Kyaeen's Follow-Up Thoughts

Udo Suzuki

Hiroyuki and I thought about Fukushima a lot afterwards. We felt truly inspired by the heartfelt devotion and beaming smiles of everyone at Fukushima High School, the Fisheries Co-operative Association, and Shinchi Town who explained things to us. The fish was delicious! Thank you so much!

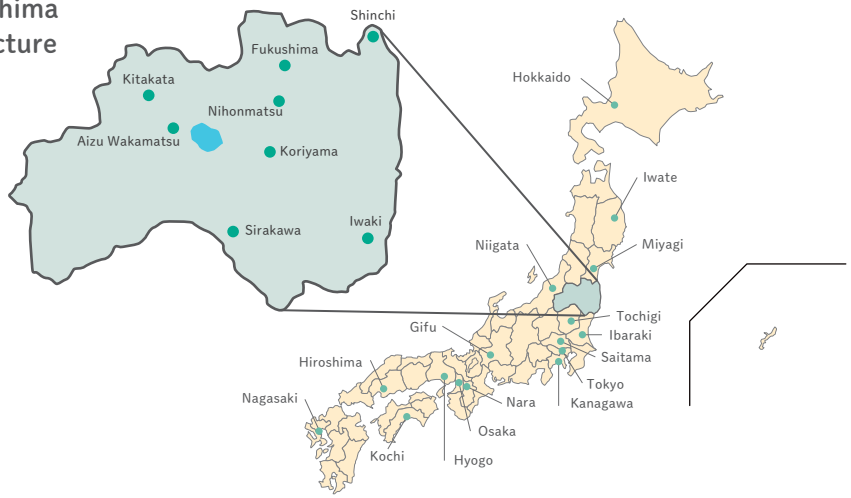
Hiroyuki Amano

Love for one's hometown, and the strength to try to understand the situation that you've been put in. I really believe that those two things are what will lead Fukushima into the future.

At Shinchi Marine Fishing Park

At Fukushima High School

Fukushima Prefecture



復興庁
Reconstruction Agency
新たなステージ　復興・創生へ
March 2020

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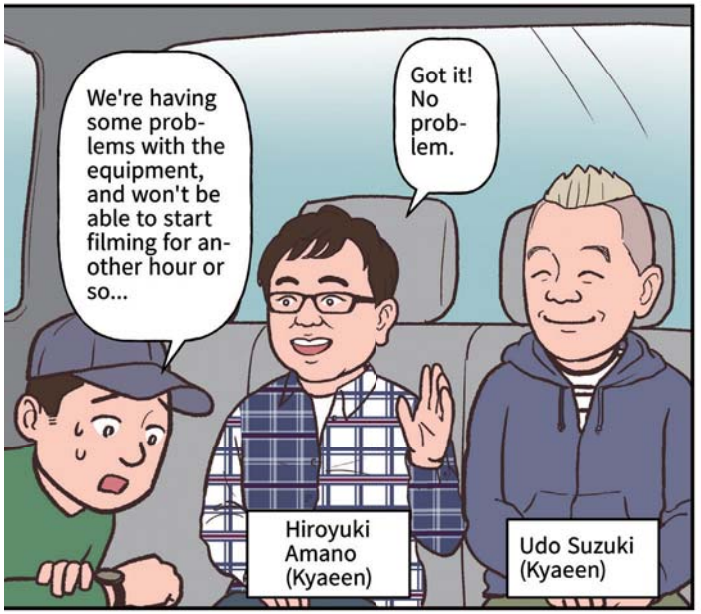
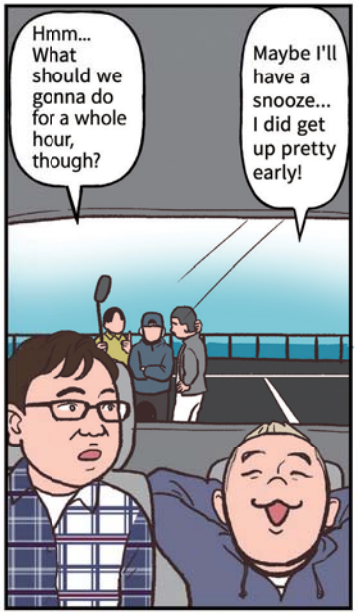
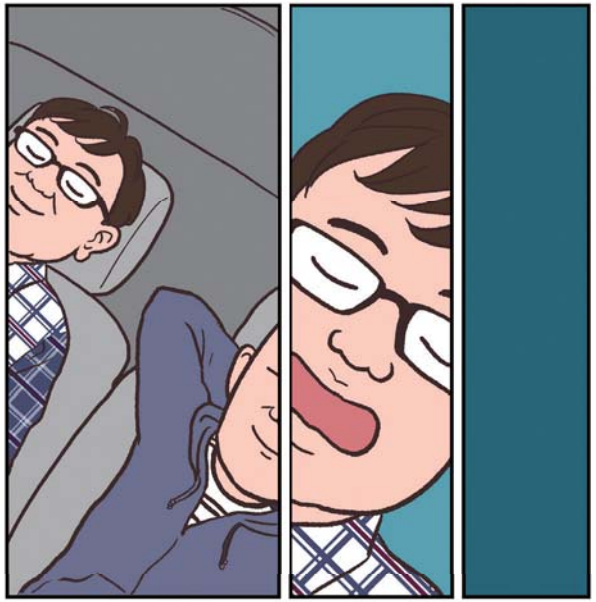
✉ info-senryaku@cas.go.jp

Kyaeen's Fukushima Travel Report

Delicious Fish and Super Science!







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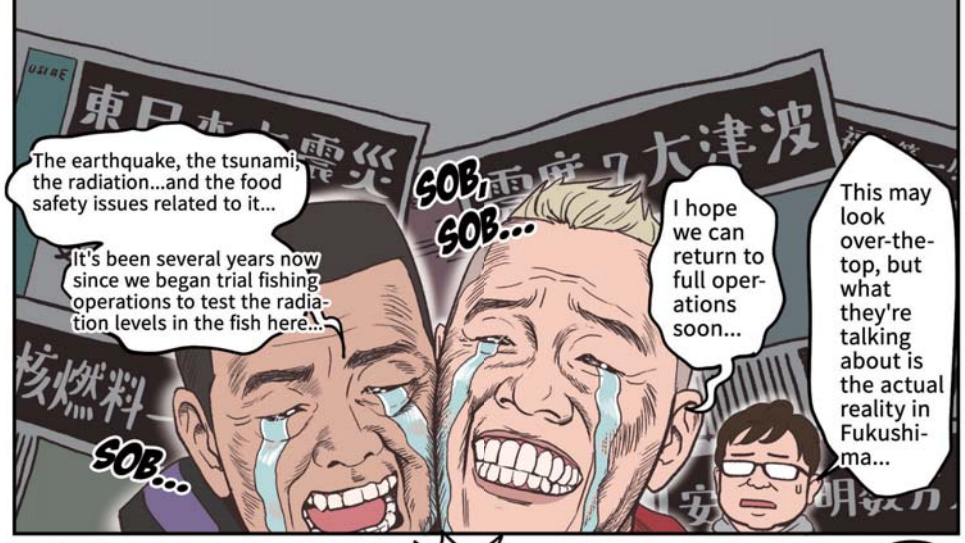
However, the surveys, inspection results, and figures featured are based on facts.



Test Procedure

①Collection of Marine Produce

Marine produce caught in different areas are collected, and the produce areas and species names are recorded.

②Length/Weight Measurement

③Mince Preparation

The edible parts of the marine products are ground to a fine mince.

④Loading Analysis Containers

⑤Analysis and Evaluation

The edible parts are analyzed to find the concentration of radioactive materials per kilogram (Bq/kg).

What are Trial Fishing Operations?

In Fukushima, trial fishing is being carried out in order to collect test data and evaluations from buyers. The aim is to eventually resume regular fishing.

*Test procedure is based on factual information.

The test results can be found at the site below.
https://www.pref.fukushima.lg.jp/site/portal-english/list381.html

You do this with every haul?

That sounds like a lot of work, even if it is just twice a week...

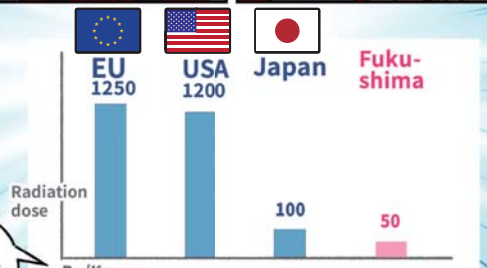
Well, it's to ensure that we only send out fish that's safe to eat!

By the way... What are the safety standards for radiation levels?

What sort of question is that, Hiroyuki? You sound like a comedian who's come here to do a report!

Japan's safety standards are particularly strict compared to other countries, and products with radioactivity over 100 Bq/kg can't be sold.

Our association uses even stricter standards, though, and we won't sell anything with radioactivity over 50 Bq/kg.



That's half the level set by the Japanese government!

The results are in, everyone!

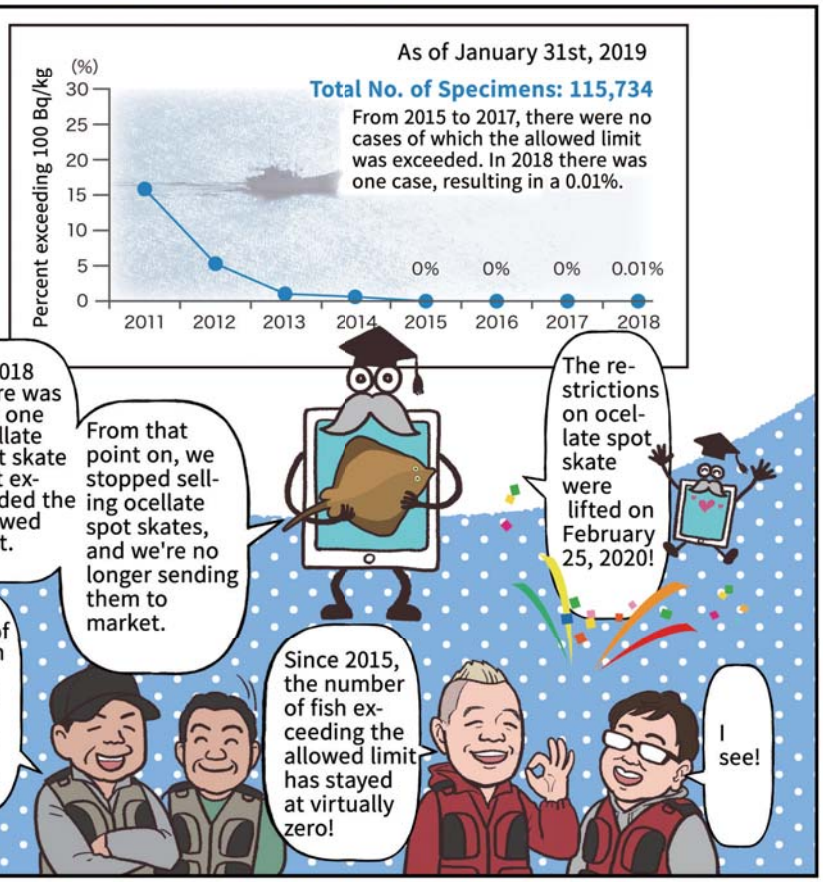
Ahah! Today's results are in!

The number of fish from today's catch with radiation levels exceeding the allowed limit is...

WHISPER... WHISPER...

Bq (becquerel) is a unit that indicates levels of radioactivity.
Radioactive decay of one nucleus per second is expressed as 1 Bq.

ZERO!



In 2018 there was just one ocellate spot skate that exceeded the allowed limit.

From that point on, we stopped selling ocellate spot skates, and we're no longer sending them to market.

None of the fish we caught today will go to waste!

Since 2015, the number of fish exceeding the allowed limit has stayed at virtually zero!

The restrictions on ocellate spot skate were lifted on February 25, 2020!

I see!

*Test results and figures are based on factual information.

Starting from February 25, 2020, all types of fish found around Fukushima Prefecture can now be sent to market!
Ocellate spot skate is delicious when fried or boiled!

We fishermen were born in Fukushima, and raised by the ocean. After the earthquake, we didn't know what would become of it...

But I guess this means it's back to normal...

But you're not from Fukushima...

Oh well...

If the testing standards are this strict, I think it must be safe...

But despite that, you're still only doing trial fishing operations.

The safety of people's food is at stake, so we have to proceed cautiously.

If we keep on steadily collecting scientific data...

Then the day when we can resume full fishing operations isn't far off!

It's a serious line unlike usual.

He's right, though ...

The day when Fukushima's fishing industry can go back to normal operations can't be too far off!

I'm a chef, too, so I can tell how delicious Fukushima's fish are just by looking at them.

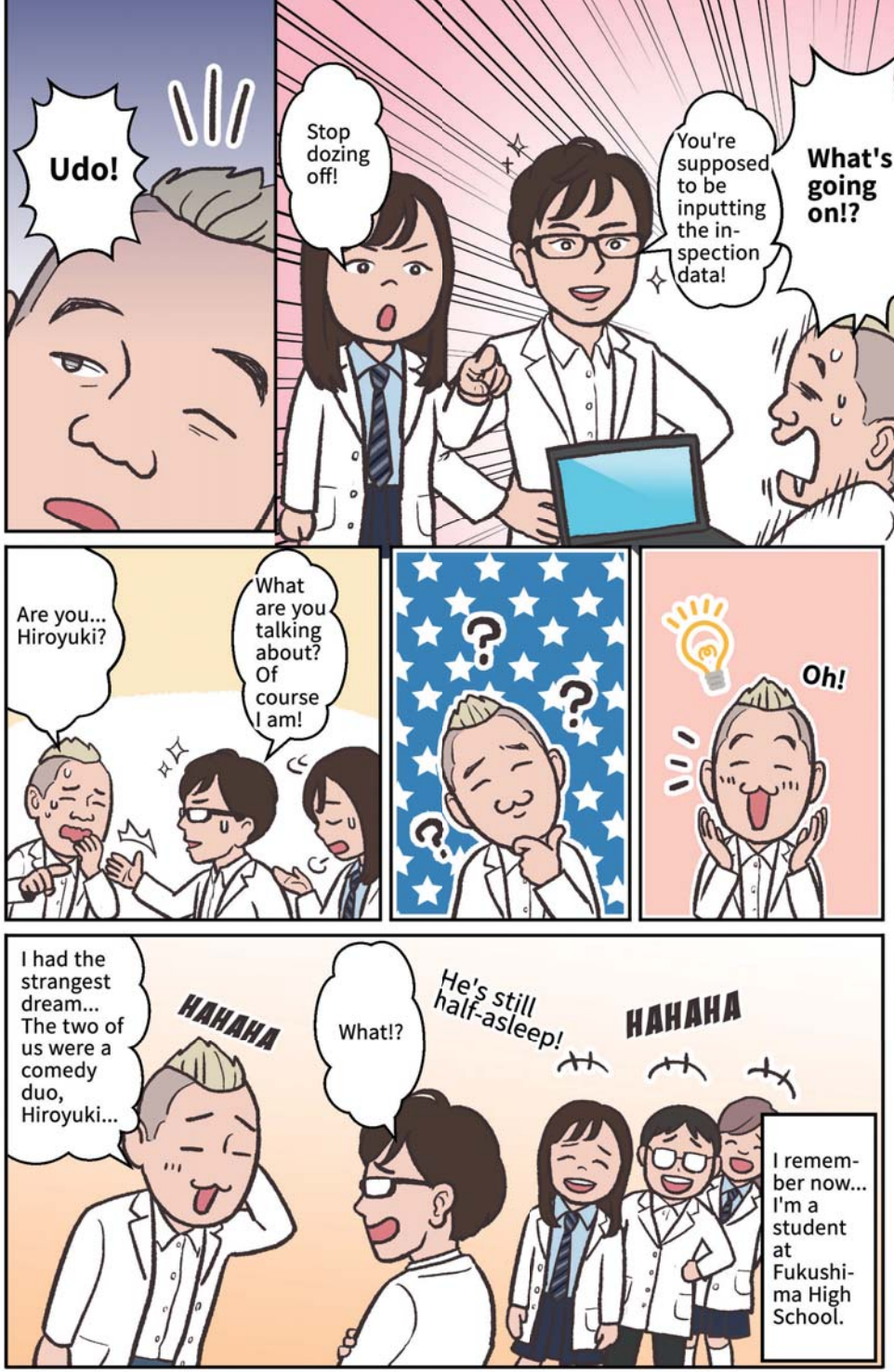
That's fine quality fish, no doubt about it!

I hope everyone gets the chance to eat more of this fish!

Exactly, Hiroyuki!

All right! Time to start shipping out the produce, everyone!

The ocean near Fukushima is a "junction line" where the Kuroshio Current (a warm current) and the Oyashio Current (a cold current) meet. Junction lines produce high quality fish, and the area where the two currents meet is known as one of the three greatest fishing grounds in the world. The fish caught in Fukushima is considered particularly high in quality, and is known by the brand name "Joban-mono".



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My name is Udoronique Suzuki. I'm half-Japanese and half-French. Everyone just calls me Udo, though!

When the Great East Japan Earthquake hit Fukushima Prefecture, we were still in elementary school.

A little while after the earthquake, we were each given something called a "glass badge".

Please keep this on you for three months.

What will this tell us?

Fukushima-city
Udo Suzuki
Chest Y-TRY

They said it would show how much radiation we were being exposed to...

Later, when the results came in...

Do you understand what it says?

It says we're all right... but I don't really understand ...

"What is radiation, anyway?" That was the question that we were left with.

With radiation, the amount received is crucial. The unit used to indicate how much radiation people are being exposed to is called Sv (sieverts).

The years passed, and we entered Fukushima High School...

In high school, my classmate Shinobu told me about the Super Science Club.

I'm gonna join this club!

MEMBERS WANTED

"Super Science"? Is it a really quiet club?

That's "silence", not "science"!

The Super Science Club combines chemistry, biology, physics, and astronomy clubs into one.

The members are split into groups, each working on different research subjects.

Chemistry

Biology

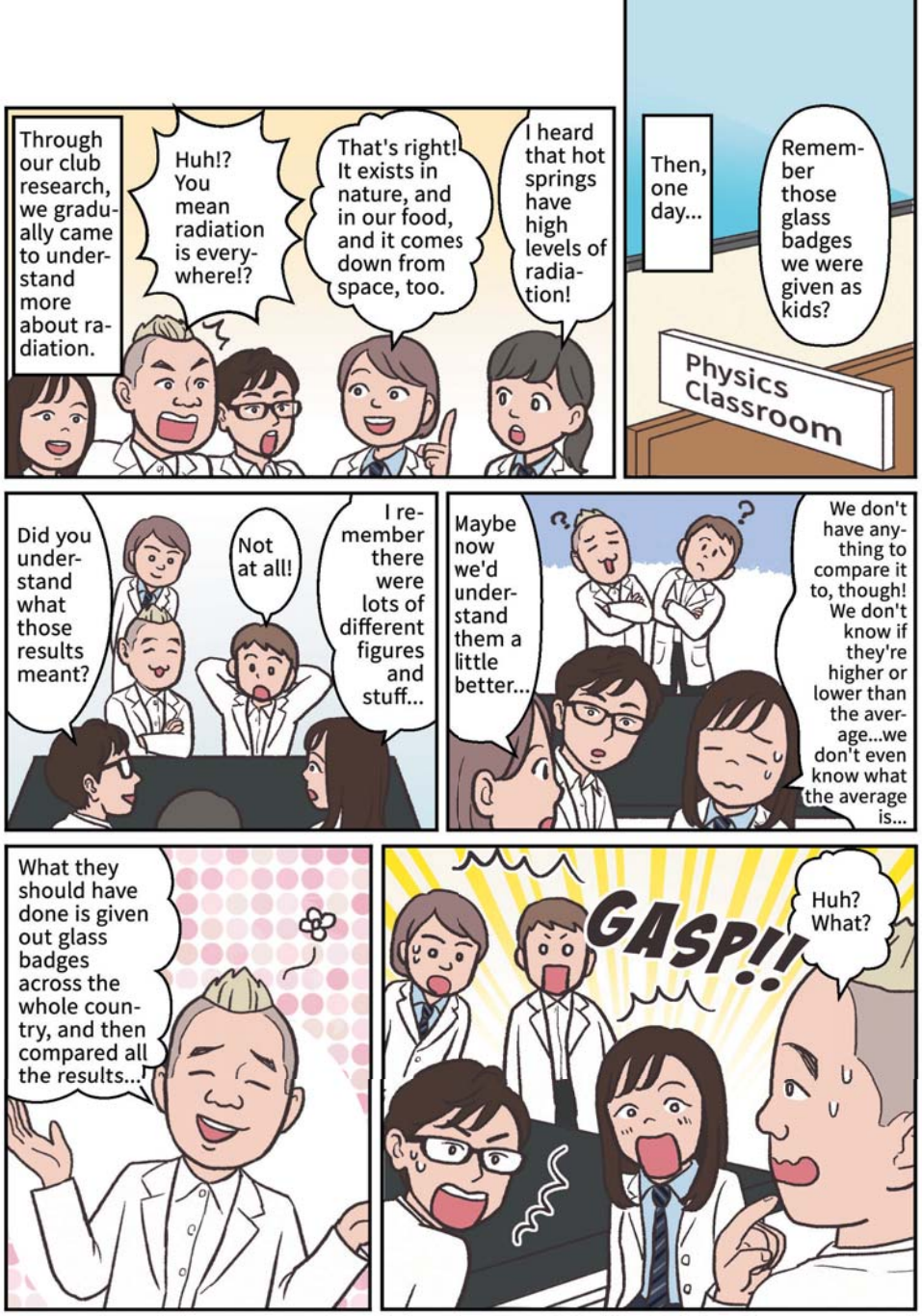
Astronomy

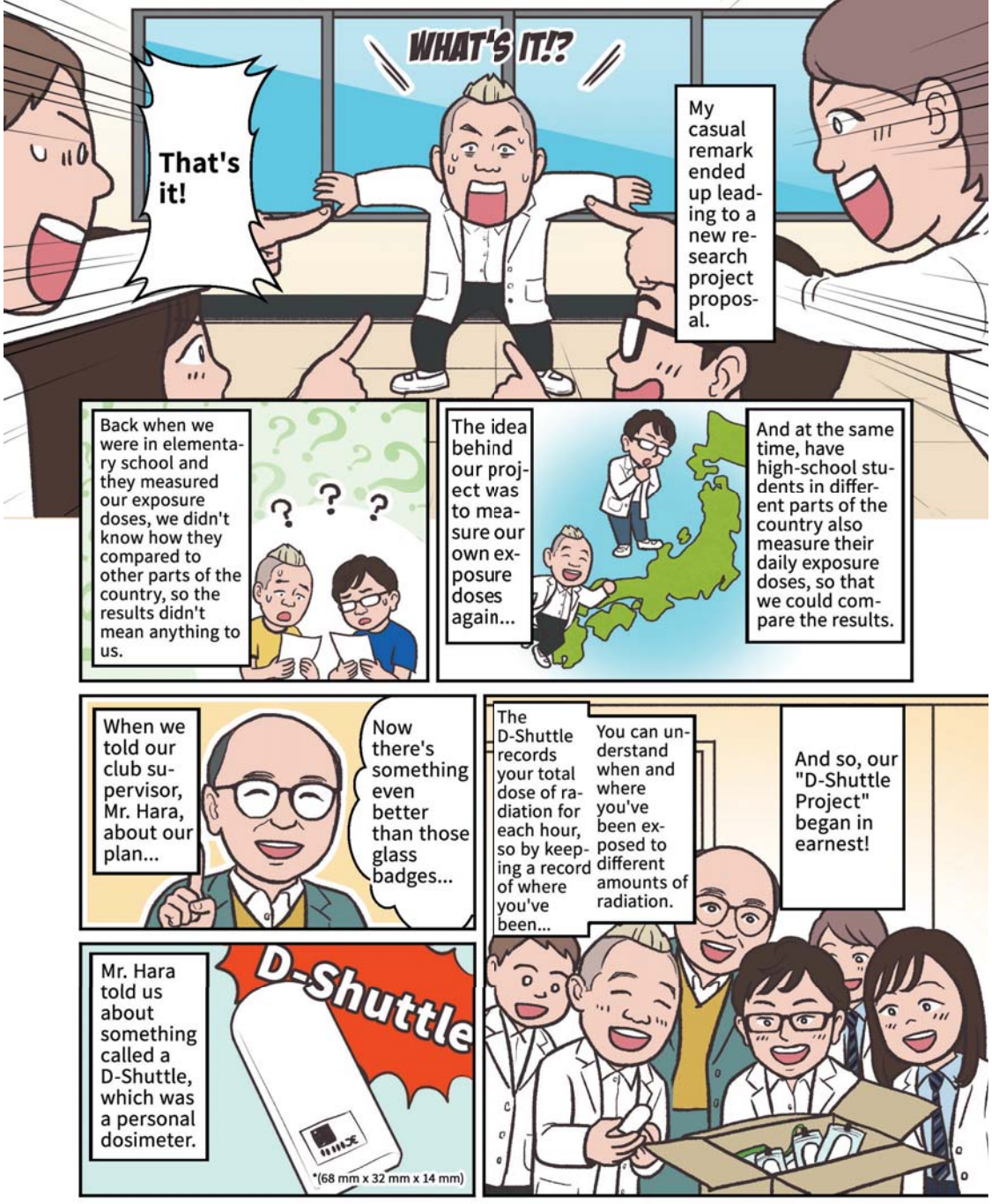
Science

We joined the Radiation Team-- part of the Physics Group.

That's because we were interested in studying about radiation.

It's said that exposure to more than 100 mSv over a short period of time increases the risk of cancer.

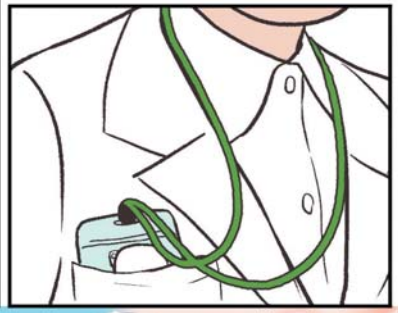


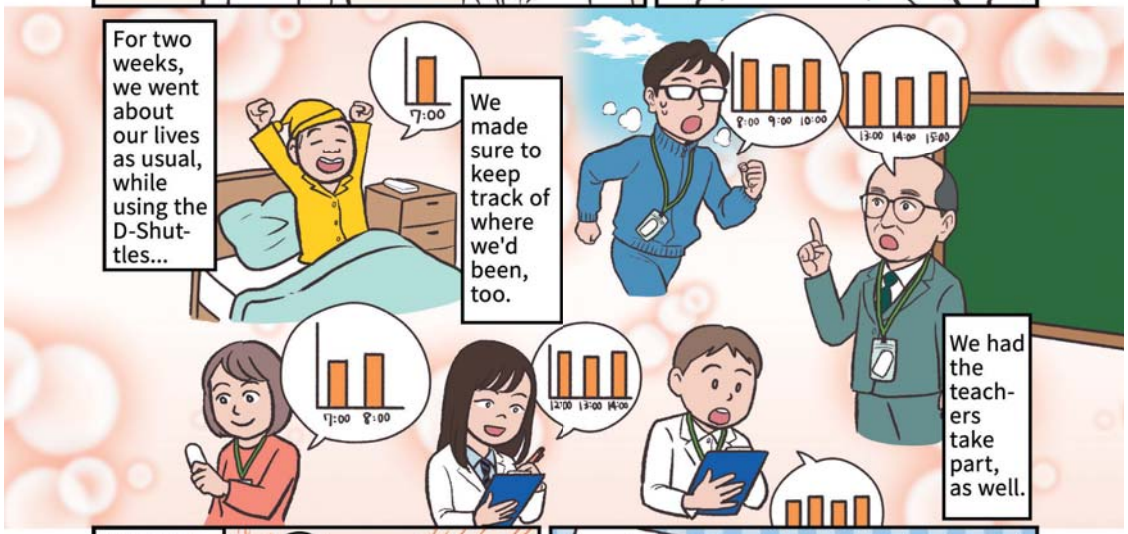


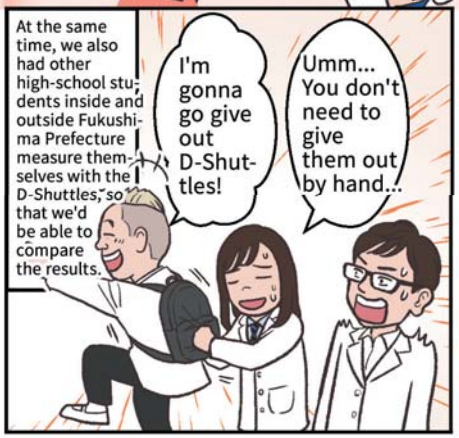
*Measures in µSv (micro-sieverts)

1 Sv (sievert) is the same as 1,000 mSv (millisieverts). Just like the relationship between L (liters) and mL (milliliters) when measuring volumes (1 L = 1,000 mL). So 100 mSv is equivalent to 0.1 Sv.

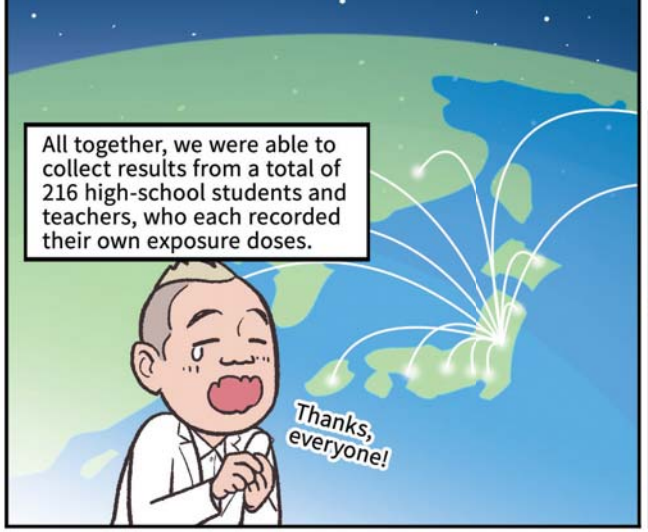
1 µSv (micro-sievert) is equal to 1/1000 of 1 mSv. In other words, 1,000 µSv equals 1 mSv.
E.g. 1,000,000 µSv = 1,000 mSv = 1 Sv, 1 µSv = 0.001 mSv = 0.000001 Sv

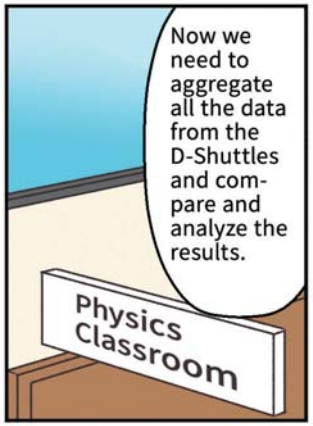


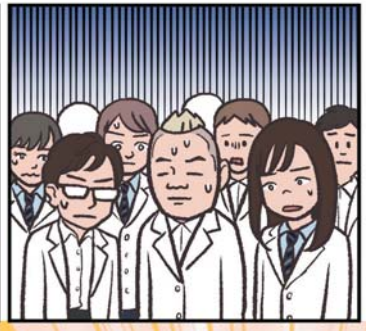


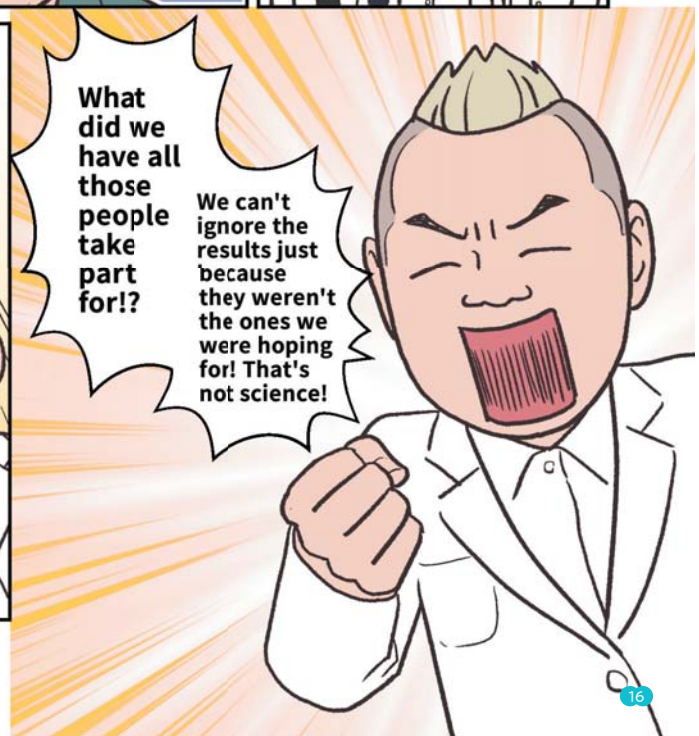


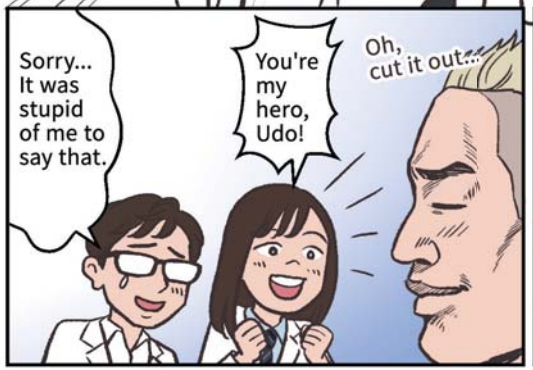
The measurements using the D-Shuttles were all taken over two-week periods in 2014: from June 18th to July 1st in Japan, from early to mid October in Belarus, from early to mid November in France, and from late November to mid December in Poland.

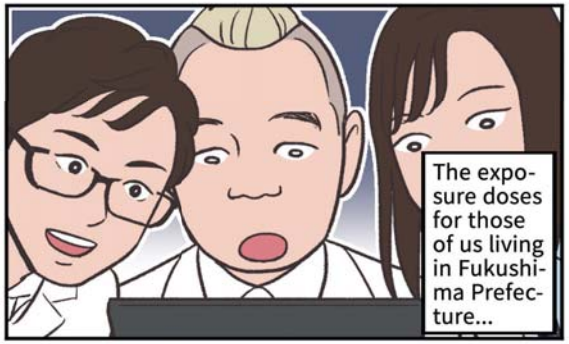


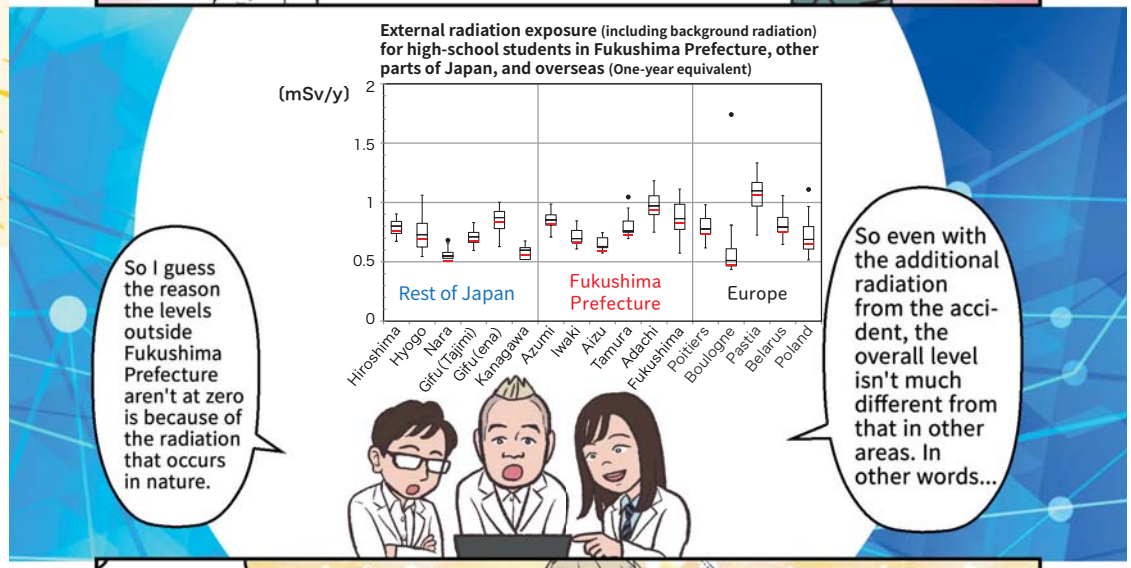








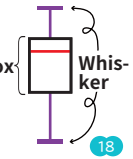


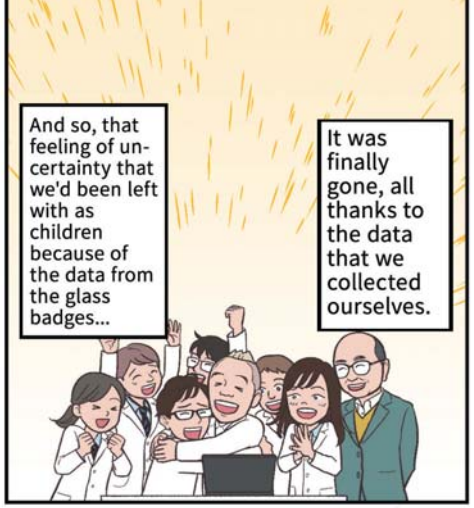


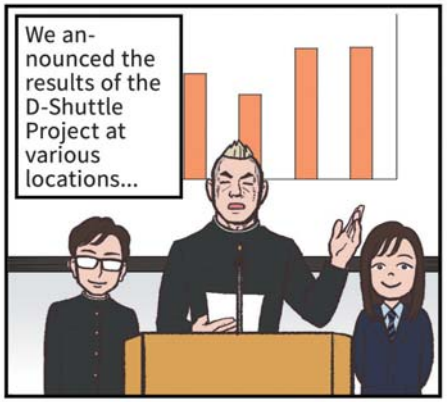
*Test results and figures are based on factual information.

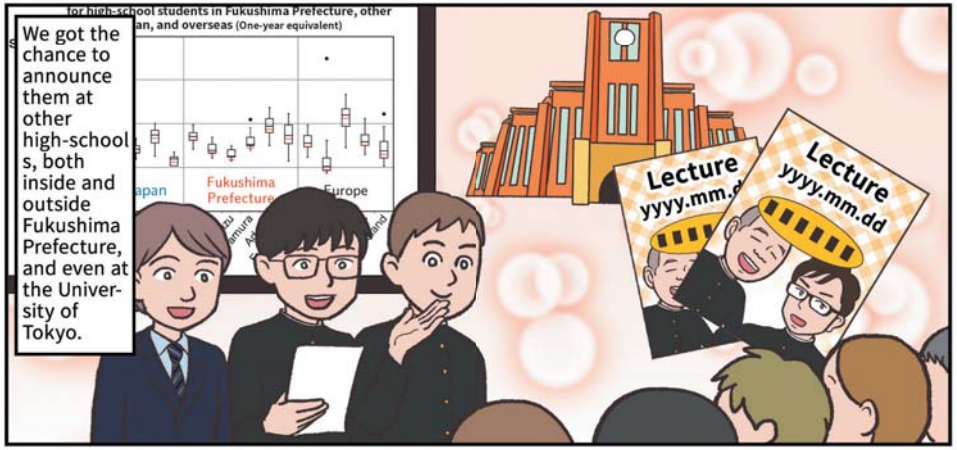
The data for Japan was collected at six high schools in five prefectures: Kanagawa, Gifu, Nara, Hyogo, and Hiroshima.

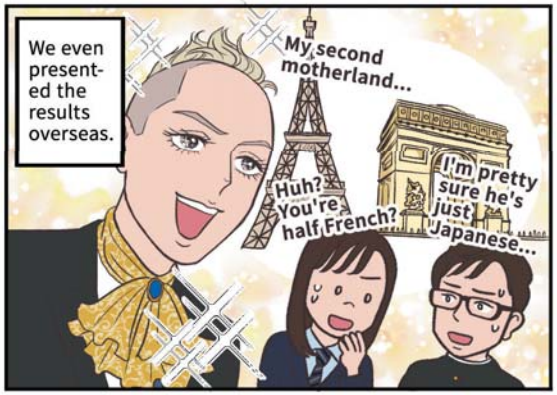
This is known as a "box-and-whisker plot", and is a type of graph that's used to compare the variations between different sets of data. To use an example, if 100 people stood in a line in order of height, the shortest person would be the bottom whisker, and the tallest person would be the top whisker. The box represents the middle 50 people, from number 26 to number 75, and the line inside the box indicates the person right in the middle.

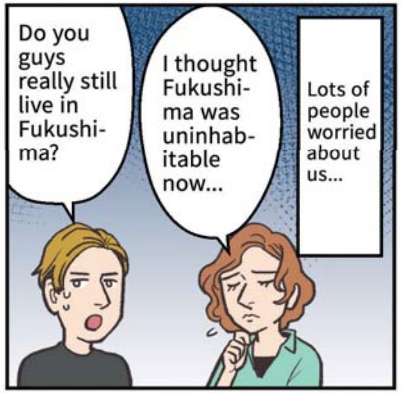




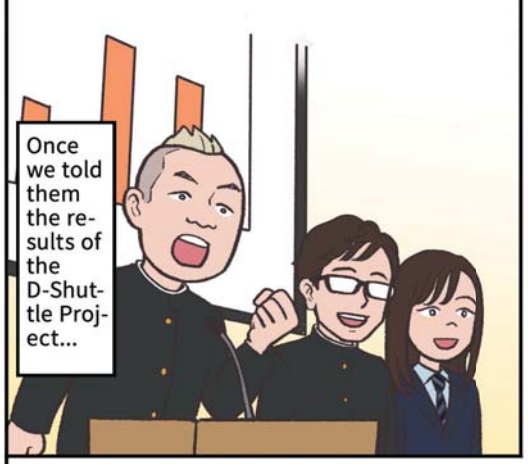


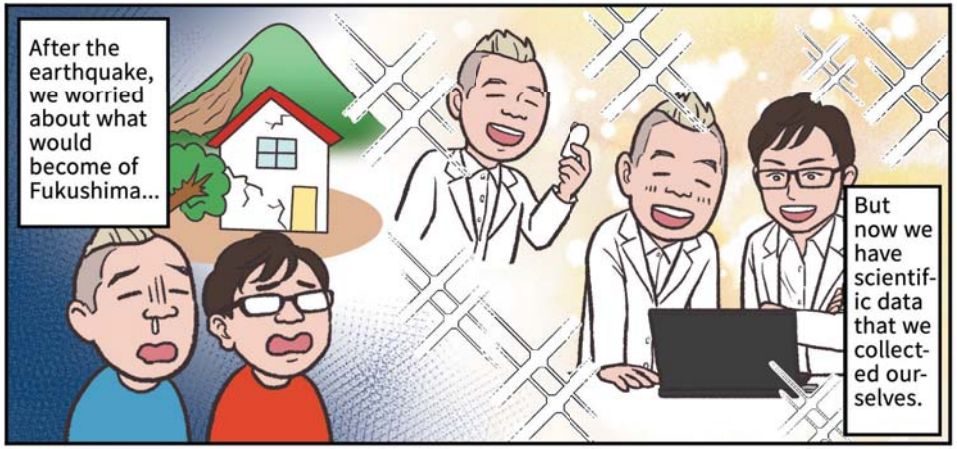


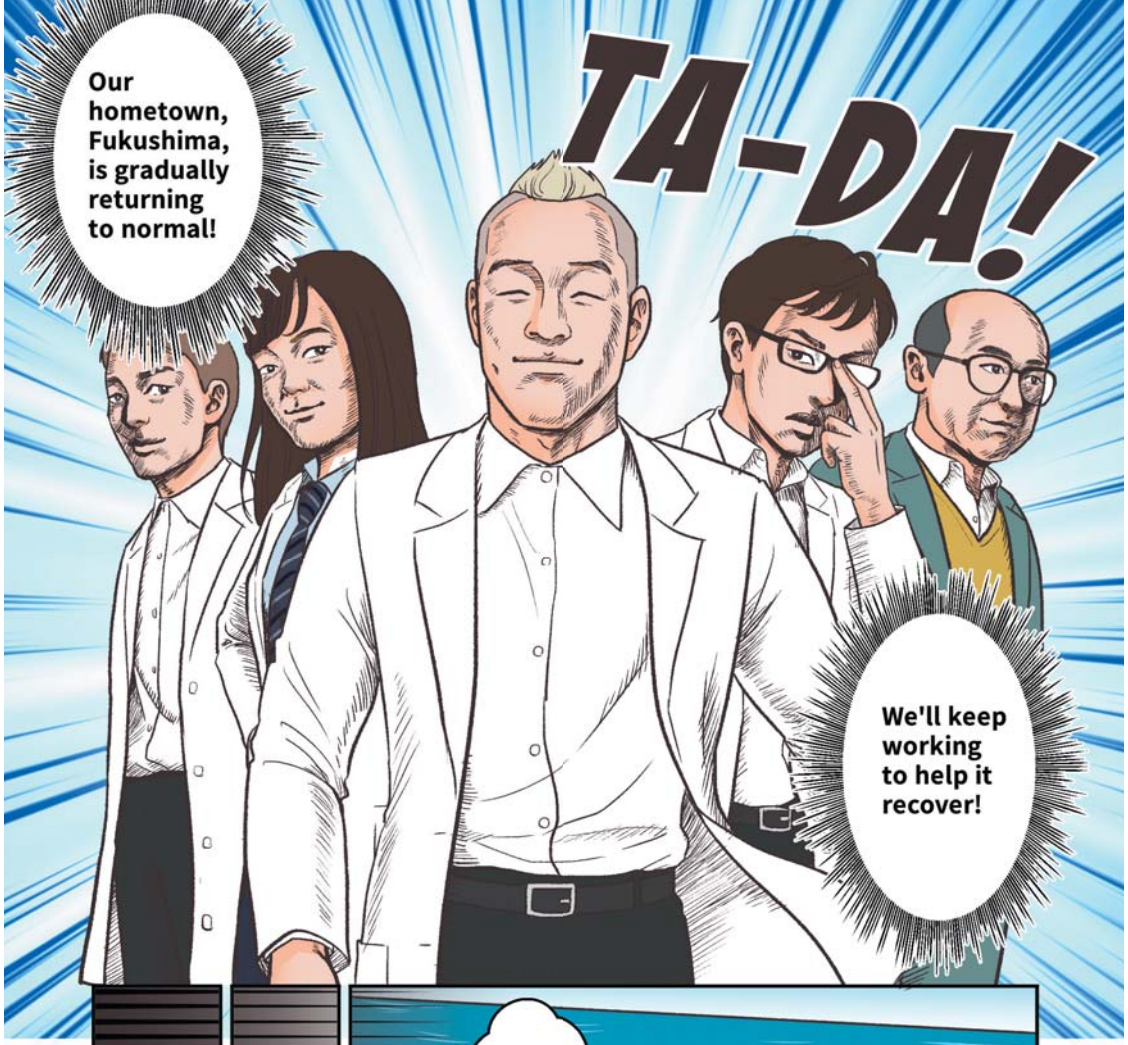


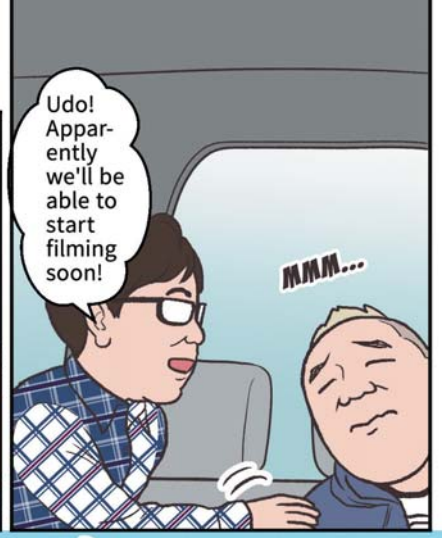


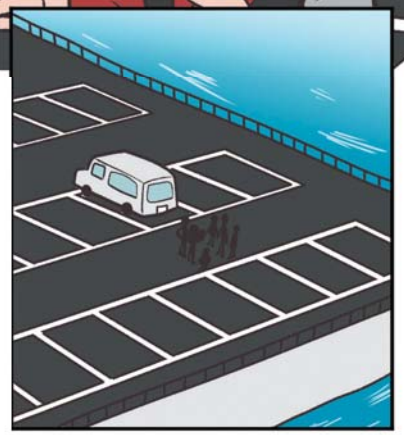
The students from Fukushima High School really did announce their results at the University of Tokyo, and in France and Italy. Some people overseas thought that no one lived in Fukushima anymore. That was a shock!



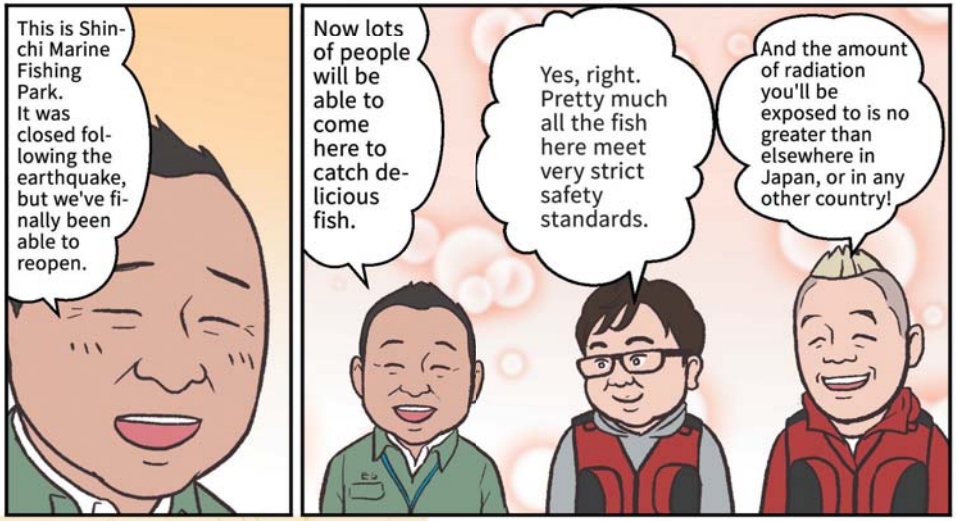








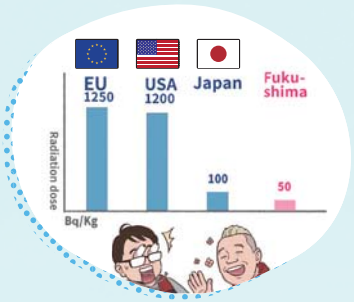
This comic is based on work done by Fukushima High School's Super Science Club in 2014. The D-Shuttles were used to collect data up until 2018.



*This comic is a work of fiction based on actual events.

Food Products & Radiation

Understand the comic better!



topic 1 Japan's standards are among the strictest in the world!

Japan's standards for food distribution is 100Bq/kg for regular food items such as fish and vegetables. When products exceeding that level are found, they don't make it to the store shelves.
In the past few years there have been virtually no cases of items exceeding 100 Bq/kg.
By the way, do you know why the level was set at 100 Bq/kg?

topic 2 How was the standard of 100 Bq/kg chosen?

The Japanese government set the upper limit for radiation dosage from food at 1 mSv per year based on the international food safety guidelines set by Codex(CAC)*1, which specify that the total additional radiation dose received from food over one year shouldn't exceed 1 mSv.
The standard of 1 mSv per year is the same level that's used by the European Union.
So why is the limit used in Japan (100 Bq/kg) stricter than those set by CAC (1,000 Bq/kg) and the EU (1,250 Bq/kg)?

That's because Japan's limit was calculated under the following conditions:
1. Based on Japan's food self-sufficiency rate, it was presumed that 50% of all food products in circulation (all domestic produce) would contain the maximum allowed level of radioactive material (×5*2)
2. Food intake varies according to age and gender, and the calculations were based on the intake amount for a male middle school/high school student with a healthy appetite (approx. ×1.4*2)
3. The results of the above calculations were also rounded down as a precaution (approx. ×1.4*2)

*1. The CAC was jointly set up by the Food and Agricultural Organization of the United Nations (FAO) and the World Health Organization (WHO) in 1963. The CAC oversees the Codex Alimentarius, a set of international standards for food, to protect consumers' health and to promote fair international food trade. As of August 2018, member states of CAC include 188 nations and the EU.
*2. The numbers given in parentheses are comparisons with the CAC standard (1,000 Bq/kg).

Standars for Radioactive Material Concentration of Foods

	Japan Food Sanitation Act	Codex (CAC) CODEX STAN 193-1995	EU Council Regulation (Euratom) 2016/52	USA Guidance Levels for Radionuclides in Domestic and Imported Foods (CPG7119.14)
Derived intervention levels (DIL) for radiocesium Concentration* (unit: Bq/kg)	Drinking water 10 Milk 50 Infant foods 50 General foods 100	Infant foods 1,000 Other foods 1,000	Liquid food (Drinking water) 1,000 Dairy produce (Milk) 1,000 Infant foods 400 Other food except minor food 1,250	Food 1,200
Upper limit for radiation dosage from food per year	1mSv	1mSv	1mSv	5mSv
Assumption on the proportion of food supply that is contaminated with radiation per year	50%	10%	10%	30%

*The DILs shown are the upper limits allowed for food to be distributed in the supply chain. DILs are set for monitoring purposes and are not standards for determining whether food is safe or not for consumption. As different countries assume different proportions of their food supply is contaminated with radiation during computation, these numbers by themselves are not comparable.

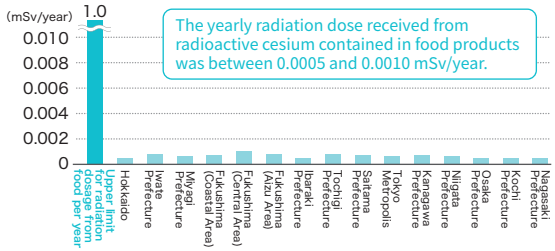
topic 3 How much radioactive material is there in Japanese food products?

Let's take a look at the amount of radioactive material found in food products from around Japan.

Products from Fukushima are tested regularly for radioactive material before being shipped out. Virtually no products with amounts that exceed the allowed levels have been found to date.

A survey (market basket survey) was carried out in different areas of Japan to see how much additional radiation people would receive over the course of one year when eating an average diet. The results showed that the amount was just 1/1000 of 1 mSv.

Additional radiation when consuming average diet (one year)



Based on results from a market basket survey carried out by the Ministry of Health, Labour and Welfare (February-March, 2019)

Source: Created based on Shinchi Marine Fishing Park's Seasonal Fish Calendar

Send any comments to this address ✉ info-senryaku@cas.go.jp