From Amagasaki to the Seto Inland Sea and the World

~High School Student Environment Network~

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Research Purpose

To increase awareness of water quality and encourage environmental improvement activities

- Local
  - Amagasaki Canal
  - Step 1
  - Local collaboration

- Regional
  - Seto Inland Sea
  - Step 2
  - Regional collaboration

- International
  - Seas around the World
  - Step 3
  - International collaboration
Step 1  Research in Amagasaki Canal

Improve the environment of the local sea!

Environmental research
Monitoring of water quality and sludge

Search for ways to improve environment
Experiments to improve water quality
Problem and Research in Amagasaki Canal

- Separated from the open sea
- Low Dissolved Oxygen (DO)
- Accumulated sludge
- Frequent occurrence of hypoxia
- Bad environment for creatures

Experiments in the past
  Accretion experiment, Amino acid-enriched concrete
  Improvement in mudflat, etc…

Clarify the relationship between water quality and sludge
→ Search for ways to reduce hypoxia
Relationship between DO & sulfide concentration

Unsociable environment → Low DO, high sulfide concentration
Expansive environment → High DO, low sulfide concentration
From Amagasaki to the Seto Inland Sea

Step 2

Water quality improvement in Amagasaki Canal → Model of water quality improvement in other enclosed coastal seas

Local

Organize a team of high school students

Global

Cooperative activities in improving coastal environment

Seto Inland sea

Water Quality

Creatures

Human Activity
Super Science High School (SSH) Project

- National Project by the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT) to foster future scientists.

- Amagasaki Oda High School has been registered in this project for 12 years.

“High School Student Forum” was organized as a part of the SSH project.
Cooperating schools of the High school Student Forum

High schools of Presenting

1. Hyogo
   Amagasaki Oda★

2. Osaka
   Higashi★

3. Hyogo
   Mukogawa Women’s University

4. Hyogo
   RokkoI island★

5. Hyogo
   Kobe commercial★

6. Hyogo
   Tatsuno

7. Okayama
   Sanyo girl’s★

8. Okayama
   Tamashima

9. Hiroshima
   Yasuda Girl’s★

10. Hiroshima
    Hiroshima Kokutai★

11. Yamaguchi
    Suo Oshima

12. Shiga
    Ritumeikann Moriyama

13. Fukui
    Wakasa

14. Kanagawa
    Yokohama Science Frontier

High schools with Report Submission only

15. Osaka
    Izumitottori

16. Hyogo
    Nishinomiya

17. Hyogo
    Koiba Yamate Girl’s

18. Hyogo
    Hyogokougyou

19. Hyogo
    Ieshima

20. Hyogo
    Koudera

21. Okayama
    Okayama University of Science

22. Okayama
    Tsuyama

23. Wakayama
    Kainann

24. Tokushima
    Kagakugijytu

25. Kagawa
    Takamatsudaichi

26. Kagawa
    Tadotsu

27. Kagawa
    Kanonji Daiichi

28. Ehime
    Nagahama

29. Ehime
    Uwajima Higashi

30. Oita
    Maiduru

31. Kyoto
    Nanyo
Thinking about what we want to do and what we should do about the sea environment and management.
Science Workshop

Workshops managed by the student organizing committee

Common learning for discussing the environment in the Seto Inland Sea
Cooperation Suma Aqualife Park Kobe

Suma Beach, Kobe and Saburoujima Fishing Port, Okayama
1. Field survey of micro-plastics
2. Studying sea bottom environment using trawling net
3. Analysis of micro-plastics survey and discuss their influence on creatures
Joint research

Working together to improve environmental problems in the Seto Inland Sea with the cooperation of high school students in the area

What are common problems that can be studied on site?

Marine litter

Micro-plastic
What are micro-plastics?

- Mainly weather eroded plastic (less than 5mm)
- Exist in beaches and seas over the world
- Swallowed by creatures
- Carcinogenic

Accumulated in higher consumers by biological concentration

Possible health hazard to humans

Increase of the plastic usage
Increase of the amount of the micro-plastic!
Joint field survey

◆ Cast ashore micro-plastics

Collecting micro-plastic using the quadrant method

◆ Floating micro-plastics

Collecting micro-plastic using plankton net
Sampling method

Target
Micro-plastics (less than 5mm in diameter and floatable)
Some had a lower density than sea water (density 1.02g/cm$^3$)

Locality
Sandy beach, mud flat

Distance from shore line  →  near  midway  far
Amount of Micro Plastics  →  few  some  many

Intertidal zone

Shore Line
High Tide Line
Micro-plastic research method

Collection Method

Original standard method of High School Student Forum

Water tank (R 30cm)

Sieve (R 29.5cm mesh 5mm)

Bucket with sea water

Take out the floating items that were thought to be plastic
There were a lot at the places far from the shoreline.

The colors and the materials were different at each point.
High School Student Forum

Research presentation
Share results of environmental research in each area

Group discussion
Discussions on micro-plastic problem
Points and Results from Meeting

- **How were micro-plastics made?**
  - Big plastics are broken and fragmented in rivers etc.
  - Local wastes could become micro-plastics

- **Why are there green micro-plastics in some areas?**
  - Artificial turf, fishery tools
  - Easier to be fragmented

- **How can we reduce micro-plastics?**
  - Reduce the plastic at their origins
  - Let many people know through enlightening activities
Participate in academic meetings
Advertise in local events
Hold classes for school children

Through Discussion

Every person makes an effort to reduce littering

Let many people know about micro-plastics

Enlightening activities
Research the sea with communication and cooperation

Large scale research discussions from various viewpoints,
Connecting with people in other areas,
Promoting further research

When environmental problems in the sea are considered…

A small part of an area < Wide network
Step 3
From the Seto Inland Sea to seas around the world

Seas are connected

From Japan to the world

Seto Inland Sea

Amagasaki Canal

Seas around the World

The sea environment is a worldwide problem

Change the sea with cooperation of high school students around the world!

Shall we work together?!