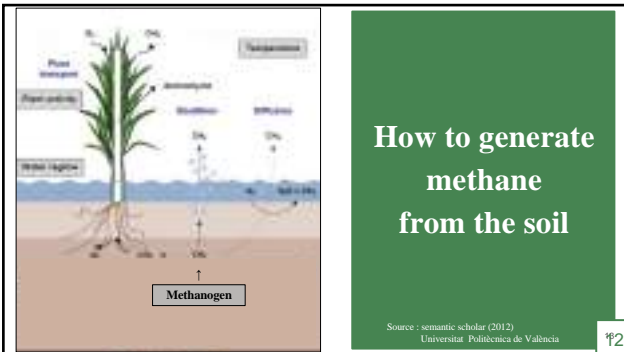
Image Sources : The United Nations

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Solutions to Climate Change



Solutions to Climate Change



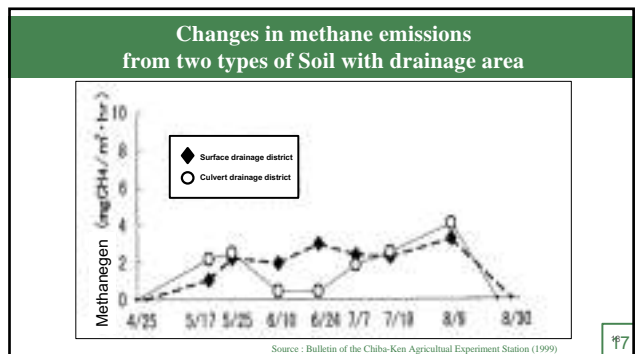
Rice

Consumption		Production	
1. China	147,060	1. China	144,000
2. India	90,007	2. India	104,000
3. Indonesia	36,500	3. Indonesia	45,700
4. Bangladesh	35,200	4. Bangladesh	34,000
5. Vietnam	22,100	5. Vietnam	24,000
6. Philippines	13,300	6. Thailand	10,700
7. Thailand	11,700	7. Myanmar	10,000
8. Myanmar	10,500	8. Philippines	11,000
9. Japan	7,966	9. Brazil	8,465
10. Brazil	7,000	10. Japan	7,000

Source: Ministry of Agriculture, Forestry and Fisheries (2014) Food Outlook (2014)

Idea No.1

Water withdrawal
which is to pour paddy water into the river through a waterway



Solutions to Climate Change

Idea No.2

digging with farm equipment

18

Problem No.1

Farmers in Vietnam
may not have **enough money**.

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GDP
in
Vietnam

20

	% share in GDP		
	1991	2000	2016
Cambodia	59.9	44.7	24.6
Myanmar	58.9	46.2	27.3
Lao PDR	35.7	30.6	16.7
Vietnam	32.4	24.3	15.1
Philippines	16.2	14.3	9.4
Indonesia	18.4	16.2	12.4
Thailand	13.2	12.5	9.0
Malaysia	20.0	11.2	8.5

Share of GDP in agriculture

Source: Research gate: FAOSTAT (2016)

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Problem No.2

Farmers in Vietnam
may struggle to **draw water**.

22

The solution to climate change is...



Solutions to Climate Change

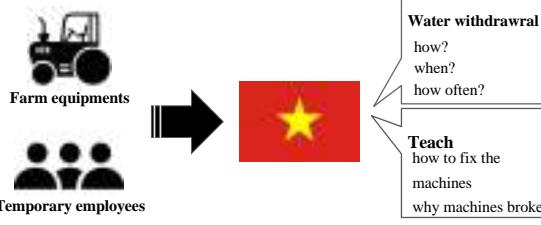
Solutions

The new company **for farmers in Vietnam**



Image Source - Noum Project 24

Detail



Water withdrawal
how?
when?
how often?

Teach
how to fix the machines
why machines broke

Image Source - Noum Project 25



Image source: flick 26

Sources of reference

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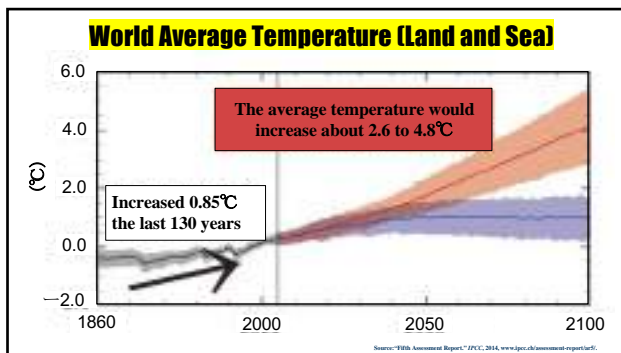
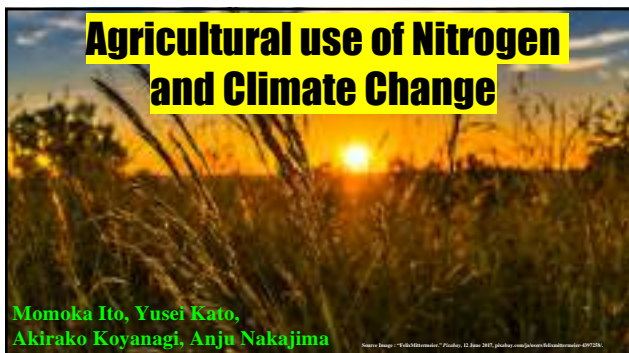
Image source: flick 27



Thank you very much!

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Agricultural Use of Nitrogen and Climate Change



SDGs

- Sustainable Development Goals

Adopted at the United Nation summit in 2015

To achieve sustainable development

17 goals 169 targets.

- Focused SDG 13

"Take urgent action to combat climate change and its impacts"

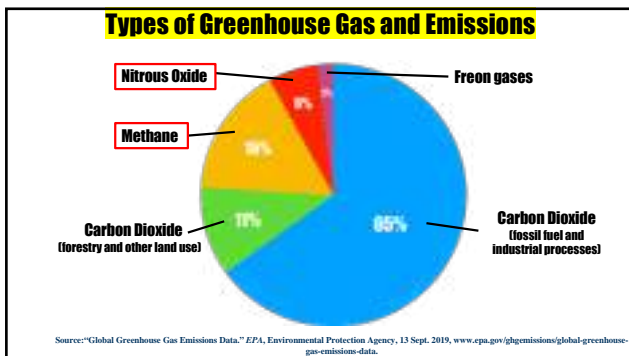
We demanded rapid actions.

Research

Climate change

Nitrogen Fertilizer

Comparison of climate change effects (drought) and nitrogen fertilizer effects (green growth).



Features of Methane Gas

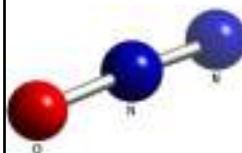
- Methane gas remains for **12 years** in the atmosphere.
- It has about **20 times greater** an effect on Global warming.

Agricultural Use of Nitrogen and Climate Change

Human Sources of Methane



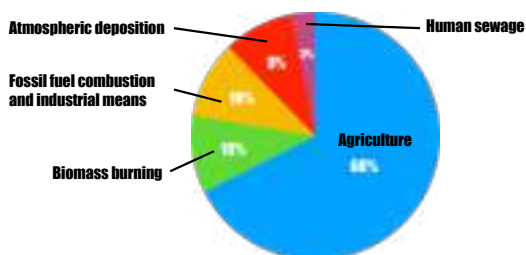
Characteristics of Nitrous Oxide



- Remains in the atmosphere for over **100 years**.
- Has about **300 times larger effect** on global warming.

Source: "古くから存在するが新しく発見された温室効果ガス 亜酸化窒素 (N2O)" 温室効果ガスの科学のブログ, blog.livedoor.jp/beichungowahan/archives/43312397.html
 Source: JCCCA and Center for Global Environmental Research

Human Sources of Nitrous Oxide



Main Cause of Climate Change

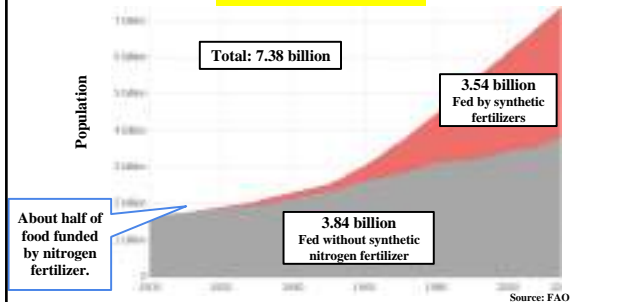
Facts

- Nitrous oxide remains in the atmosphere for over **100 years longer** than carbon dioxide.
- It has about **300 times larger** an effect upon global warming

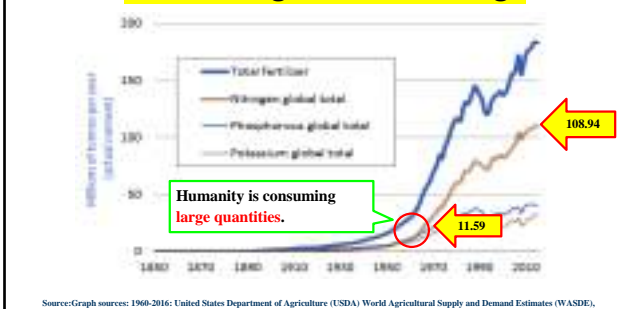


Based on these facts,
 Nitrous oxide is the **major cause** of all the greenhouse gases produced by the agricultural sector.

Food Production

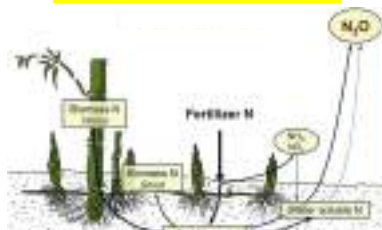


World Nitrogen Fertilizer Usage



Agricultural Use of Nitrogen and Climate Change

Usage of Nitrous Oxide



The crops usage of nitrogen is 20% to 60%.

Source: Journal of Climate Production Volume 112, Part 4, 20 January 2016.

The Amount of Nitrogen Fertilizer Discharge

The consumption of nitrogen fertilizer in 2014: 108.94 million tonnes

➔ The crops usage of nitrogen : Less than 50%



Source: weathernews

$$108 \text{ million tonnes} \times 0.5 = 54 \text{ million tonnes}$$

54 million tonnes of nitrogen fertilizer flows out to rivers and soil.

Environmental Impact

Water



Source image: "/>

Biodiversity



Source image: H&Spart

Effect to Japanese Ecosystem



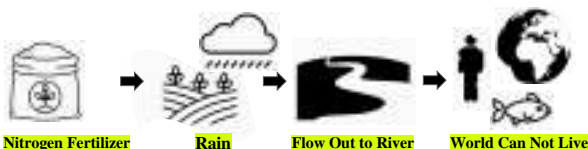
Shinjiko, Shimane Prefecture

Japanese fish such as smelt and eel are becoming extinct and are decreasing respectively.



Source: Asahi Newspaper 2019.11.01

The World No One Can Live



- Nitrogen fertilizer make soil acid if people gave it too much.
- In acid soil, metal such as magnesium are melted, so it wither crops.
- Plants become not to grow.

People continue to use nitrogen fertilizer?

Source: Nichio Doutoku 20th May 2019

Realization



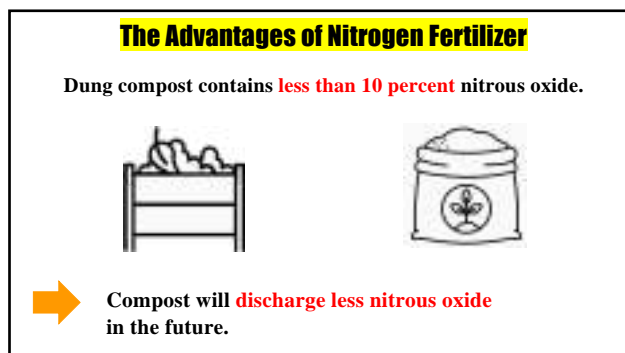
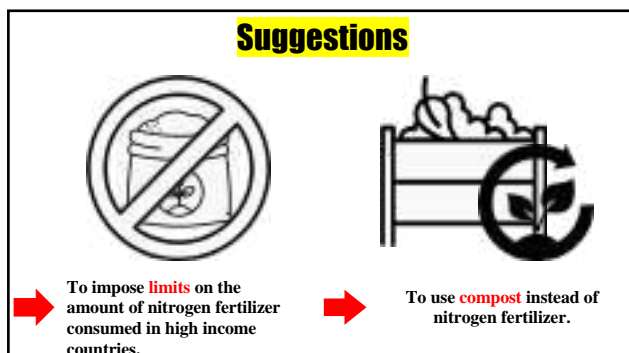
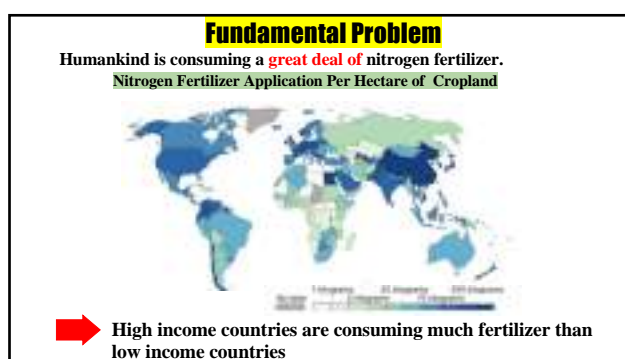
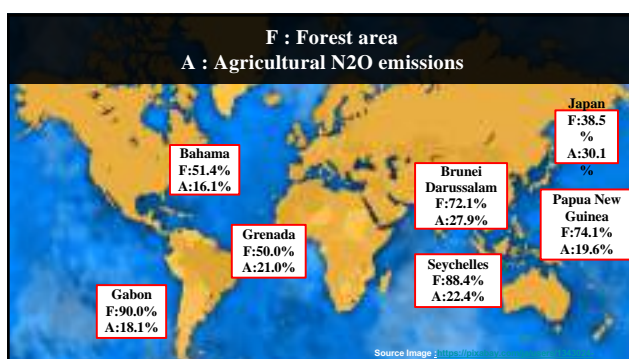
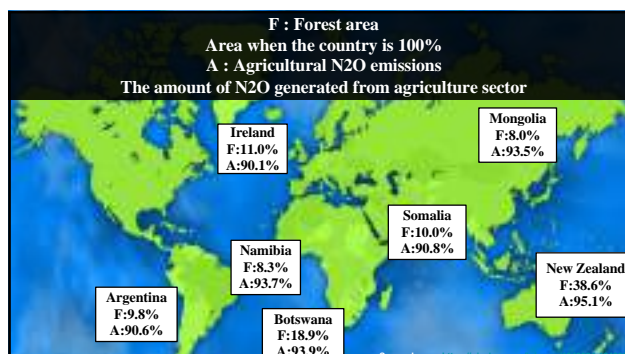
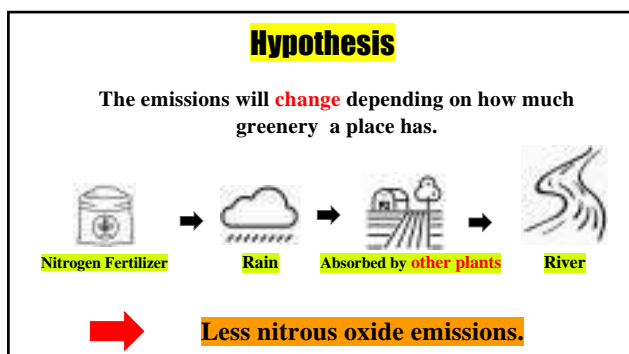
Source: Google Earth

Those countries emitting a lot of nitrous oxide are brown while those which emit less are green.



Hypothesis

Agricultural Use of Nitrogen and Climate Change



Agricultural Use of Nitrogen and Climate Change

The Characteristics of Each Compost



Increases soil water retention.



Contains more nitrous oxide than any other excrement.



We found a possibility of sustainable agriculture in compost.

Solutions

1. To impose **limits** on the amount of nitrogen fertilizer consumed in **high income countries**.
2. To use **compost** instead of nitrogen fertilizer.



Our hope is introduce agriculture that can be used in harmony with natural cycles and we believe that will connect to protecting **our earth's environment**.

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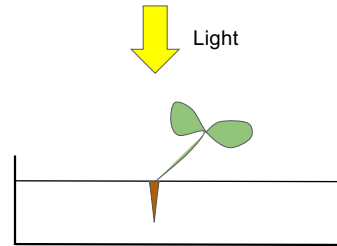
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- World Bank

The Effects of Lightening Radish Sprouts Upward On the Root

THE EFFECTS OF LIGHTENING RADISH SPROUTS UPWARD ON THE ROOT GROWTH

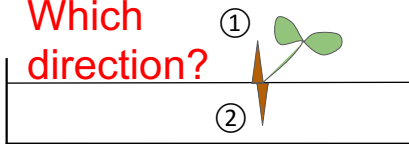
Yuka Okawa Mikako Narita
 Arisa Umehara Emiri Kawabata
 Ayane Tsutsumi Chihana Hayashi

Introduction



Introduction

Which direction?



Intoroduction

AUXIN is involved in plant growth.

What is AUXIN...

Auxin is one of plant hormones; it is involved in growth



Fig.1 indole-3-acetic acid

Intoroduction

The function of auxin

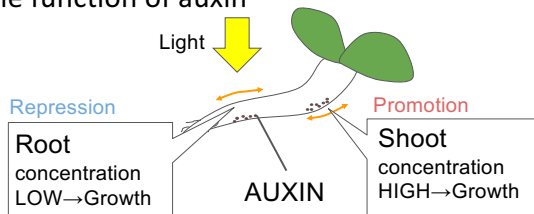


Fig. 2 the function of auxin in plant roots
 In plant roots, high concentration of auxin represses the root growth.

Intoroduction

- If we light the plant roots from below, which direction do they grow?
- Which are strongly roots affected by light or gravity?

radish sprout →



The Effects of Lightening Radish Sprouts Upward On the Root

Materials and methods

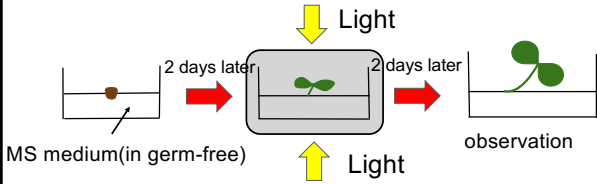


Fig.4 The condition of experiment
After the seeds germinated, we lightened plants from above. And after 2 days we observed direction of roots.

Materials and methods

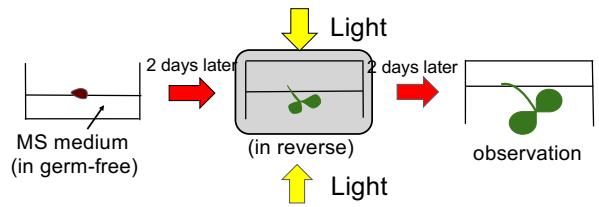


Fig.5 The condition of experiment
After the seeds germinated, we grew plants in reverse and lighted from above. And after 2 days we observed direction of roots.

Materials and methods

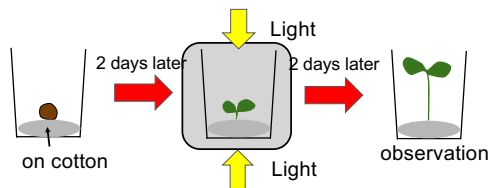


Fig.6 The condition of experiment
After the seeds germinated, we lightened plants from above by plant box. And 2 days after we observed direction of roots.

Materials and methods

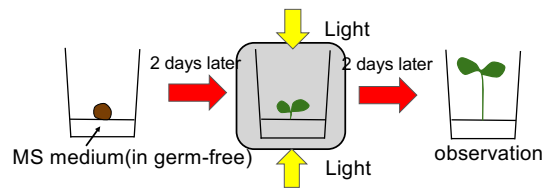


Fig.7 The condition of experiment
After the seeds germinated, we lightened plants from above by plant box. And 2 days after we observed direction of roots.

Materials and methods

Table.1 experimental condition

	MS medium in petri dish	MS medium in plant box	Cotton in plant box
Light condition	from above(↓) or below(↑)	from above(↓) or below(↑)	from above(↓) or below(↑)
Growth condition	natural or reverse	natural	natural

How to observe

Root grow UPWARD or DOWNWARD

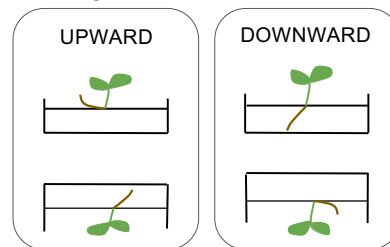
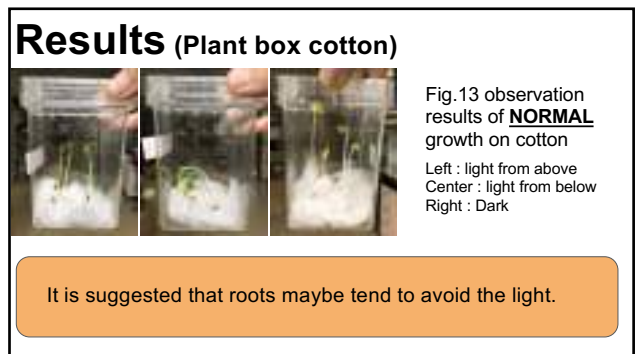
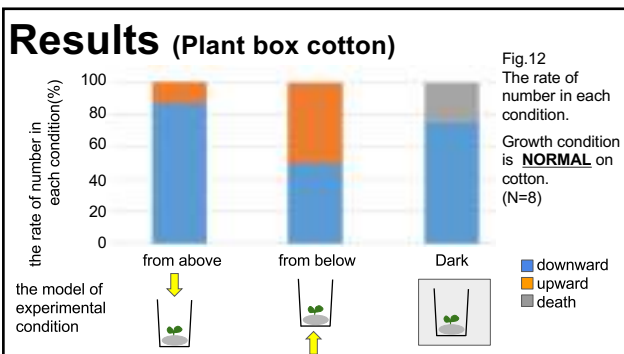
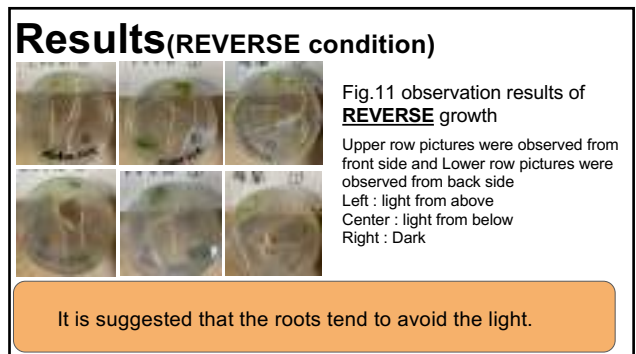
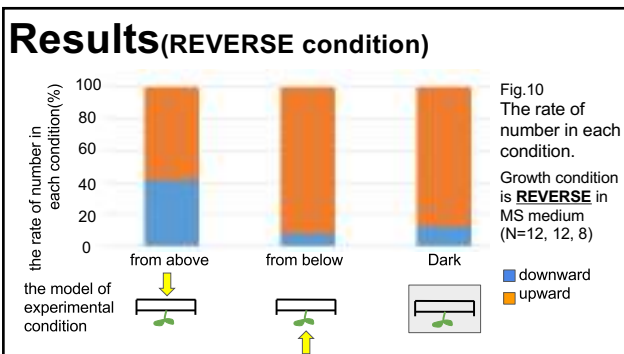
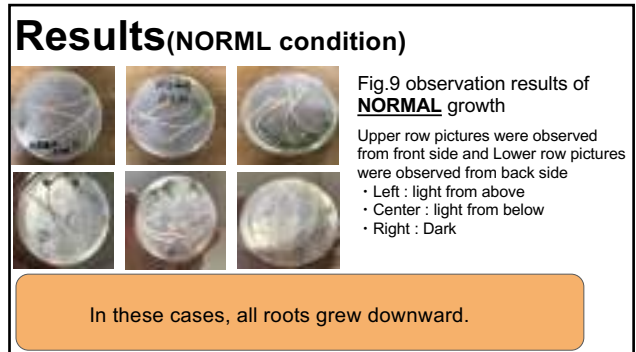
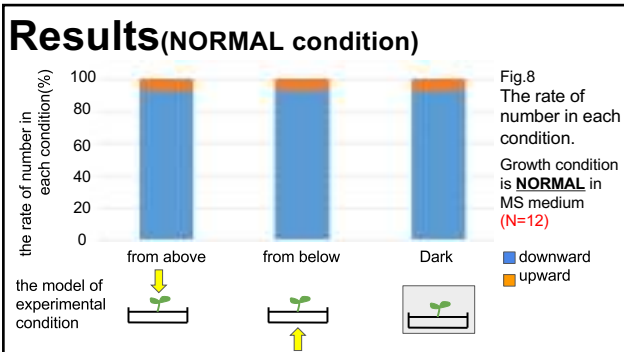
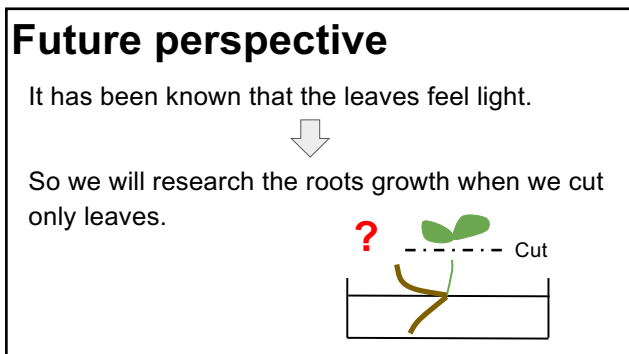
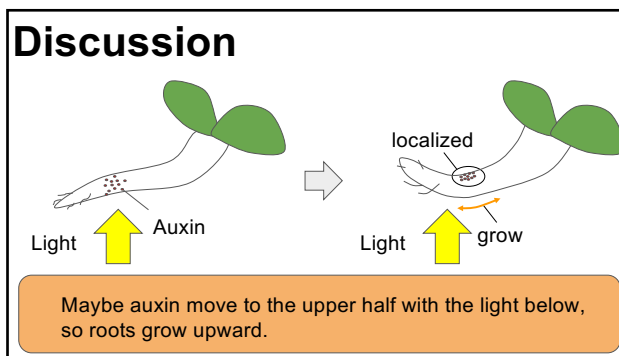
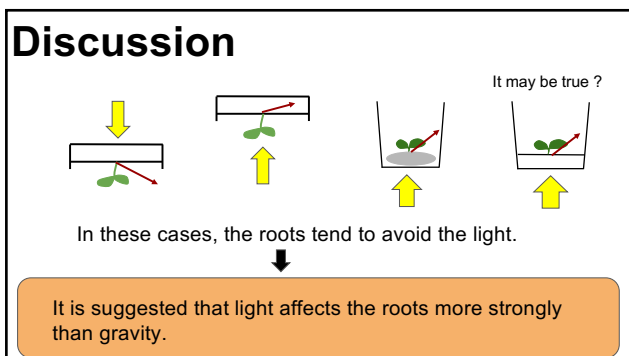
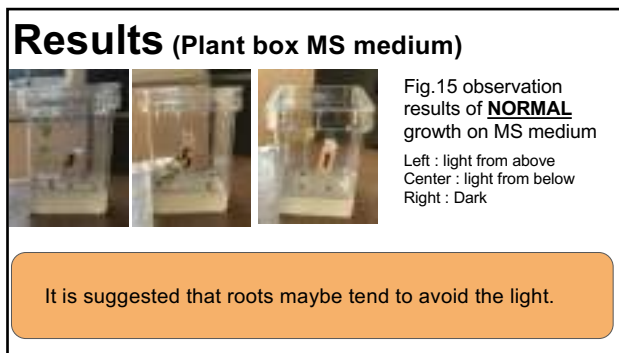
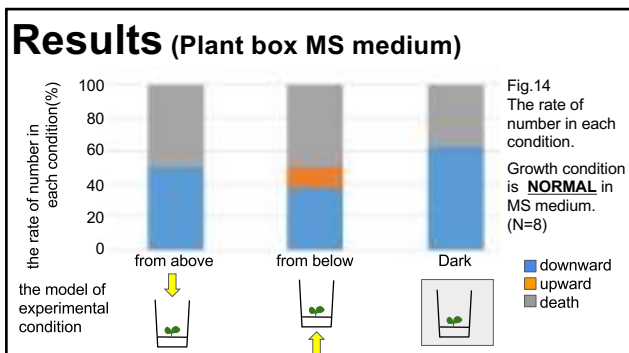


Fig.9 How to observe
We defined the direction of the roots when lightened from above or below.

The Effects of Lightening Radish Sprouts Upward On the Root





Reference

General incorporation the Japanese society of plant physiology open space of all
https://jspp.org/hiroba/q_and_a/detail.html?id=1556

Aoyama Farm The roots growing under
<http://aoyamafarm.co.jp/archives/711>

Plant grvitropism molecule mechanism
https://www.jstage.jst.go.jp/article/kagakutoseibutsu/55/9/55_624/_pdf

How to Make Slow-Melting Ice Cream

How to make slow-melting ice cream

Shimizu, Yamazaki, Yamamoto, Matsumoto

Introduction

We'd like to finish ice cream before it starts melting.

purpose

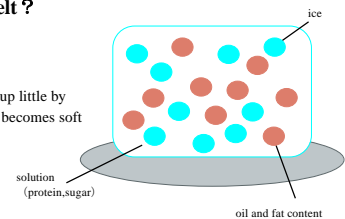
We will explain 2 things.

- 1 How to make slow-melting ice cream.
- 2 Its mechanism.

Background

How does the ice cream melt ?

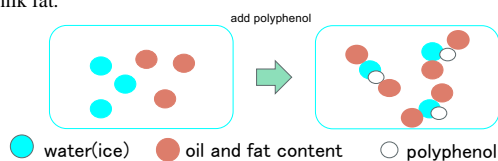
The air surrounding ice cream warms it up little by little, and the outer surface of ice cream becomes soft like bubbles.



The functions of polyphenol

If you put polyphenol in ice cream . . .

Water included in ice cream and bubbles in it are surrounded by milk fat.



Method of the experiment 1

1. Put the six yolk of eggs , sugar 150 g , milk 600ml , fresh cream 200ml in a bowl and mix.
2. Put 300ml of each of the mixture in a containers and add
①solid chocolate ② strawberries ③grapes
to each of them.

How to Make Slow-Melting Ice Cream

Method of the experiment 1

→Also, we prepared a container of the mixture without adding anything.

* Each of ①, ②, ③ was mashed.

3. Put the containers of the mixture into the freezer and freeze them for 78 hours.

Method of the experiment 1

4. Observe the conditions of ice cream. (check every 1 hour)



Chocolate ice cream



Strawberry ice cream



Grape ice cream

Results

at the start 2 hours later 4 hours later

vanilla ice cream



completely melted

chocolate ice cream



Results

at the start 2 hours later 4 hours later

strawberry ice cream



grape ice cream



Considerations

The time needed for the icecream to completely melt	The melted proportion in descending order	content of polyphenol (per100 g)
1 hour	vanilla ice	trace amounts
3 hour	chocolate ice	About 8 mg
3.5 hour	grape ice	About 24 mg
5 hour	strawberry ice	About 33 mg

(reference:saply)

Method of the experiment 2

We used strawberries and soy milk.

- milk strawberry ice cream
- soy milk strawberry ice cream

We compared these two.



A funnel and graduated cylinder were used to determine the dissolved amount.

~conditions~

28 degrees celsius, measured 1 hour and a half.

How to Make Slow-Melting Ice Cream

About soy milk

What was used: 『Sujata Meiraku Organic soy milk 900ml』
 According to the table of ingredients, it contains isoflavone (30mg/100ml)
 amount of soy milk : 600ml

Results

Red → Soy milk strawberry ice cream

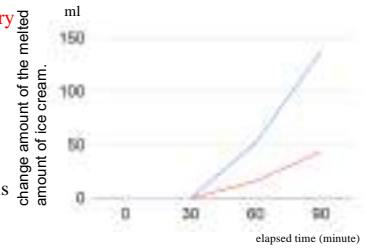
I : 180mg/100ml

Blue → Milk strawberry ice cream

I : 0mg/100ml

Soy milk strawberry ice is the hardest to melt.

* I is content of isoflavone.



Considerations

Soy milk strawberries ice cream was melted more than milk strawberry ice cream.

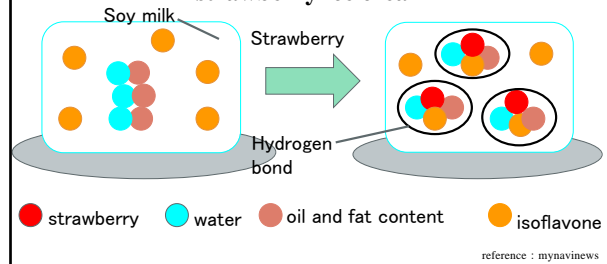
Isoflavone included in soy milk affects this result.

100 ml)



(30 mg /

The image of the construction of the soy milk strawberry ice cream



Method of the experiment 3

Compare 3 types of ice cream

- Soy milk okara ice cream
- Soy milk strawberry okara ice cream
- Soy milk strawberry ice cream (to compare)

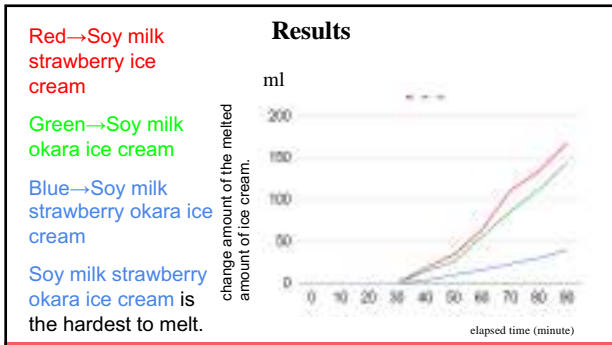
using okara. Under the same condition as the experiment 2.

※Okara is soy bean curd refuse.

Why did we use okara?

- It contains dietary fiber.
- It has a complex structure like mesh.

How to Make Slow-Melting Ice Cream

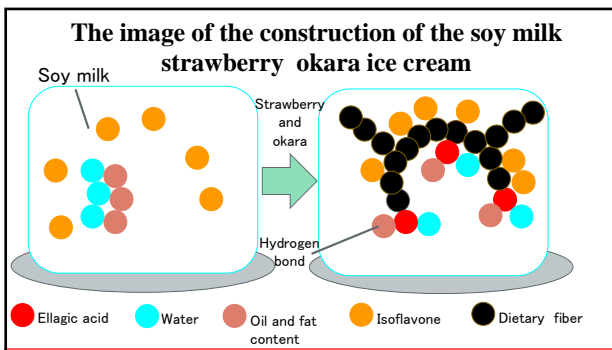


Considerations

dietary fiber and polyphenol

↓ Hydrogen bond

Ice cream did not melt easily.



Conclusions

When polyphenol is contained in solvent and solution, ice cream is hard to melt because hydrogen-bonds with dietary fiber.

↓

A lot of water and bubbles are surrounded by oil and fat content, which is generated by hydrogen bond.

(reference:mynavinews)

Prospect

We will find the other materials which extend the time it takes for ice cream to melt.

References

gakkenkidsnet : <https://kids.gakken.co.jp/> read:12/26

shaply: <https://shaply.jp> read:12/26

mynavinews : <https://news.mynavi.jp/> read:12/26

ice confectionery and ice confectionery ingredients : <https://patents.google.com/patent/JP5065357B2/ja>

Yoshikura Shiraishi 2009 read:12/26

How to Make Slow-Melting Ice Cream

References

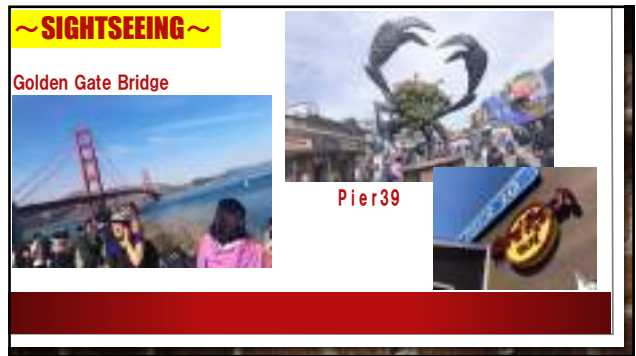
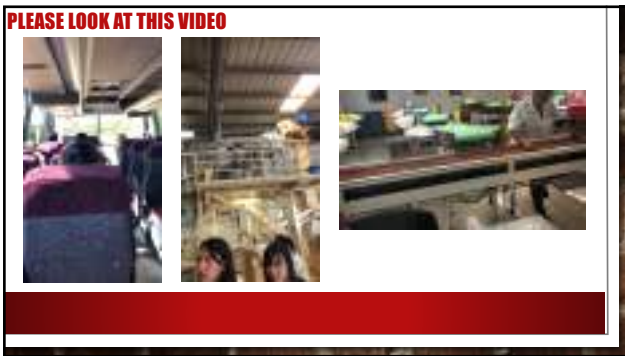
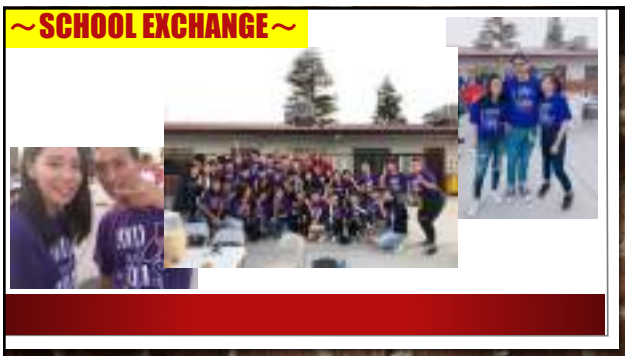
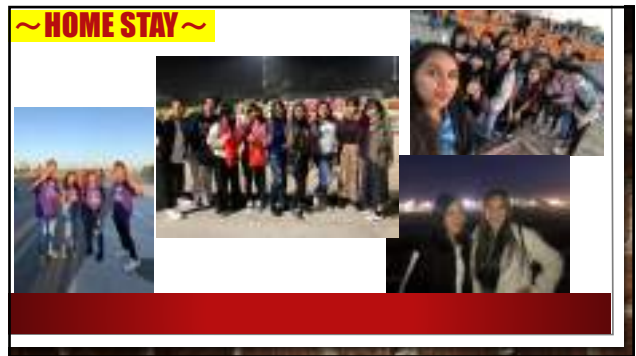
SGS in 2017 groupE : Hashimoto etal read:12/26

difference in melting by concentration of sodium chloride
aqueous solution ice

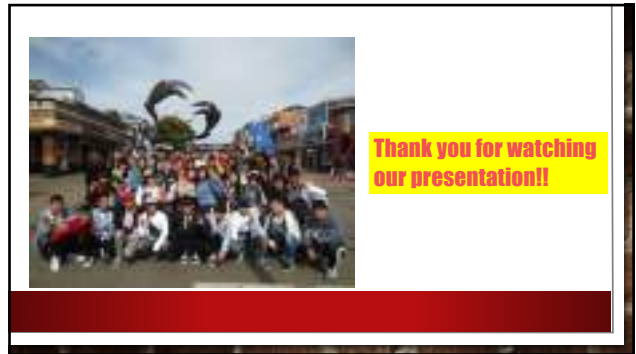
the result of the food containing polyphenol's product test :
<http://www.kokusen.go.jp/> read:12/26

Thank you for listening.

School Trip in USA



School Trip in USA



The U.S.A. As Seen by a Girl of 17 Years of Age

17歳が肌で感じた アメリカ合衆国

2年進学コース

発表者: 植山聖月



<アメリカが持つ包容力の大きさ>

- ①多様性を受け入れ、人種・性別・年齢
など関係なく、一人の個人として尊重し、
扱うリスペクト文化
- ②見返りを求めないホスピタリティ精神

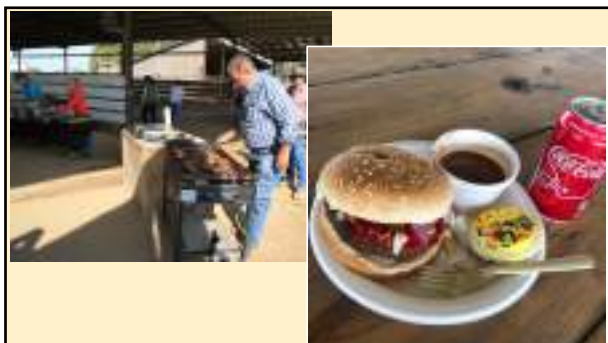
①アメリカ流のリスペクト文化

- 授業で寝ている生徒が誰もいない
→ 教育・学習に対するリスペクト
- 学校交流におけるセレモニーでの大歓迎ムード
→ 他国の人に対するリスペクト
- ホストファミリーが浴槽に入る文化を持つ私の
ためにお風呂にお湯を張ってくれた。
→ 異文化に対するリスペクト



②アメリカ流のホスピタリティ 精神

- 初対面の学生さんや店員さんの全てが笑顔で接して
くれた → 一人ひとりを対等に扱うホスピタリティ
- 農場において今まで食べたことのない新鮮なハンバー
ガーを提供してくれた → おもてなしホスピタリ
ティ



The U.S.A. As Seen by a Girl of 17 Years of Age

②アメリカ流のホスピタリティ

- 初対面の学生さんや店員さんの全てが笑顔で接してくれた → 一人ひとりを対等に扱うホスピタリティ精神
- 農場において今まで食べたことのない新鮮なハンバーガーを提供してくれた → おもてなしホスピタリティ
- 様々な観光地に連れて行ってくれたり、自分の誕生日を祝ってくれたホストファミリーの無償の愛 → 見返りを求めない博愛のホスピタリティ



**必ずもう一度。
今度は自分
の力で会いに
行く！！**

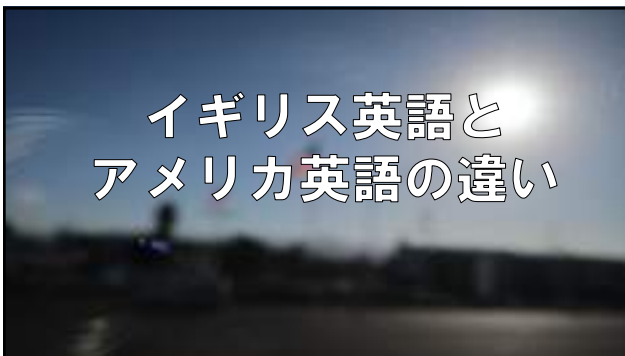
The U.S.A. and the U.K.



イギリスとアメリカの違い USA

- ①方言・文化→イギリス英語とアメリカ英語の違い
- ②法制度→治安維持に対する認識
- ③習慣・歴史→国旗に対する認識

UK



この動機は、
新版Sherlockシリーズ
ドラマを見るために
英語の勉強を始めた!!

→ イギリス研修旅行
→ 短期イギリス留学...

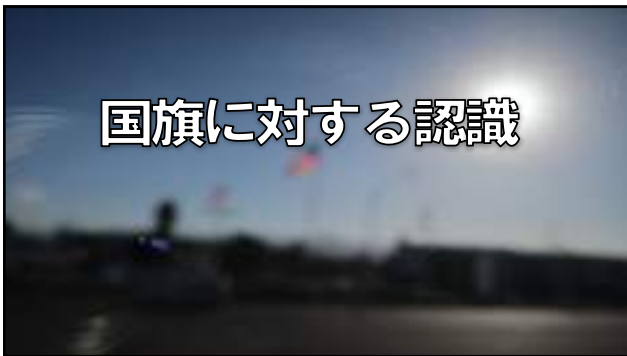
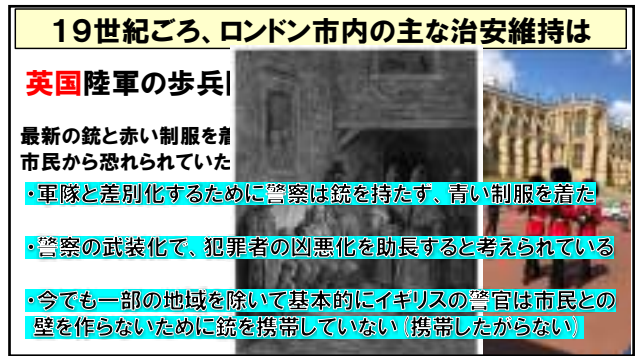
アメリカでもうまいくと思ってた...

画像 BBC HPより



the ground floor	一階 (建物)	the first floor
the first floor	二階 (建物)	the second floor
jumper	セーター	sweater
lift	エレベーター	elevator
football	サッカー	soccer
film	映画	movie
petrol station	ガソリンスタンド	gas station
trolley	ショッピングカート	Shopping cart
trousers	ズボン	pants

The U.S.A. and the U.K.



The U.S.A. and the U.K.

