From the school yard to the world

Age-group: 3-6 years old
Number of hours: 15-20 hours
Short description of activity: (max. 4 sentences)
The young children think about how to beautify/embellish the school yard greening it. They explore the space, the needs of the plants as living beings and decide what and where plants. They celebrate the new green area in the school for the wellbeing of the planet, as an action for biodiversity and the climate too.
CT-competences:
- Abstraction
- Pattern Recognition
- Algorithms
- Data collection
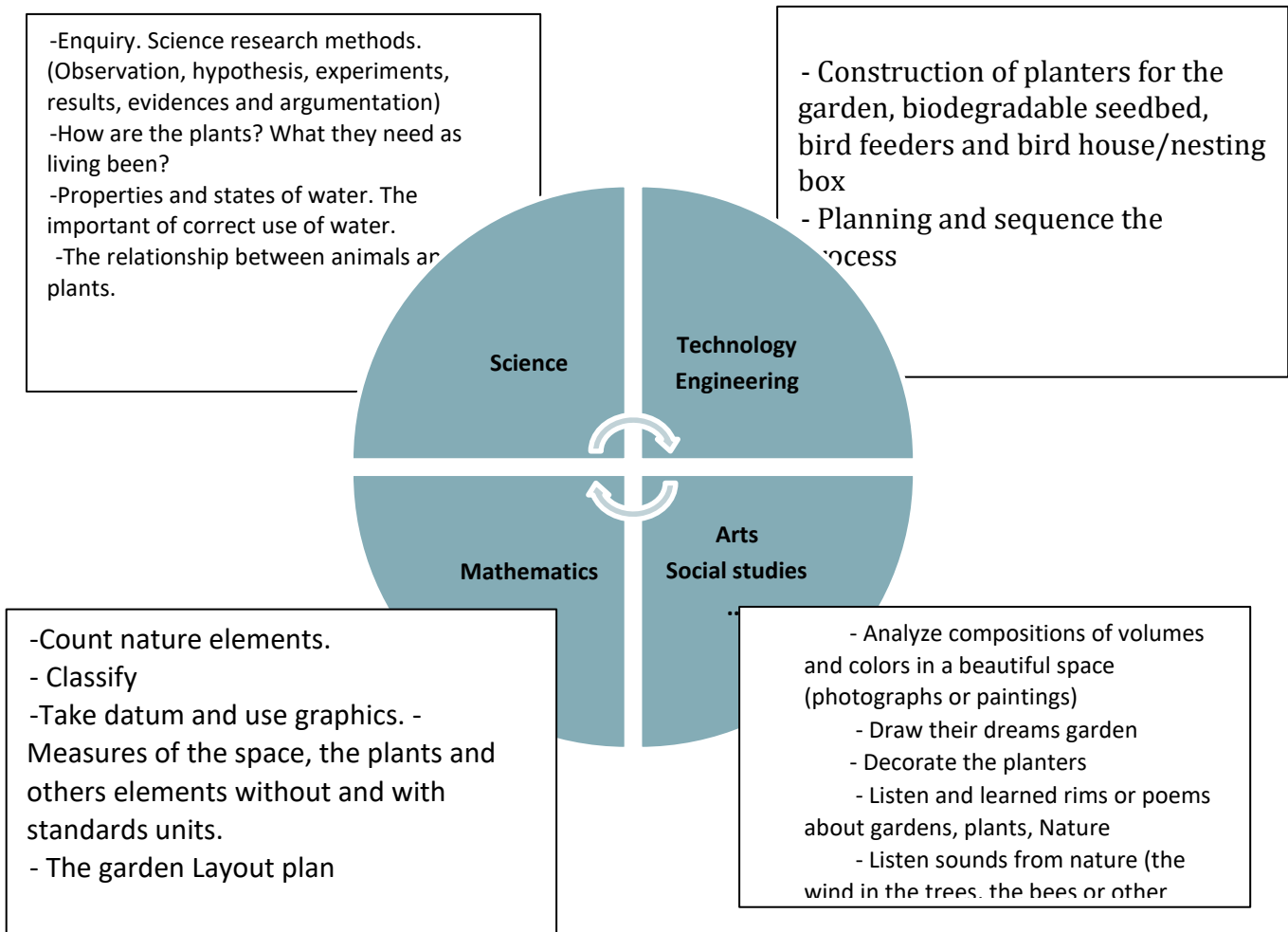- Data analysis
- Problem decomposition

Goals

(summary of the most obvious goals in clear language)

- Create a new green area or expand the green areas of the school yard.

Realistic STEAM-context

(short description including problem(s) to be tackled)

Children have to create a new and beautiful space for animals to live (Story tales of Maya the bee or Juanita can be the motivation and engagement elements)

-Enquiry. Science research methods. (Observation, hypothesis, experiments, results, evidences and argumentation)
-How are the plants? What they need as living been?
-Properties and states of water. The important of correct use of water.
-The relationship between animals and plants.

- Construction of planters for the garden, biodegradable seedbed, bird feeders and bird house/nesting box
- Planning and sequence the process

Science

Technology
Engineering

Mathematics

Arts
Social studies

-Count nature elements.
- Classify
-Take datum and use graphics. -
Measures of the space, the plants and others elements without and with standards units.
- The garden Layout plan

- Analyze compositions of volumes and colors in a beautiful space (photographs or paintings)
- Draw their dreams garden
- Decorate the planters
- Listen and learned rims or poems about gardens, plants, Nature
- Listen sounds from nature (the wind in the trees, the bees or other

Methodology

The following information shows the activities of the project. Some of them are optional and the project can be carried on without them, but they complement the contents and competences written in the curriculum, so, it's recommendable to try to do them. You can distinguish this activities because their title is green and also remarked.

Part	Description	Timing (sessions)
1	**Explore the yard** The teacher read a letter from Maya the bee/Juanita the ladybug asking for help from the children. The students explore the yard to find a good place for Maya/Juanita. Create a new garden, in case the school hasn't had a garden previously, or improve the garden if the school has had a garden previously. The students, in small groups, take data of the conditions of the garden after summer time.They will have a template to register. The template will have drawings of the different plants and they can put a sticker red for the	1

	bad ones and green for the good ones (the template can be seen in the folder/additional materials). CT. Data collection & analysis	
2	**What are the plants like?** At first, students are asked to do a "I see, I think, I wonder" (Template in Support materials) routine with some photos of different living beings (the routine can be found in tips and tricks). In this routine, teachers should guide students to talk about the living beings and the differences between a plant and an animal. Second, students have to do the "Compare and contrast" routine (the routine chart can be found in Support materials). With this routine students are asked to find the similarities between some plants that are given (these plants can be chosen from the garden, from a photo, etc.). Once the routine is done, students should extract the main characteristics we can find in plants, like form, parts, colours, leaves… in order to make a chart to classify any plant. With this chart, students have to find the patterns of the plants in their school or nearby environment, to talk about them in a big group in the class. CT. Abstraction	1
3	**Story: The little tulip** Artistic introduction with the animation: "Story of flowers" or "Story of flowers 2" (links below -Support materials-) With the "The little tulip" story or similarities, students are introduced to the growing plant world. With this story they learn how to order the steps to grow a seed and the temporal sequence of the flower growing. (you can find more info about "the little tulip" in the following folder: https://drive.google.com/drive/u/7/folders/1MsfoCzZ0E_ww0Fq5aHuw2pkKfEjxXqVD) If the school has a beebot (or similar), the teacher can make a path and ask the students to use the beebot to go to the different steps to grow a seed with the beebot. (See a beebot path in Support materials) If the school hasn't got a robot to make the activity, students can make the path with their own body and movement, acting as if they are the robot. The most important thing is to remark on the CT process. CT. Algorithms & procedures	1

4	**Needs of plants**	1
	Students have to do a brainstorm under the question "What do plants need to live?" At this point, teachers can make students think about the differences between the different living beings.	
	From this brainstorm teacher can extract the main ideas, dividing the big problem (plants needs) into smaller problems (place to put the plants, how much water plants need, which soil have we got to use…).	
	Once the teacher has divided the main problem into smaller problems 3 groups have to be done. Each of these groups have a "secretary" who has the QR reader.	
	For each group there are some images they obtain by reading different QR codes, and they have to write the initial letter of what is represented in the image. When they have all the letters they have to sort it to make "water", "soil" or "light".	
	When all of the groups have the complete word, we put together all the students again to reflect about the three requirements.	
5	**The hotbeds workshop (Optional activity)**	1
	Each child will make their hotbed with a roll of toilet paper. The session will begin by introducing the children to different common waste materials (a plastic bottle, a roll of toilet paper, a can of tuna, a brick of fried tomato…). From there, discuss in a large group the characteristics of each one, thinking about what materials they think could be biodegradable (think about the meaning of this term and define it together with the teacher's guidance). The teacher could dip the different materials in a bucket of water and see what happens. Probably, students will immediately notice that the roll of paper begins to deform, to absorb water … The teacher will guide them in the decision to choose the toilet paper roll to make their hotbeds. (The cardboard is biodegradable and you can transplant the seedling directly into the ground, without the roots suffering).	
	After that, teachers give instructions to the students to make a hotbed. With the cardboard of the toilet paper each student has to make, at least, one hotbed as the teacher has shown. (See pictures below, Support materials) At first, students have to write/draw/pictograms and sequence (depending on the level of the students) the steps to make the final product, trying to make a written "algorithm" (sequence of steps) to craft a hotbed.	
	CT. Algorithms & procedures	

6	**Making our indagation with the hotbeds**	About 1 session each week
5	Once they have all of the hotbeds (if you have skipped the previous session, you can use other material or do it by yourself), the teacher shows the enquiry process: students will study 4 characteristics of the plants: Water, soil, light and biodiversity. To study these characteristics teachers have to divide the class into four teams, each one will experiment with one variable through some weeks. Each group have to focus on:	
	● Soil team: The water and the light will be constant. They change the hotbed, trying to grow plants in soil, in cotton, in mulch and in sand. ● Light team: The soil and the water are constant. They change the exposure time to light, moving the plants to some places with different light hours/no light places. ● Water team: Soil and light are constant. Students have to decide how much water and in how much time (a cup each day, a cup each week, half of a cup each 2 days…) ● Biodiversity team: Soil, light and water are constant. This team has to plant different seeds (fruits, vegetables, forest trees such as oaks, pines, holm oaks…).	
	To make this process visible for all the students, the teacher prepares a big cardboard with a grid to write the detailed observations and the doings they are making with the plants on the corresponding day.	
	During some weeks, students should visit their plants and write the main things about their growing in the big cardboard. Once they have enough information (after some weeks) they are asked to extract all the information to present it clearly to the partners in the class.	
	CT. Data collection, Data analysis	
7	**Workshop bird feeders and nesting boxes/birdhouses or insects hotels (optional activity).**	1-2
	Depending on the age, students can craft a bird feeder/bird boxes for their garden, studying some physical concepts such as equilibrium, matter properties (sticky, heavy…). It's recommended to use recyclable materials. Below, in support materials, some ideas can be seen. As in the activity 5, algorithmics can be worked with the same method.	
	CT. Algorithms & procedures	
8	**Measure the garden**	1
	In groups of 3, children will use their feet or steps to measure the space available.	
	When realizing that body parts are not universal, they have to try to use a single object (a pencil/pen/stick for example, but any object can be used) to measure the space.	

	Once they have measured, they will realize that the measure in "pencils" is not the best way to express the distance, so the teacher can introduce the meters through the metric tape.	
9	**Deep in the garden (Optional activity)** Teachers have to prepare some recorded sounds from different natural elements, like water sounds, bird sounds… to make students think about the sounds they want to hear in a garden. Students have to replicate the sounds shown by the teacher, repeating the onomatopeias they hear. The garden should be understood as a set of real sounds. In this activity we should work with the concept of "sound space", taking into account the self perception of the students about the sounds they hear and the feelings they sense about the sounds. After this, with the whole class, the teacher has to go to the school yard and ask the students to smell the different plants, so they can reflect about the differences between aromatic plants and non aromatic plants. If the school doesn't have aromatic plants, the teacher should bring some containers with this kind of plants. This activity can be done blindfolded if the teacher considers it necessary. CT Pattern recognition	1
10	**Knowing other gardens/Artist´s gardens (Optional activity).** Two options: In the big group, the teacher gives students some images of different gardens. These images should be commented on with the students to make them reflect on the different aspects of the garden. (See link below with examples) Students are asked to see and analyze different paintings of some artists in which we could see gardens in order to extract ideas to design our garden (see links below) CT. Abstraction	1
11	**Designing our garden (Dream our garden)** With all of the information students have acquired in the previous sessions, they have to make a garden design. With environmental music, they are asked to make a first draw of their garden, placing the plants and the feeders for the animals.	1

	Finally, with any technique (collage, painting, making a real model…) students have to complete their garden, reasoning why they put each object in each place.	
12	**Presenting our garden** With the product made in the previous session students have to prepare a brief speech to present it to their parents/relatives/partners showing what they have learnt and the final design of the garden.	1-2
13	**Improving our own garden** With all the experience acquired, students, in groups of 3, are asked to reflect about the school garden and propose some improvements we can do to make it better. They could plant the seedlings of the seeds that have survived after the experiment of the absence of some of the properties. They could also make a selection of some vegetables, flowers and aromatic plants that they would like to have in their garden and plant them.	2-3

Organization

Support Materials:
1.- Conscious registration chart (in the Support materials folder)
2.- "I see, I think, I wonder" and "Compare and contrast" templates. These templates can be discharged or copy-pasted to make them bigger to print. Both routines have to be done with the whole group and the teacher has to guide the students.

3.- Introduction of the sesion: "Story of flowers" (3 minutes)
https://www.youtube.com/watch?v=vDpFyHmt0AE
- Little tulip story
- Alternative option: "The apple and the butterfly" (A storytale without words 2 minutes)
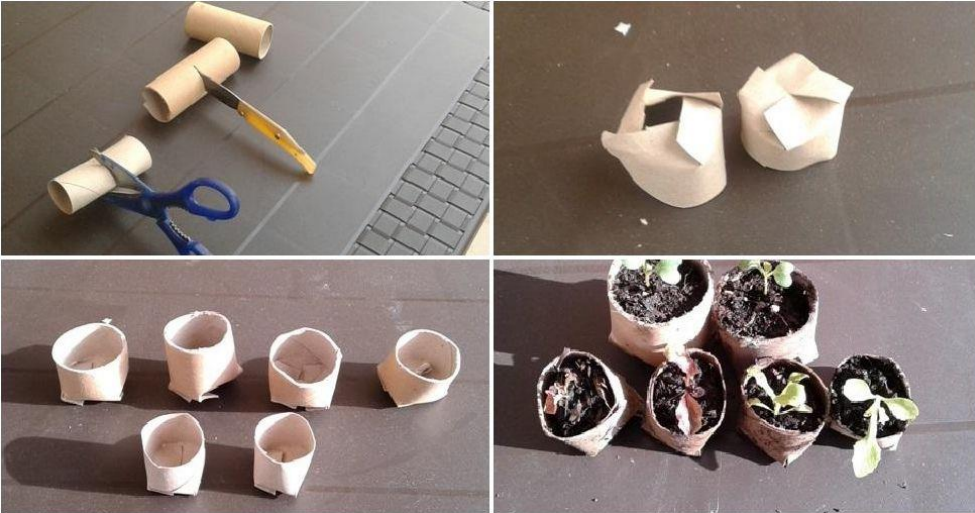 https://www.youtube.com/watch?v=blw_NdysgGM
Path for algorithm (bee bot or a classmate) Scratch

5.- Hotbeds pictures

7.- Bird feeders pictures

Following some examples of bird feeders can be seen. More information in the folder "support materials".

Bird feeders with egg-cup:

Bird feeders with a cardboard:

Bird feeders with plastic bottles:

9.- Sounds of nature elements in a garden:

<u>Nature sounds:</u>

[Bee effects](#)

[Cartoon Bee](#)

[Rain](#)

[Wind](#)

<u>Birds sound exemples:</u>

- <u>Video Blackbird</u> (*Turdus merula*): https://www.youtube.com/watch?v=3SZcBREAjJw (1´ 13´´)

- <u>The blackbird by the musicians:</u>

Two versions of the Blackbird by Olivier Messiaen

-Le merle noir (Olivier Messiaen) [Olivier Messiaen - Le Merle Noir - Bing video](#) (6 minutos)

[Olivier Messiaen - Le Merle noir (1952) - Bing video](#))

10.- (a) Knowing other gardens (examples in support folder)

b) Introduction of the sesion "Story of flowers 2" (3´)
https://www.youtube.com/watch?v=SuhR3zBypog
Alternative option: "Meng" https://vimeo.com/467383260?from=outro-embed (42´´)
The Artist's gardens (exemplos in Powerpoint, support folder) PDF IN FOLDER (Painters and gardeners)

Coaching

Useful questions:

Part	Questions
1	**Explore the yard** What do you think is a "bad plant"? And a "good plant"? How can we differentiate them? "Bad plants" and "good plants" are always the same or can we consider them different depending on the context? What happens when we don't look after our garden in summer? Why do you think that happens?
2	**What are the plants like?** What is a living being? Which are the differences between a human, an animal and a plant? Every plant has the same parts? What is missing, what is always in a plant? How can we classify the different plants? Why do you think that could be a good class to classify? Have you got plants in your house/nearby environment? How are they? [Ampliation]: If there is a garden with some mushrooms or similar, students can be asked to establish the difference between the animals, plants and fungi.
3	**Story: the little tulip** Every plant grows in the same way? Can you find some examples of plants that grow differently than the tulip? Apart from the sun and the water, do you think that plants need something more? Why do you think that?
4	**Needs of plants** Think about living beings, all of them need the same to grow? Which differences can you find?

	Do plants need "food" to grow? What is this "food"? How can the plants obtain their "food"? Can plants grow without one of the studied needs? Why do you think that?
5	**The hotbeds workshop** Which is the best way to make a hotbed? Can hotbeds have been made with another material? Can you give an example? Is cardboard a good material to craft the hotbeds? Why? How can we write/draw some steps to make them understandable for everyone? If any other person takes your steps, he/she can craft a similar hotbed than yours?
6	**Making our indagation with the hotbeds** Do you know what a hotbed is? What do you think a hotbed is? This tool help us to grow different plants? Why? Which is the best way to make a hotbed? How can you express it in a paper? Is the same method as your partner? Which are the differences? Why do you think that we make different environments for the plants? What can we discover with this? When have we got to revise the plants? Everyday? Once a week? Once a month? more at first than at least? Why is observation important? How can we register our observations? Are there big differences between some of your plants? Why do you think that these differences appear? Which one of your plants is the tallest? And which one is the thickest? Which one of your plants do you consider "the best"? Why is this plant "the best" for you? What characteristics of a plant can reflect good growth? Is the growth of the plants constant? They grow more in the first month/week than in the second?
7	**Workshop bird feeder** Which is the function of the bird feeder? How can we make the bird feeder attractive? Which has to have a bird feeder to be good?
8	**Measure the garden**

	Can we measure something with our body? How can we make it? Have you ever heard "3 arms" or "7 fingers" anytime? And have you ever heard "inches" or "feets" anytime? Can we measure with any part of our body? Are your feet similar to mine? Which one is bigger? How can this difference affect the final measure? Do you think that measuring with our body is correct? So, what can we use to measure? How does a measuring instrument have to be? Can we use a pencil (or something similar) to measure the garden? Try it and compare results with your partners. Is every pencil/pen/stick similar in every country? How can we solve that problem? How can we measure in the same way as the rest of the world?
9	**Deep in the garden** Can you find some common things in every garden? What can you find? Are there a lot of different colors in the different gardens? Is that characteristic important? Why do you think that? What sounds can we hear in a garden? How can you describe these sounds? What do you feel when you listen to nature sounds? How can you express it?
10/11	**Knowing other gardens & Designing our garden** What are the main things a garden has? What makes a garden to be a garden? Is the water important? Are the flowers/animals/sounds/shadows/trees… important in a garden? Where have we got to put the feeders? Why do you think that? Birds can eat on the floor or is it better if they have their breed in the top of the trees? Why?
12	**Presenting our garden** Why is/makes your design unique? Do you think that design could be done in real life? Why? What have you learned about plants/animals/seeds (...) ? How are these learnings reflected in the project?
13	**Improving our own garden** Where have we got to plant our plants? Why? Is the soil/sun/water/biodiversity correct in this part of our school? How can we improve it?

Stimulation of self-management: (concrete opportunities/remarks adapted to the project)

Stimulation of cooperation: (concrete opportunities/remarks adapted to the project)

☐ Teamwork:
- Groups consist of:
  - ➢ In sessions 2 and 9 the activity should be done with the whole class, in a big group.
  - ➢ In sessions 1, 3 and 7 the recommended group is formed by 3 students.
  - ➢ In session 4 at first the activity should be done with the whole group. For the second part, the teacher has to divide the class into 3 groups.
  - ➢ In sessions 5, 8 and 11 the students have to be divided into 4 groups.
  - ➢ The work in session 10 can be done alone or in pairs.

Formative assessment: Students should be encouraged to concentrate on the process and not the final result. Teachers shall communicate often with each other to remark student's improvements or learning needs. Grading should never be based on their final outputs but on their searches, presentations and developed skills.

Adaptations

- General ideas:
- Ideas with younger/older children: (3-6 <-> 6-9 / 9-12 <-> 12-15)

For all ages: With Aronson's jigsaw technique, students will share their discoveries with their partners, so every student can learn about all of the plant's needs. Aronson's jigsaw technique is explained in tips and tricks.

In general, Make a deep research, related to their age and curriculum (for example: soil composition, chemistry of the nutrients, light, physics principia...). Children from 9 years are able to make a deeper research, so take that into account with them.

With the younger ones (3 years old), try to avoid all the optional activities, they could be complex for them.

Tips & tricks

As an idea, you can make an art session by showing kids some paintings and asking them to abstract the colors, forms… to create their hotbeds.

During the piloting of the activity, some teachers have created their own materials (letter from maya, memory game…). These materials can be downloaded and they can be helpful for the teachers. As an example, there is a letter that "came" from Maya the bee.

This project has a lot of activities and they could be really complex sometimes (specially the indigation part). We highly recommend some previous experience in PBL if you want to carry out this project.

Activity 3: Path generators. If the school has no robot to work with or the path for the robot can be personalized, it's interesting to use some path generators. These tools can be found easily in Google. As an example, you can **visit the following link:**

https://scratch.mit.edu/projects/557317926/

Aronson jigsaw technique: First of all, students have an original group, where they design their project. During the development of the project they will be mixed with other students from other groups, in order to share and compare their project. In the following picture we can see the distribution of the students in their original groups (the same colour) and in the mixed groups (mixed colours).
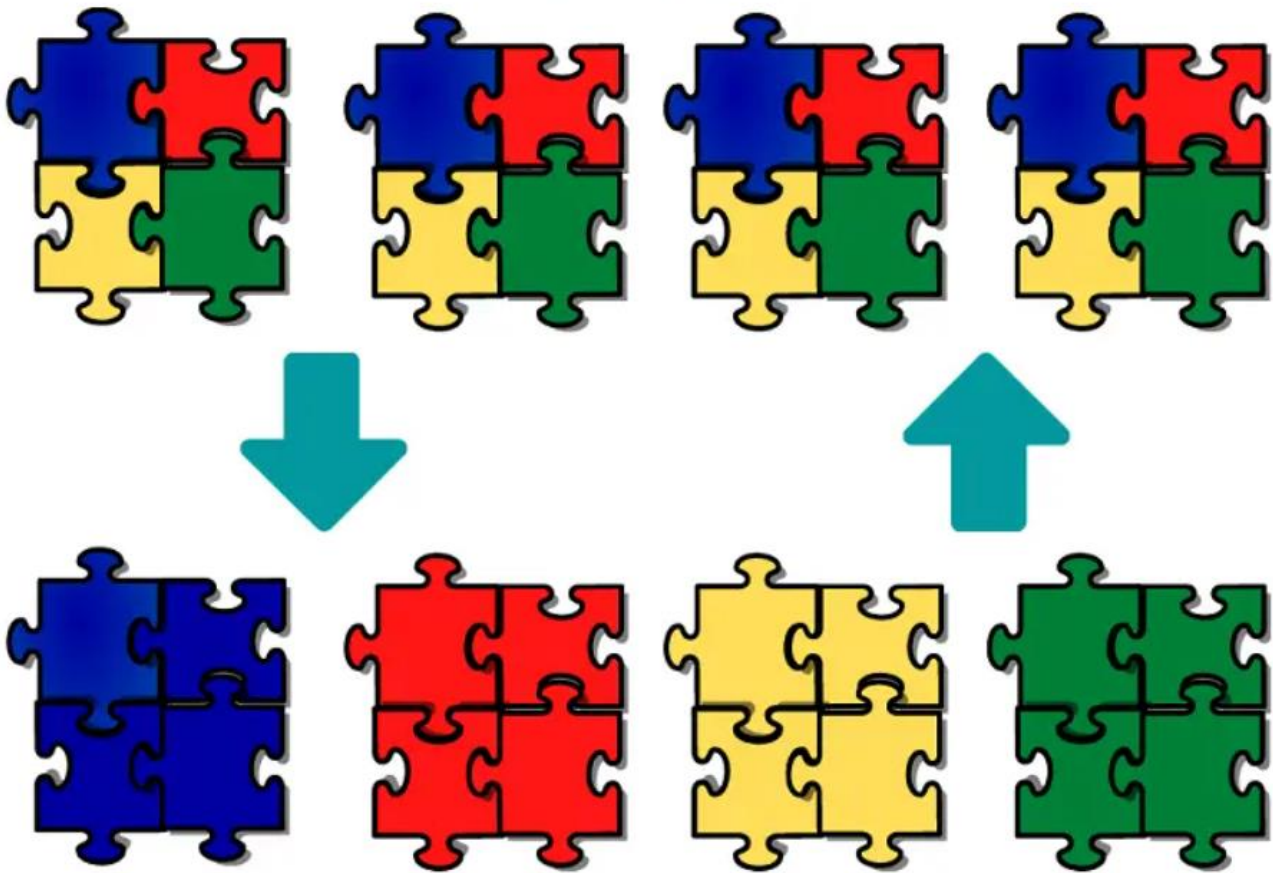
Some sounds that can be usefull:

Bird sounds:

https://www.elconfidencial.com/medioambiente/naturaleza/2021-10-09/sabados-de-campo-audio-pajaros-otono_3303692/

https://www.xeno-canto.org/?prm=ep-app

Nature sounds:

https://drive.google.com/drive/folders/1X4UJOK5d7Iq1ls5nt7TnIpY4Dy1_biL6

Artist´s gardens

Painters and gardeners

Riches "El jardinero"

"El ayudante de jardinero"

Brueghel "Las cuatro estaciones. Verano"

Mahoney "El jardín"

Mahoney "Miss Edith inspecciona el jardín de guisantes'

Boucher "La pequeña jardinera"

Spitzweg "La Torreta"

Khakhar "Iglesia y jardinero"

Spartali Stillman "El jardín encantado"

Monet

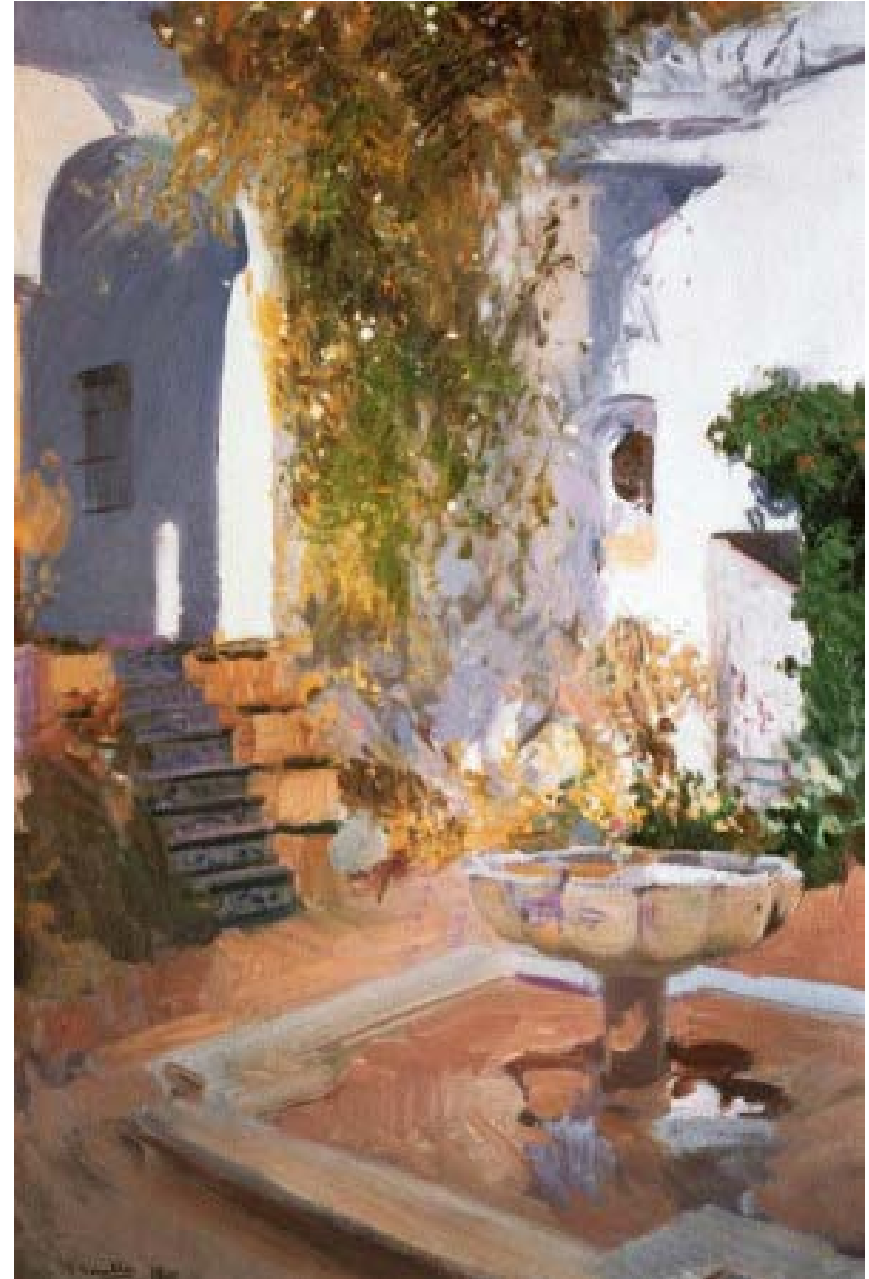# "Jardín de Giverny"

"Puente japonés"

"Jardín de Vetheuil"

Pissarro "Casas de Campesinos, Éragny"
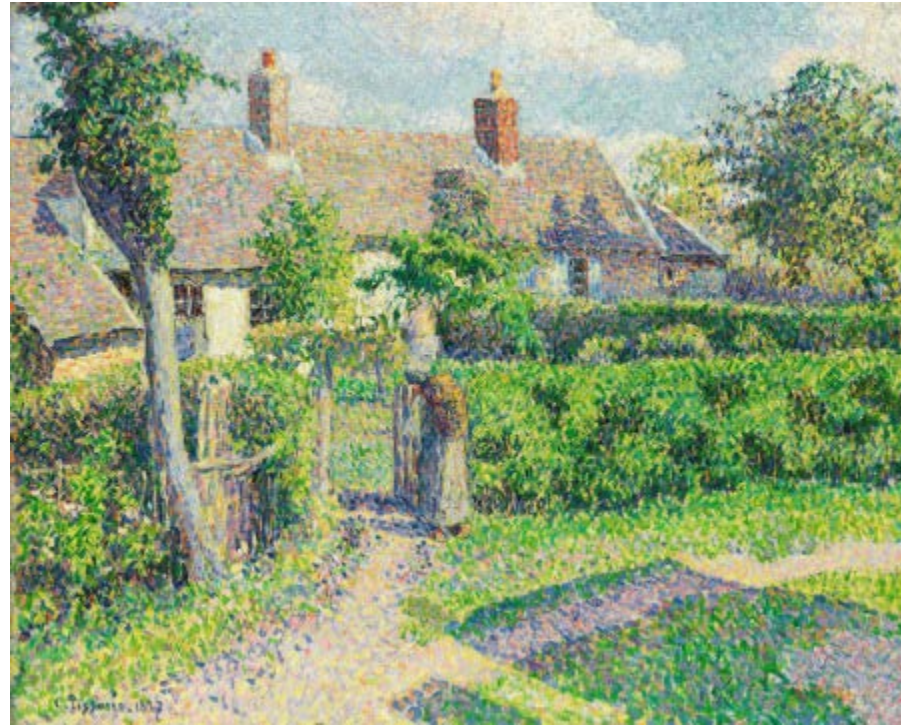
"Primavera al Alba y Nublado"

Sorolla **"Gruta del jardín en Sevilla"**

"El jardín"

"Saltando la comba"

Van Gogh **"El huerto blanco"**

"El jardín del poeta"

"El melocotonero"

"Jardín de Montmartre"

"Pequeño peral en flor"

"Lirios"

"Almendro en flor"

Caillebotte "Los naranjos"

"Los jardineros"

"Las rosas"

"Retratos en el pueblo"

"Casa de la granja"

"Tejados rojos" y "El jardín de las dalias"
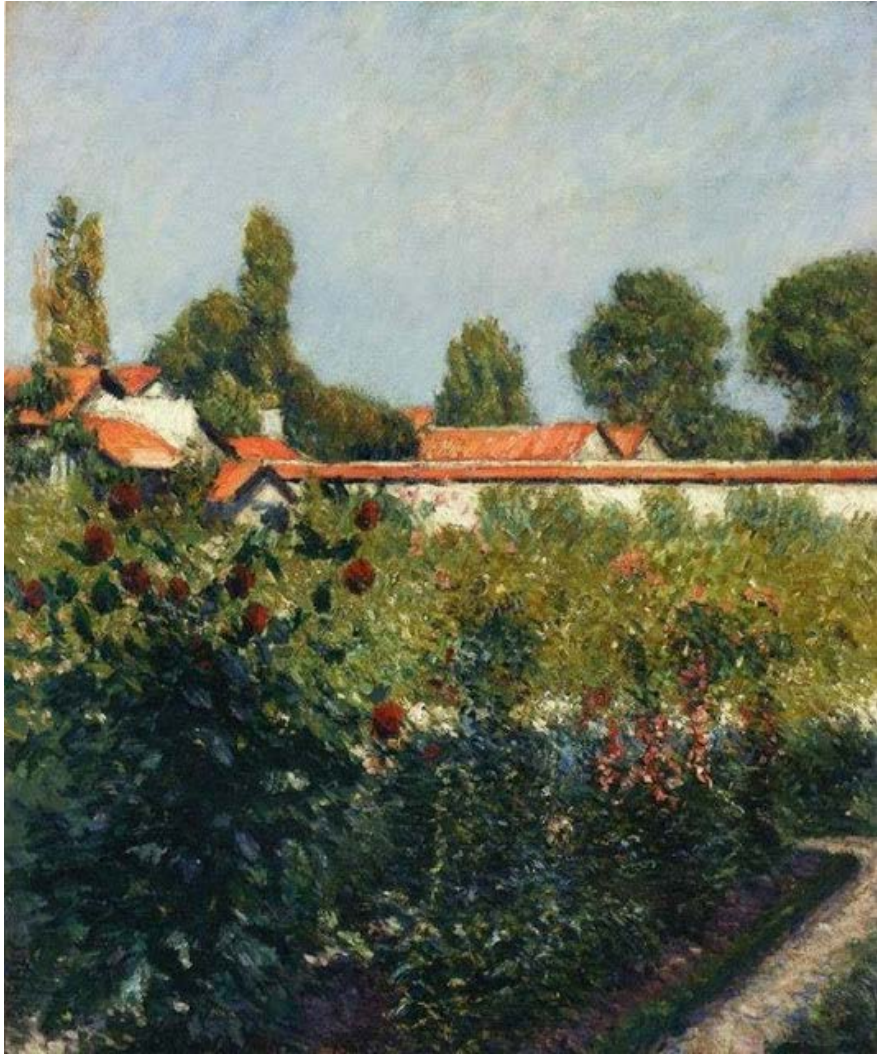
"Orquideas"

"Parterre de margaritas"

Klimt "El jardín del Palacio Schönbrunn"
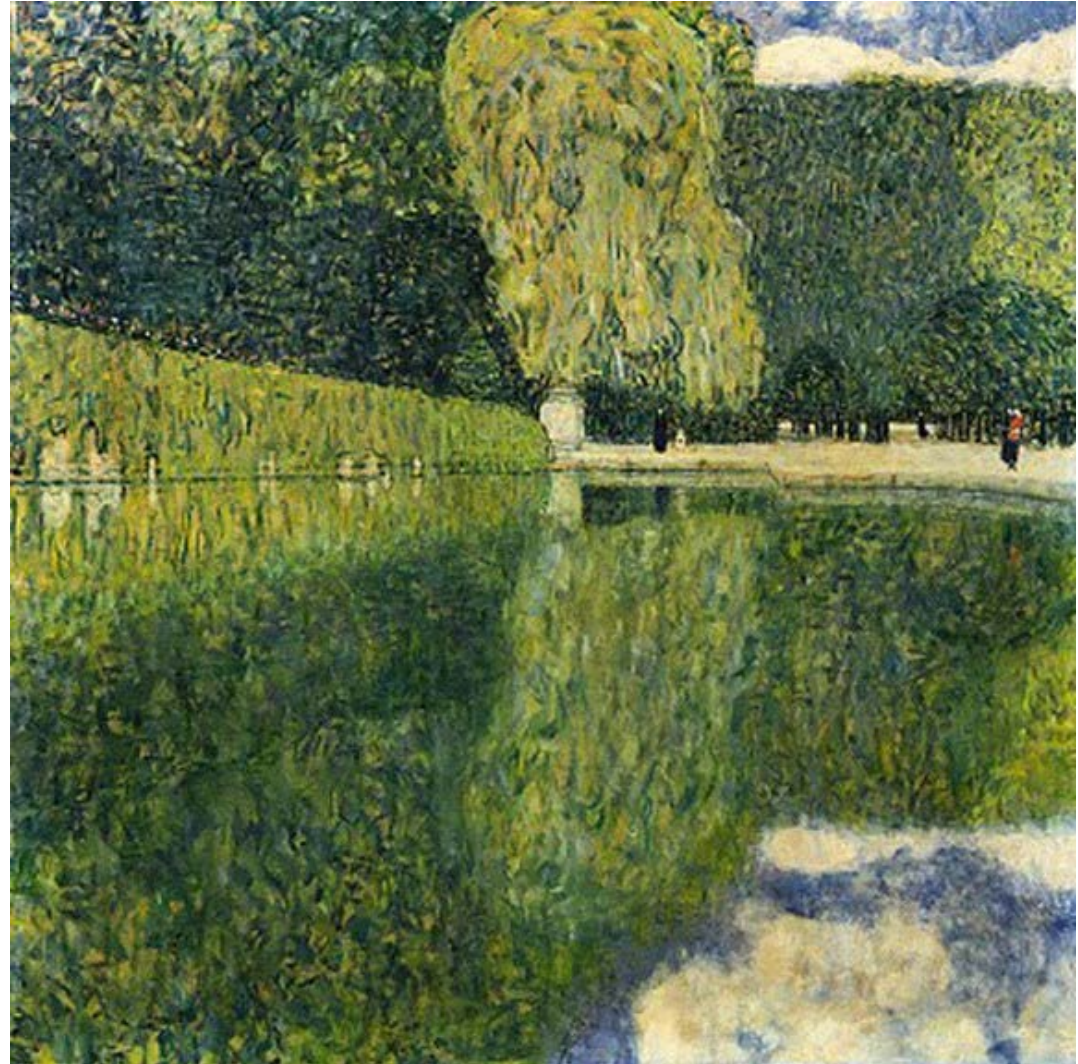
"Rosales bajo los árboles"
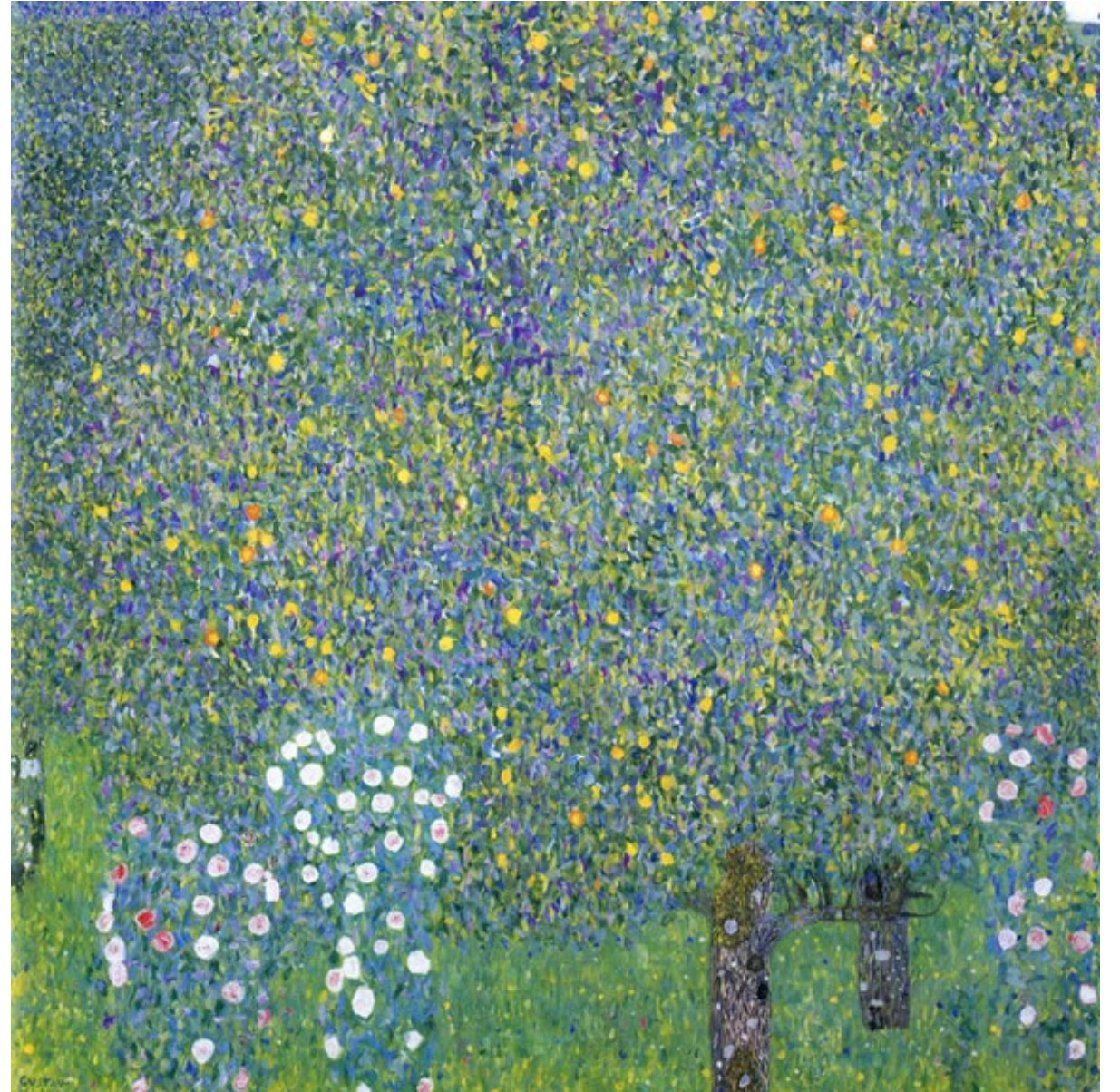
"Jardín con gallinas"
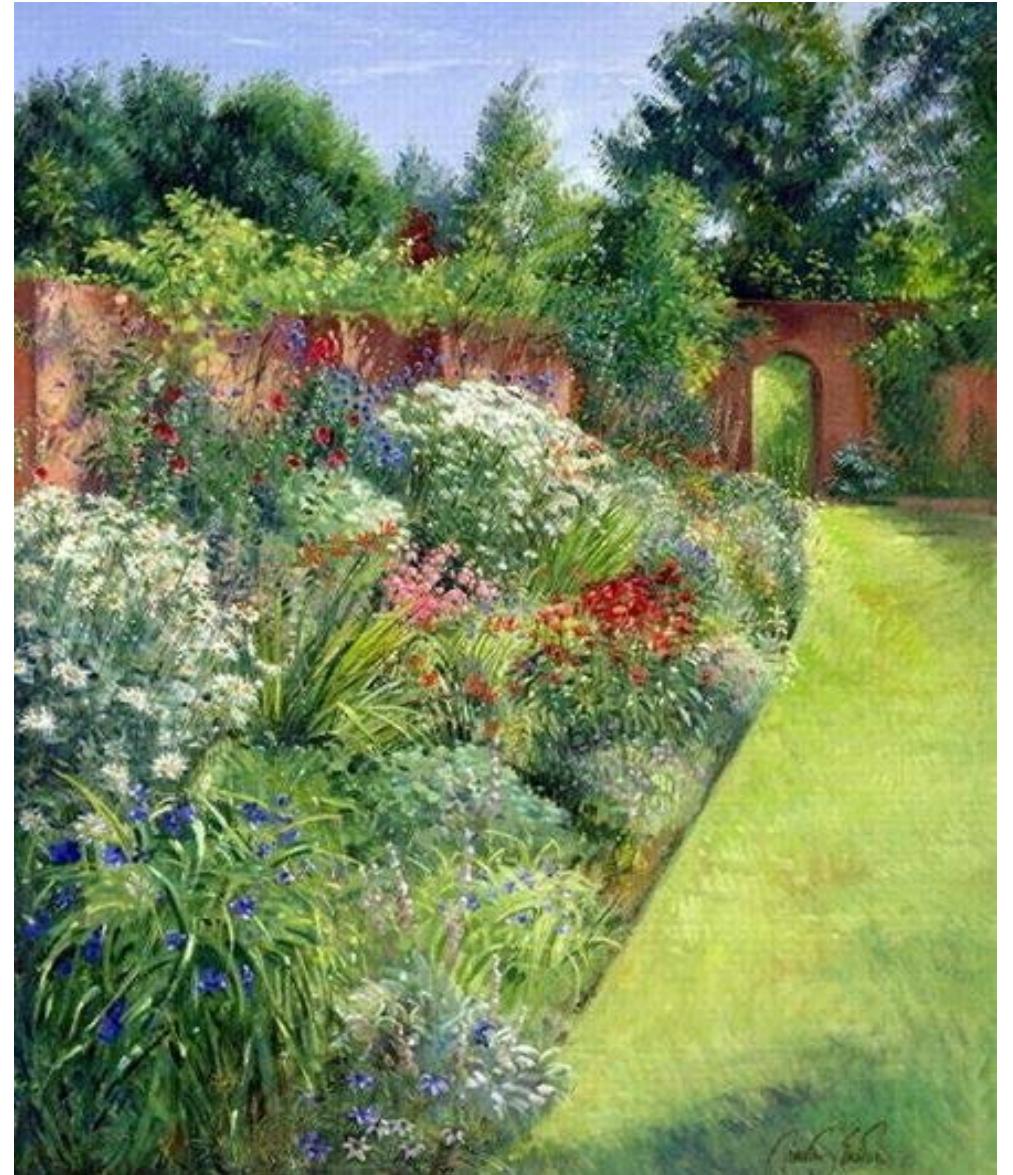
Nolde "Jardín florido"

"Rosas rojas y amarillas"

"Jardín de flores"

Easton
"Camino hacia el jardín secreto"

"Lirios en el jardín de hierbas"

"Descanso matinal en el jardín"

"Julianas, dedaleras y lirios"

"Cardos contra el foso"

"Guisantes y cosecha de otoño"

Kidd "El jardín de Derek Jarman"

"Le Manoir aux Quat'Saisonsen"

"Jardín de boj en Bourton House"

"El arco de Sissinghurst"

Downer Riker "El future de Brooklyn Grange a vista de pájaro"

"Apicultor en la azotea"

"Granja en la azotea"

"Granja en Eagle Street"

"Cosecha de octubre"

"Jardín de la felicidad"

Parry "El jardín moderno"

"Alegoría"

"Milano real"

"Maniquíes de las rosas"

"Jardín de ballet I"

"Fiesta en el jardín"

Hockney "La llegada de la primavera en Normandía"
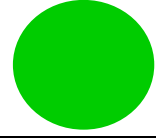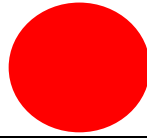
Vertical gardens and other ideas for schools

CONSCIOUS WALKING OBSERVATION LOG SHEET

TREES		
FLOWERS		
AROMATIC PLANTS		
VEGETABLE GARDEN		
POTS AND ORNAMENTS		
TERRAIN		