Balancing rocks - studying the phenomenon of equilibrium

1 Overall aims:

- Investigating the equilibrium/ balance phenomenon on the example of a simple lever made of stones and a ruler
- Observing the change of the state of matter from solid to liquid and back (while melting crayons on heated stones)
- The use of the equilibrium phenomenon in the process of building a tower of stones
- The use of natural elements to stimulate children's creativity

2 Vocabulary - keywords

lever, balance, ruler, stones - rocks

3 Sustainable abilities developed

- System thinking
- Collaboration competency
- Integrated problem solving
- Self-awareness

4 Pillars of sustainability included

- socio-cultural

5 STEAM domains

S, M, T, A

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

6

Teaching methodologies/activity outline

Introduction:
Conversation - what does a man use rocks for? Drawing a mind map using pictures prepared by the teacher (for building houses, for heating houses - coal; as spices - salt; for water / wastewater treatment; in the cosmetics industry, etc.)

Main part:
Children go out to the garden or for a walk - on the way everyone has to find and pick up a few stones. From the collected stones, we build a simple machine called a lever (photo below)

1. The stone in the center serves as a support point for the lever.
2. Choose one stone and balance with a ruler or stick in the center. Can you equalize it?
3. Grab another stone and place it at one end of the ruler.
4. Now for the hard part! Grab another stone of a similar size to the last one and try to balance it at the other end of the ruler.
5. Try to balance stones of different sizes by changing their position on the ruler. Do heavier rocks have to get closer to the fulcrum or further?
6. You can decorate your stone - paint it with paints or melted wax crayons (instructions below),

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Artistic activity - painting stones with melted crayons
Stone painting instruction:

- Preheat oven to 300 ° F.
- Line the baking tray with parchment paper or aluminum foil and place the stones on the baking tray with the side to be painted facing up.
- Heat the stones for 10 minutes.
- While the stones are in the oven, prepare a place to melt the crayon with hot stones. The stove is a great place to do this as it sits directly on top of the oven and is easy to clean.
- Adults only: Remove stones from oven and place on heat-resistant pads.
- Gently place the first crayon on the stone and let the heat from the rocks melt it a little. Then add another color. Watch as another round of melted wax moves the first color around the rock.
- This is a great time to think about mixing colors! The colors on the color wheel, such as orange and blue, red and green, and yellow and purple, will turn slightly cloudy brown when you melt them side by side.
- After the stones are colored, take them out with a spoon into a lined tray to let them dry.
- When the rocks are dry, they can be sealed with a waterproof varnish for outdoor use.

Summary:
STEAM Challenge: Build the highest tower possible using the balance as the only glue for the rocks found in the garden (work in teams of 4-5 people)
Reflection: Can balance be the glue for rocks? Why?

Other suggestions for teachers to choose:
Creative paintings / compositions using colored stones and other natural elements found in the garden (twigs, feathers, pieces of bark, etc.)
Arranging the mandala on A3 pads prepared by the teacher (attachment) - maintaining the principle of symmetry

7 Expected learning outcomes

The child will be able to:

- indicate the various ways in which people use rocks
- explain the concept of balance/ equilibrium
- draw a structure of a simple lever
- create colorful compositions and patterns on heated stones (or colors them with fans according to his own idea)

8 Assessment

The child can explain in his own words what balance is
The child is able to prepare a drawing instruction on how to make a lever for others

Co-funded by the Erasmus+ Programme of the European Union

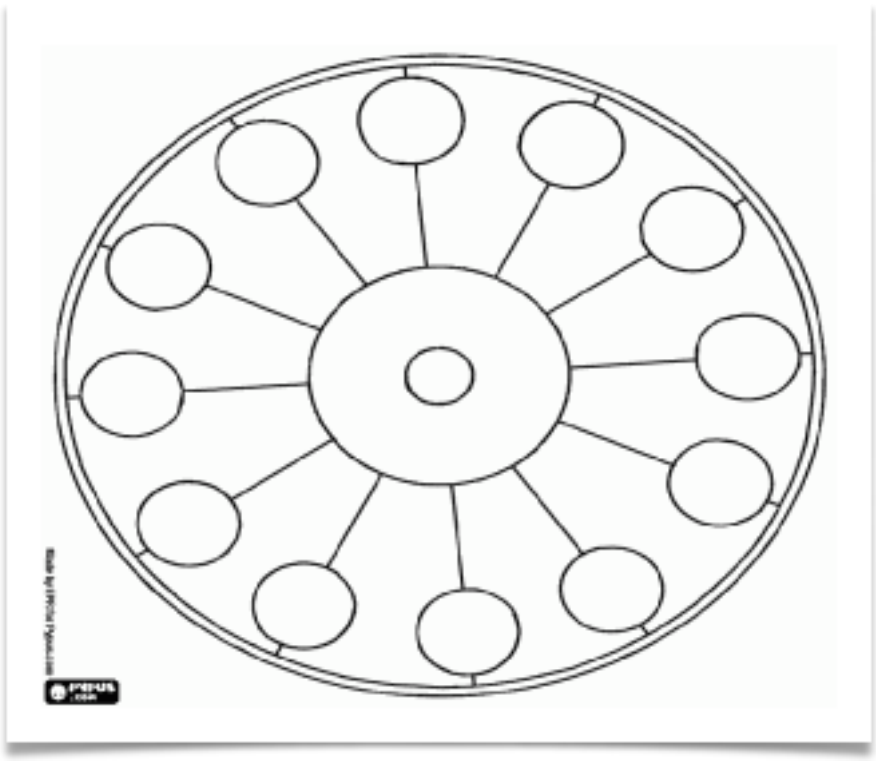
This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

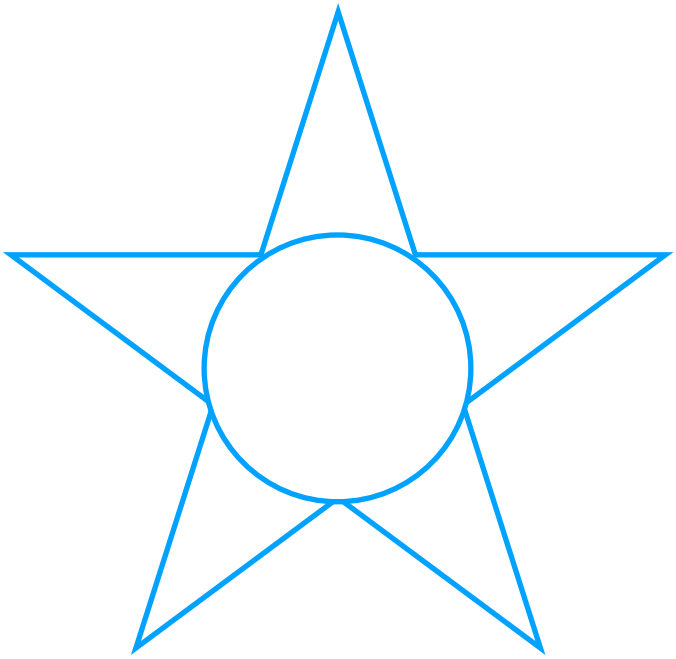
9	**Equipment and materials to be used in learning unit (tools, ingredients etc)** ● Stones of various sizes (smooth stones work best) ● Crayons (broken scraps) ● Parchment paper or aluminum foil ● Kitchen glove ● Pliers or spoon ● Oven (you can use a candle warmer if an oven is not available ● A strong, wooden ruler or stick to mix the paint
10	**Kind of setting - lab, kitchen, outdoor etc.** preschool garden, public park, classroom or kitchen
11	**References - source:** 1. https://leftbraincraftbrain.com/melted-crayon-rainbow-rock-balancing/?utm_source=ActiveCampaign&utm_medium=email&utm_content=+Rainbow+engineering&utm_campaign=LBCB+092621+-+Rainbow+Rocks+Balancing+and+Innovation+Ebook&vgo_ee=TwsMW3x43E8QVebIyVFMGPlMy%2BOWWuyaZunZiCXh6gI%3D 2. https://rhythmsofplay.com/rock-balancing-stone-stacking-art-steam-activity/

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Appendix: Examples of a graphic scheme for arranging a mandala





Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.