



UrbSTEAM

Teaching STEAM through Urban
Garden Based Learning
in the kindergarten

Educational Material
Module 5
Pedagogical benefits on
combining STEAM and
Garden based
learning/outdoor learning



Co-funded by
the European Union



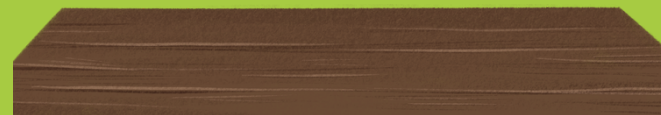
LEARNING OBJECTIVES

- to inform and promote the combination of STEAM methodology and outdoor activities among educators in the 0-6 age group
- raising awareness among educators and teachers of the advantages of combining the STEAM method and outdoor activities in kindergarten gardens



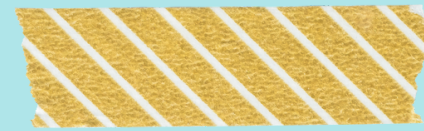
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EXPECTED RESULTS

1. to increase **knowledge** of the STEAM and Outdoor Education methodology starting from the educational needs of children in the 0-6 range;
2. to provide **new ideas on how** to successfully combine the two educational methodologies for the 0-6 target group;
3. to raise awareness of the **pedagogical advantages** of combining the STEAM steam method and outdoor activities in kindergartens.;
4. Increasing the importance of the **topic of documentation** in the 0-6 target group is very important. This ensures quality and reflexivity in educators and children following the activity. In addition, the STEAM method can contribute to very valuable interactive documentation that can be shared with families.



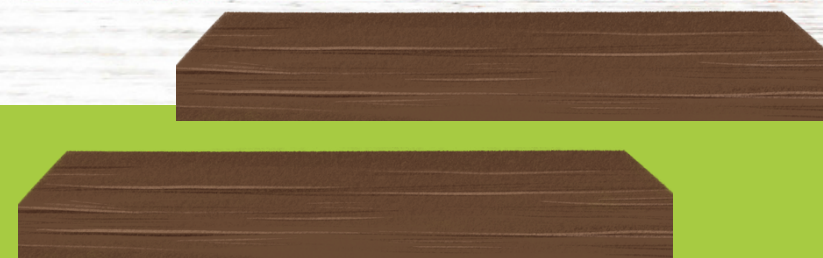
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COMBINATION OF STEAM AND OUTDOOR LEARNING



STEAM stands for Science Technology Engineering Art Mathematics, an interdisciplinary learning method developed in 2000 in the United States.

The thing that differentiates the study of **STEAM** from traditional science and mathematics is the different approach. Students are shown how the **SCIENTIFIC METHOD** could be applied to everyday life or to the study of other disciplines.

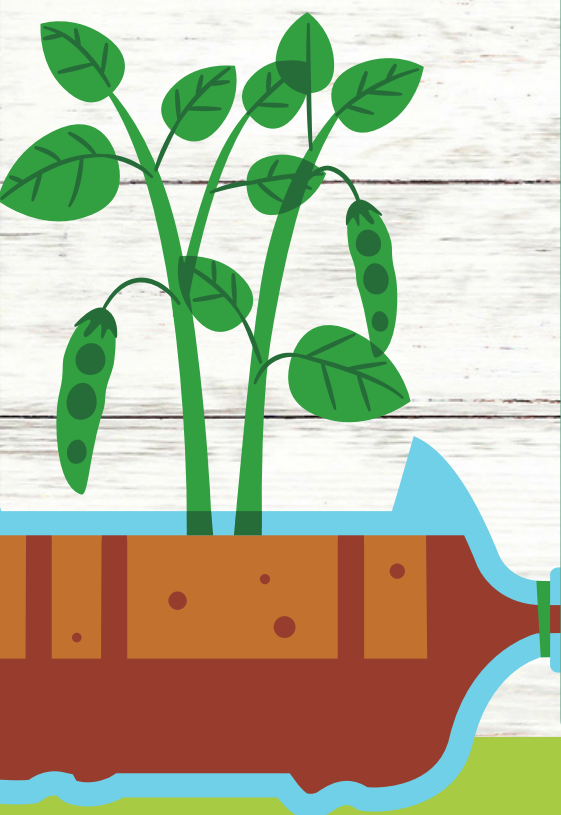


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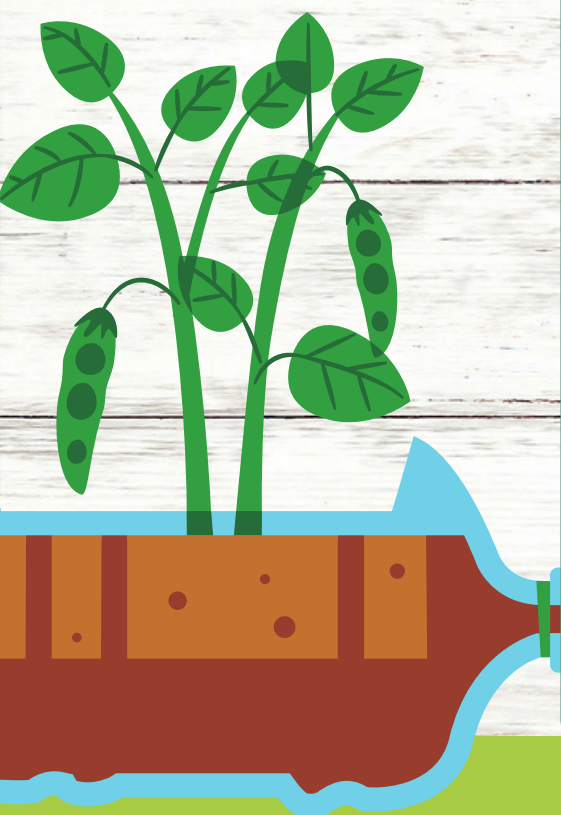
COMBINATION STEAM AND OUTDOOR ACTIVITIES IN THE GARDEN

The term '**outdoor education**' refers to pedagogical experiences that take place in natural contexts (school gardens, parks, farms, etc.) but also to educational pathways implemented in urban environments (museums, squares, city parks, etc.), where a direct and concrete relationship with the real world is guaranteed and the involvement of the subject in education in its entirety (cognitive, physical, affective and relational dimensions).



COMBINATION STEAM AND OUTDOOR ACTIVITIES IN THE GARDEN

Outdoor education thus includes a wide variety of educational activities, ranging from **perceptive-sensory experiences** (educational vegetable garden, visits to farms, museums, parks, etc.) to experiences based on **locomotor and exploratory activities typical of adventure education** (orienteering, trekking, etc), to **school/kindergarten projects** that interweave openness to the natural world with technology (coding, robotics, tinkering, etc.), and **to educational paths deeply** inspired by the Northern European tradition.



COMBINATION OF STEAM AND OUTDOOR LEARNING

The combination of the two methodologies according to several scholars, including Halton and Treveton (2017), methodologies is able to implement the sense of:



Curiosity

Material handling



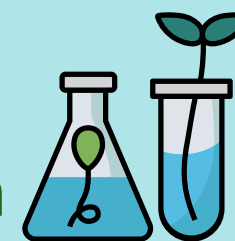
Storytelling skills

Imagination



Observation

Experimentation

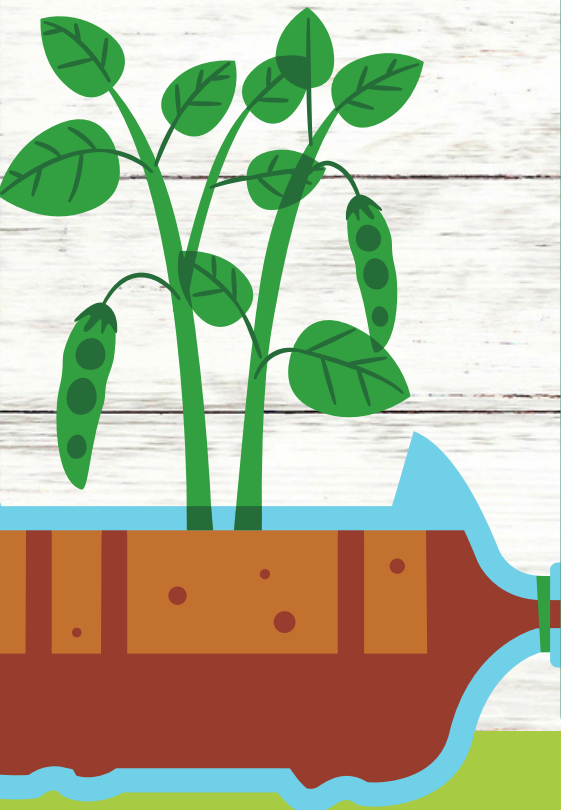


COMBINATION OF STEAM AND OUTDOOR LEARNING



STEAM activities in open spaces (natural and built environments such as schoolyards, parks, gardens, and paths) should primarily encourage **observation, exploration, and natural play** in which children make sense of the world around them, developing an understanding of how things **change over time, observing a variety of different structures (natural and man-made), patterns and behavior.**

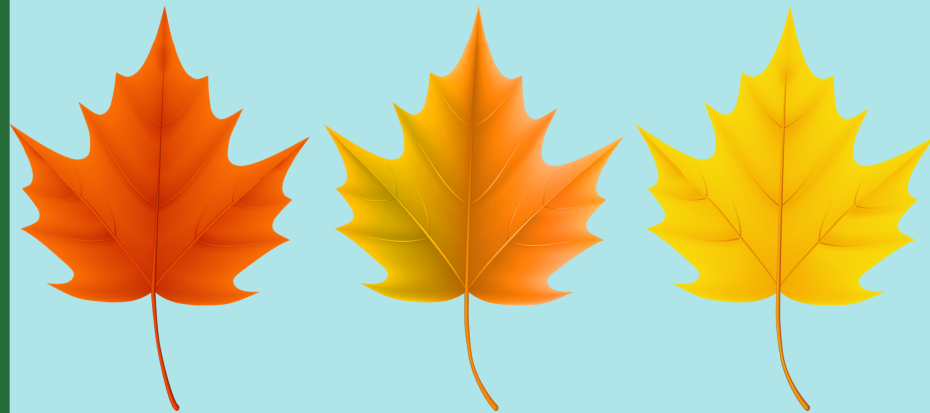
in a context that outdoors **reducing the stress** that can be generated in a closed environment when faced with an obstacle to overcome.



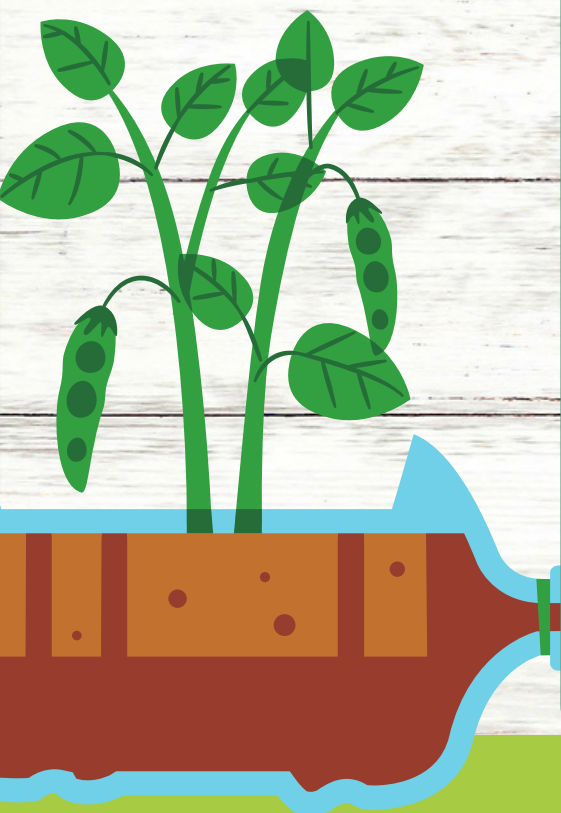



COMBINATION OF STEAM AND OUTDOOR ACTIVITIES

For example, observing what leaves look like, what color they are, whether they hang on the tree or not, what they look like to the touch, etc./ observing flowers, what color they are, what shape they are, what the ground they are on is like, are there insects on or near them, etc.



The focus is on the reasoning behind the question and not the answer itself. It is about training the child to reason from what he sees, touches smells, and not from an abstract notion.





THE PEDAGOGICAL BENEFIT OF COMBINING THE STEAM METHOD AND OUTDOOR LEARNING

1. Children's awareness of their surroundings and how they locate themselves in space

Research shows that spatial awareness helps sharpen a child's awareness of his or her surroundings (Mhuiiri, 2020). This awareness could be developed from an early age by giving children the opportunity to explore natural spaces through their senses. This will enable them not only to have an insight into natural space but also into themselves within this space. For example, movement, shape and space, and 3D structures implement the ability to determine dimensions and develop a concept of self in relation to their surroundings. Many children in the 0-6 range post-Covid-19 showed difficulty in orienting and moving in space.



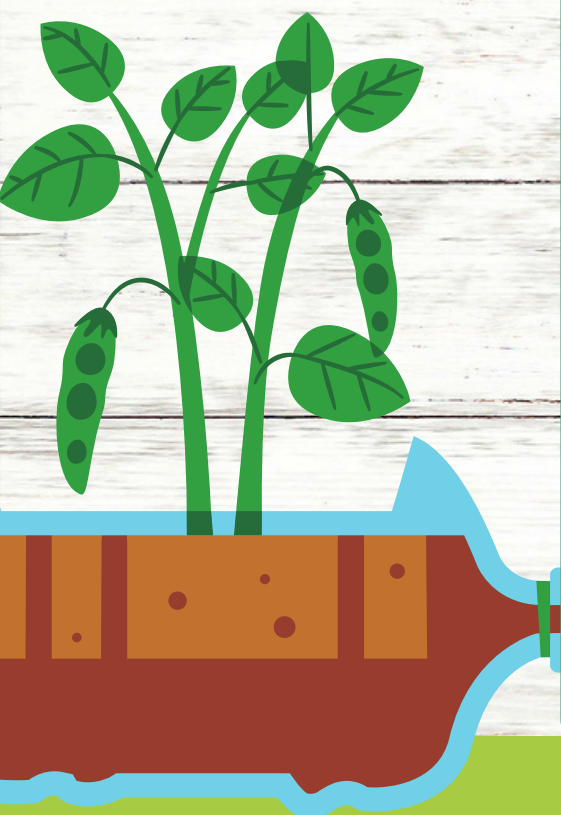
THE PEDAGOGICAL BENEFIT OF COMBINING THE STEAM METHOD AND OUTDOOR LEARNING



2. Living hands-on experiences

One of the major proponents of experiential learning is Jean Piaget, who argues that a child's cognitive development flows from interaction with the surrounding reality, due to which a transformation occurs in terms of gaining information useful for practical knowledge. Moreover, children who engage in experience alone, without being led by the adult yet being able to refer for key moments and in case of need, may acquire a **stronger understanding of the words they are using or hearing**, rather than engaging in mechanical reformulation and learning styles of the past.

That is part of **indirect pedagogy** in which the child is the protagonist, while the adult is always behind the scenes and leaves room for the child to act.

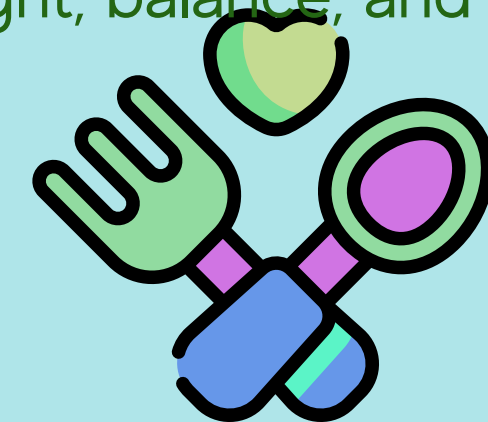




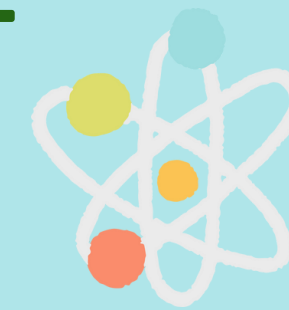
THE PEDAGOGICAL BENEFIT OF COMBINING THE STEAM METHOD AND OUTDOOR LEARNING

Moreover, the adult does not anticipate the child in his or her actions but lets him or her experience in his or her own time by asking questions and accompanying him or her in the narration and re-elaboration of the lived experience.

Allowing children to build their own hut out of twigs and branches, rather than providing a mud kitchen allows them to implement their awareness of space, of themselves, and at the same time their practical and mathematical skills. Being able to grasp weight, balance, and quantities.



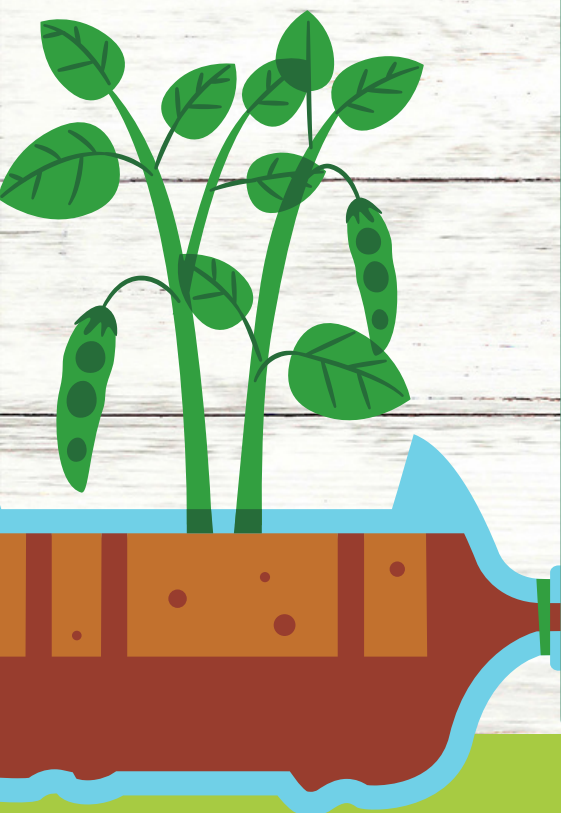
THE PEDAGOGICAL BENEFIT OF COMBINING THE STEAM METHOD AND OUTDOOR LEARNING



3. STEAM language acquisition

Engagement with the natural external environment allows for exploration and physical engagement. If we consider the language acquisition of scientific or mathematical terminology. Evidence shows us that young children process language faster if they have the opportunity to manipulate and explore related objects (Shiel, 2012).

Children relate better to objects that are naturally found in their environment and we often see evidence of preschoolers being given the opportunity to engage in a physical exploration of their natural environment, developing language and

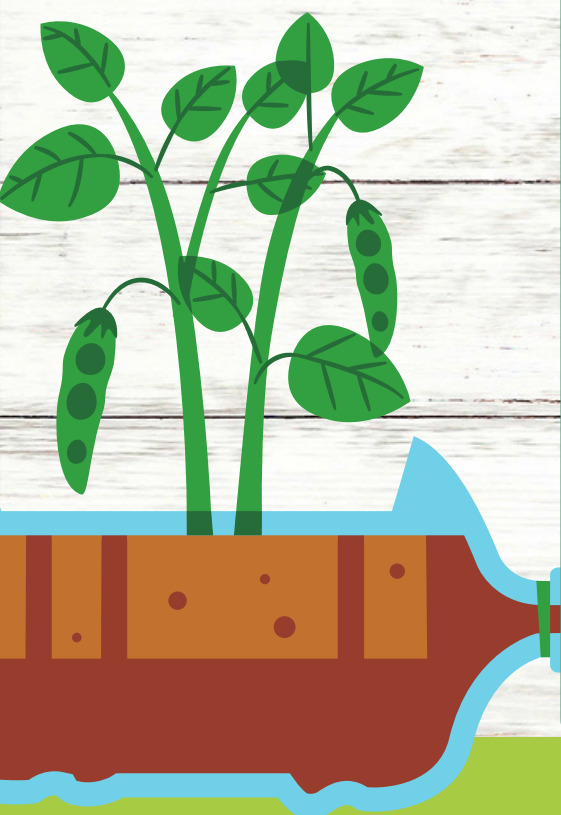




THE PEDAGOGICAL BENEFIT OF COMBINING THE STEAM METHOD AND OUTDOOR LEARNING

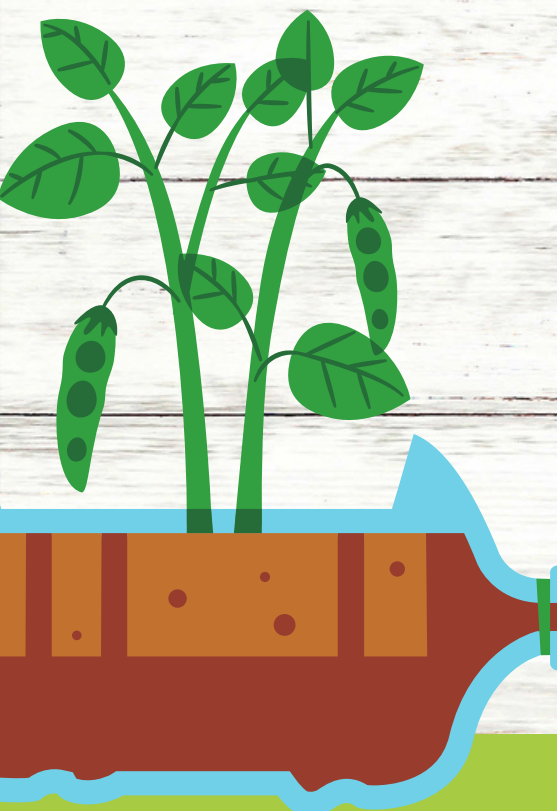

mathematical concepts faster than those who are not, with language extending to include vocabulary related to force, action, and movement; showing the value and importance of outdoor play environments to promote and provide situations that develop the vocabulary for STEAM-related topics.

Thus, the child who is given the opportunity to touch and handle a piece of wood better understands the language related to weightlessness, buoyancy, softness, and texture; and children who play on slopes or in the woods develop a stronger concept related to movement, gravity, friction (Vygotsky, 1979).





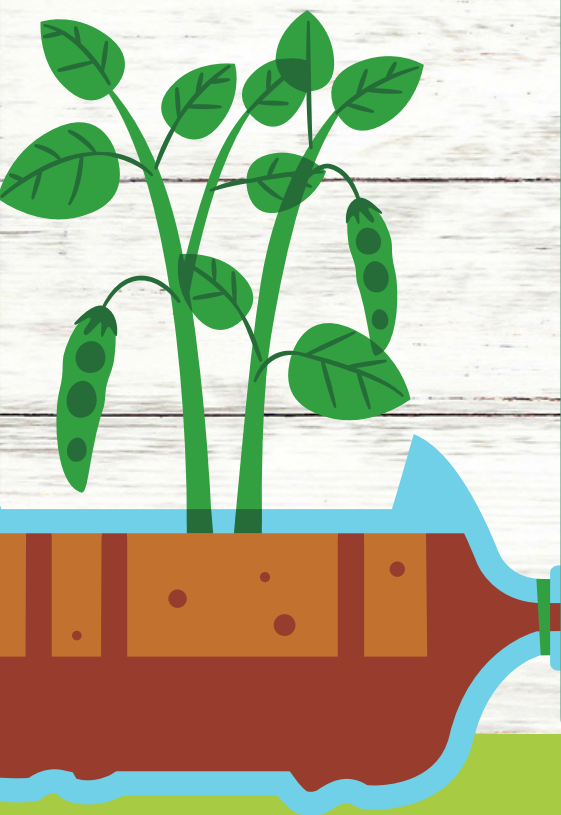
TIPS: HOW THE ADULT CAN SUCCESSFULLY APPLY THE TWO METHODS BY COMBINING THEM?

- **Make learning opportunities spontaneous and reduce the level of passive observation.** Provide opportunities for children to explore and raise questions on their own. Children do not need to wait in turn to see a ladybird, a leaf, or a sycamore seed; allow them to find their own, experiment, and ask questions.
 - **Choice of space and tools.** Open, safe and welcoming space for children to explore. The danger is not an enemy. there may be stones that potentially hurt but the child must be able to experiment. I do not remove but leave and focus on the identity of things. The presence of child-friendly tables, chairs, and utensils is an advantage. Use recyclable materials to carry out the workshops.
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TIPS: HOW THE ADULT CAN SUCCESSFULLY APPLY THE TWO METHODS BY COMBINING THEM?

- **Involve children in conversations about the child's discoveries.** Introduce words that will help reinforce emerging concepts and start introducing STEAM language. Introduce words such as uneven, soft, hard, smooth, fuller, heavier, thicker, thinner, and wider, for example; but also include language that encourages a focus on movement or force; so when a branch sways in the wind, or leaves flutter to the ground in an autumn adventure, or sink into a puddle of rainwater, draw attention to these phenomena.





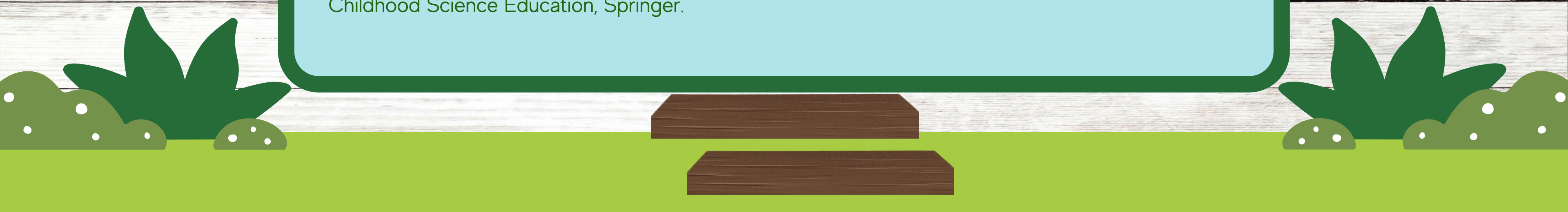
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- **Ask - what happens questions - encourage children's critical thinking and problem-solving skills.** What makes that little trickle of water appear in the mud or among the pebbles after a heavy rain? Why do seeds fall to the ground and what happens when they land on fertile soil? Why does the stone sink into the puddle, but the leaf floats along the surface? etc.? These kinds of simple questions and activities, especially repetitive ones, help to strengthen the child's understanding of how the world and nature work, laying the ever-important foundation for a future in STEAM education.





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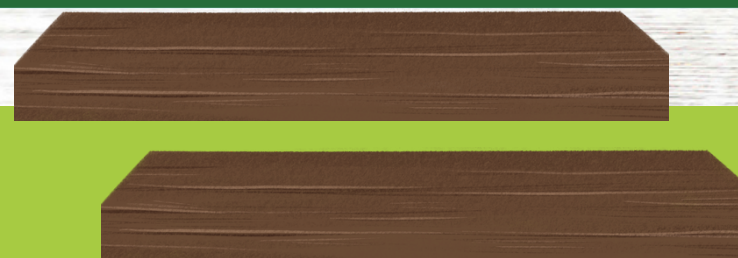
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Thank for your attention

