

Improving the Quality of Education Through the GIGA School Program

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MEXT

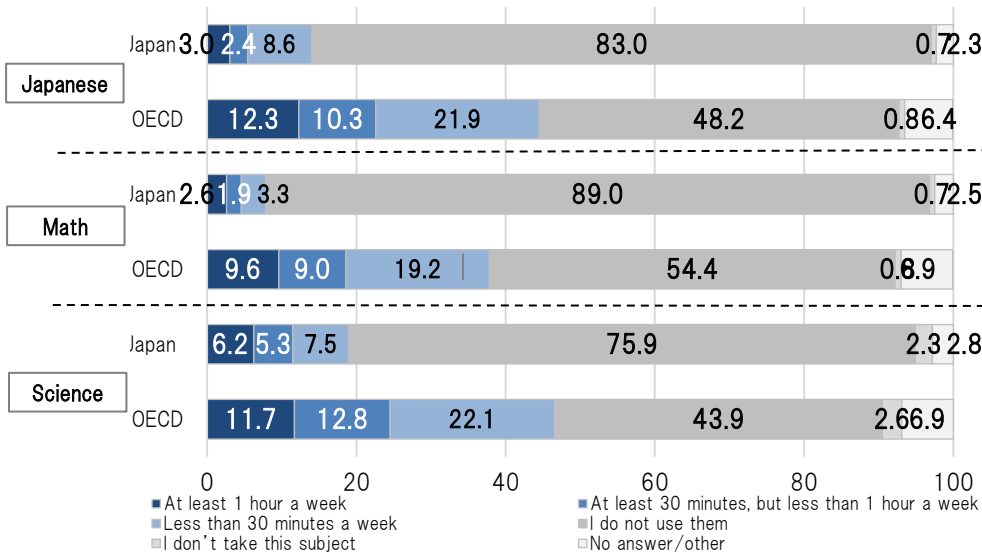
MINISTRY OF EDUCATION,
CULTURE, SPORTS,
SCIENCE AND TECHNOLOGY-JAPAN

SCIENCE AND TECHNOLOGY-JAPAN

Findings from PISA 2018 (questionnaire survey on the educational achievement of students in OECD countries)

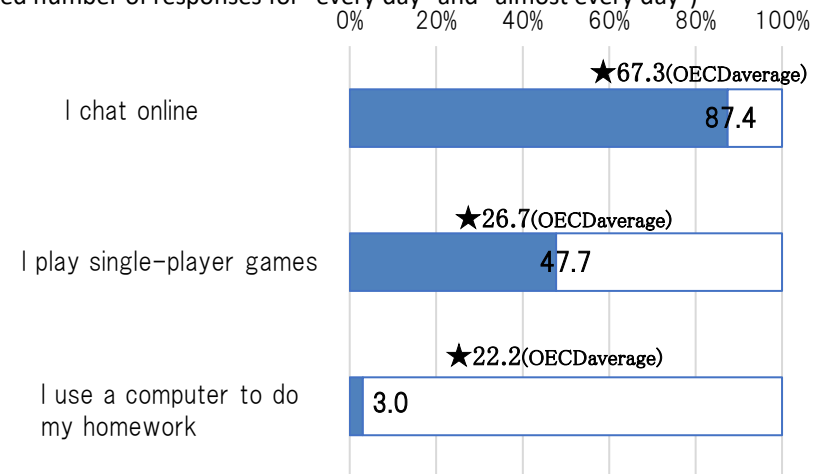
- ◆ In terms of the use of ICT among students, the amount of time that is spent on using digital devices during school classes (Japanese, math, science) in Japan is short, and is the lowest among OECD member countries (37 countries).
- ◆ In Japan, the use of digital devices outside of school tends to be skewed towards chatting and games (the number of responses for "I chat online" and "I play single-player games" is the highest among OECD member countries). The number of responses for "I use a computer to do homework" is the lowest among OECD member countries.

Time Spent on Using Digital Devices During Classroom Lessons Within a Week



Use of Digital Devices Outside of School During Weekdays

(The blue bars represent Japan and the ★ represent the OECD average for the combined number of responses for "every day" and "almost every day")

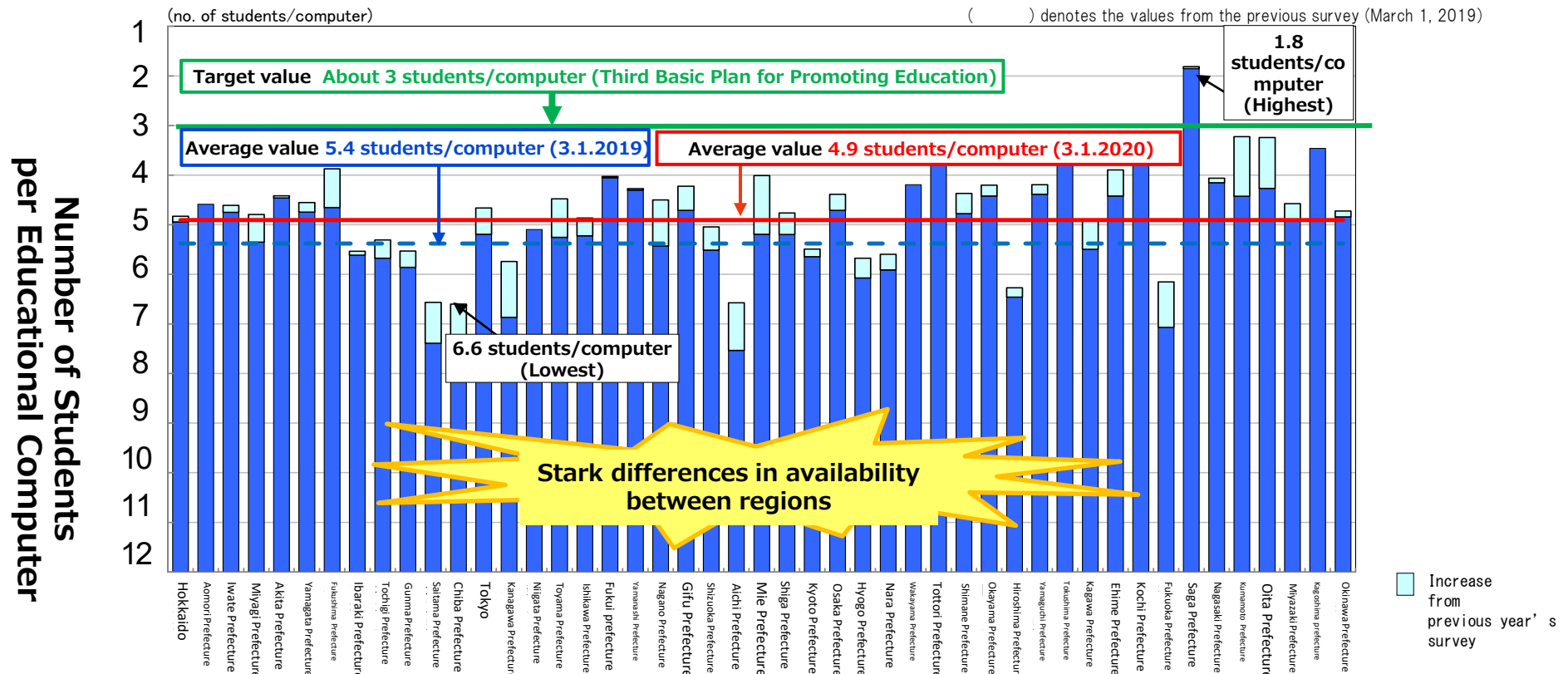


Current Availability of ICT Equipment in Schools (March 2020)

Targets for 2018-2022

As of March 1, 2020

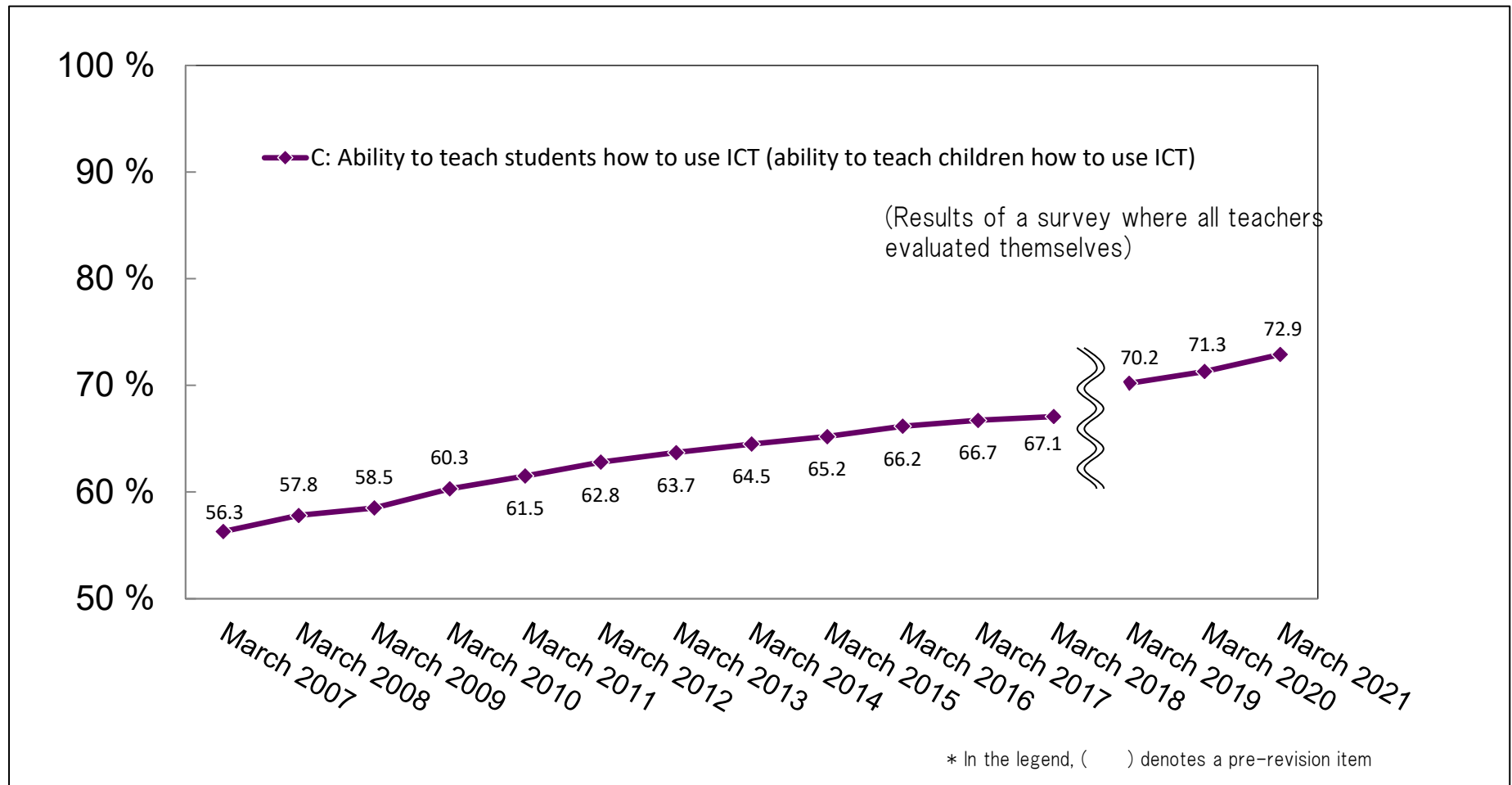
- Number of students per educational computer **4.9 students/computer** (5.4 students/computer) **(Target: About 3 students/computer)**
- Percentage of schools with wireless LAN in ordinary classrooms **48.9%** (41.0%) **(Target: 100%)**
 Percentage of schools with LAN in ordinary classrooms **91.4%** (89.9%) **(Target: 100%)**
- Percentage of schools with internet connection (30Mbps or higher) **96.6%** (93.9%) **(Target: 100%)**
 Percentage of schools with internet connection (100Mbps or higher) **79.2%** (70.3%)
- Percentage of schools with large presentation devices in ordinary classrooms **60.0%** (52.2%) **(Target: 100% (1 device per class))**



The availability in all municipalities is disclosed on the website.
https://www.mext.go.jp/a_menu/shotou/zyouhou/detail/1420641_00001.htm

(Source: Survey on the State of Computerizing Education in Schools [Confirmed Values] (as of March 2020)

Changes in Teachers' Ability to Teach Students How to Use ICT



* These are values calculated by averaging the percentage of teachers who answered “I can do it” and “I can somewhat do it” on a 4-point scale with the options, “I can do it”, “I can somewhat do it”, “I can’t really do it”, and “I can’t do it at all”.
(Source: Survey on the State of Computerizing Education in Schools (as of March 2021))



Concept of GIGA School Program: To improve the quality of education by the integrated enhancement of personalized, self-regulated learning and collaborative learning through the preparation and utilization of a school-wide ICT environment equipped with high-speed networks in each school and provision of 1 device for 1 student.

Background of concept: ① By international comparison, Japan ranks at the bottom for the amount of time students use digital devices for learning. (OECD survey)
② There are significant disparities among regions in the preparation of ICT environments at schools. (MEXT survey)

⇒ For children living in the Society 5.0 era, PC devices are must-have items along with pencils and notebooks. The 1-device for 1-student environment will be the standard for schools in the current Reiwa era. (December 2019 MEXT Minister message)

1. Preparation of school ICT environments based on the GIGA School concept

→ Due in part to the COVID-19 pandemic, the preparation plan based on the GIGA School concept, continuing from fiscal 2019 (supplementary budget) to fiscal 2023, has been significantly advanced ahead of schedule.



(1) 1 device for 1 student

(2019, 2020 supplementary budgets)

Current situation: Support for provision of 1 device per student: 314.9 billion yen → Provision of 1 device per 1 student already achieved in public elementary and junior high schools (March 2021)

Issues: Lack of, or only old, learning guidance PC terminals for teachers (July 2021 Digital Agency survey)

Initiatives: For guidance terminals for teachers, 1 PC device will be provided for each classroom through allocation of local tax revenue. * A separate PC will be provided for administrative duties.

Upgrading of class ICT environment, including terminals for teachers — Preparations advancing through utilization of temporary grants for regional revitalization for terminals in high schools.

(2) Preparation of high-speed communications networks

(2019, 2020 supplementary budgets)

Current situation: 136.7 billion yen allocated for nationwide preparation of school network environments → Around 98% of schools have started using networks. 54% of local governments have no plans to assess school network environments.

Issues: Networks are slow, cannot connect (July 2021 Digital Agency survey)

(Survey as of end of May 2021)

Initiatives: Study of nationwide assessment of networks and stopgap measures.

2. Enhancing support for utilization of school ICT environments



(1) Support for operation

Current situation: Promotion of assignment of ICT support staff who provide daily support (at direction of MEXT ordinance “Support Staff for IT,” August 2021) and GIGA School supporters who provide initial support for preparation of ICT environments. Notification for active utilization of PC terminals, including conducting checklists, in March 2021, and revision of security policy guidelines in May.

Issues: • Burden for setting equipment, etc. falling on teachers • Regional disparities in usage at home, etc. (July 2021 Digital Agency survey)

Initiatives: New GIGA School Operational Support Center Project scheduled to be started in order to develop and enhance regional support systems that shift from person-centered to organization-centered support. Guidelines scheduled to be drawn up by the end of this fiscal year to promote utilization of terminals.

(2) Learning guidance support

Current situation: Around 4% of local governments had completed ICT preparation by September 2020. Many local governments are starting to provide 1 device for 1 student from fiscal 2021. Support for trial-and-error efforts will be important.

Issues: Dissemination of guidance methods insufficient (July 2021 Digital Agency survey)

Initiatives: The GIGA StuDX Promotion Team (established in December 2020) is starting its support activities for learning guidance using ICT to boards of education, schools, etc. nationwide. The team will provide “push-type and accompanying-type” support, including disseminating information on best practices for dealing with concerns and problems at schools, holding online consultation meetings and training, publishing e-newsletters, etc. It will also enhance online training programs, including using explanatory videos produced in collaboration with the National Institute for School Teachers and Staff Development, provide specialist advice and training support by ICT educational advisors, etc.



Future developments: Further collaboration with other related ministries and agencies, beginning with the Digital Agency, to advance the GIGA School concept!

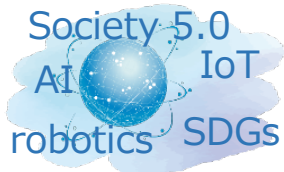
● Contents enhancement (digital texts, online learning system [MEXCBT]) ● CBT of national academic ability, learning situation ● greater efficiency in school admin affairs through digitalization ● Post-GIGA models for teachers, school facilities ● Roadmap for utilization of education data (Digital Agency) ● Evidence-based policy making (EBPM) (under Cabinet Office Council on Economic and Fiscal Policy) ● EdTech, STEAM education (CSTI, METI) etc.

Relationship Between the New Course of Study and the GIGA School Program

The Future of Our Society and Children in 2030

(Excerpt of the report from the Central Council for Education in December 2016)

Social changes accelerate and become complex and difficult to predict



An era where it is difficult to take a passive stance on dealing with changes in society

Changes are accepted positively, and our society, lives, and lifestyle are enriched through the use of our human sensibilities

The 2017, 2018 and 2019 Course of Study

Preface In the future, schools need to help (omitted) each and every child (student) to not only recognize his or her own merits and potentials, but also respect all others as valuable beings, overcome a variety of social changes while collaborating with various people, carve out rich lives for themselves, and become creators of a sustainable society.

Three pillars for the qualities and abilities we aim to develop

Ability to approach learning, human nature, etc.

Knowledge and skills



Abilities to think, judge, express, etc.

Develop qualities and abilities



- Develop qualities and abilities that are aimed at in each subject, etc.
- Develop qualities and abilities such as language skills, information management skills, and problem finding/solving skills from a cross-curricular perspective, etc.

Improve classes

Proactive, interactive and deep learning

Course of Study General Rules
3. Implementation of curriculum and evaluation of learning

Perform integrated enhancement

Course of Study General Rules
4. Support for the development of children (students)

Optimal individual learning ("personalized teaching" from the teacher's point of view), collaborative learning

Utilize for proactive, interactive and deep learning, optimal individual learning and collaborative learning

GIGA * School Initiative (one computer per student, high-speed network) (positioned to improve the physical system in curriculum management) Capitalizes on the characteristics and strengths of using ICT in education and learning, and plays an important role in achieving the objective of the new course of study.

* Abbreviation for Global and Innovation Gateway for All

Special Characteristics and Strengths of Using ICT in Education and Learning

(software/functions that can be utilized in the GIGA school standard specifications (examples))

Special characteristics and strengths of using ICT in a high-speed and high-capacity communication network environment where there is one computer per student	Software/functions
<u>(1) Handling of diverse and large amounts of information, and simple trial and error</u>	Web browser, document creation, spreadsheets, presentations, programming
<u>(2) Accumulation of information beyond time constraints, and visualization of processes</u>	(In addition to the software/functions in (1)), class management, photo and video shooting, editing, saving
<u>(3) Mutual and instantaneous information sharing (interactivity) beyond spatial constraints</u>	(In addition to the software/functions in (1)), comments, questionnaires, chats, emails, web conferences, file sharing

By capitalizing on the special characteristics and strengths of using ICT in education and learning, we will improve classes with the aim of achieving "proactive, interactive and deep learning", and enhance optimal individual learning and collaborative learning in an integrated manner. In addition, we will develop qualities and abilities that were difficult to develop in the past, such as information management skills, demonstrate the effects of ICT use on some of the students who had difficulties with conventional learning methods, and make it possible to carry out learning activities that were not possible before.

Research Process and ICT Use During Integrated Learning Time

Research Process

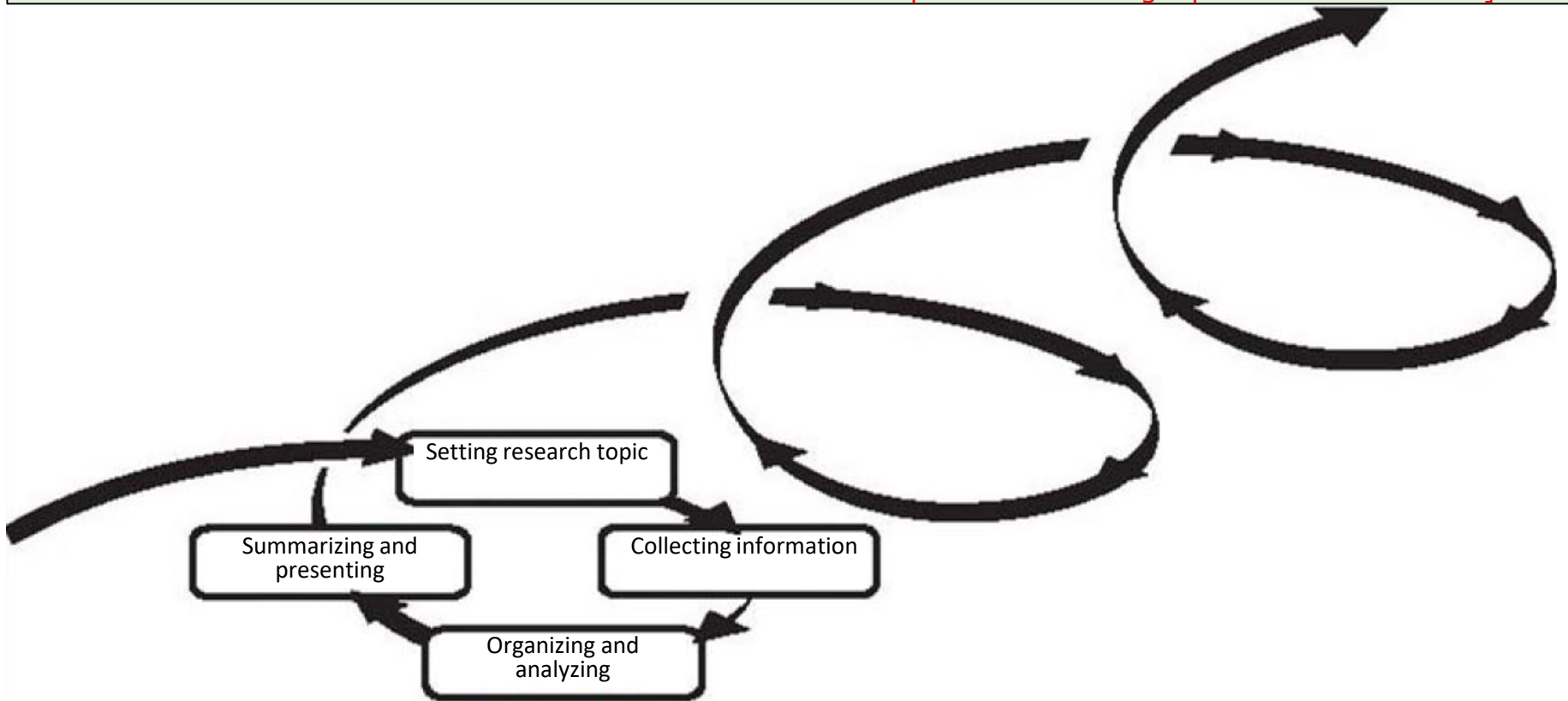
1. Setting research topic
2. Collecting information
3. Organizing and analyzing
4. Summarizing and presenting

[Use of ICT]

[Internet search using a web browser]

[Organization and analysis of data using a spreadsheet program]

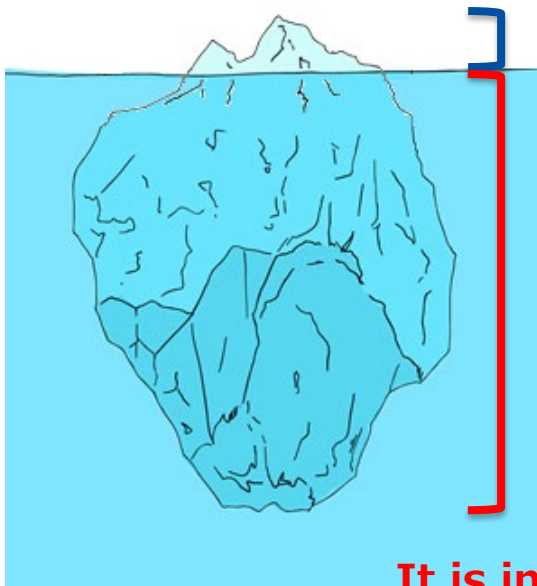
[Creating a short essay using a document creation software, and a presentation using a presentation software]



Support for Educational Guidance in an Environment Where There is One Computer per Student

<Basic concept> To help achieve the objective of the new course of study, all boards of education, schools, and teachers will strive to foster qualities and abilities in students by facilitating their use of computers and networks

Current situation (image)



Municipalities where schools have accumulated some experience in teaching in an environment with one computer per student **Approximately 4%**
(Municipalities where schools have established said environment by September 2020: 4.4%)

Municipalities where schools will fully teach in an environment with one computer per student from 2021 onwards **Approximately 96%**

- Municipalities where schools will establish said environment from October to December 2020: 18.3%
- Municipalities where schools will establish said environment from January to February 2021: 25.4%
- Municipalities where schools will establish said environment in March 2021: 48.3%
- Municipalities where schools have yet to establish said environment in 2020: 3.5%

||

**It is important to raise this portion
(Push the whole iceberg above the
surface of the water)**

Viewpoints of the initiative

- For many schools and teachers, it will be their first attempt at facilitating the regular use of computers from their computer rooms to their usual classrooms on a one computer per student basis. Therefore, trial and error is important.
- It is important for each board of education to fully understand the situation in their area before providing their schools and teachers with detailed support.
- The Ministry of Education, Culture, Sports, Science and Technology, centered on the GIGA StuDX Promotion Team, will also maintain close communications with parties such as the boards of education, and will gain an understanding of the latest situation nationwide, before providing encouraging and accompanying support from the specific standpoint of raising standards.

Activities Led by the “GIGA StuDX Promotion Team”

In order to stimulate improvement in the quality of education through efforts such as integrally enhancing optimal individual learning and collaborative learning to bring forth the potential of all children, the Ministry of Education, Culture, Sports, Science and Technology has established the "GIGA StuDX* Promotion Team " to carry out support activities such as facilitating educational guidance in environments where ICT is used nationwide.

GIGA StuDX Promotion Team



- **Eight teachers** from all across the country are assigned to be **in charge of each region, subject, and OS**
- The teachers build **networks to collaborate with the boards of education in the regions they are in charge of**, and support the collaboration and self-propulsion of the boards of education and schools, while maintaining close communications with them
- The teachers gain an understanding of the **concerns and issues at the schools** and reflect them in the policies of the Ministry of Education, Culture, Sports, Science and Technology

Activities of the GIGA StuDX Promotion Team

Building networks

The icon shows a bar chart with three bars of increasing height, and below it, two stylized human figures sitting at a table and talking.

Collaborating online

The icon shows two stylized human figures, one sitting and one standing, with a speech bubble between them, representing online collaboration.

Sharing information from the special website StuDX Style

The icon shows a computer monitor with a cursor pointing at it, and below it, a stylized human figure with a lightbulb above their head, representing sharing information.

Distributing the GIGA StuDX e-mail newsletter

The icon shows an envelope with a speech bubble above it, representing the distribution of an e-mail newsletter.

(Note) "GIGA StuDX" is a coined word that combines "DX", which refers to the digital transformation of learning through the spread of the GIGA school initiative, and "exchange", which refers to the exchange of information to promote the use of ICT in educational activities in schools.

The Special Website "StuDX Style"

The special website "StuDX Style" provides many fine examples on how to use the computers provided by schools and municipalities nationwide, in order to further facilitate the use of said computers on a one computer per student basis.

Specifically, it provides (1) usage examples for "getting used to" and "connecting", which are the first step in using the computers, and (2) usage examples for each subject, as well as (3) usage examples for engaging in cross-curricular learning such as STEAM education.

スタディーエックス スタイル
StuDX Style
GIGAスクール構想を浸透させ 学びを豊かに変革していくカタチ

"すぐにも" "どの教科でも"
"誰でも"活かせる1人1台端末の活用シーン

慣れる つながる 活用
各教科等での活用
STEAM教育等の教科等横断的な学習

教師と子供が つながる
子供同士が つながる
学校と家庭が つながる
職員同士で つながる

GIGAに慣れる (文房具や教員として使えるようにする)

Usage examples for each subject



小学校



中学校



高等学校



Usage examples for engaging in cross-curricular learning such as STEAM education



Usage examples for getting used to GIGA

Usage examples for "connecting"

Linking with each OS operator



“Promotion of Cross-Curricular Learning Such as STEAM Education”

In an effort to develop the qualities and abilities that are needed of citizens who live in a modern society in which each field of STEAM is complexly related, as well as human resources who will create a society with new values, the Ministry of Education, Culture, Sports, Science and Technology is promoting cross-curricular learning to enable students to utilize what they learn in each subject to find and solve problems in the real world.

Cross-curricular learning such as STEAM education



STEAM教育等の教科等横断的な学習の推進

STEAM教育等の教科等横断的な学習の推進について

慣れる つながる 活用

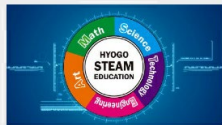
各教科等での活用

Cross-curricular learning such as STEAM education

文部科学省では、STEAMの各分野が複雑に関係する現代社会に生きる市民、新たな価値を創造し社会の創り手となる人材として必要な資質・能力の育成に向け、各教科等での学習を実社会での問題発見・解決に生かしていくための教科等横断的な学習を推進しています。

詳しい資料はこちら

事例



兵庫県教育委員会

モデル校の指定等により「兵庫型STEAM教育」を県立高校で展開。



兵庫県立加古川東高等学校

SSHの実績を生かしながら最新のテクノロジーの活用等を通じて新たな価値の創造につながる人材を育成。



高知県立山田高等学校

学校地域協働本部を通じて地域の大学や団体等と連携し科学的な探究を推進。

関係ウェブサイト等



関係施策

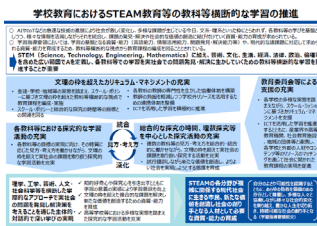
- スーパーサイエンスハイスクール (SSH) □
- スーパーグローバルハイスクール (SGH) □
- ワールド・ワイド・ラーニング (WWL) コンソーシアム構築支援事業 □
- 地域との協働による高等学校教育改革の推進 □
- スーパー・プロフェッショナル・ハイスクール (SPH) □
- グローバルサイエンスキャンパス (GSC) □

STEAM教育等の各教科等横断的な学習の推進

STEAM教育等の各教科等横断的な学習の推進について

AIやIoTなどの急速な技術の進展により社会が激しく変化し、多様な課題が生じている今日、文系・理系といった枠にとらわれず、各教科等の学びを基盤としつつ、様々な情報を活用しながらそれを統合し、課題の発見・解決や社会的な価値の創造に結び付けていく資質・能力の育成が求められています。

文部科学省では、STEM(Science, Technology, Engineering, Mathematics)に加え、芸術、文化、生活、経済、法律、政治、倫理等を含めた広い範囲でAを定義し、各教科等での学習を実社会での問題発見・解決に生かしていくための教科等横断的な学習を推進しています。



中央教育審議会関係資料

- 「令和の日本型学校教育」の構築を目指して～全ての子どもたちの可能性を引き出す、個別最適な学びと、協働的な学びの実現～(答申)(令和3年1月26日中央教育審議会)
- 教育課程部会における審議のまとめ(令和3年1月25日教育課程部会)
- 学習指導要領の趣旨の実現に向けた個別最適な学びと協働的な学びの一体的な充実に関する参考資料
- 教育課程部会(第112回) 配付資料(令和元年9月4日教育課程部会)
- 教育課程部会(第120回) 配付資料(令和2年9月24日教育課程部会)

参考資料

- Society 5.0に向けた人材育成～社会が変わる、学びが変わる～(平成30年6月5日Society5.0に向けた人材育成に係る大臣懇談会、新たな時代を豊かに生きる力の育成に関する省内タスクフォース)(本文p13など)
- 技術の進展に応じた教育の革新、新時代に対応した高等学校改革について(第十一回提言)(令和元年5月17日教育再生実行会議)(本文p6など) □
- 経済財政運営と改革の基本方針2020～危機の克服、そして新しい未来へ～(令和2年7月17日閣議決定)(本文p28など) □
- 「未来の教室」とEdTech研究会STEAM検討ワーキンググループ中間報告(令和2年8月12日経済産業省「未来の教室」とEdT

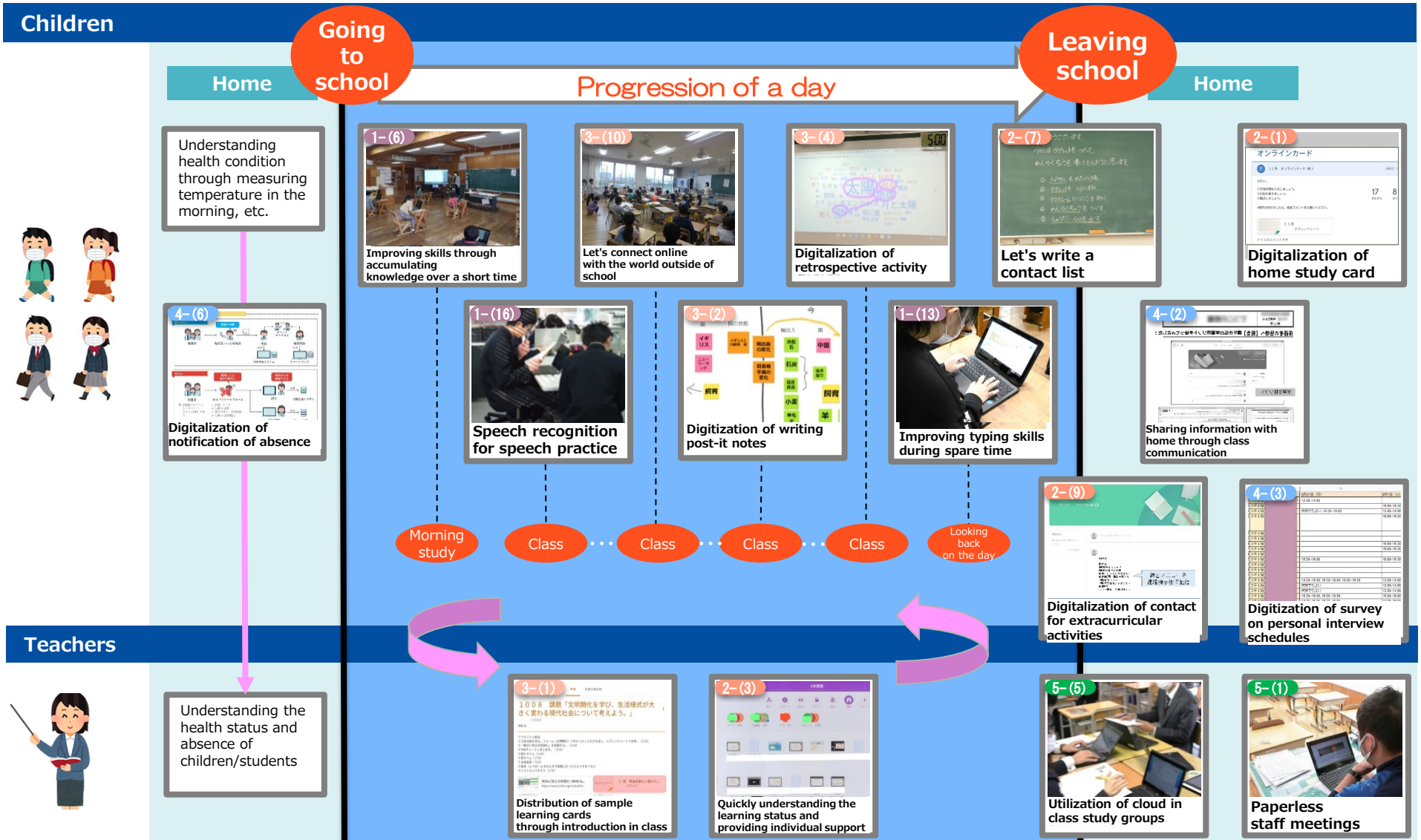
Promotion of cross-curricular learning such as STEAM education:

<https://www.mext.go.jp/studxstyle/index3.html>



Scenarios Where Computers can be Used “Immediately”, “For Any Subject”, and “By Any Student” on a One Computer per Student Basis (example)

Example of the progression of a day where students use computers at school and at home on a one computer per student basis (this can be considered from the examples published on StuDX Style)



Promoting the GIGA School Program to Achieve Optimal Individual Learning



Supplementary budget amount of 2021

20.1 billion yen

- **In order to achieve optimal individual learning**, we have advanced the GIGA school initiative and **developed environments where there is one computer available for each student** as a learning tool.
However, there are still some issues remaining such as the availability of networks and computers for instructors.
- After taking the necessary measures, we will **advance the initiative to the next STEP**



STEP 1 Efforts of the GIGA School Program Thus Far

We will rapidly provide each student with a computer and develop network environments in schools, which will be used at a full-scale starting from 2021. (Total: 481.9 billion yen)

⇒ **When usage begins, various issues will come to light.**

- Issues (1) ✓ Usage will vary between regions ✓ The network line will be slow ✓ The burden of setting equipment will mainly fall on teachers
- Issues (2) ✓ Insufficient/old computers for instructors ✓ Inadequate environments for online classes Issue (3) ✓ Insufficient introduction of digital textbooks

STEP 2 Implementation of GIGA by Accelerating Support

(Support (1) School operation support, teacher support)

[Supplementary budget amount of 2021 5.2 billion yen]

- We must urgently establish a "GIGA School Management Support Center" that provides one-stop support for schools in each prefecture, and inspect the school network and implement emergency measures simultaneously across the country.

(Support (2) Improvement of classroom environments)

[Supplementary budget amount of 2021 8.4 billion yen]

- In addition to developing environments where not only children but also teachers will have access to computers on a one computer per person basis, we must also support the enhancement of environments where online classes are implemented by providing high-performance cameras and microphones, as well as large presentation devices, etc.

(Support (3) Use of digital textbooks and development of platforms for distributing information)

[Supplementary budget amount of 2021 6.5 billion yen]

- In addition to enabling the use digital textbooks in all elementary and junior high schools, we must solve problems based on actual usage conditions and verify information distribution methods so that digital textbooks and linked digital teaching materials can be used more smoothly.

(* Teaching abilities of teachers)

- Promotion of online training through the use of training videos at the National Institute for School Teachers and Staff Development
- Detailed support and sharing of information on teaching methods by the GIGA StuDX Promotion Team
- The Central Council for Education is reviewing how teachers should be trained, hired, and trained



Respond to issues by working closely with relevant ministries through a cross-ministerial task force, etc.

STEP 3 Improvement/Installation of Networks that Serve as the Foundation of GIGA

By assessing networks and demonstrating the use of digital textbooks, **issues such as network bottlenecks can be visualized**, which allows operators to strive towards improving the foundation by taking measures in response to such issues

<To the Next Development>

- Implementation of digital textbooks based on demonstrations ●
- Digitalization of the nationwide achievement test
- Utilization of education data obtained from the use of one computer per student, etc.



- Based on the results of the 2020 "Demonstration Project for Introducing Advanced Technology in Learning in the New Era", the **Guidebook for Utilizing Advanced Technology in Schools (1st Edition)** was released in March 2021, in an effort to facilitate the **effective use of advanced technology in schools**.

2020



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2021

While looking at the schools/educational institutions that are under an environment where there is one computer per student due to the GIGA school initiative,

Utilization of Advanced Technology

- ✓ **In addition to digging into specific cases**, we also examine **technological trends and cases of use in other countries**. Further, **we enhance points for adopting advanced technology that can be used at schools**.

Utilization of Education Data

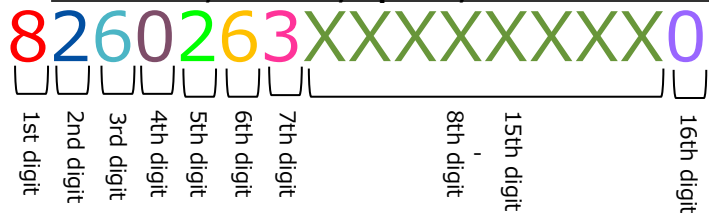
- ✓ **We organize points to keep in mind when handling education data(*)** in municipalities and schools, based on the **cases of advanced municipalities** (e.g.: Method of taking over education data, handling of personal information, and other matters when moving up a grade, entering a higher-level school, changing schools, etc.)

* This is to organize the handling of education data in schools and municipalities, and does not indicate that the government is considering to centrally manage the education data of individuals.

- ✓ **Scheduled to be organized and released as a guidebook within 2021**

What is the Course of Study code?

- It is a **16-digit code** for the Course of Study that is assigned sequentially from the beginning, under **certain rules**.
- As part of the standardization of education data, the **data set was released on the website of the Ministry of Education, Culture, Sports, Science and Technology in October 2020**.



Digit	1st digit	2nd digit	3rd digit	4th digit	5th digit	6th digit	7th digit	8th to 15th digits	16th digit
Classification	Notification time	School type	Subject	Field/subject/category	Goals/contents/handling of contents (major items)	Grade/level	Goals/contents/handling of contents (minor items)	Details	Partial revision

(Image example of the utilization of the Course of Study code)

STEAM teaching materials

(e.g.: STEAM Library)



Contents

Section 1: **Energy related to life and society**
 Section 3: **Basic principles of power generation/storage/transmission** and energy mix
 Section 11: Thinking about energy problems from a **mathematical point of view**

Connect with the Course of Study code

Social Studies

Resources/Energy and Industries

Course of Study Code
83212A3325300000

Science

Energy and Matter

Course of Study Code
8361233711100000

Math

Utilization of Data

Course of Study Code
8350213412100000

Textbooks/teaching materials

Social Studies

Japan's resources and industries

Science

Properties of carbon

Math

Frequency distributions and histograms



This is how learning in class is connected to real-world challenges!

- While engaging in cross-curricular learning under the theme of real-world issues, learners can easily access relevant information in textbooks and teaching materials, which **allows them to use real-world issues as an entrance to understanding the relevance of each subject as they learn**