

記録本文

"Bringing the Subject Closer to Students: Key Elements for a Powerful Project

(Through the Junior High School 1st Year Science 'Living Weeds Project')

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●Introduction

From April to early June in 2023, our school conducted a project-based learning (PBL) activity called the "Living Weeds Project" for the 1st-year junior high school students in two classes (53 students in total). During the science unit on "Characteristics and Classification of Plants," students used weeds to create Ikebana (Japanese floral arrangements) and compiled their works into a book.

Ron Berger (2023) states that a robust project requires the following elements:

- Authentic research
- The power of art
- Modeling
- Multiple drafts
- Critique
- Presentation of the work
- Assessment

We will reorganize our recent practice according to these elements and explore the question, "At what moments does the distance between the subject and the students get closer?"

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Chapter 1: Preparation for the Lesson

Authentic Research ①: Living Weeds

"Living Weeds" is a book that compiles the efforts of Kobayashi, who collected and photographed local plants every day for a year starting in April 2016 and posted them on Instagram. According to the Educational Guidelines (2017), the objectives for first-year students in the field of biology include, "Actively engaging with and scientifically exploring matters and phenomena related to life and the Earth. Fostering an attitude of respecting life and contributing to the conservation of the natural environment, as well as being able to see nature in an integrated manner." Inspired by this book, I thought that "focusing on the small beauties in daily life could be the first step towards an attitude that contributes to the preservation of the natural environment." I conducted an activity where students would experience what Kobayashi is doing and articulate their thoughts in the process.

At the start of the project, we appreciated Kobayashi works and conducted an online interview. During the interview, we discussed the changes that came from continuing to create "Living Weeds" for 365 days (e.g., even in places that initially looked like just green land, plants would pop into view once their names were known) as well as the particularities of creating the works (e.g., photos are taken in natural light without editing, and household items are used as containers). We also talked about the reasons for their favorite works.

Authentic Research ②: Collaborative Design with Local Community

Members

First, believing that students needed an opportunity to encounter authentic Ikebana, we reached out to Takunori Okazaki from the Ikenobo School of Ikebana. We arranged for him to give a lecture on the methods of expressing beauty in Ikebana, as well as technical advice for creating works.

Last year, when I collected plants with the students, I felt that I was unable to fully convey the diversity of plant life in the area. Therefore, we decided to have Yukihiisa Kiyosue, a curator from the Tottori Prefectural Museum, accompany us during our fieldwork (hereafter referred to as FW). In addition, Tottori Prefecture is known for its thriving forestry industry. However, we learned that the children were unable to distinguish between cedar (Sugi) and cypress (Hinoki) trees commonly found in the "mountains." We then reached out to Yosuke Hamada of the Eastern Tottori Forestry Association to obtain offcuts of cedar and cypress for use in Ikebana. We also invited Makoto Kiribayashi from the Tottori Prefectural Forestry Experiment Station to give a lecture on the theme of "Our Connection with Gymnosperms," providing an opportunity to shift the students' focus towards these non-flowering plants as well.



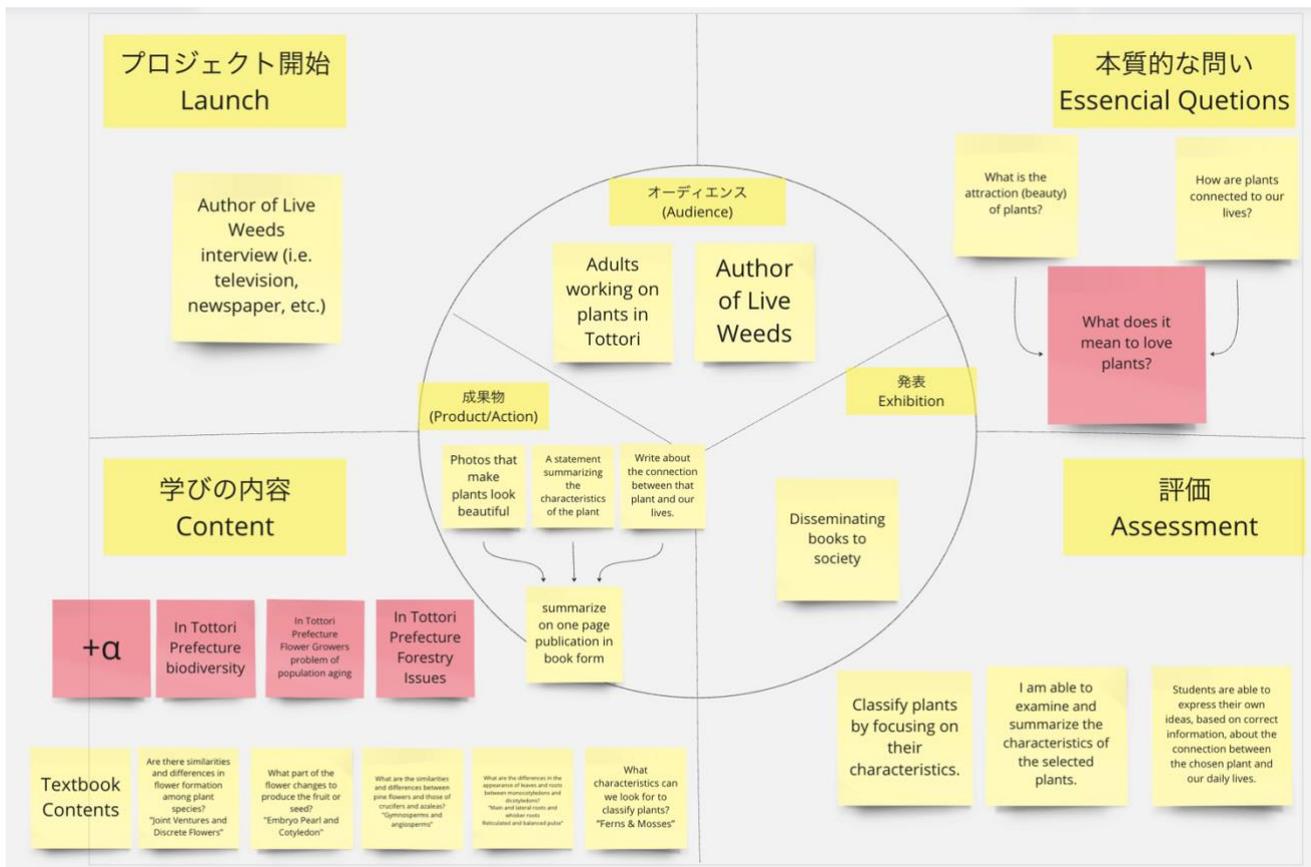
| | | | |
|--------------------|--|-----------------|--|
| トクサ科 | | アカネ科 | |
| スギナ | | ヤエムグラ | |
| ヒガンバナ科 | | カワラマツバ | |
| ノビル | | キョウチクトウ科 | |
| イネ科 | | ツルニチニチソウ | |
| ハルガヤ | | オオバコ科 | |
| スズメノカタビラ | | ヘラオオバコ | |
| キンボウゲ科 | | タチイヌノフグリ | |
| トゲミノキツネノボタン | | オオイヌノフグリ | |
| マメ科 | | シソ科 | |
| コメツツメクサ | | カキドオシ | |
| スズメノエンドウ | | オドリコソウ | |
| カラスノエンドウ (ヤハズエンドウ) | | ヒメオドリコソウ | |
| カタバミ科 | | キク科 | |
| カタバミ | | ヨモギ | |
| タデ科 | | ノボロギク | |
| スイバ | | セイヨウタンポポ | |
| ナデシコ科 | | スイカズラ科 | |
| オランダミミナグサ | | ノヂシャ | |
| コハコベ | | | |
| ミドリハコベ | | | |

(Photo 1)

Top Left: A scene from the planning meeting conducted at our school

Bottom Left: A list of plants found in the fieldwork location, identified during the preliminary survey with Mr. Kiyosue

Project Design and Project Tuning



(Photo 2) Project Discussion Pattern of this Project

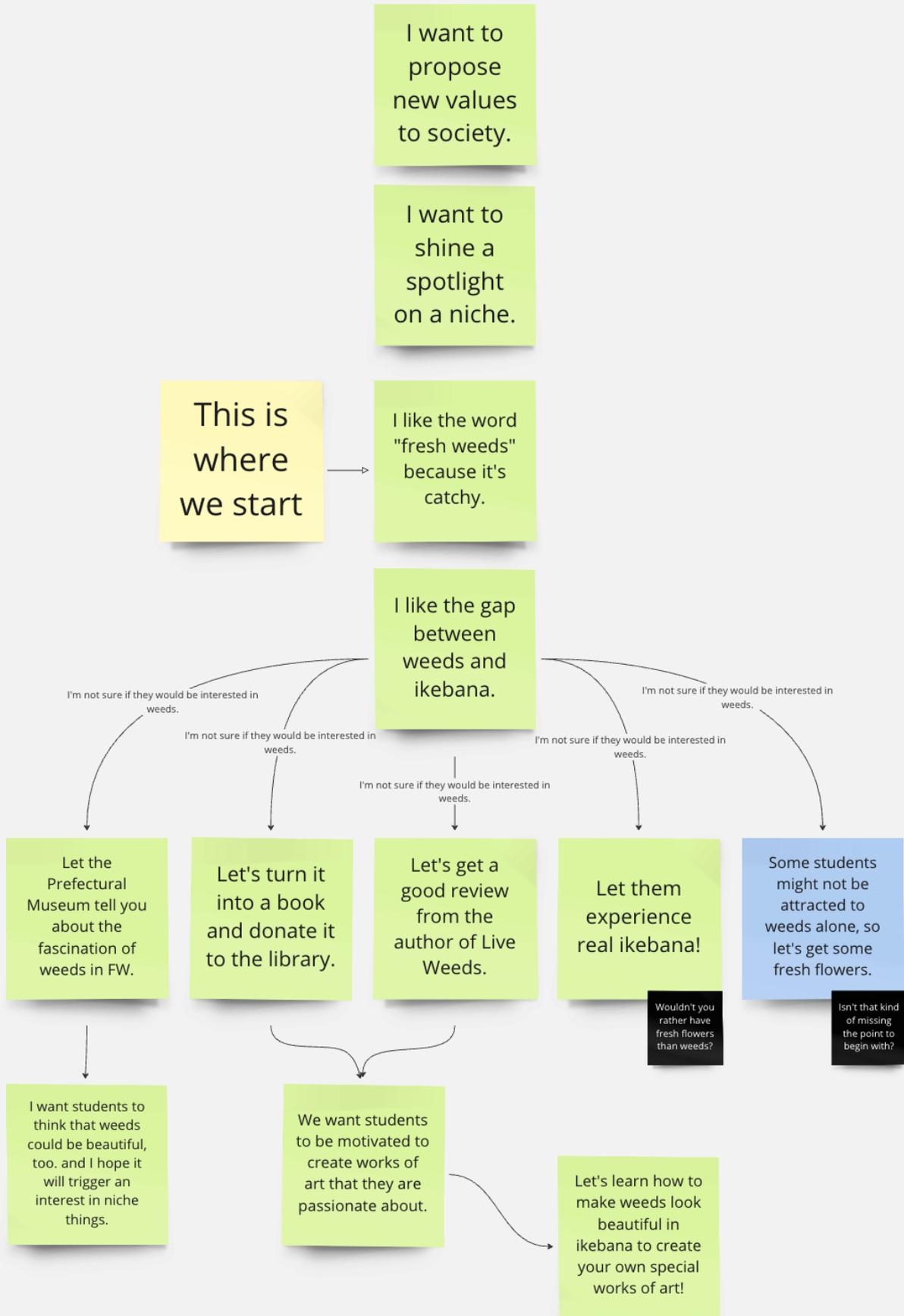
The overall framework of the project was developed based on the Project Discussion Pattern (Fujiwara 2020). In the planning stage, we had concerns about whether we could maintain the students' excitement through the use of weeds. Therefore, we set up a dialogue with acquaintances in the education field about the unit plan, following the project tuning procedures in the translated version of "WORK THAT MATTERS." We discussed how important the sense of distance between the subject and oneself is for maintaining students' excitement. Suggestions like "Is there a connection to daily life, such as edible wild plants?" and "Can one project oneself into the posture of the plants?" were raised. Additionally, the essential question for this project shifted from

"What perspective did the botanist Tomitaro Makino have when looking at plants?" to "What does it mean to admire plants?"

The overt theme for this lesson was, "By paying attention to weeds, one becomes aware of the small beauties in everyday life that were previously unnoticed. To become aware of this beauty, closely observe plants and share the sensation of admiring them." The covert theme was, "By putting the spotlight on something niche, propose a new value standard to society."

Ron Berger (2023) states, "Self-esteem is cultivated in the process of creating good work. High-quality work has the power to bring about transformation. Submitted works that are returned to students often end up in the trash, and truly meaningful works that both the students themselves and those around them can be proud of are rare." Therefore, as a learning task, we decided to publish the students' works into a book to create beautiful pieces that many people can see, thus proposing a new value standard to society.

My thoughts at the time of project planning



(Photo 3) Thoughts Organized Through Project Tuning

Rubric

Based on the content of project tuning, we determined that the moments when the distance between the chosen plants and the individual feels closer occur when a connection to one's own life is discovered. With this in mind, we set up the rubric as follows. Additionally, we consulted with the librarian at our school while creating the rubric and had them prepare bibliographic materials for research on plant classification and the connection between plants and human society (see separate material ① Living Weeds Booklist for reference).

| | Perspective (Learning Objectives) | A | B | C |
|---------------------------------|--|---|--|--|
| Knowledge & Concepts | Domain-specific knowledge and concepts have been formed (evaluated through the work). | Correctly written the Japanese names of the used plants, classification (belongs to the ●● family of -- plants), and structural features (root, stem, leaf, flower). & Included additional information such as strategies for propagating offspring (mechanisms for transporting pollen or spores, mechanisms for facilitating pollination, mechanisms for transporting seeds). | Correctly written the Japanese names of the used plants, classification (belongs to the ●● family of -- plants), and structural features (root, stem, leaf, flower). | Written the Japanese names of the used plants, classification (belongs to the ●● family of -- plants), and structural features (root, stem, leaf, flower), but there are errors or omissions in the information. |
| Critical Thinking | Able to hold a multi-faceted and objective viewpoint and introspect one's own judgment. (Evaluated through the work) | Written thoughts on the connection between the plants used and human society (our lives) based on information from books and personal experience. | Written thoughts on the connection between the plants used and human society (our lives) based on information from books. | Written information about the connection between the plants used and human society (our lives), based on information from books. |
| Expression | Able to visually express thoughts (Evaluated in the report). | Able to explain the following content using one's own work as a subject: "What does it mean to appreciate plants?" · The parts of one's own work that make them proud · How their thoughts on "What does it mean to appreciate plants?" changed before and after the activity · How the change in thoughts influenced the work they created | Able to explain the following aspects using their own work as a subject matter: "What does it mean to appreciate plants?" · The aspects of their own work that make them proud · How their thoughts about "What does it mean to appreciate plants?" have changed before and after the activity | Able to explain the following aspects using their own work as a subject matter: "What does it mean to appreciate plants?" · The aspects of their own work that make them proud |

(Photo 4) Rubric Indicators

Project Plan

The project was implemented according to the following plan.

| | Main Activities: | "Mini-lesson Content" Content for the First 10 Minutes of Lecture | Elements for a Robust Project |
|-------|---|--|--|
| 1.2 | "The Too-Mysterious Evolution of Plants ABD": Division of reading, document preparation | | |
| 3 | Presentation on "The Too-Mysterious Evolution of Plants ABD" | | |
| 4 | "Project Overview Explanation: Online Interview with Mr. Kobayashi, the author of 'Ikezakusa'" | | "Authentic Research" "Model" |
| 5.6 | "Field Work at Waterside Park 1 → Nature Journaling: Instructor: Mr. Kiyosue from Tottori Prefectural Museum" | | "Authentic Research" |
| 7 | Nature Journaling | | |
| 8 | Nature Journaling | | |
| 9.10 | "Ikebana Lecture → Ikebana Experience Using Fresh Flowers: Instructor: Mr. Okazaki from Ikenobo" | | "Authentic Research" "The Power of Art" |
| 11 | Research on the plants used for Ikebana | Features of Leaves and Flowers | |
| 12 | Research on the plants used for Ikebana | <ul style="list-style-type: none"> ・ Differences in the Structure of Peach and Strawberry Flowers ・ How Plantain Seeds Are Dispersed | |
| 13.14 | "Field Work at Waterside Park 2 → Ikezasso 1: Instructor: Mr. Okazaki from Ikenobo" | | "The Power of Art" "Creating Multiple Drafts" |
| 15 | Research on plants → Creating artwork | | |
| 16.17 | "Field Work at Waterside Park 3 → Ikezasso 2 (Using Gymnosperms & Ferns): Instructor: Mr. Okazaki from Ikenobo" | About Gymnosperms | "The Power of Art" "Creating Multiple Drafts" |
| 18 | "Our Connection with Gymnosperms: Lecture → Creating Artwork: Instructor: Mr. Kiribayashi from Tottori Forest Experimental Station" | | |
| 19 | Research on plants → Creating artwork | | |
| 20.21 | "Critique Meeting (Rubric Content Confirmation): Knowledge Confirmation" | About Ferns and Moss Plants | "Critique" "Assessment" |
| 22 | Reconfirming the content of ABD | About Plant Classification | |
| 23.24 | "Field Work at Waterside Park 4 → Ikezasso 3 (Using Ferns): Instructor: Mr. Okazaki from Ikenobo" | | "The Power of Art" "Creating Multiple Drafts" |
| 25 | Research on plants → Creating artwork | | |
| 26 | Research on plants → Creating artwork | | |
| 27.28 | Completion of artwork → Publication → Self-evaluation | | "Presenting the Work" |

(Photo 5) Unit Plan

Trial Implementation of Living Weeds

Before the actual implementation, we conducted a Living Weeds experience with several students. However, some students said, "I was excited before doing it, but the stems are weak and break easily. It's not sticking the way I want, so it's not fun anymore." Therefore, we arranged for technical support from Mr. Okazaki during the actual Living Weeds activity.

Chapter 2: Implementation

Active Book Dialogue

We conducted an Active Book Dialogue (hereafter referred to as ABD) using Professor Inagaki's book "The Wonderfully Bizarre Evolution of Plants," who is a weed scientist. The ABD was carried out in the following sequence:

1. Decide on the chapter to read
2. Read one's designated part and summarize it on 3 to 5 sheets of B5 paper
3. Present the summarized content in a relay format

This book explains plant classification based on the process of evolution and allows for an overall understanding of the field of plants covered in the three years of junior high school. We implemented this activity at the beginning to have students initially get an overview of the unit and become acquainted with key terms. The reason was that we wanted students to naturally learn about the characteristics and classification methods of plants during the process of creating their works.



(Photo 6) Classroom Scene During ABD (Active Book Dialogue)

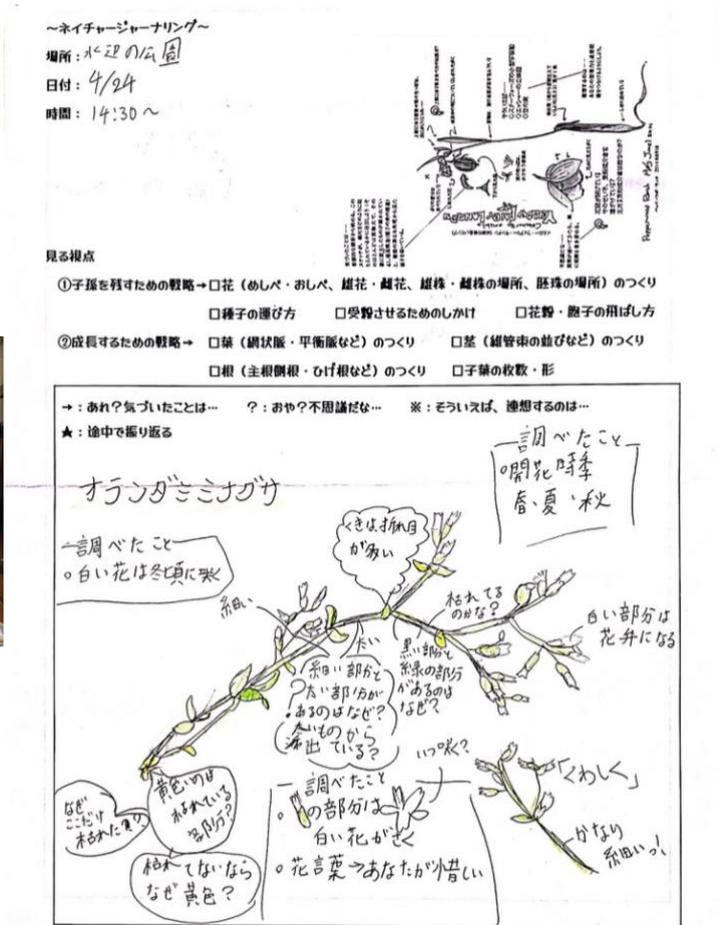
FW → Nature Journaling

We conducted fieldwork (FW) at a waterside park with the theme "Turning an unremarkable, slightly overgrown riparian park into a treasure trove." Under the guidance of Professor Kiisue, the students realized that the types of plants living in the area changed as they moved up the embankment from the water's edge. They then selected their favorite plants and returned to school to engage in Nature Journaling (John Muir Laws 2022).

Nature Journaling was carried out in the following manner:

1. Sketch while considering three questions ("What did you notice?", "What do you wonder?", "What does it remind you of?") and jotting down notes simultaneously.
2. Look up the answers to these questions in a reference book.

One student, while looking at a walnut that had fallen on the embankment, wondered, "Why is there a walnut here? Did a bird bring it?" I suggested, "Let's go look for a walnut tree in the riverbed then. Research what a walnut tree looks like in a reference book in preparation." After school, we went on a search for the walnut tree. We found it a little away from where the nut had fallen, and under it were many more fallen nuts. In the next session, the students explored methods to cleanly crack open the walnut. They then noticed that oil comes out when you scrape the inside, and started sketching while researching what it could be.



(Photo 7)

Top Left: The scene during Nature Journaling

Bottom Left: Lecture by Professor Kiisue

Right: Students' Nature Journaling

The Power of Art: Lecture and Experience in Ikebana

Before proceeding with the "Living Weeds," we conducted a lecture on how to express beauty in Ikebana and an Ikebana experience using fresh flowers. This was aimed to help students understand what aspects to focus on when doing Ikebana, based on my own experience of not knowing what to focus on and therefore not being fully engaged. The concepts of "natural expression (birth and landscape)" and "artistic expression (partial beauty)" discussed in the lecture are deeply related to the learning objectives in the Curriculum Guidelines (2017), which involve "Observing the external morphology of nearby plants and, based on such observational records, understanding the basic structure of plant bodies as well as discovering and understanding their commonalities and differences. Moreover, understanding that plants can be classified based on these commonalities and differences."

After the lecture, students freely arranged flowers and took photos. Since we used fresh flowers instead of weeds on this day, there was a vibrant beauty. At the end of the lesson, we posed the question, "Is this beauty only because we used fresh flowers? Can we also express a unique kind of beauty with weeds?" and this led to the "Living Weeds" activity.



(Photo 8) Scene of the Ikebana Experience Using Fresh Flowers

Multiple Drafts & Assessment: Living Weeds

The Living Weeds activity was conducted three times, following this flow:

1. Collect plants that were liked during the Field Work (FW). For the second time, gymnosperms were prepared, and for the third time, ferns were also available.
2. Observe the parts of the plant that you want to feature, take close-up photos, and use field guides to identify the plant.
3. Perform Ikebana and take a photo.
4. Investigate the classification of the featured plant and its connection to society.
5. Create a work using CANVA.

Initially, there were concerns that students might get bored by repeating the same process three times. However, some students noticed seasonal changes in plants because they went to the same FW location multiple times, saying things like, "The one I picked last time isn't here!" or "There weren't flowers like this before!" As a result, we saw students trying different approaches, such as using plain flowers after using flashy ones the previous time or only using invasive species.

Moreover, we were able to provide feedback to the students from a publisher's perspective, highlighting "what was excellent here" and "what could be improved," and they could use that feedback as a reference for their next project. This was an assessment method that was made possible by repeating the same process multiple times.

Critique & Model: Review Session

After completing the second round of Living Weeds, I felt that if we were aiming for publication, students needed to research their plants in more detail and be more creative in how they photograph them to make them stand out. So, we hastily organized a critique session. First, students admired the photos by Kobayashi-san and considered what was different between their own works and his. We then shared works where the

student's ingenuity was apparent, asked the creator what they had focused on, and had pairs discuss what was excellent about that piece. Lastly, I conveyed, "A Living Weed only becomes a piece of art when captured in a photograph. To truly express the beauty of the plant in a photo, I want you to be more creative in how you express yourselves."

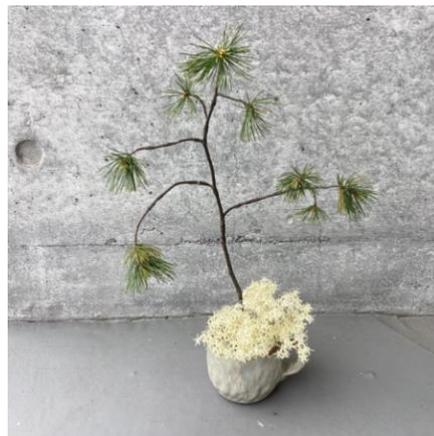
As a result, in the third round of Living Weeds, there was a noticeable increase in works that had creatively addressed "how to make the plant look beautiful," such as pieces where white sand was laid down as a base or where sunlight was utilized.

Presenting the Work: Publication

Students who finished their works early proceeded with organizing and publishing them through CANVA. Following suggestions like "let's include what we've done so far," materials created in class such as Nature Journaling were also added, leading to the completion of the book ([see additional document ② for reference](#)). After class, the completed works were added to the school's digital library.



(Photo 9) Scene from the Living Weeds Class



(Photo 10) Photos from the Third Round of Living Weeds

Chapter 3: Reflection

After the project was completed, I asked the students to articulate the changes in their thinking regarding the question, "What does it mean to admire plants?" and how this change impacted the work they created. Here, I will introduce the reflections of three students, along with the photos of the Living Weeds they created. The depth of the students' thought processes and their dedication to the work come through clearly.

| Reflection Content | Submitted Photos |
|---|---|
| <p>"Before the activity, I thought that appreciating plants was difficult and not something I could do. But after the activity, I think it means facing plants with the same value system as us humans. I also think it means recognizing and accepting that there are many types of plants. I experimented with using completely different plants or similar ones, but in the end, I felt that using completely different plants—those differing in color, leaf size, and shape—was the best. I think I was able to make a good piece because I accepted the individuality of each different plant."</p> |  |
| <p>"Before the activity, I thought that if I could appreciate the current state (at the time of collection) of the plants, that would be enough. But now, I feel that appreciating plants is not just about their appearance at the time of collection, but also about loving their natural progression and growth. Initially, I was focused on finding beautiful flowers during fieldwork, but now I can feature plants that seem a bit different from the others, plants that are unique."</p> |  |
| <p>"Before the activity, I thought that simply directing my attention towards beautiful flowers and arranging them would be considered appreciating plants. However, now I think that it's not just about beautiful flowers; it's also about loving them in their natural state, including their leaves and bent stems. I also think it means deeply understanding the plants. At first, I thought 'it has to be beautiful,' but gradually I started to arrange the plants in a way that brings out their natural beauty. I was also able to arrange them using various methods and containers, not just flower vases."</p> |  |

●Conclusion

I would like to analyze the answers to the question I asked the students, "What contributed to your increased motivation?" in line with Ron Berger's (2023) elements of a powerful project.

- "Real Research" resonated when students "heard from people who work with plants and when they went out themselves to find plants they liked."
- "The Power of Art" was felt when students "had a rich array of choices (both plants and containers) and could freely express their own sense of beauty."
- The "Model" element was engaged when they "saw many beautiful works created by professionals (such as Kobayashi's Instagram)."
- "Critique" was meaningful when they "appreciated the beautiful work of someone close and heard their thoughts."
- "Presenting the Work" mattered when they "heard that their work would be published as a book."
- "Assessment" and "Creating Multiple Drafts" were important when they "had someone nearby to ask when they were struggling with methods (arrangements) and knew they could redo it after being assessed."

Additionally, there were answers like "discovery" when "they noticed things about plants they hadn't noticed before," and "curiosity" when "they had questions while researching or observing plants."

Based on these powerful project elements, it seems that coming sufficiently close to the subject matter leads to "personal discoveries" and "personal questions." To provide such experiences to more students in the future, I would like to continue creating beautiful works with them, fostering their self-esteem.

(作成年月日) 令和5年9月5日
(名前) 松永 悟郎

Resources

- ・ロン・バーカー 著、塚越悦子 翻訳、藤原さと 解説（2023）『子どもの誇りに灯をともし－誰もが探究して学びあうクラフトマンシップの文化をつくる』英治出版
(Ron Berger 『An Ethic of Excellence』 Heinemann)
- ・小林南水子 著（2017）『生け雑草』柏書房
- ・文部科学省（2017）中学校学習指導要領
- ・藤原さと 著（2020）『「探究」する学びをつくる－社会とつながるプロジェクト学習』平凡社
- ・森尾早百合／中庭廣子／岩田龍明／藤澤佑介 翻訳、三原菜央／岩田岩田龍明 編集『WORK THAT MATTERS～先生のためのプロジェクト・ベースド・ラーニングの手引き（翻訳版）』
- ・稲垣栄洋 著（2021）『植物たちのフシギすぎる進化－木が草になって本当?』筑摩書房
- ・ジョン・ムーア・ロウズ 著、杉本裕代／吉田新一郎 翻訳（2022）『見て・考えて・描く自然探究ノート－ネイチャー・ジャーナリング』築地書館