

VEGETABLES - A HANDS ON PROJECT

Summary

A teaching concept has been developed by the School Biological Centre in Hannover (Schulbiologiezentrum Hannover) which aims to raise the environmental awareness of adults and children.

The school proposes an educational framework which uses seven integrated "fields of experience", it takes into consideration that everyone experiences the world differently, both intellectually and emotionally. The project described below uses vegetables to illustrate this educational framework.

Introduction

How do we make children and adults aware of the problems facing our environment, so that they feel personally involved? How do we convince them that they are themselves responsible for taking part in the care of the environment?

The founders and the staff of the School Biological Centre in Hannover believe that to achieve this students cannot only learn scientific skills - they need to feel emotionally affected as well. One way is to use an intergrated teaching approach such as the one developed by Winkel (1990) who equally emphasizes mental, emotional and manual skills.

Two definitions of an integrated teaching approach will be considered here:

1. **Self integration.** As every person experiences life mentally, physically and emotionally it is appropriate to direct teaching towards the whole person, not just towards certain parts of a person.
2. **World integration.** Everyone is an integral part of the environment. Teaching has to consider the environment as a whole first and then later analyse the integral parts to rebuild them.

The concept of "Fields of Experience"

Winkel and others (1990) developed a concept which provides a framework for integrated teaching. The aim is for this concept to be used as an aid to stimulate the imagination of teachers and group

leaders. For any given topic there are often many different viewpoints all of which result in different teaching approaches. However, when one experiences the environment, similar areas can be identified which Winkel calls "fields of experience" ie:

1. five senses of perception
2. games
3. aesthetics and fine arts
4. natural sciences
5. practical applications
6. representation
7. social and cultural importance.

Winkel suggests that these "fields of experience" need to be thought about and incorporated into lesson plans wherever possible. They are considered important for the development of standards and rules which lead to future stimulation of action and will be more successful in increasing students motivation.

The concept of the "fields of experience" is not a complete system. It is possible to argue that the number and the sequence of "fields of experience" are interdependent and cannot therefore be completely separated from each other. The system needs to be regarded simply as a framework which invites teachers to be creative, to use different viewpoints and to plan an integrated curricula. *Vegetables - a Hands on Project* will be used to explain this concept.

This project is not fixed, it consists of a collection of already proven ideas and is, as such, open for development. It serves as a stimulus for teachers to organize a concrete lesson plan centred around the topic of vegetables or gardens.

Certain factors, such as age, have to be taken into consideration when addressing a specific group, but the concept can be used for all ages, from elementary school students to adults.

During the workshop in Utrecht only seventy five minutes were allowed for the presentation of the project. The people who took part were only able to sample a small amount of materials presented.

Vegetables - a hands on project

Events that happen every day are often so familiar to us that they are overlooked. Vegetables belong to everyday experiences and are an essential part of our daily diet. However, in school they are often only studied as a topic by elementary school students, for example Exploring a Farmers Market, but rarely are vegetables discussed on a biological level and even more rarely are they used as a theme within an integrated teaching approach; an approach which will be suitable not only for elementary school students, but for all age groups as well.

As this paper does not allow for a detailed description of how to organize the Vegetable Project, only a few elements and steps will be explained.

Although the stated order of the "fields of experience" appears didactically to make sense, and after testing has proven to be functionable, one does not have to stick to the specific order and can limit the number of species of vegetables to a few examples or to one group of vegetables (e.g. pumpkin, melon, egg-plant (aubergine), courgette (zucchini), tomato, peppers, cucumber). Creativity has no limits when it comes to letting the students experience the subject-matter intensively and in-depth.

Materials

Have available the following materials:

- At least two of each vegetable for each student.
If possible chose different coloured vegetables.
Shop at the farmers' market, local store or harvest vegetables in the school-garden or botanic garden.
- One white sheet, a cooking knife, a cutting board, pencils, coloured markers, crayons, dye, watercolours, paintbrushes, paper, material, glue
- Magnifying glasses and chemical indicators
- Kitchen utensils, dishes, and cutlery
- Spices, sugar, salt, vinegar, etc.

Fields of experience 1 and 2

Five Senses of Perception and Games

Introductory Game

Before the participants arrive, put various kinds of vegetables on the table. Allow at least two of each vegetable for each participant. Cover everything with the large sheet. Ask all the participants to sit around the table and to reach under the sheet and touch the vegetables.

Ask them to identify the vegetables without calling out the vegetable's name. Nothing else apart from the form, shape and surface texture of the vegetables can be described.

From this the participants can be asked to collect a certain species of vegetable. With the vegetables still hidden under the sheet, they have to describe them and guess what is being handed to them.

The players are then asked to close their eyes while the leader pulls away the sheet. When the participants open their eyes encourage them to see whether the vegetables have been sorted correctly and whether there any vegetables remaining. Often their first impression is of the diversity and intensity of colour!

Suggestions for other activities

- guessing-games and identification-games with covered eyes, like those described by Cornell (1979), identifying vegetables by smell and taste
- memory games, inventing puzzles
- making musical instruments
- word games: riddles, scrabble, dominos
- rhymes and stories, making up adverts, stories or fairy tales
- carving of pumpkins into jack-o-lanterns (the fruit pulp can be used later)
- stories such as "Gurkenkönig (king of cucumbers)" (Lohf and Sailer, 1985) or the "Bohnen-Jim" story (Nüstlinger, 1986) can be dramatized.

Field of Experience 3

Aesthetics and Fine Arts

- draw pictures of vegetables with pencils, and/or coloured pencils and crayons
- make watercolour paintings of vegetables
- draw and paint pictures of vegetables using just various shades of one colour (e.g. green)
- decorate pumpkins or gourds
- print with half vegetables (red cabbage, brussels sprouts, cucumber, pepper, egg-plant) using either their natural colours or artificial colours
- print cloth (shopping bags) with vegetables and dye
- arrange and draw a still life
- use dried pumpkin seeds to make seed pictures
- model vegetables out of wood or clay
- look at pictures of paintings, in which vegetables are depicted, e.g. Arcimboldo, genre-paintings, still life of the 16th and 17th centuries, Max Liebermann, Picasso, and other modern painters.

Field of Experience 4

Natural sciences (measuring, analysing, counting...)

- look at structures of fruits with their placenta, ovule, and pericarp, the development of seed after fertilization of the flower (Rauh, W,1950)
- observe the development of a plant (scarlet runner) from seed to fruit (Strasburger, et. al., 1983)
- study and observe the life cycle of a cabbage (Winkel, ed., 1989)
- look at which parts of plants are edible
- compare various types of tomatoes focusing on propagation and genetics (including the effects of mutations (Winkel, ed., 1989))
- measure and compare the percentage content of vitamin C and nitrate in various vegetables using chemical indicators; sugar with Fehling's solution, starch with potassium iodide-solution
- determine the water content of various vegetables
- weigh and measure the giants to the dwarfs

- plant systematics (phylogenetic tree) - work out a simple classification for trees

Field of Experience 5

Practical Usage

- test vegetables with your nose and tongue (ie. smell and taste)
- decide which vegetables need spices
- decide which vegetables need further preparation before being eaten
- observe the changes that take place when cooking or stewing vegetables
- make salads
- create recipes and trying them out
- decide what vegetable matches what (regarding taste and colour)
- look at the significance for a balanced diet (vitamins, minerals)
- plant recommendations - looking at what grows well together
- wash, dry, sow, prick out, plant, cultivate, harvest, and process vegetables

Field of Experience 6

Representation

- create a play. For example how a scarlet runner develops (Grothe and Schultz, 1988)
- create a play showing various areas of conflict (see next field of experience)
- have a panel discussion
- make a map, e.g. vegetable planting in our community
- exhibit and demonstrate the results of other "fields of experience"

Field of Experience 7

Social and Cultural Importance

- research how long a particular species of vegetable has been in your country and where it originally came from (Franke, 1985)
- research the history of vegetable growing and distribution

- look at vegetables in mythology and religion (e.g. peas as a symbol for Mary or the former condemnation of the tomato as a devilish fruit by the Church)
- look at cultivation here and in other countries. Look at how old the market is (e.g. tomato growing in Italy, or a younger example, pepper growing in Hungary)
- look at the influences of cultivation on the economy and ecology of a country (Makowski and Buderath, 1983)
- calculate production statistics
- compare market prices. Look at how and when bargain or sale prices are offered. Look at how bargain prices effect the economic conditions of the consumer and the domestic vegetable farmer
- look at the effect on the economy of the cultivating regions due to changing consumer habits and/or marketing strategies (eg.change in transport)
- look at the ecological effects of specific cultivation methods (e.g. large monocultures in greenhouses, soil changes in tropical areas)
- look at alternatives to over-fertilization, landscape sealing and energy consumption in countries that cultivate in disadvantaged climates
- look at how eating habits have changed due tourism and the immigration of people from foreign countries.

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Schulbiologiezentrum Hannover, Vinnhorster Weg 2, D-3000 Hannover 21, Germany