

# Development and Practice of “RIKADOKU” Program for Biological Education of the Early Year Children

-Case Studies about “the Similarities and the Varieties of the Citrus Fruits” based on Japanese Culture-

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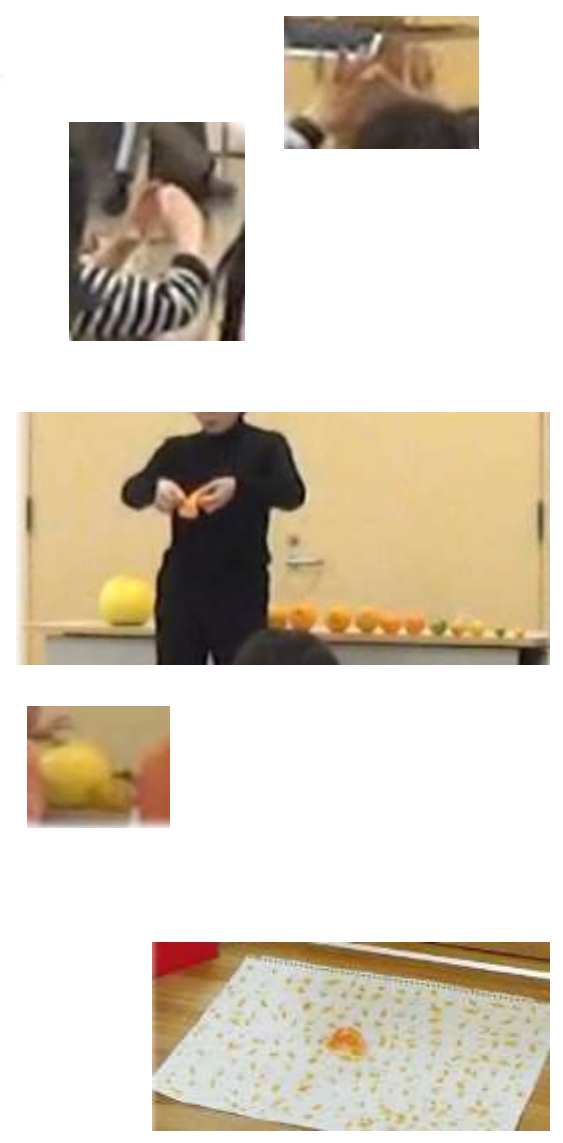
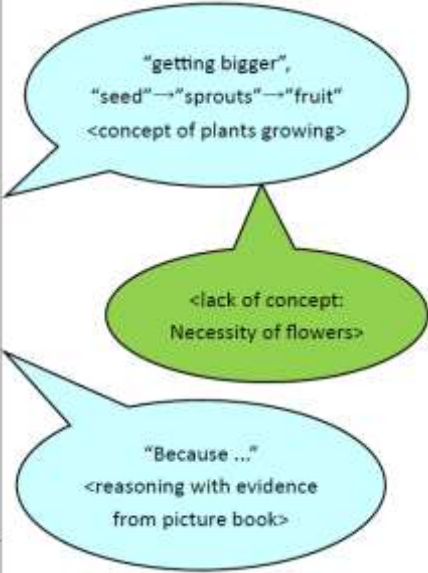
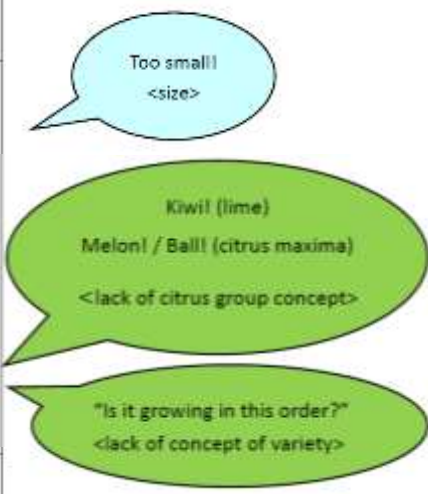
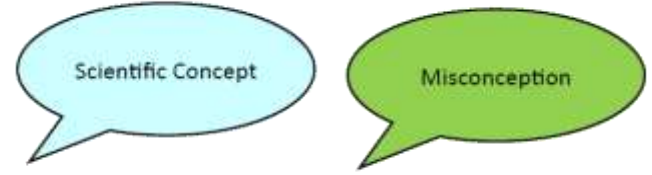
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In the former research, we designed the programs of “Air” and “Light and Shadow” and clarified through the programs that the early year children have the incipient scientific thinking (Ohnuki et al., 2016). As we can find citrus tachibana in “Chronicles of Japan”: one of the oldest official national histories of Japan, the citrus fruits are ingrained in Japanese Culture. In Japan, a varieties of citrus fruits are available all year round. In addition, there are the customs to eat “Mikan (satsuma orange)” and to take “Yuzu-Yu (the bath with *citrus junos*)” in winter. In this research, “RIKADOKU (science education using the books)” (Takikawa, 2010) program for understanding the similarities and the varieties of the citrus fruits is developed based on those Japanese backgrounds. **The observation** of the real citrus fruits, **reading aloud** of the picture books, and **the interchange with the teachers** are included in this program. It consists of 2 parts: “**the similarities and the varieties of the citrus fruits**” and “**the fructification process of the citrus fruits**”. In the former part, the picture book “*みかん (satsuma)*” were read aloud for remind of children’s experiences. Then, they observed 16 kinds of citrus fruits to figure out their similarities and the varieties. After that, in the latter part, children learned the fructification process of satsuma through the observation of the inner structure. At the last part of this program, another picture book “*みかんのひみつ (The Secret of Satsuma)*” was used for enriching their understandings. The practice was held at 3 public nurseries in Tokyo. Through this practice, it was clarified that the children could figure out satsuma from a variety of the citrus fruits. However, several children mistook lime as kiwi, and citrus maxima as melon. Hence, they had not had the image of the difference between the citrus fruits and other fruits. For those children, the second book was efficient to notice the similarities of the various kinds of

**Target (Required Time)** 4 year olds (about 30min) / 5 year olds (about 40min)

**Practice** (Underlined: only for 5 year olds)

min.	Support by teachers	Children activities
5	<p><b>[Introduction] Prompt children to recall their experience about citrus</b></p> <p><b>&lt;Read aloud&gt;</b></p> <p>Picture Book 1 “<i>みかん</i>” (by Reiko Nakagawa, illustrated by Yuriko Yamawaki, Fukkan.com, 2008)</p> <p>Q: Did you eat citrus in winter vacation?</p>	<p><b>[Introduction] recall the experience about citrus</b></p> <p>“Yes”, “I ate.”</p>
10 15	<p><b>[work①] variety &amp; similarity of citrus</b></p> <p>Q: Which size is similar to those you’ve eaten? (showing the smallest KINKAN)</p> <p>Q: Like this? (Show citrus fruits in order of size) citron, sudachi, lemon, lime, cabos, satsuma, ponkan, orange, dekopon, grapefruit, hassaku, natsudaidai, oniyuzu, zaban, banpeiyu</p> <p>“All of them are citrus fruits, instead of the difference of their tastes and the size.”</p>	<p><b>[work①] variety &amp; similarity of citrus</b></p> <p>“about this size” (expressing size with hand gesture)</p> <p>“No.”, “Too small.”</p> <p>•try to tell teachers the name of citrons.</p> <p>Q: “Is it growing in this order?” by 4 year old boy (Nursery A)</p> <p>“They are all the group of satsuma” 5 year old boy (Nursery B)</p>
10	<p><b>[work②] fructification process</b></p> <p>Q: Have you ever peeled Citrus? Q: When you peel it, how’s inside? (peel satsuma from the bottom and make white strings remain)</p> <p>Q: Have you known that there are white strings inside? “There are many sacks, and each of them connected to a white string.”</p> <p>Q: Where did the Calyx connected to? •Ask children to explain about the fructification process in their works</p> <p>(After children’s comments--)</p> <p>Q: Before the fruit? Q: Do you know what color the flower is? Q: Where the fruit connected to? Etc. ...</p> <p>The white strings transport nutrition to each sack/ the fruits bear after the flower/ they are getting bigger</p>	<p><b>[work②] fructification process</b></p> <p>“Yes” / nodding</p> <p>“something small--”</p> <p>“there is something like a hair--”</p> <p>•nodding</p> <p>“It’s like roots” 5 year old boy (Nursery B)</p> <p>“Tree”</p> <p>“First it’s small, and getting bigger” 4 year old (Nursery A)</p> <p>“the Seed sprouts, and is getting bigger, and becomes fruit” 5 year old (Nursery A)</p> <p>“flower”</p> <p>“?”</p> <p>“Tree. Because Ground-Ma took it from the tree.” 5-year boy (B)</p> <p>“stalk”</p>
5 10	<p><b>[Conclusion] Make children realize that the citrus are the fruits covered the seeds, the fructification process, and there are many kinds of citrus.</b></p> <p><b>Read Aloud</b></p> <p>Picture Book 2 “<i>みかんのひみつ</i>” (photograph by Shiro Iwama, Hisakata Child, 2007)</p> <p><b>•Introduction of other related books</b></p> <p>“Let’s talk to your family.” (provide chance to extend their experience, and to express their understandings or interests about citrus with words)</p>	<p><b>[Conclusion] Realize that the citrus are the fruits covered the seeds, the fructification process, and there are many kinds of citrus.</b></p> <p>(while listening)</p> <p>•recall the program, and confirm their understandings about the citrus.</p> <p>“It is white!” (Confirm the color of the flower) 5 year old girl (Nursery A)</p> <p>•Find the books want to read</p> <p>•Wish to find in their daily life the citrus fruits and to observe that the fruits bear after the flowers.</p>



## Reference

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