Rain Collector

TINK@School

Co-funded by the
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Rain collector

Duration	*3 hours*
Target group	*Students that can use scissors safely in combination with plastic (approximately ages 10 and older)*
Connection to curriculum	*This activity can help students to work on fluid mechanics and physics, while challenging their practical and creative skills.*
Particulars	*Collect recyclable materials a few weeks in advance for the students to tinker with.* *It is also advisable to have easy access to water as it is needed for testing the rain collector.*

Outline

In this tinkering activity, the focus is on building a rain collector using recycled materials previously gathered by the students themselves.

This activity is at its core connected to sustainability issues: students are asked to use recycled materials collected from their home garbage and the goal of the activity itself is to collect and use water that would otherwise be lost.

Connection with sustainability

During this activity, students consider rain as a natural resource that is becoming scarce. They construct new ways to collect rain water and think about the methods to distribute the water. The students use recyclable materials to construct their rain collectors.

Health and safety

Hazard	**Controls**
Box cutters are very sharp, students can cut themselves.	*Do not let all ages use the box cutters, do not leave them lying around, instruction in advance on how to use them, always slide them in when not in use. Always use a cutting mat.*

Glue guns get very hot.	*For young ages use the glue guns only under supervision. Let the students use them in a designated place, and keep an eye on it.*
Hand drills have sharp points, students can cut themselves	*Do not leave the hand drills lying around, give instruction beforehand on how to use them, always use them under supervision. Always use a cutting mat.*

Essential materials

Item	Comment	Total
Containers	such as tins, jars, bottles, soap dispensers; make sure the containers can be cut	Collected by the students before the activity
Umbrellas		Collected by the students before the activity
Toothpicks		3 boxes
Elastic bands		2 boxes
Wooden sticks		3 boxes
Rubber hose	Various sizes	4
Straws		2 boxes
Rope		4 balls
Plastic such as sheets, shopping bags, etc.		Enough for the students to tinker with
Padding		Enough for the students to tinker with
Cardboard		Enough for the students to tinker with

Essential tools

Item	Comment	Total
Hot glue guns		3
Vinylic glue		5
Tape		15
Hand drill		2
Scissors		15
Box cutters	Optional	3
Cutting mats	Optional	3

Preparation

Ask the students to collect umbrellas and containers such as jars and bottles before the activity. Stress that you have to be able to cut into the containers.

Set the classroom in a tinkering setting: set up a table with tools and a table with all materials on other sides of the room so the students are encourages to walk around and be inspired by other groups. Sort the materials based on function and size, so the students can easily see what is available.

Create designated spaces for the hot glue and hand drill tools, so they can be used under supervision.

Activity Plan

Introduction (30 minutes)

- The activity starts with a discussion on how water is extremely precious, especially in places where it is scarcely available. The students are invited to share how and when they use water in their daily life and share which places they see in their daily lives where water is needed, for example in factories or in agriculture.
- Engage the students in a conversation about the ways we collect and save rain water. Pictures, photos or short videos of rain collectors can be shown as inspiration.
- The teacher presents the outline of the activity and mentions the range of materials, where the materials are located. The teacher pays special attention to simple and clear rules, emphasizing safety when handling tools.
- In this activity the students are going to make something with which they can collect rain. To engage the students in different ways, there are variations to the prompt the teacher can add to the activity:
    - Create a rain collector that distributes the water evenly
    - Create a rain collector that distributes the water over a large distance
    - Create a rain collector with which you can control the amount of water it collects and releases
- The students are encouraged to work in groups. The teacher outlines simple and clear rules, emphasizing safety and teamwork.

Managing the activity (120 minutes)

- Pay attention to safety. Students work with hot glue guns, which get hot, and hand drills, which can be sharp.
- Indicate every 10 minutes how much time is left.
- Walk around the room write down remarks the students make and other observations that strike you.
- If students struggle with their ideas, ask them to articulate their problems or goals. Then ask questions that guide them to the right direction.
- If the students get stuck, encourage them to walk around the room and see how the other pairs progress.
- Tips for guiding this activity:
    - Have the students test their rain collector outside to prevent the floor from getting wet.
    - Show some examples to encourage creativity
    - Simulate rain by using containers like watering cans or bottles.

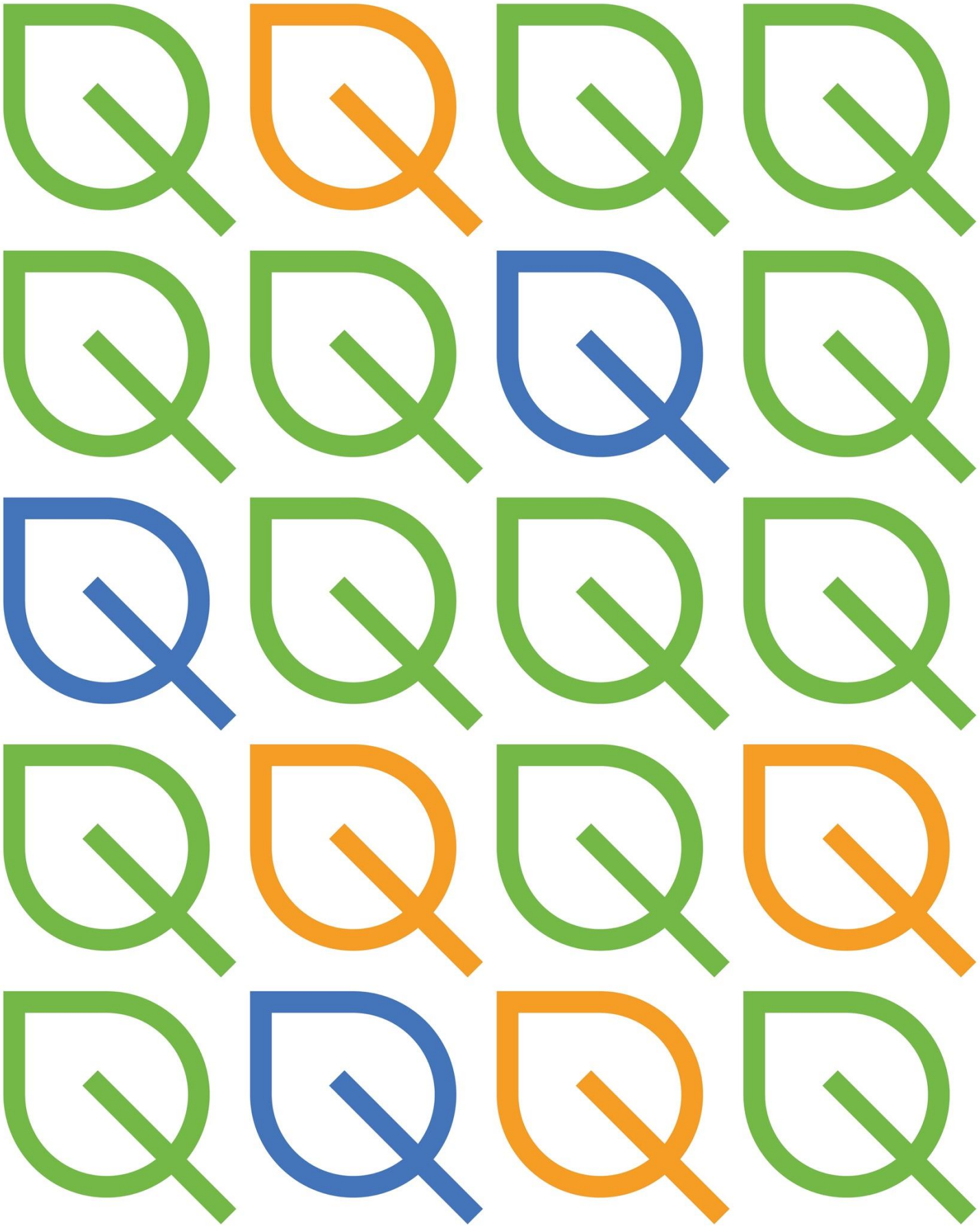
Conclusion (30 minutes)

- At the end of the activity, the teacher invites each group to present their work.
- The teacher can stimulate the conversation about the result by asking what difficulties were encountered and what progress was made during the work. The teacher can ask how they

collaborated, what inspired them, whether they deviated from their initial ideas and how. Note how many works of art relate to the environment and how objects from waste have been incorporated.

- Have a concluding discussion with the students to collect their impressions, difficulties, satisfactions and whether they had any unexpected thoughts during the whole tinkering experience.
- The rain collectors can then be installed in the school garden or vegetable garden, on window sills or wherever possibile. Students can also take them home and use them on their balconies.

The activity can also be used to address the connection between balance and size, capacity and mass.



Appendix

Appendix Examples of possible outcomes

Colophon

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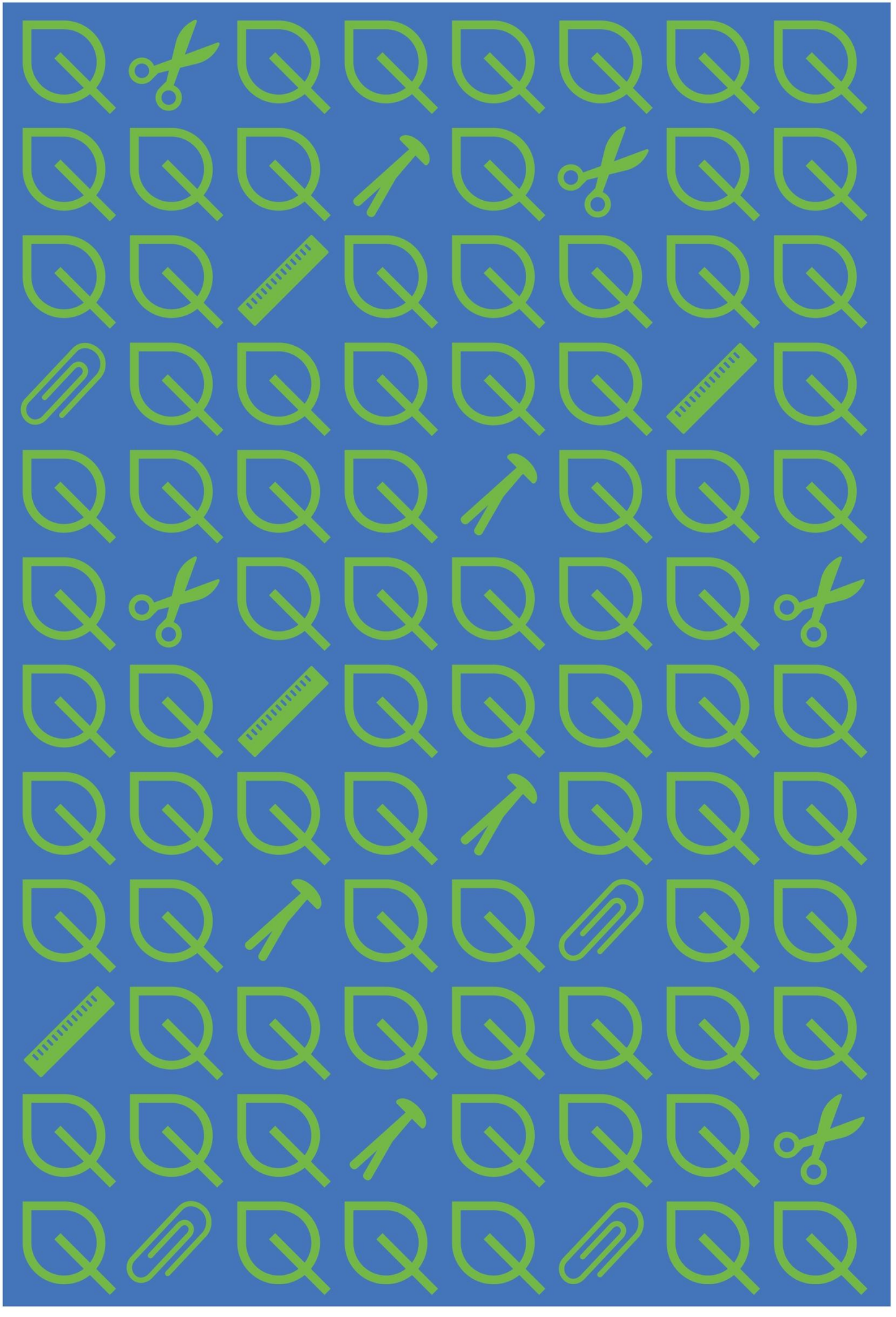


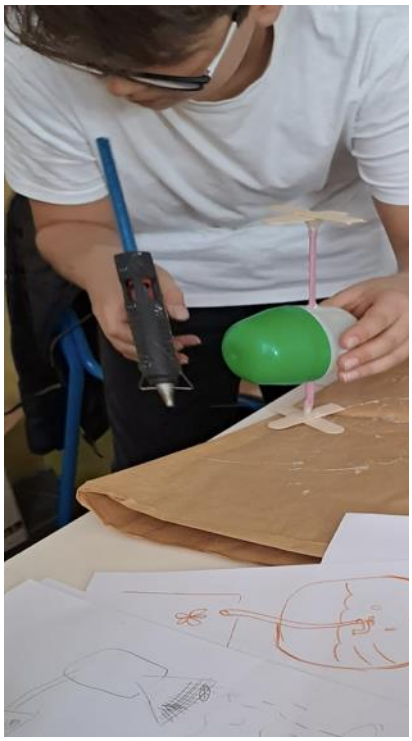
Scarecrow artwork

TINK@School

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

Scarecrow artwork

Duration	*150 min (divided into 3 phases: 30 min, 90 min, 30 min)*
Target group	*Students that can use basic tools safely, (Students from 10 years and up)*
Connection to curriculum	*Art, Science (environment, sustainability, construction), mathematics (measurements, data collection)*
Particulars	*The activity can be done indoors or outdoors, suggested to work in pairs. Start collecting materials 2 weeks before the activity.*


Outline

In this tinkering activity, the students build bird scarers using recycled materials previously collected by the students. Only a few essential materials are provided by the teachers: students are asked to gather materials themselves, prior to the workshop, and to share collectively. Some methods for scaring birds, like propane canons or crows made of plastics, are not really environmental friendly. In this activity the students use a more ecological approach: the use of materials that have fulfilled their primary purpose and now have a second chance to serve as extravagant guardians of the garden.

Connection with sustainability

The activity starts with a discussion on environmental issues and uses the creative activity of scarecrow construction as a symbol of sustainability. By using waste materials, the activity aims to instill a mindset that values creativity in the use of materials in innovative ways, promoting an appreciation for sustainability that extends beyond the borders of the workshop.

Health and safety

Hazard	Controls
Tins can be very sharp, students can cut themselves.	Do not let all ages use tins, do not leave pieces unattended, instruction in advance on how to handle it. Have a first aid kit in the room.
Glue guns get very hot.	Give an instruction on how to use the glue guns. Let the students use them in a designated place, and keep an eye on it.

Essential materials

Item	Comment	Total (for 20 students)
Boxes	Cardboard or plastic boxes and containers collected by students in the week prior to the activity	10-12
Tins	Tins collected by students in the week prior to the activity	8-10
Wood sticks	Can be colored by the children to make the scarecrow more creative	many
Toothpicks		Two packs
Balls of wool or cotton	Various colors	1 pack
Cardboard	Start collecting two weeks in advance	a few boxes
Elastics bands		Two boxes
Recycled materials	E.g. plastic bottles, cups, cans, bags, old banners etc. Start collecting two weeks in advance	Enough for each student to create a scarecrow

Essential tools

Item	Comment	Total
Hand drill		one/two
Hot glue		a few
Cold glue		a few
Scotch		4-5
Cutting mats		one/two

The list of materials and tools is not exhaustive, but it is important to have a variety of materials available. Adapt this list to the prompt you give the students.

Preparation

- Let the students collect materials a few weeks in advance.
- Try some techniques in advance. Make sure there are examples to show the students. These can be homemade examples or the examples from the Appendix.
- Prepare the classroom, arranging the different on tables and sorting them in order to give a better overview of what is available for tinkering. Materials can be sorted them according on type, colour, size, etc.
- Create lively and creative islands with materials. Prepare two working tables, one for using hot glue and the other for using the hand drill. The children can use these spaces in pairs, taking turns.

Activity Plan

Introduction (30 min)

- The teacher promotes a friendly and inclusive environment for discussion, encouraging children to share their thoughts on how we can be kind to our planet.
- To introduce the activity, the teacher engages the children in an interactive discussion on the role of bird scarers and scarecrows in protecting crops. Pictures, photos or short videos can be shown. Discuss with the students about different ways that may scare birds away: movement, sound, reflection, other birds or animals that are bigger.
- The teacher then presents the outline of the activity (the range of materials the children can explore, the setting of the room, the special tables, how much time they have, encouraging to work in pairs)
- Child-friendly models and examples are shown to spark inspiration and show that the possibilities are as limitless as their imagination.
- Depending on the goal of the activity you can use the following prompts:
    - **Prompt:**
        - Create a bird scarer that scares away birds in a (vegetable) garden.
        - The mission is to create a scarecrow using recycled materials, picturing it as a friendly defender, not only scaring away crows but also spreading a message of environmental care.

- The teacher outlines simple and clear rules, emphasizing safety and teamwork. The students choose their pairs.

Tip: This activity can be caried out in combination with *Tinkering with solar panels*. In this case, students first make a scarecrow and then try to make it move using the solar panel and a motor.

Managing the activity once it is in progress (90 minutes)

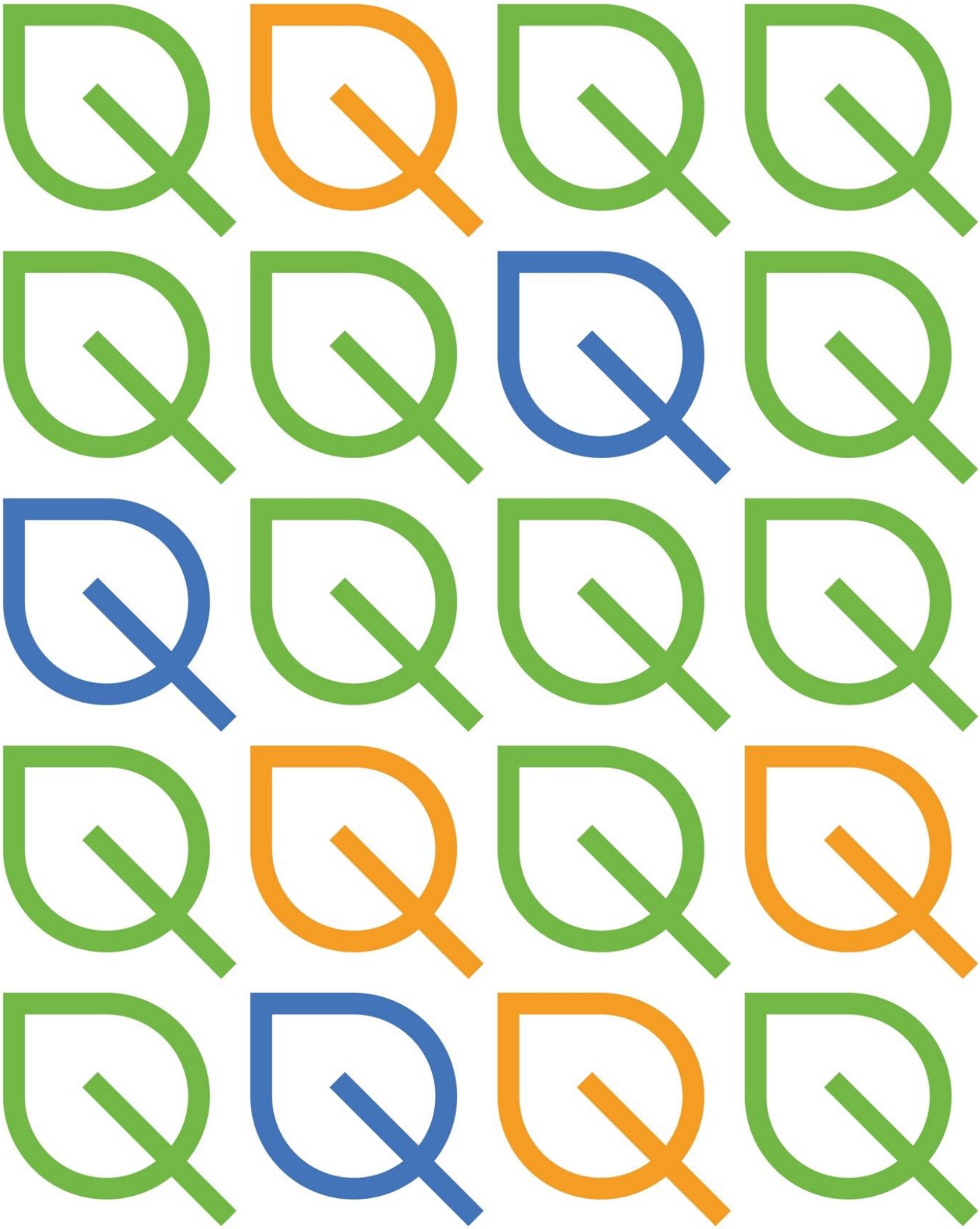
- Workstations are transformed into lively, creative islands. The teacher outlines simple and clear rules, emphasizing safety and teamwork.
- The children choose their work partners and work in pairs.
- The teachers walks around the room and observe how pairs work and writes down remarkable things to use in the comclusion. Teachers support the students' ideas and give alternatives if needed. If they get stuck, encourage them to walk around the room and see how the other pairs progress.

Conclusion (30 min)

At the end of the activity, each pair can present their work. The teacher can stimulate the presentation by asking questions based on their notes, e.g. what difficulties were encountered, how did they overcome those difficulties, and what progress was made during the work. The teacher can ask how

they collaborated, if they drew on the ideas of others, whether they deviated from their initial ideas and how. Note how many works of art relate to the environment and how objects from waste were incorporated.

Have a concluding discussion with the students to collect their impressions, difficulties, satisfactions and whether they had any unexpected thoughts during the whole tinkering experience.
The scarecrows can then be installed in the school garden or vegetable garden or the children can take them home and use them on their balconies and gardens.



Appendix

Examples of organized material

Examples of special settings for hand drill and hot glue

Examples of bird scarers

Colophon

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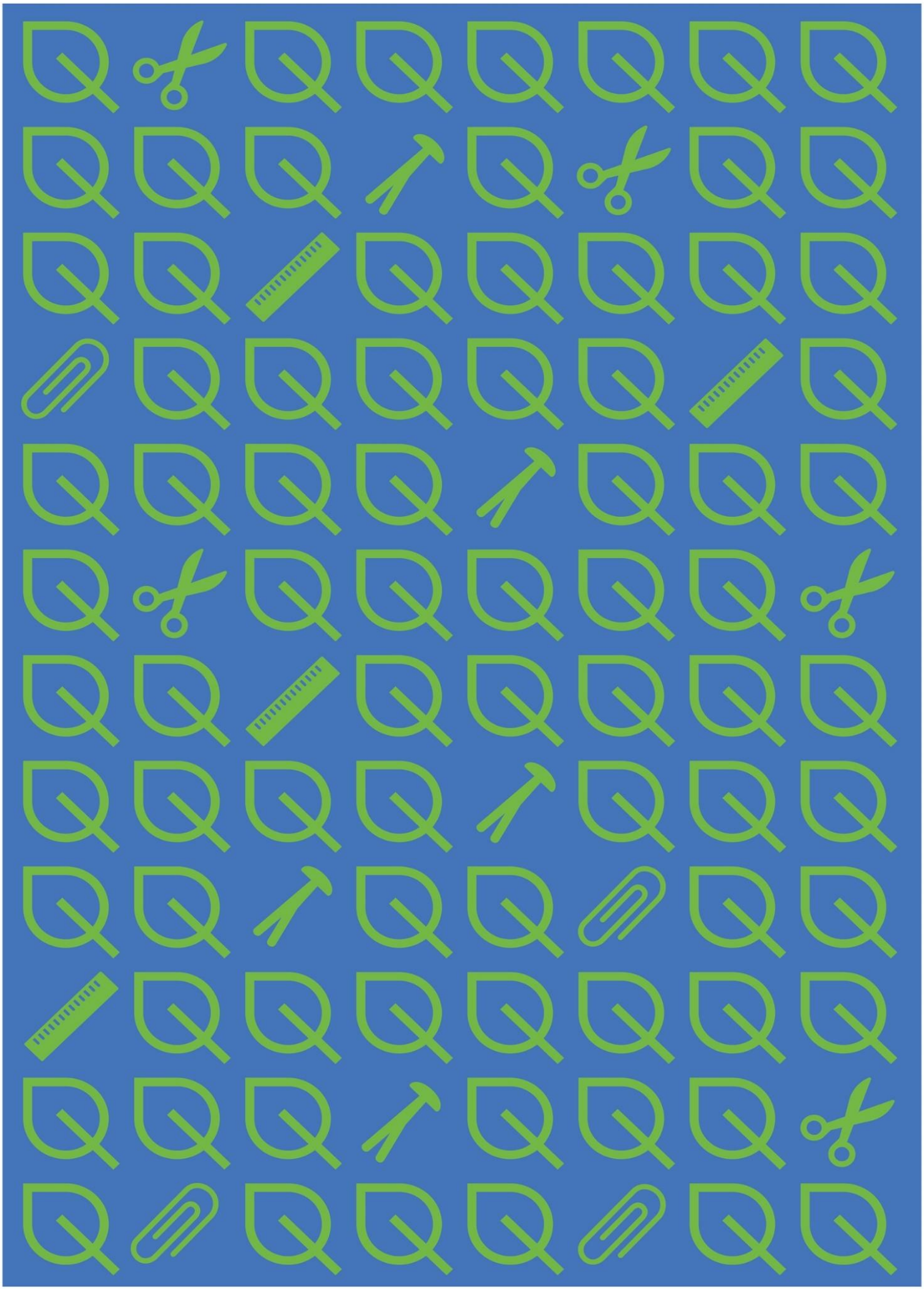

Tinkering with Solar Panels

TINK@School

Co-funded by the
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Tinkering with Solar Panels

Duration	*3 hours*
Target group	*Students that are able to safely handle hot glue and electrical wiring from solar panels (approximately ages 10 and up)*
Connection to curriculum	*This activity is well suited for exploring solar energy and for discussing sustainable energy sources. It can be connected to the art curriculum and to the physics and sciences curriculum.*
Particulars	*This activity has been developed as a second step of the Scarecrow artwork activity. We suggest you allow an extra 60 minutes for the first section if you have not started with the Scarecrow. Needing solar power, the activity works better if you can set the working area outside and it benefits from good weather - which allows solar panels to properly function.*

Commentato [JB1]: @Denise Kool hier nog de vaardigheid aan toevoegen?



Outline

Do we know what we talk about when we mention renewable energy and solar power in particular? Starting from a group discussion, participants are invited to design a moving scarecrow, brought into motion by solar power. Creativity is engaged in designing the scarecrow, which is built out of recycled materials, previously collected by the students themselves. Engineering mechanisms need to be discovered in order to make the scarecrow move on solar power. The final product is a scarecrow army, well suitable for protecting school lawns and flowerbeds from birds.

Connection with sustainability

The whole project revolves around sustainability issues, starting from the search for used materials for producing the scarecrow and ending with using solar power as the propelling energy. Seeing solar power at work enables students to gather a better understanding on the application of renewable energy.

Health and safety

Hazard	Controls
Tins might have sharp edges and students can cut themselves.	*Have a first aid kit in the classroom and express caution for handling sharp materials.*
Hot glue guns can be hot and students can burn themselves	*Give an instruction on how to use the glue guns. Let the students use them in a designated place, and keep an eye on it.*

Essential materials

Item	Comment	Total
Tape		5 rolls
Wooden sticks		2 boxes
Toothpicks		4 boxes
Wool		3 skeins
Rubber bands		3 boxes
Tins or plastic boxes		1 per pair
Picture frames		10
Recycled materials		Enough to tinker with

Essential tools *[fill in the table, if needed add a photo]*

Item	Comment	Total
Solar cells		1 per pair
Engines		1 per pair
crocodile clips		4 per pair
Hand drill	place these on a designated table	1 set per 4 pairs
Hot glue	place these on a designated table	3
Glue		1 bottle per 2 pairs

The list of materials and tools is not exhaustive, but it is important to have a variety of materials available. Adapt this list to the prompt you give the students.

Preparation

Prepare the classroom in advance, arranging the different materials on tables, sorted according to type of material, size, and color. Place the materials and tools on different tables around the classroom. Work stations are transformed into lively, creative islands. Prepare two ad hoc tables, one for using hot glue and the other for using the hand drill. These working areas can be used taking turns, while the construction activity takes place on desks.

Activity Plan

Introduction (45 minutes)

- Participants are encouraged to share their thoughts on renewable energy and its effects on the planet.
- To introduce the activity, the teacher engages the class in a discussion on renewable energy sources and explores their range.
- The challenge of the activity is shared with the class: each pair needs to employ solar energy to make a specific item move. A brief research is undertaken to gather inspirations for the construction (this part can be skipped if the class has already undertaken the *Scarecrows Artwork* activity)
- The class is invited to explore the range of materials collected, the setting of the room, the special tables. The time for the activity will be stated, so that everybody can manage their own time frame.
- Child-friendly models and examples are shown to spark inspiration and show that the possibilities are as limitless as their imagination.
- The prompt: design an object that can move with solar power. The educator can modify the prompt by mentioning the size, weight, or balance to steer the activity in that direction (e.g. the object needs to be lightweight)
- The teacher outlines simple and clear rules, emphasizing safety and teamwork.

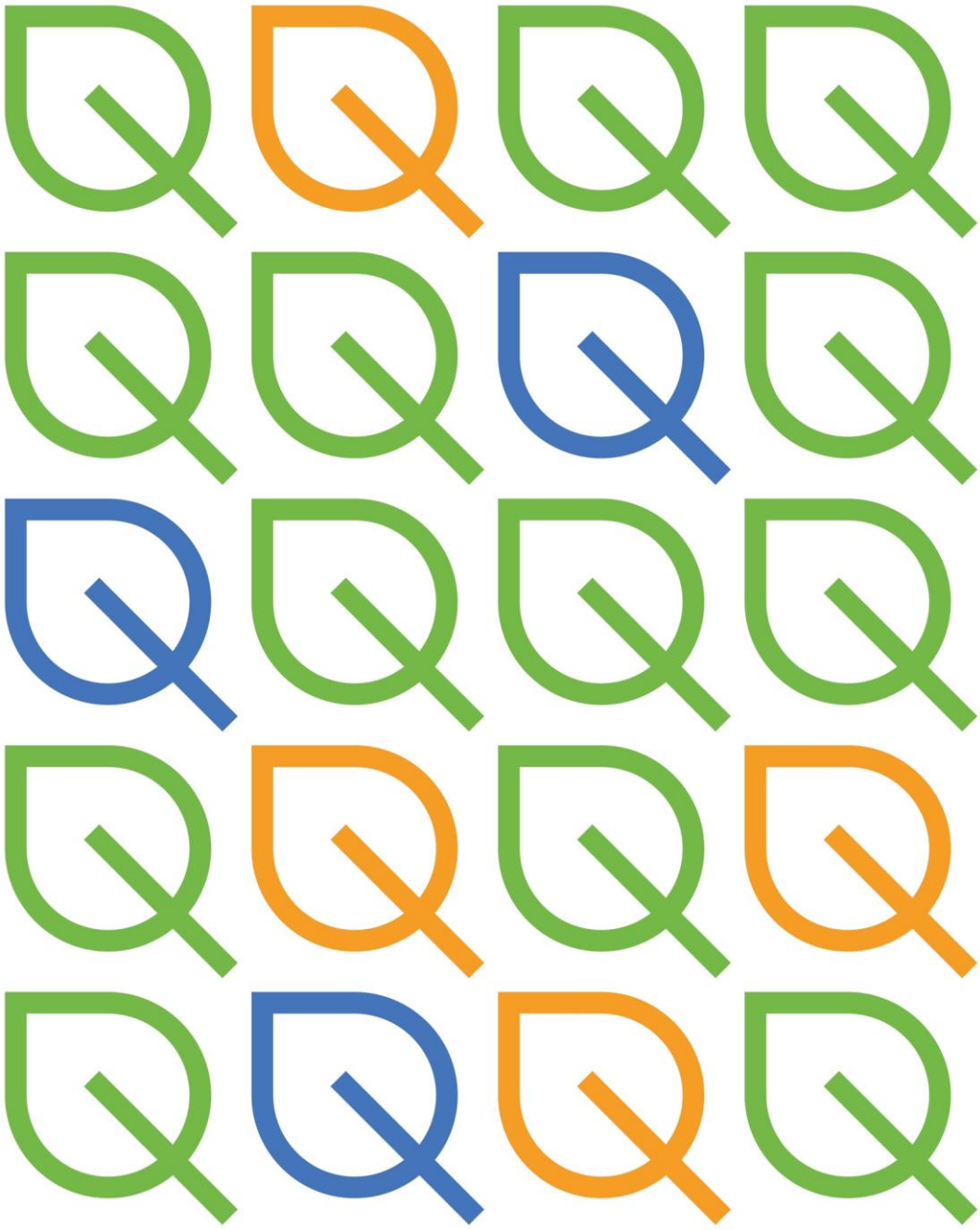
Managing the activity once it is in progress (120 minutes)

- The students choose their work partners and work in pairs.
- Teachers support the students' ideas and give alternatives when needed, suggesting to observe other pairs and encouraging those who feel stuck by providing different materials or options.
- Pay attention to safety, students work with glue guns which get hot.
- Ask questions to get students thinking about possible solutions or to help them articulate their goals or problems. Then ask questions that make them see for themselves where things might be going wrong or encourage them to come up with solutions.
- Write down events or statements from students that stand out, to use when discussing the activity afterwards. (E.g: If you saw them working together really well, or overcoming a frustration.)
- Have the groups round off after 110 minutes.
- In case the students finish earlier, the activity can also be stopped earlier. Let it depend on the group.
- Clean up, make sure that materials that can be used again are not thrown away and paper scraps are collected in the paper trash.
- Tips for guiding this activity:
    - Encourage students to make the moving part first before attaching the solar cell and engine.
    - Encourage students to find out in what ways the engine can move and how they can influence it

Conclusion

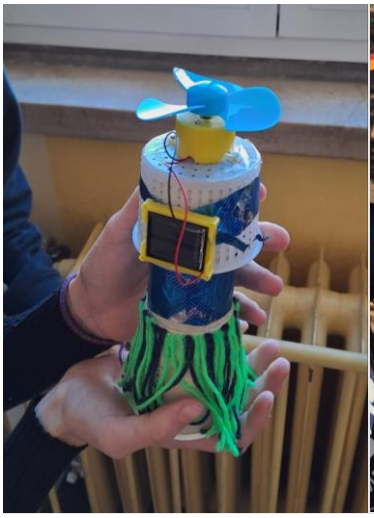
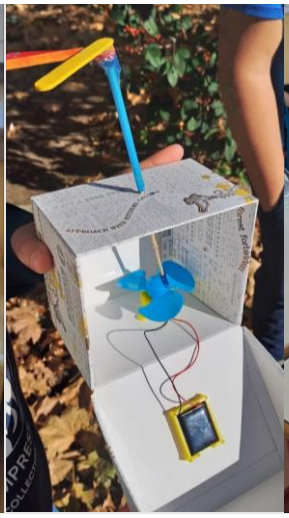
- At the end of the activity, each pair presents their work to the others. The teacher can stimulate the presentation by asking what difficulties were encountered, how they overcame the difficulties and what progress was made during the work. The teacher can ask how they collaborated, where they drew inspiration from for their design, whether they deviated from their initial ideas and how.
- Have a concluding discussion regarding solar power: have they gathered new thoughts on the matter? What are their observations? What have they learned? Have they concocted new ideas about sustainability? Do they feel empowered by having designed a machine working with solar power?

This activity can also be done as a stand-alone activity. Make sure to collect more recycled materials for the students to tinker their object with.



Appendix

Appendix Examples of possible outcomes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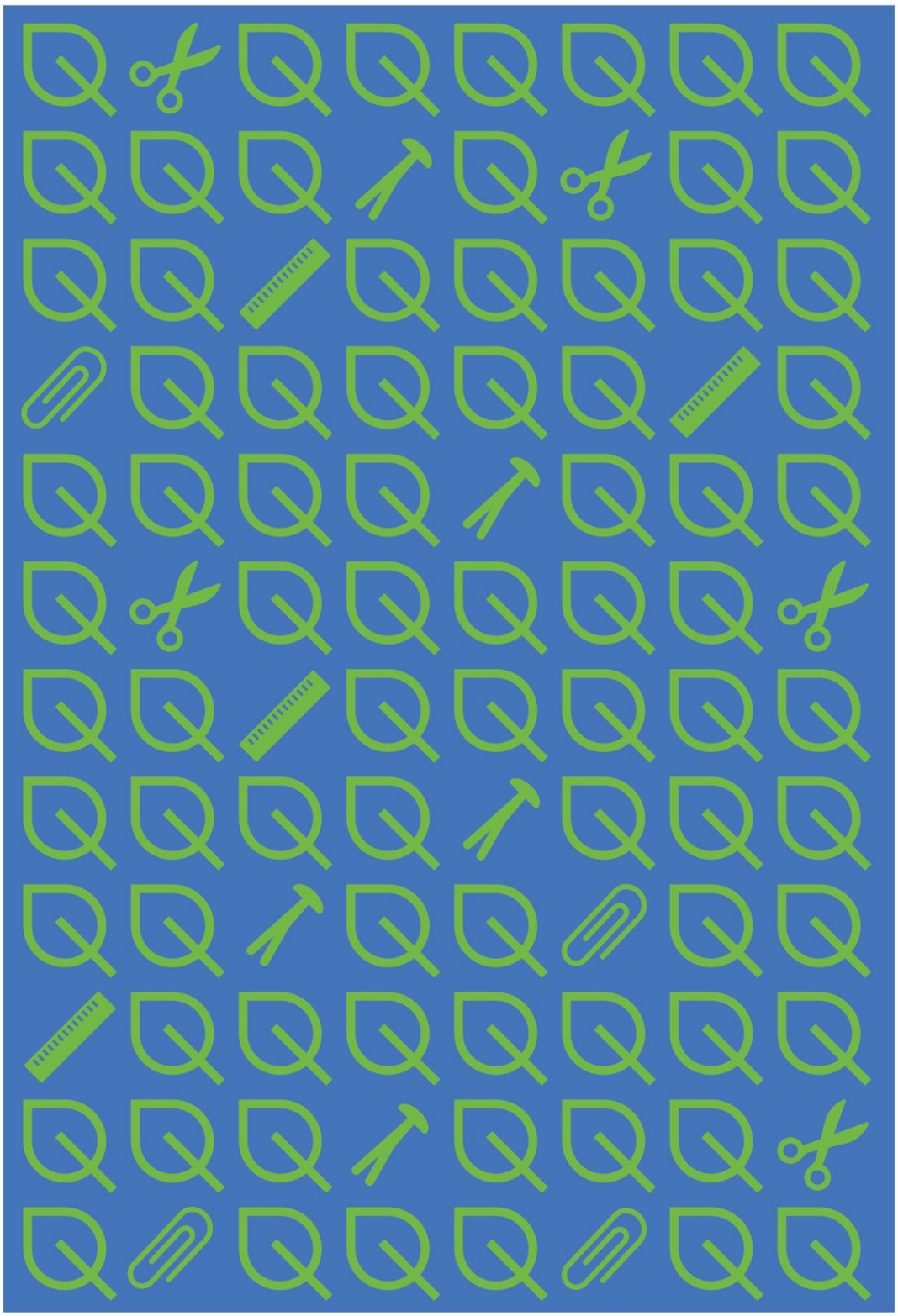


Sustainability calendar

TINK@School

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

Sustainability calendar

Duration	*90 minutes (8-9 y.o.) 60 minutes (10-12 y.o.) (different sessions)*
Target group	*Students from 8 to 12 years old. Students are able to read, use scissors, some also the cutter*
Connection to curriculum	*This activity can be implemented during art, science, math lessons* *In this activity the students work on the following set of skills:* ➢ *cooperation* ➢ *communication* ➢ *critical thinking* ➢ *creativity* ➢ *hand skills* ➢ *leadership* ➢ *team work* ➢ *time management* ➢ *self-esteem* ➢ *etc.*
Particulars	*Participants (teachers and students) were informed in advance that they would be involved in group activities on the topic of sustainability. Students were then asked to begin collecting recycled/waste materials and their respective teachers to divide the children into groups of 4 maximum 5 each beforehand. The 4 workshop sessions have taken place in class.*

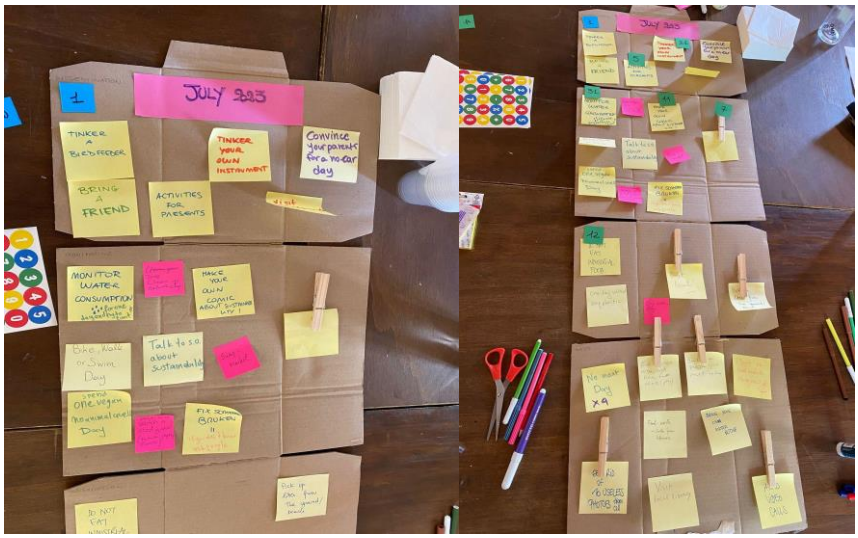


Figure 1,2. Outcomes from workshop to tinker a sustainability calendar, TINK@SCHOOL Consortium, Milan, June 2023

Figure 3. Outcomes from tinkering workshop at «Pablo Neruda» school, Rome (IT)

Figure 4. Outcomes from tinkering workshop at «Anna Michely» school, Rome (IT)

Outline

In this activity the students create a 'sustainability calendar' using the tinkering approach, focusing and promoting concepts such as recycling, saving water, saving electricity, and repurposing clothing and products. By tracking progress towards sustainability goals, the students can identify areas for improvement.

The 'sustainability calendar' can include a range of activities around the following topics: reducing energy consumption, conserving water, reducing waste, using sustainable transportation, and supporting local and organic food systems. Days such as Earth Day or World Environment Day, can be used to raise awareness and encourage participation.

Connection with sustainability

- The students use recycled/waste materials to create sustainable calendars
- The students think about sustainable actions, to what extent they are effectively committed into them and whether they adopt sustainable behaviors as much at home as at school.

Health and safety

Hazard	Controls
Craft knives are sharp, the students can cut themselves	Adults are required to provide appropriate supervision and support during the tinkering sessions.
Needles	

Essential materials

Item	Comment	Total
Recycled Paper	Ask a local offices or libraries if they can collect paper or have old flyers and posters	Enough for each group to craft with
Cardboard	Old boxes, etc.	2 per group
Clips or Binder Rings		5 per group
Re-used decorative Materials	Corks, crowncap, string, colorful packaging, posters, magazines, folders, postcards,	several
Cotterpins		three boxes
Recycled materials	plastic cups, packaging etc	several

Essential tools

Item	Comment	Total
Crayons		1 set per group
Scissors		3 per group
Thread or rope		3 per group
Cutting mat		1 per group
Craft Knife		1 per group
Paper Trimmer		1 per group
Glue		3 per group
Eraser		1 per person
Ruler		1 per group
Hole Puncher		1 per group
Tape		

Preparation

Group tables and arrange them in the classroom to ensure group work. Incentivize the students to walk around and observe. Distribute the materials on the different “work stations”. Arrange the dangerous one on the teacher's desk. Sort the materials to give a clear overview which materials are available.

Prepare some examples to be showed to the students.

Activity Plan

Introduction

Begin by discussing the concept of sustainability and its importance in taking care of our planet. Ask questions like, "Have you ever thought about ways we can help the environment?" or "What actions do you think are sustainable? What are some sustainable actions you do at home? At school? In the neighborhood?"

Divide the students (max 20) into groups of 4/5 and let them create a word cloud about sustainability. Encourage students to brainstorm and share their ideas for sustainable actions they can take. This could include activities like recycling, conserving water and energy, planting trees, reducing waste, or spreading awareness about sustainability.

Then explain the assignment and prompt and let them have a look at the materials.

Prompt to start the activity: Create a calendar or other way* to keep track or stimulate people to take more sustainable actions.

- Duration: between 60 and 90 minutes
- Show some examples (see appendix) to the students.
- Give some suggestions to get them started:
    - Who are they making the calendar for? (e.g. school, their family, themselves)
    - What kind of actions do they want to record or stimulate with the calendar? (recycling, reusing, but also engaging people to be more sustainable, organize picnics, enjoy nature, spend less time in front of the screens, help the elders). How do they want to stimulate the actions? (track actions on the calendar, fun encouragements, track appointments or trash collection dates.)

* Other ways can be: a chart that shows how much you recycle, award board, board with notes with chores. see appendix.

Managing the activity once it is in progress

The facilitator guides the students during the tinkering process by offering assistance in brainstorming ideas, using the materials, and troubleshooting any challenges they encounter. They should foster an environment that celebrates creativity and encourages students to think outside the box. Inspire them to come up with unique ways to represent sustainability on their calendars, whether it's through artwork, symbols, or innovative ideas.

It is important to encourage students to share their progress and ideas with their peers.

- Pay attention to safety, students work with tins or scissors, which are sharp, and glue guns, which get hot.
- Indicate every 10 - 20 minutes how much time is left.
- Observe the groups and know what students are working on, and whether students are frustrated or stuck.
- Use comments and questions to get students thinking about possible solutions or to help them articulate their goals or problems:

- ***Pose questions instead of answers:*** what message do you want the calendar to help you convey? What kind of time frame helps you most to remember to have sustainable behaviors?
- ***Create a supportive and inspiring environment****: I really like how you are using the material.*
- ***Help in case of frustration and failure in a positive and productive way:*** *why do you think this is not working for you?*
- ***Encourage learners to pursue personal interest:*** *don't worry if you think it might not work, have a go anyway.*
- ***Encourage collaboration:*** *maybe you can ask the other group how that worked for them.*

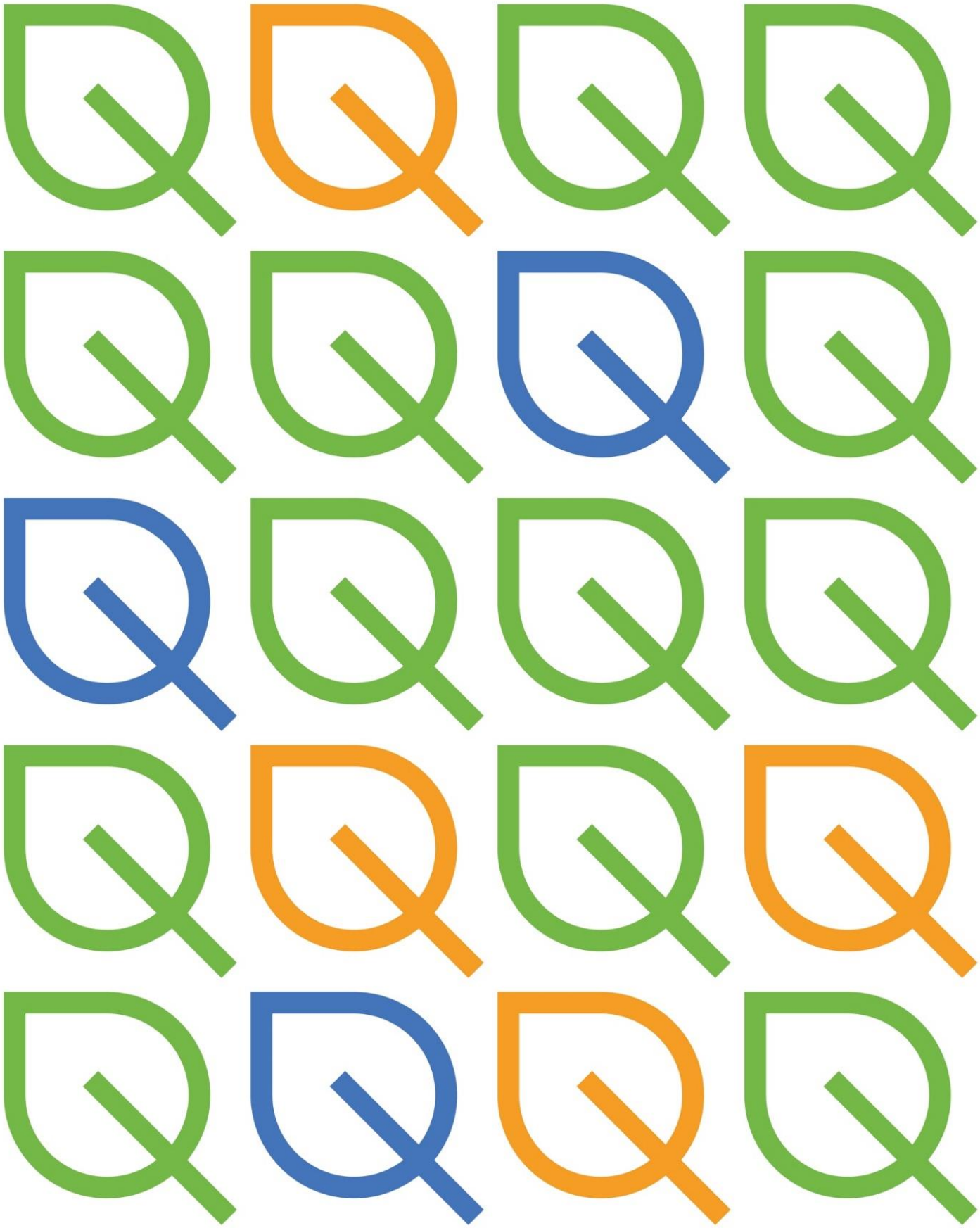
- Encourage students to look at other groups or the material tables if they get stuck.
- Write down events or statements from students that stand out, to use when discussing the activity afterwards. (E.g: If you saw them working together really well, or overcoming a frustration.)
- Have the groups round off after 60-90 minutes. In case students finish earlier, the activity can also be stopped earlier, let it depend on the group.
- Tips for guiding this particular activities:
  - See appendix for examples of *"Sustainability calendar"*
  - Clothespins, rubber bands, glue, thumbtacks work really well to connect things
  - The use of colors and decorations (i.e., stickers, glitter) increased the level of engagement
  - Key words on the theme of sustainability helped artifacts as better express the concept of sustainability
- Clean up, make sure that materials that can be used again are not thrown away and paper scraps are collected in the paper trash.

Conclusion

As the facilitator or participant, concluding the tinkering activity is an opportunity to reflect on the journey and acknowledge the accomplishments. Reserve some time for participants to share their tinkering calendars and discuss their experiences. Encouraging them to talk about the sustainable actions they tracked, any challenges they faced, how they overcame them, and the progress they made. Before the tinkering session ends, encourage students to reflect on their own sustainable goals and actions.

Specifically, highlighting the sustainable actions they undertook and the positive impact they made and emphasizing that every small step towards sustainability matters and that their contributions are valuable. Engage participants in a conversation about their plans for continuing their sustainability journey beyond the tinkering activity. Encourage them to set new goals and explore further sustainable actions they can take in their daily lives.

Follow-up activity: Let the students use their own calendar or the calendar from another group to track their activities for two weeks. After two weeks, discuss what actions they did and if they did more than they did before.



Appendix

Appendix Examples of possible outcomes

@Amazon


@Freepick

Figure 5. Examples of hand-made calendars

See https://pin.it/6bVZY2hio for more ideas.

Colophon

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This activity has been authored by Alessia Spatafora (Centro di Ricerche e Studi Europei-future business/CRESfb)

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NEMO Science Museum, Netherlands

MIO-ECSDE, Greece

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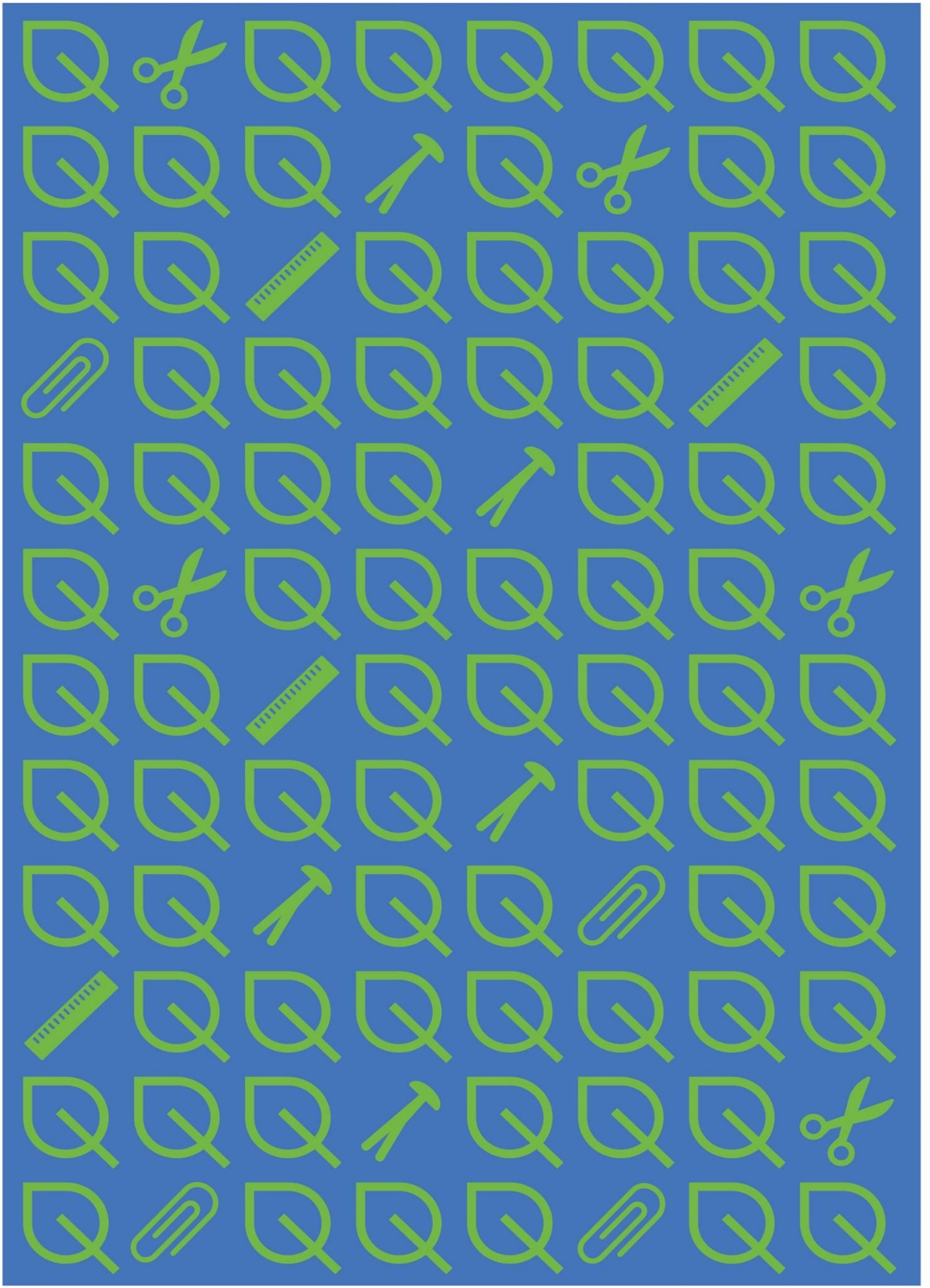


Save the planet bag

TINK@School

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

Save the planet bag

Duration	*120 minutes*
Target group	*Students from 10 to 12 years old. Students are able to read, use scissors, cutter and needle and thread*
Connection to curriculum	*This activity can be implemented during art, science, math lessons* *In this activity the students work on the following set of skills:* ➢ *cooperation* ➢ *communication* ➢ *critical thinking* ➢ *creativity* ➢ *hand skills* ➢ *leadership* ➢ *team work* ➢ *time management* ➢ *self-esteem* ➢ *etc.*
Particulars	*Participants (teachers and students) were informed in advance that they would be involved in group activities on the topic of sustainability. Students were then asked to begin collecting recycled/waste materials and their respective teachers to divide the children into groups of 4 maximum 5 each beforehand. The 4 workshop sessions have taken place in class.*

Outline

Sustainability means taking care of our planet by reducing waste, reusing materials, and recycling whenever possible. We can be sustainability superheroes by encouraging others to recycle, reusing items creatively, and making eco-friendly choices in our daily lives.

In this activity the students tinker a unique bag that encourages others to take sustainable actions. For example, the bag can be used to collect recyclables, encourage reusing items, pick up litter, and spread awareness about the importance of reducing waste. The materials provided are the students' creative toolkit, they get to decide what their bag is for and how to make it.

Connection with sustainability

The Save the planet bag is based on a sustainable approach through the use of recycled products, its collection and use. On the other hand, within the tinkering process the students will be directly asked to discuss the use of the final product considering a sustainable approach and impact.

Figure 1,2,3,4. Outcomes from tinkering workshop at «Anna Micheli» school, Rome (IT)

Health and safety

Hazard	Controls
Sewing needles are sharp, students can prick themselves	Stress caution when handling the needles. Have a first-aid kit in the classroom.
Glue can stick fingers together or stick materials to them	Depending on what kind of glue, some fabric glue can be quite strong, have something like oil prepared to easily get the glue off. If using hot glue, give an instruction on how to use them and stress caution. Provide supervision when needed.

Essential materials

Item	Comment	Total (for xx persons/pairs/groups)
Recycled paper or sustainable paper for bag patterns and designs.		about 2 per group
Various colors of pens, pencils, or markers made from eco-friendly materials.		about 1 set of colors per person
Recycled materials to create a bag.	*Shopping bags, bags, shoppers, tote bags, old clothes,*  *bulk package, potato nets, old clothes*  *Old banners or flags (like the ones from building sites)* 	about 3 per group
Fruit nets		
Decorative elements	Try to use re-used items e.g. from seat belts, or a charity shop	
Thread and fabric	From old clothes or other textiles, ready to be reused creatively	about 1 per person

Essential tools

Item	Comment	Total (for xx persons/pairs/groups)
Scissors		1 per pair
Glue	The glue must be strong enough to hold the fabric together.	1 per pair
Eco-friendly tape		1 per group
Needle and thread	Depending on whether the students involved are capable of sewing. Provide a pincushion or box to keep the needles in.	4 per group (needle) 3 or 4 set of threads
Ruler		2 per group
Pins or pegs	To hold the fabric together before sewing	

Preparation

Group tables and arrange them in the classroom to ensure group work. Incentivize the students to walk around and observe. Distribute the materials on the different “work stations”. Arrange the dangerous one on the teacher's desk. Sort the materials to give a clear overview which materials are available.

Prepare some examples to be showed to the students.

Activity Plan

Introduction

Tell the students: their task is to tinker a unique bag that encourages others to take sustainable actions. For example, the bag can be used to collect recyclables, as a way to encourage reusing items, pick up litter, or spread awareness about the importance of reducing waste. The materials provided are their creative toolkit, and they get to decide what their bag is for and how to make it.

Divide the students into groups of 4/5. Let the students explore the wide range of materials. Ask them to discuss and brainstorm on sustainable actions they want to stimulate with the bag. Let them think about creative ways to encourage others to take part in sustainable actions.

Show the students different ways to attach fabric and other materials together (gluing, sewing, knotted edges.) Encourage them to think creatively and to decide how to design their bag. Will they use fabric patches, sew on decorative elements, braid with old plastic bags or use thread for stitching? Emphasize that there are no right or wrong ways to approach the activity.

Prompt to start the activity: Tinker a bag to encourage sustainable actions. The activity takes 120 minutes.

At the end it is encouraged to take the bags home, depending on a follow-up activity, students can take the bags home to collect trash or the class can collect trash in the neighborhood together.

Managing the activity once it is in progress

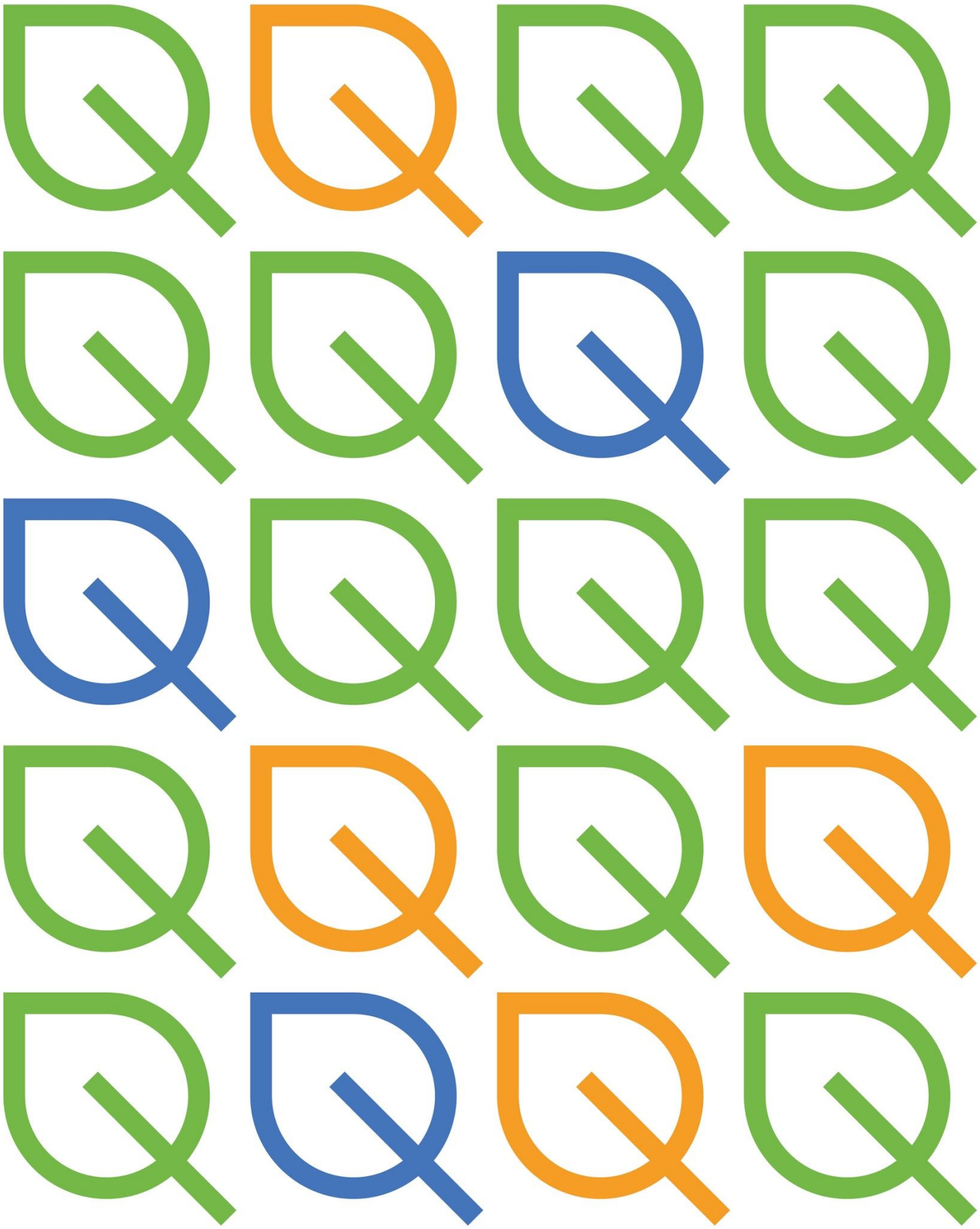
- Pay attention to safety, students work with tins or scissors, which are sharp, and glue guns, which get hot.
- Indicate every 10 - 20 minutes how much time is left.
- Observe the groups and know what students are working on, and whether students are frustrated or stuck.
- Use comments and questions to get students thinking about possible solutions or to help them articulate their goals or problems:
    - ***Pose questions instead of answers:*** what message do you want the bag to help you convey? What kind of objects you would put inside it and why? Would you be able to reuse it for other occasions? If yes, which ones?
    - ***Create a supportive and inspiring environment****: I really like how you are using the material.*
    - ***Help in case of frustration and failure in a positive and productive way:*** *why do you think this is not working for you?*
    - ***Encourage learners to pursue personal interest:*** *don't worry if you think it might not work, have a go anyway.*
    - ***Encourage collaboration:*** *maybe you can ask the other group how that worked for them.*
- Encourage students to look at other groups or the material tables if they get stuck.

- Write down events or statements from students that stand out, to use when discussing the activity afterwards. (E.g: If you saw them working together really well, or overcoming a frustration.)
- Have the groups round off after 55 minutes. In case students finish earlier, the activity can also be stopped earlier, let it depend on the group.
- Tips for guiding this particular activities:
    - See appendix for examples of ***"Save the planet bag"***
    - Clothespins, stapler, attaches, needle and threadwork really well to connect things
    - The use of colors and decorations (i.e., stickers, glitter) increased the level of engagement
    - Key words on the theme of sustainability helped artifacts as better express the concept of sustainability
    - Thinking about what kind of objects or waste/recycled materials these bags should contain helps the creation process
- Clean up, make sure that materials that can be used again are not thrown away and paper scraps are collected in the paper trash.

Conclusion

Once the students' bags are complete, share the creations with the group. Let them explain the sustainable actions they want to stimulate and how their bag can inspire others to take part. Also reflect on their learning process: what went well? What would you do otherwise next time? How would you do that? Let their enthusiasm for sustainability inspire each other and take pictures of all the creations!

Finally, have the students take their sustainable trash collection bags home with them. Use them proudly to collect recyclables or spread awareness about the importance of sustainable actions.



Appendix

Appendix Examples of possible outcomes

@greenMe

@Easymomswissmade

@Non sprecare

Colophon

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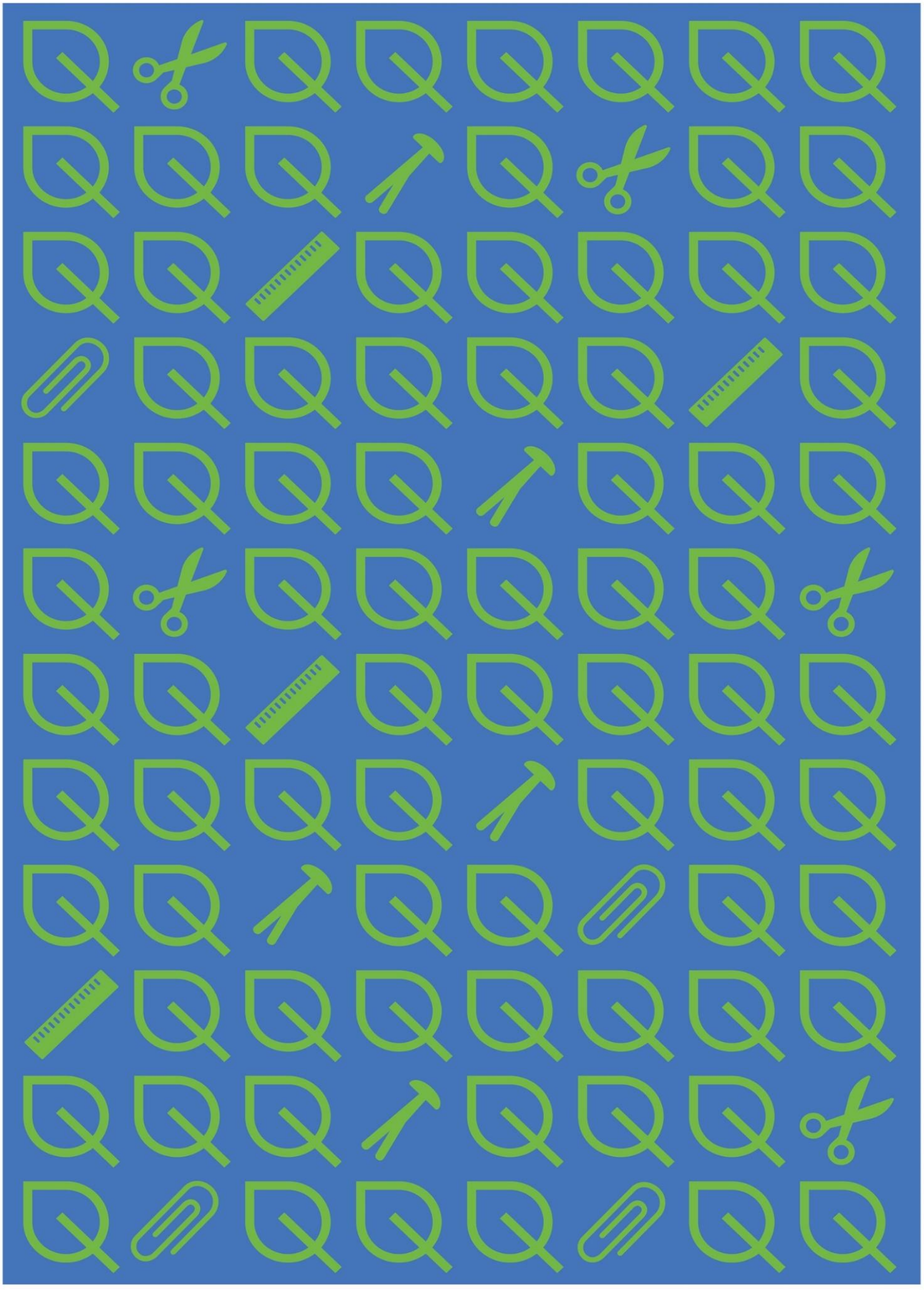


Old toys to new toys

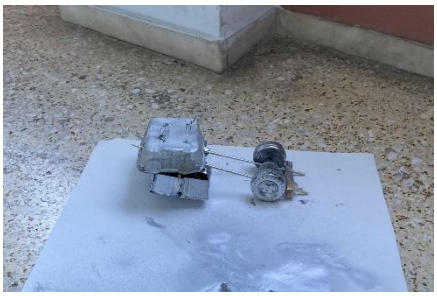
TINK@School

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

Old toys to new toys

Duration	*4-5 sessions of 60 min each*
Target group	*e.g. students 12-13 years old (with some experience of circuits).*
Connection to curriculum	*This activity can be linked to subjects of science (electricity, circuits), Arts*
Particulars	*Takes place indoors; suggested to work in pairs*





Outline

The participants are asked to bring old or broken toys (ideally with batteries), they have at home. They are invited to dismantle them to see the mechanisms hidden inside. Once they are familiarized with the interior and after testing if they can repair the toy, they are invited to re-connect parts and make a new toy or sculpture or movable device. To do that a bunch of other materials from the recycling bin will be required.
* In case of participants unfamiliar with tinkering, the whole first session could be devoted to explaining the methodology, demonstrating it through videos and photos, and trying out a simple tinkering activity, e.g. “Tinker your name”.

Connection with sustainability

Students are explained the meaning behind tinkering and the now vanished profession of tinkerer, that has to do with repairing, improving and reusing things. This “old way of doing things” is closely linked to the modern day principles of circularity, zero-waste, and sustainability.

Students are invited to give a new life to broken toys that were non-functional. They are also invited to use a bunch of items from the recycling bin. In this context we can talk about the options of reusing, recycling, and upcycling, and debate on which of these verbs is more important for managing our wastes and why.

EU Waste Directive:
Preventing waste is the preferred option,
and sending waste to landfill should be the last resort.

Health and safety

Hazard	Controls
Cut in finger	*Explain to students the dangers of cutters, and hammer beforehand; have a first aid kid in the room; be alert to help them at certain points*
Toys that have to be plugged in	*Avoid them, use only toys that work with batteries, or stuffed toys*
Soldering wand and tin	*Becomes very hot, use with caution and under supervision*
Batteries and short circuit	*Remove all batteries from toys ad the end of the activity*

Essential materials

Item	Comment	Total (for xx persons/pairs/groups)
Broken toys	*They can be brought by the students, or ask a local thrift shop if they collect them for you.*	*At least one toy per pair*
Batteries	*Of different voltages, e.g. 1.5V, 3V.*	*At least 4 per pair*
Battery holder	*For 2 or 4 batteries*	*At least 1 per pair*
Electrical wires		*Plenty*
Light bulbs or LEDS	*At voltage fitting the batteries*	*At least 1 per pair*
Aluminium foil		
Materials from the recycling bin	*E.g. containers made from cardboard, plastic or metal, toilet paper rolls etc. The materials can be collected in advance.*	*Plenty*
Big size papers (At least A3)	*To make the diagram of the toy circuit*	*1 per pair*
Markers / pens	*To make the diagram of the toy circuit*	*2 per pair*
Elastic bands		
Clothes pegs		
Corks		
Rope / String		

Scotch tape		
Glue		
Containers / empty boxes	*To store components extracted*	*1 per pair*
Fabric	*For stuffed toys*	

Essential tools

Item	**Comment**	**Total (for xx persons/pairs/groups)**
Scissors		*1 per pair*
Cutters		*1 per pair*
Screwdrivers	*Of different sizes and shapes*	*At least 1 per pair*
Wire stripper		*Have available at least one*
Glue gun	*Optional*	
Soldering tin and Soldering iron	*Optional (for advanced groups)*	
Needle and thread	*For stuffed toys*	*Set per group*

Preparation

Prepare the room: If possible, use three material tables spread around the room (a. for essential tools, b. for essential materials, b. for other materials, e.g. from the recycling bin). By making the students walk around you foster their creativity and support them to draw inspiration from the work of others.

Alternatively,if you don't have space, you can bring together the tables to create a central big surface, and have the pairs work around it.

Make sure you have the right tools (esp. the screwdriver size and type) to open the toys.

Activity Plan

Introduction

- Present yourselves and briefly explain tinkering (what is tinkering, what could be its possible outcomes, how it links to circular economy & sustainability).
- In case of participants unfamiliar with tinkering, the whole first session is devoted to explaining the methodology, demonstrating it through videos and photos of examples, and trying out a simple tinkering activity, e.g. “Tinker your name” with materials from the recycling bin.
- Present the outline of the “Old Toys to New Toys” activity (what is the room set up; where to find essential materials & tools; what will be the duration of the activity; how students will work in pairs; how to leave the room before the session ends).
- In case of electronic toys, explain what an electronic circuit is and that the circuit needs to be closed for electricity to flow through. Most circuits use a power source (e.g. battery), wires (to transport electricity) and something that uses the electricity (e.g. a lamp). If there is not something that uses the electricity in a cycle, this might cause it to short circuit.
- Prompt the challenge: “Our goal for the next sessions is to experiment with old toys: open them, see what is inside, understand how the toys work, and then use these elements together with items from the recycling bin to make a new toy or structure (with movement or without).”
- Underline some safety rules (especially for tools like cutters and hammers)
- Encourage the students to try, fail, adapt, get inspired by the projects of others, ask and give help, discuss. Insist that “failure” is an integral part of tinkering, and that we should not be put off by it, but see it as an opportunity to test something different.
- Optimally discuss if and how their projects will be showcased at the end (exhibition, school bazaar, movies, photos).

Managing the activity once it is in progress

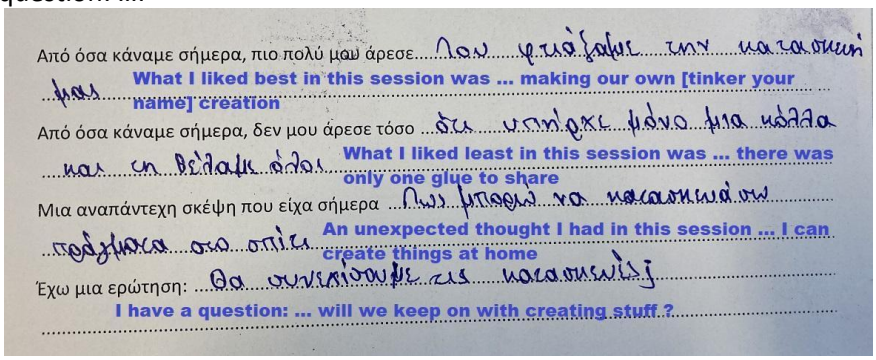
- Encourage students to take their time to observe the outside of the toy, look for switches, moving parts, etc., and convey these in a diagram.
- Once the students have opened their toys, help them to identify some basic elements that can be found inside (e.g. battery packs, alligator clips, motors, speakers, resistors, LEDs, switches, gears). If they can repair a toy, congratulate them and ask them to pick another toy to dismantle.
- While dismantling, one tricky moment is when it looks like it’s not possible for the toy to be further taken apart. Encourage learners to look for hidden switches and seams, before they use a saw or hammer.
- Once all “toy-guts” are exposed and students are familiar with the basic elements of their toy, they can reconnect them into their personal toy or project.
- During the activity pairs will not progress with the same pace and creativity. Support those feeling frustrated by giving them alternative scenarios for their progress. Those that are more prone to circuits may create something with light or movement. Explain to all that it’s OK also to have as a result an artistic creation (a standing sculpture, a Christmas decoration, a souvenir for their room etc.), as long as it’s meaningful to them.
- At the end of each session reserve 10 minutes in order for students to collect the materials in their boxes and tidy up the room.

- At the end of the session, save some time for the debriefing: Ask pairs to also note their progress (e.g. reflect on learning, explain what they have changed about the toy/what they have built, etc.). and what they plan to do in the next session. During the pilot it was observed that some groups diverted their whole creation from one session to the next, starting building something new every time.

Conclusion

Evaluation can be done in various ways. Depending on the time and the circumstances we suggest the following:

a. Asking students to fill in an anonymous mini survey at the end of each session with the following questions:
   - What I liked best in this session was …
   - What I liked least in this session was …
   - An unexpected thought I had in this session …
   - I have a question: ….

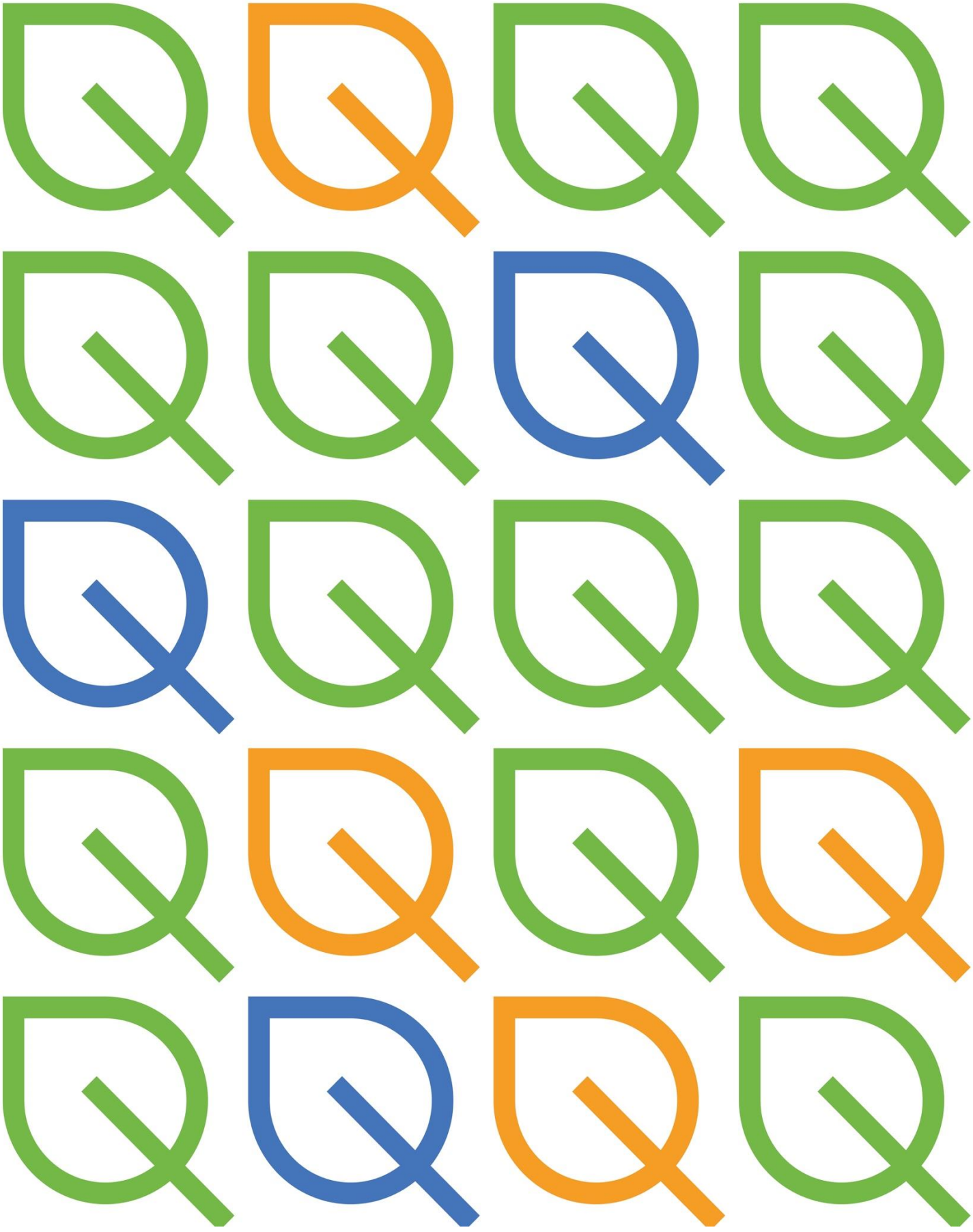


Filled evaluation Card from the first session during the Pilot

b. Having a debrief discussion with the class teacher after the end of each session (especially if you are an external facilitator, not familiar with the participants). The teacher's comments are useful inputs for improving the next session.
c. Having a wrap- up discussion with the students at the last session to collect their impressions and connect the whole tinkering experience with the principles of sustainability and circularity.
d. Discussing with the teacher the elements of the Learning Dimension Matrix on Making and Tinkering.

Extra tips for teachers:

- It is suggested that the group size does not exceed 12-15 students, especially if there is only one facilitator.
- The results will be different if you hold the whole activity in a single 4-5 hour long session. Some pairs diverted their whole idea of "what to create" from one session to the next.
- Taking toys apart creates a large amount of waste. It could be helpful to have bins to sort out skins, plastics, stuffing and mechanical parts. These bins can be the raw materials for making new creations or as material in other activities, but in the end a lot of waste remains. The bulk of resulting waste gives the opportunity to discuss the "buy-use-throw" culture that is imposed on our modern societies from a young age.
- This activity can be also done with stuffed toys, especially for younger students.



Appendix

Examples of possible outcomes / Piloting with the 1st Highschool of Athens

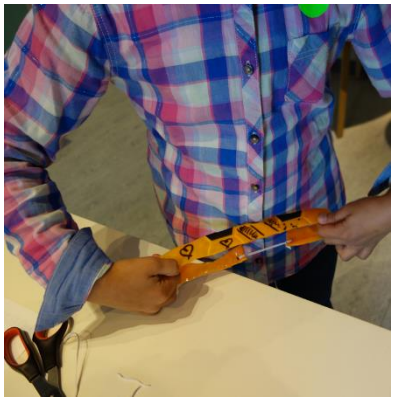
This group did not divert a lot from their original plan: They created a bulky night decoration element for a child's room and they intend to sell it in the School Christmas Bazaar.

This group finally opted for making a small size projection screen that is led through the "leg" of an old toy. They made the figurines to be projected and also wrote a script to play.

This pair dismantled a toy-car. They experimented with making a rotating mill (a), but finally they resulted to a moving device (b), which they also decorated (c).

And **video** of preparing their "Mars-Vehicle" to move

Other toy making tinkering activities for inspiration



Credits: Judith Bal, NEMO

Credits: Agency by design – Instagram

Credits: V. Malotidi

"Franken toy": Incorporate elements from several toys

"Inside Out": Reverse the Skin and sew again

De-soldering elements to re-attach them to a new circuit (and toy)

Source: https://www.exploratorium.edu/sites/default/files/tinkering/files/Instructions/toy_take_apart_0.pdf

Tinkering with movement (videos)

Source: Twiter: @ryanejenkins - https://t.co/bakqSAXI6M

Source: https://t.co/HQLs3vaQS7

Tinkering with light

www.instructables.com/Tinker-Bell-Pixie-Pumpkin-Carving-Poeira/

www.instructables.com/Pipe-Cleaner-LED-Christmas-Decorations/

www.instructables.com/Design-Build-Reiterate-and-Light-It-Up-Circuits-an/

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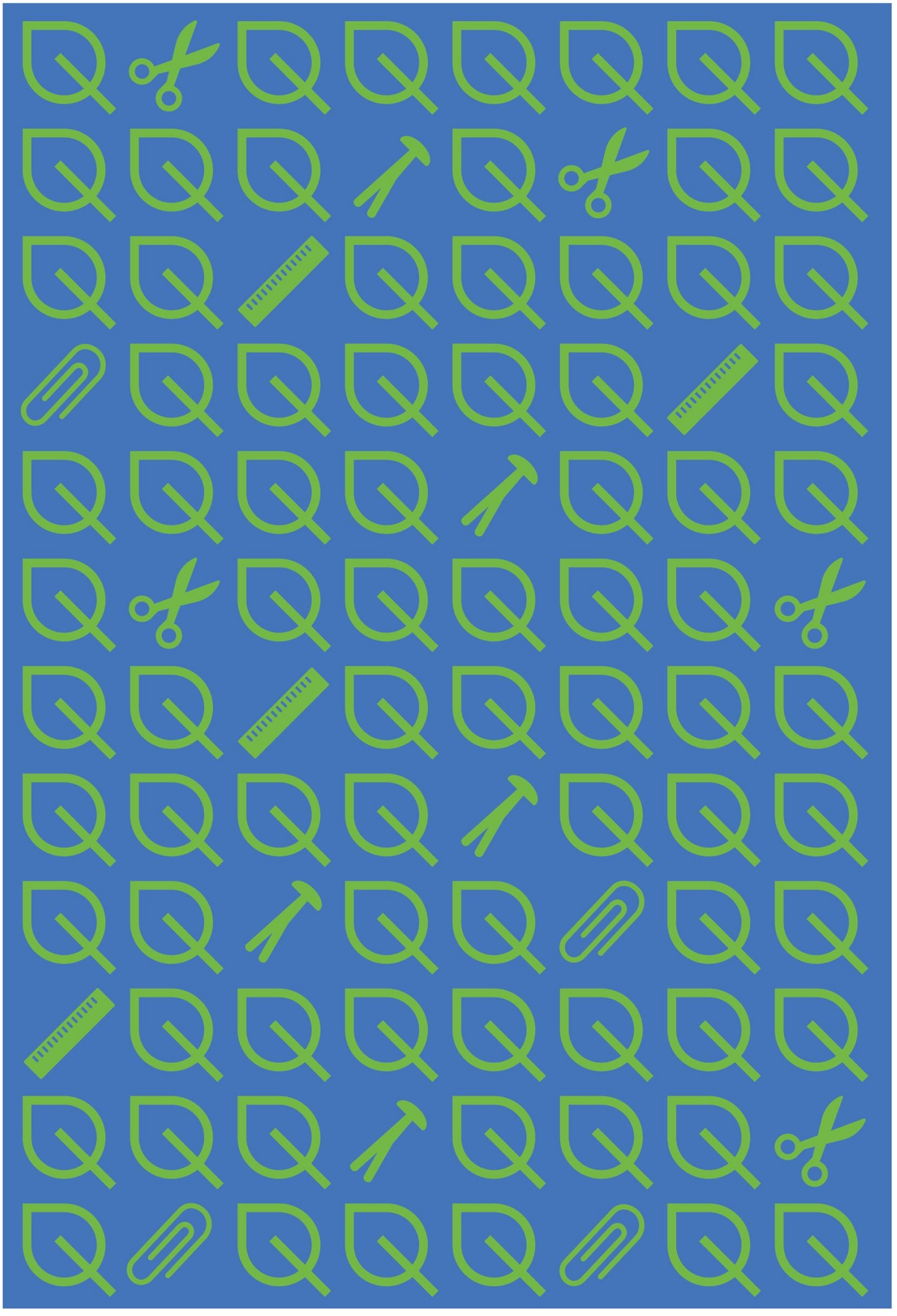


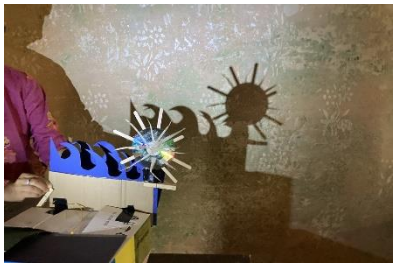
Shadow art with (marine) litter

TINK@School

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

Shadow art with (marine) litter

Duration	*90 min*
Target group	*students 9+, families*
Connection to curriculum	*This activity can be linked to subjects of environment, and arts, physics (light and shadow and connections)*
Particulars	*Can be adjusted to take place indoors or outdoors. This activity should follow after a clean-up of a beach, park, river bank, etc.*



Outline

Using a pile of different sorts of waste from the recycling bin or collected during a clean-up event, the participants experiment with flashlights and surfaces to create a “Shadow Art Piece” that tells a story. Their creations may be inspired by the litter items, or can relate to environmental topics, or other topics that are meaningful to the participants.
* The activity should follow after a clean-up of a beach/park/river bank, etc., during which, a variety of waste items will be collected together with natural material like weeds, branches, feathers, etc.

Connection with sustainability

The activity is proposed to be linked to a clean-up (e.g. on a beach, a wetland, or river bank), which in itself can be a shocking experience for those taking part, in terms of the number of items collected. For example, even seemingly clean beaches have impressive amounts of small sized litter items (e.g. cigarette butts and microplastics). More bulky waste accumulates on unattended beaches over winter time.

The activity is also an opportunity to talk about artists all around the world who work with waste as raw material. In case a clean-up does not fit your plans, participants can be asked to bring items from their recycling bin (the volume and number of items disposed daily is equally impressive). Ask the students to wash the waste before bringing it to school.

Health and safety

Hazard	Controls
Cuts due to broken glass or sharp items or metallic surfaces	*Discuss this with the students before the clean-up; point out hazardous materials and use gloves while collecting the litter. Avoid using such items in the activity*
Dirty or hazardus litter like cigarette butts	*Use gloves to collect such litter.* *For dirty plastics, rinse to remove sand and weed. Aboid using items that are too dirty.*
Box cutters	*Use a cutting mat and supervise if needed.*

Essential materials

Item	***Comment***	***Total (for xx persons/pairs/groups)***
A variety of 3D waste items from the clean-up	*During the clean-up ask participants to keep 3 waste items that impressed them, wash them, and have them available for the Shadow Art.*	*At least 3 items per participant*
A variety of 3D natural items from the clean-up	*Feathers, branches, leaves*	*At least 3 items per participant*
Materials from the recycling bin	*Ensure you have a bulk of material (opaque, translucent, glossy, coloured) that give interesting results in shadow art like: fruit nets, colorful plastic or glass bottles, bowls, baskets, membrane, etc.*	*Plenty*
Household items	*Optional, use items that create nice shadows or reflections like, forks, glasses, drainers etc.*	*A few*
Small 3D toys (human figures, animals, cars, etc.)	*Optional, these can add 'drama' to the art stories created*	*A few*
Light sources	*Use a flashlight or the mobile's flash.* *You can opt for some coloured light.*	*One per participant*
Clothes pegs	*Of various sizes, can be useful in making things stand, or holding the flashlight*	*Plenty*
Big size cardboard boxes and cartons	*Optional, for those wishing to frame their creations*	*A few*

Fishing line or thread and/or string	*Optional, can be useful for hanging things*	*A few*
Scotch tape		
Glue		
Projection space	*All groups need a space to project on, this can be the wall, inside a box or on a paper.*	*1 per group*

Essential tools

Item	***Comment***	***Total (for xx persons/pairs/groups)***
Scissors		*1 per group*
Box cutters		*1 per group*
Cutting mat		*1 per group*

Preparation

- Prepare the room: If possible, use three material tables spread around the room (a. essential tools, b. essential materials, b. other materials, from the clean-up or the recycling bin).
- It is important to ensure a dark space, and empty from clutter walls or surfaces, on which you can project.
- If needed rinse the marine litter you wish to incorporate in the shadow art activity.
- Alternatively, collect a variety of materials from the recycling bin.

Activity Plan

Introduction

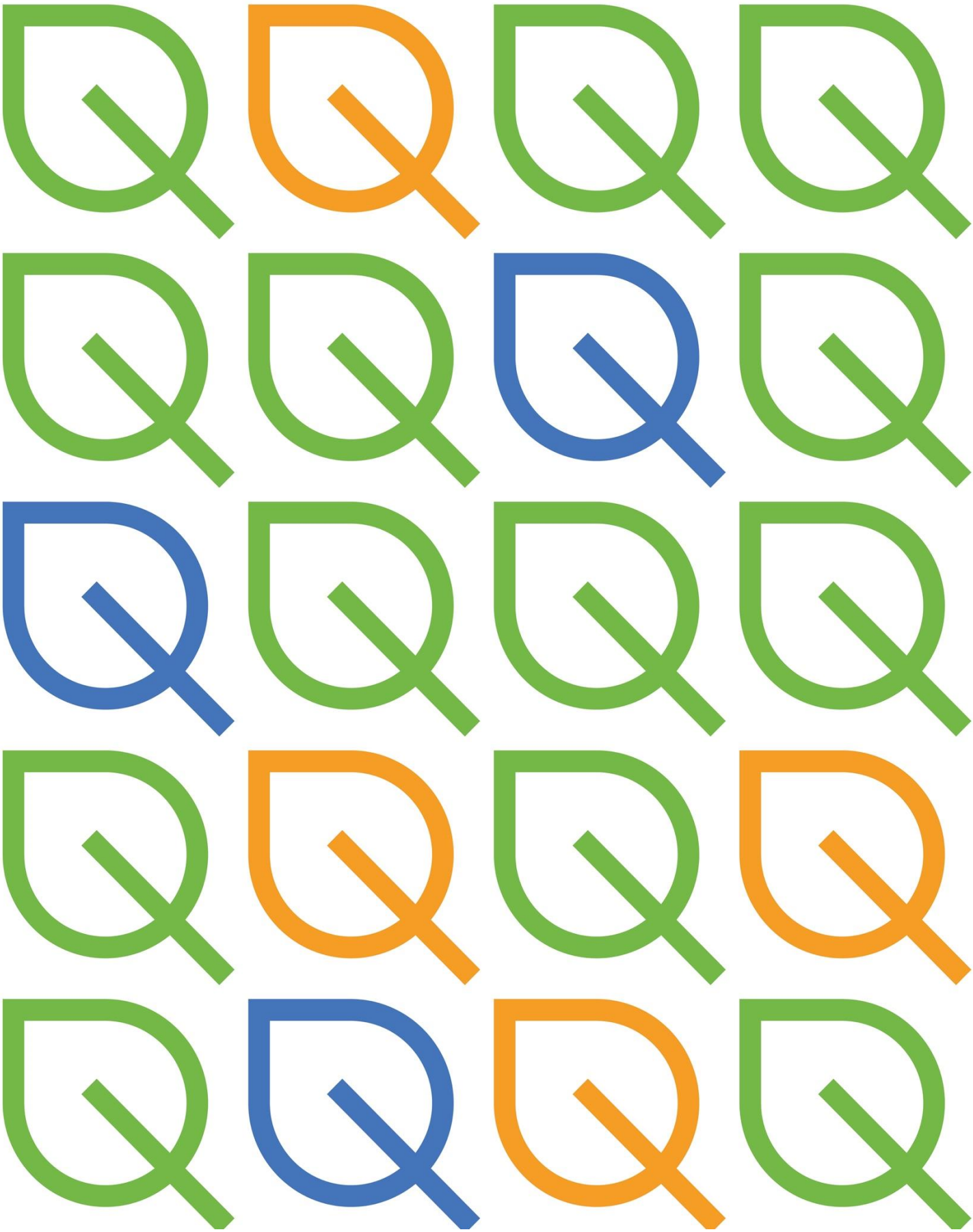
- Present yourselves and briefly explain tinkering (what is tinkering, what could be its possible outcomes, how it links to sustainability).
- In case of participants unfamiliar with “shadow-art”, devote some time to demonstrate it through videos and photos of students’ or artists’ creations (see appendix).
- Explain the outline of the activity (what is the room set up; which surface to project on; where to find flashlights, materials & tools, how much time they have; how they will work in pairs or individually).
- Demonstrate a simple shadow on the wall; using your hands and a couple of materials that, behave differently with light (e.g. reflective, semi-transparent, colorful).
- Prompt the challenge: We will experiment with light, using litter collected from the beach or from the recycling bin and create meaningful Shadow Art works.
- Explain that their creations can be relevant to the environment or not (e.g. their works can represent a memory, their school, a park, their mood, a dream etc.), and that they can integrate one or more of the items they brought from the clean-up.

Managing the activity once it is in progress

- Encourage pairs to listen to one another as they create their stories and build their art-works.
- Walk around the room and be attentive to how pairs work. Support the students’ ideas and give alternatives if needed. If they get stuck, encourage them to walk around the room and see how the other pairs progress.
- Allow enough time (at least 40 minutes) for this step and indicate the time periodically.
- At the end of the activity the art works can be presented one by one, or, in case of “boxed” works, they can stack on top of each other and presented all together in a single collaborative work.

Conclusion

As each pair presents their work, ask them to recall how some objects may have led them to their creations, or if they had a story or idea in mind from the beginning and how they used objects to realize it. Ask them about the creation process, how they collaborated, how they built on each other’s views, if they diverted from their initial ideas for the art work and how.
Notice how many art works relate to the environment, and how the beach litter items were incorporated.
Finally, have a debrief discussion to collect their impressions, difficulties, satisfactions, and if they had any unexpected thoughts (Aha moments) during the entire tinkering experience.
Optionally, discuss with the class teacher how the elements of the Learning Dimension Matrix on Making and Tinkering were addressed.

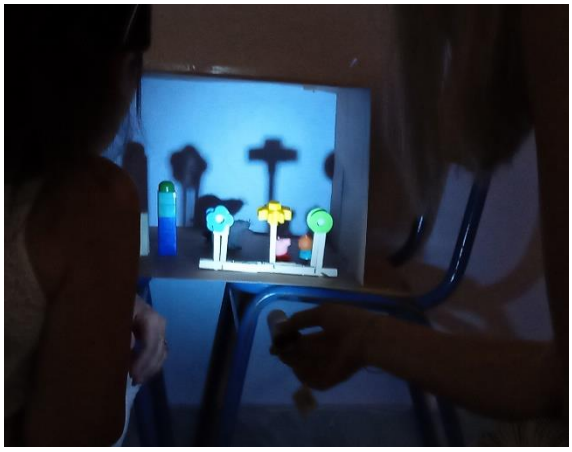


Appendix

Examples of possible outcomes

Photos from our first testing of the activity with the project partners (June 2023)


Photos from the second testing of the activity that took place at the Associate Partner 1st Primary School of Halandri (June 2023).

Photos from the third testing of the activity that took place at the Associate Partner 70th Primary School of Athens (October 2023).


Colophon

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This activity has been authored by Iro Alampei (MIO-ECSDE / MEdIES)

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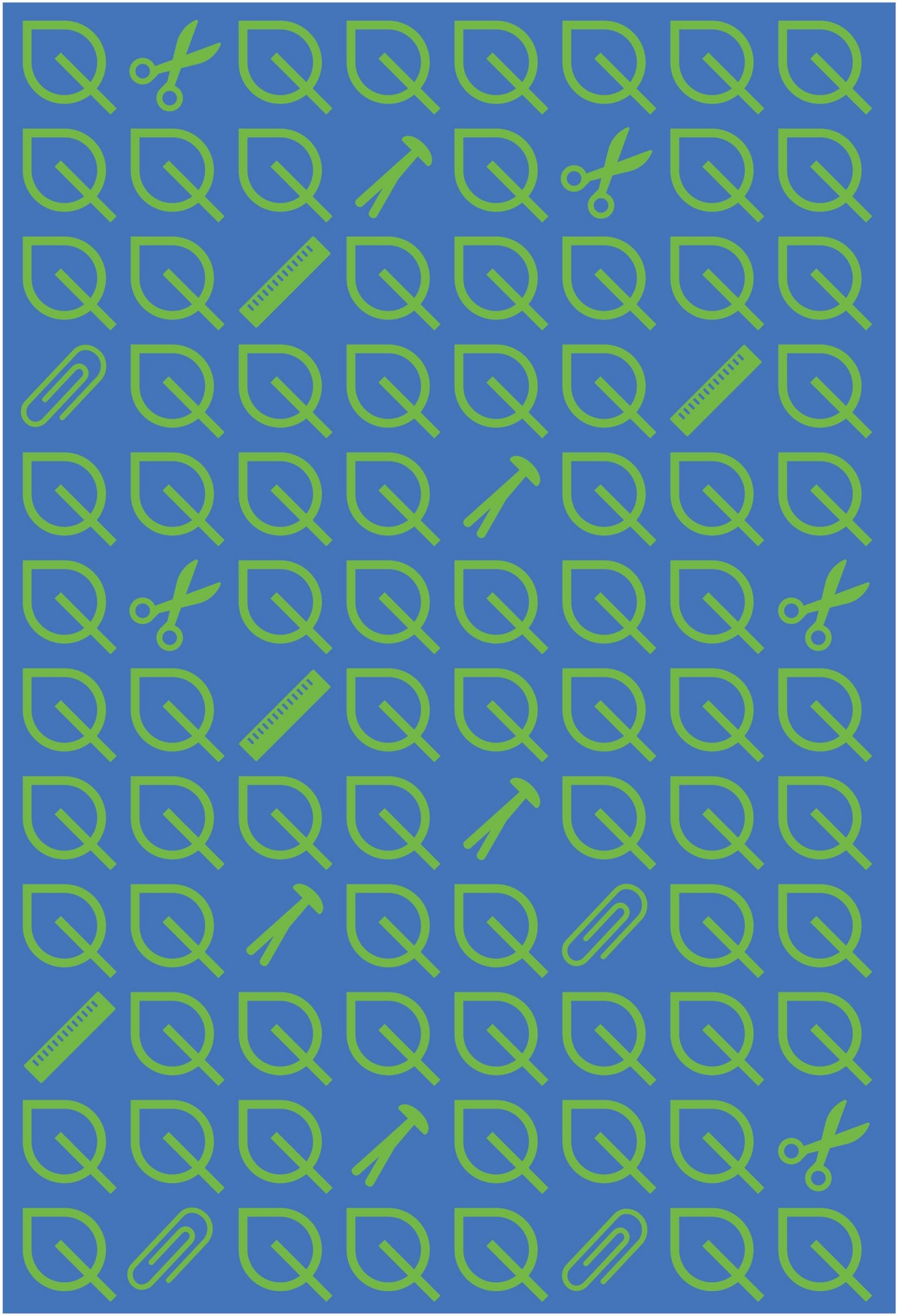
Co-funded by the Erasmus+ Programme of the European Union



Tinker a kinetic sign

TINK@School

Co-funded by the
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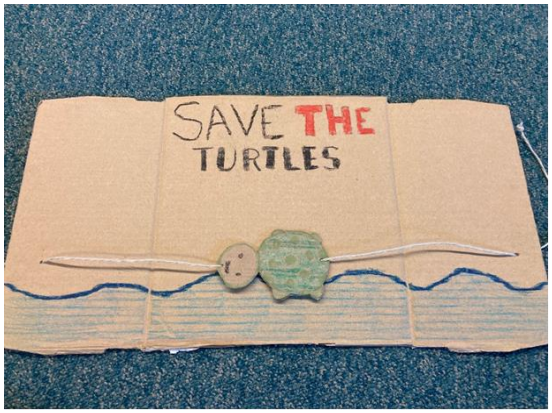
Tinker a kinetic sign

Duration	*90 minutes*
Target group	*Students that can use scissors safely in combination with cardboard. (approximately ages 9 and up)*
Connection to curriculum	*e.g. social studies, sustainability, art, (fine motor skills and coordination) Can be used with many topics, for example, you can assign students to create a moving explanation board about flowers.*
Particulars	*Collect cardboard boxes and other paper material a few weeks beforehand so there is enough material available for the students.*



Outline

In this tinker activity, students create an action sign on the theme of sustainability. Sustainability has many sides, and can be tackled on a small scale. For example in school. Students think about what they would like to see differently at school when it comes to sustainability, and make an action sign to convince other students, teachers or parents of this. In addition, it has to be a sustainable sign, so it is made with recycled cardboard. By playfully creating a changing action sign, students learn to engage with sustainability, and think about how to properly communicate their message on this topic. In addition, they also learn different techniques to use pop-up/movement.

Connection with sustainability

- They think about problems or solutions connected to sustainability issues to create a sign to either express their concern about a topic or invite other people to take action.
- Students work with recycled cardboard boxes and paper and see that waste can be reused

Health and safety

Hazard	Controls
Box cutters are very sharp, students can cut themselves.	Do not let all ages use blades, do not leave them lying around, instruction in advance on how to use them, always slide them in when not in use. Always use a cutting mat.
Glue guns get very hot.	Give an instruction on how to use the glue guns. Let the students use them in a designated place, and keep an eye on it.

Essential materials

Item	Comment	Total (for 30 students)
Rope/string		2 balls
Skewers,cocktail sticks and/or popsicle sticks		1 or 2 packages
Cork	optional	15
Pegs		25
Cotter pins		2 boxes
Paperclip		2 boxes
Rubber bands		2 boxes
Recycled cardboard (sturdy)	Large packing boxes, serves as base of the sign. Cut the boards beforhand	1 per group; size approximately A4-A3 + some extra to build with.
Recycled cardboard (thinner)	Think: biscuit packaging, tea boxes, egg cartons, toilet rolls, cardboard cups, toy packaging, etc.	Enough for all groups to tinker with.
Paper and craftmaterials	Think: Old posters, flyers, misprints, candy wrappers, fruitnets, etc.	Enough for all groups to tinker with.

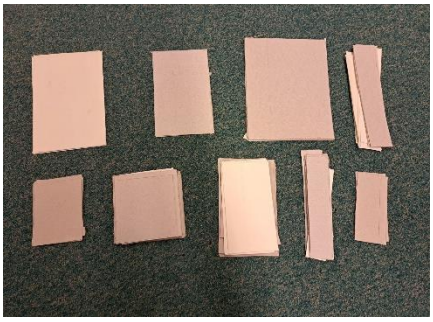
Essential tools

Item	Comment	Total (for 30 students)
Scissors		15
Painter's tape		15
Glue		15
Stanley blades		15
Cutting mat		15
Stapler		5
Pencils/wasco	Don't supply a lot o to encourage them to be creative with the cardboard materials.	Tray per pair
Glue gun	Optional	1
Eraser		15

Preparation

- Try some techniques in advance. Make sure there are examples to show the students, these can be homemade examples or the examples from the Appendix.
- Collect enough cardboard. Provide a good variety of sturdier cardboard (as a base) and thinner cardboard (for cutting and gluing).
- In advance, cut basic boards from the thick cardboard from which *the students will make their sign.* The size can be determined depending on the age of the students. (Smaller boards for younger students.)

Tip: Make the materials more attractive to use by cutting them the same size beforehand and display them according to color or size. See the examples for cardboard materials below:



Cardboard materials sorted by size and shape

Recycled cardboard boxes cut into shapes.

Preparing room:

- Place enough work tables throughout the classroom. The number depends on the number of students. 1-2 groups can work per table.
- For each table, divide the base boards.
- Make 2-3 materials tables scattered around the room, one for big cardboard, one for small cardboard and one for tools and other materials. This way, students have to discover what materials are there, and walk to get them during which they also see what others are making.

Activity Plan

Introduction (15 minutes)

Explain to the students that signs are used to convey messages to other people. Think of signs used in demonstrations or advertisements. In this activity the students are going to design a sign like that about sustainability.

Ask the students if they know the term sustainability and what it means. Explain that the term sustainable is used for products that do not harm the earth and nature, and that sustainability is the concept that stands for living with happy people and animals on a healthy earth now and in the future. Sustainability is a very broad concept; but small acts can make a difference. Like making people more aware about an issue, recycling trash or buy secondhand clothes.

Hold a brainstorm with the students about what sustainability issue they want to raise awareness about or invite people to take action on. Remind them it can be about simple things.

1. Write down everything you can come up with when thinking about the concept of sustainability. (Examples: pollution, electric cars, boring, hippies, etc) (3 min)

2. Write down everything you can come up with when thinking about your neighborhood, home or school connected to sustainability. For example problems or possible solutions. (5 min)
(Examples: litter, throwing away food, paper use at school, water shortage, recycle materials,)

Help the students to come up with an idea for the sign. With the results of the brainstorm in mind, are there any issues, solutions or ideas about sustainability they want to be known? (Examples: buy second hand, take care of nature, be kind to bees) Encourage the students to think of a problem or idea that they find important.

Instruction: Create a moving sign (5 minutes)

If the students know what they want to convey, they can start tinkering. Tell them they are going to make a sign, it is not just another (protest) sign, but a sign in which something can change or move. There should be a movement or pop-up element in it so that the sign really attracts attention. Show the students some examples (see appendix.) Also mention that it will be a sustainable sign, so as much recycled material as possible will be used.

Give each group (2-3 students per group) a thicker cardboard as a base. They can pick their own thinner cardboard and other materials to get started and try out some things with. It can be useful to have a few small examples ready of pop-up/movement, to inspire the students and get them started.

Students have 50 min to make the sign. Indicate a few times how much time is left.

Managing the activity once it is in progress (50 minutes)

- Pay attention to safety, students work with box cutters or scissors , which are sharp, and glue guns, which get hot.
- Indicate every 10 min how much time is left.
- Observe the groups and see what students are working on, and whether students are frustrated or stuck.
- Ask questions to get students thinking about possible solutions or to help them articulate their goals or problems. Then ask questions that make them see for themselves where things might be going wrong or encourage them to come up with solutions.
- Encourage students to look at other groups or the material tables for inspiration.
- Write down special things you see so you can tell them when discussing afterwards. (If you saw them working together really well, or overcoming a frustration.)
- Have the groups round off after 50 min.
- In case students finish earlier, making signs can also be stopped earlier, let it depend on the group.
- Tips for guiding this particular activity:
    - See appendix for examples of moving paper constructions. The first three ones are really easy to make.
    - Encourage students to try out mechanics first and make them work before decorating.
    - Use posters, magazines or folders for students to cut out images to use in their posters
    - Cotterpins are a handy tool to make objects move or to create a slot between two pieces of cardboard.

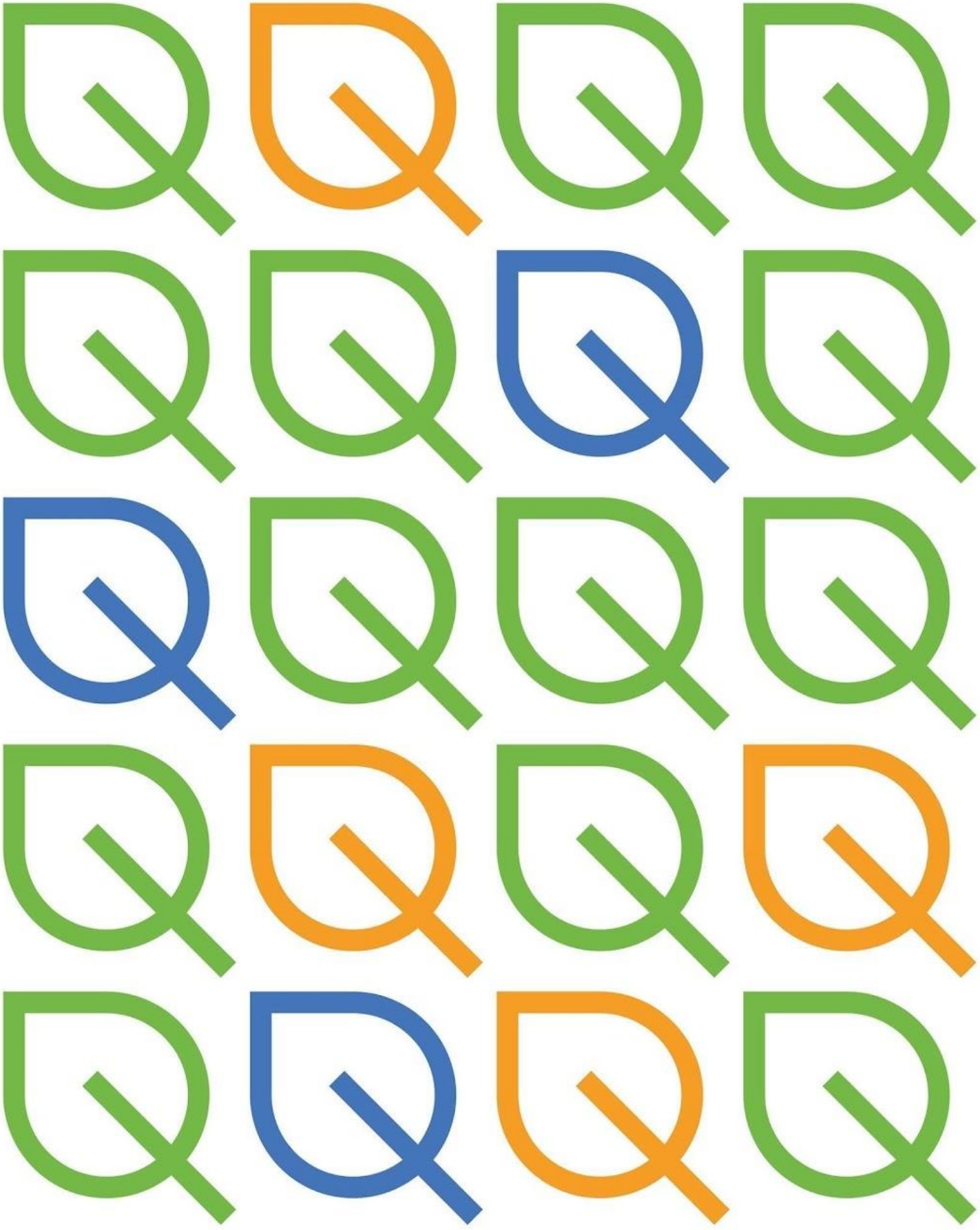
Clean up, make sure that materials that can be used again are not thrown away and paper scraps are collected in the paper trash.

Conclusion (20 minutes)

Evaluate the activity together with the students. First discuss what you saw happening among the different groups, were there any difficulties? What topics did you see on the other signs? Ask some students what they ran into or what problems they encountered, and how did they solve them?

Depending on the class, you can give some students the chance to present their action sign. Let them tell which sustainability topic they have chosen and why they think it is an important one. Ask them to show their changing elements, and what they did to convince the other students. Ask the class if they think this is also an important topic.

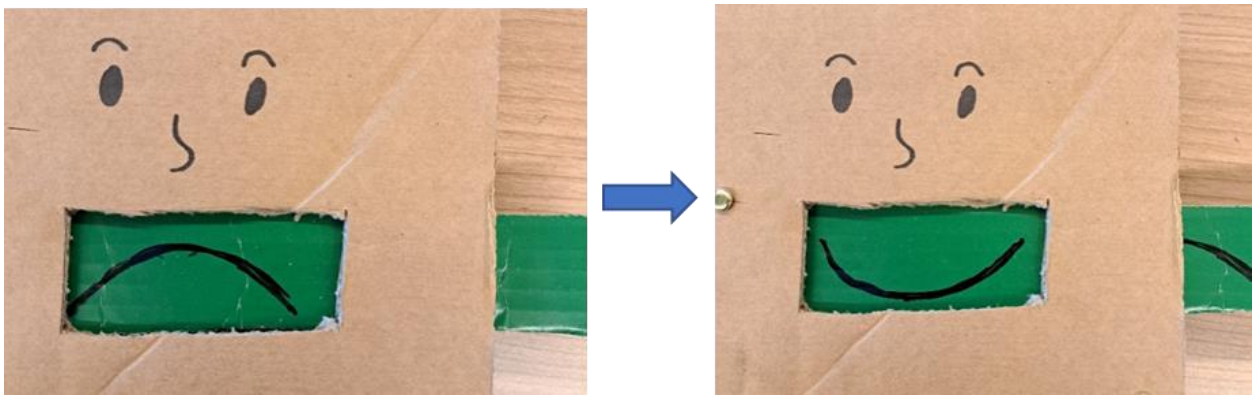
You can also choose to give students time to walk past all the signs and look at them. Afterwards, discuss with the students in class what they saw on the other signs. What other issues did they come across, and are they convinced that these are also important? What different changing elements did they come across? Conclude in class with the message that sustainability is an important topic, and that you can already apply this with small things in school but also, for example, at home.



Appendix

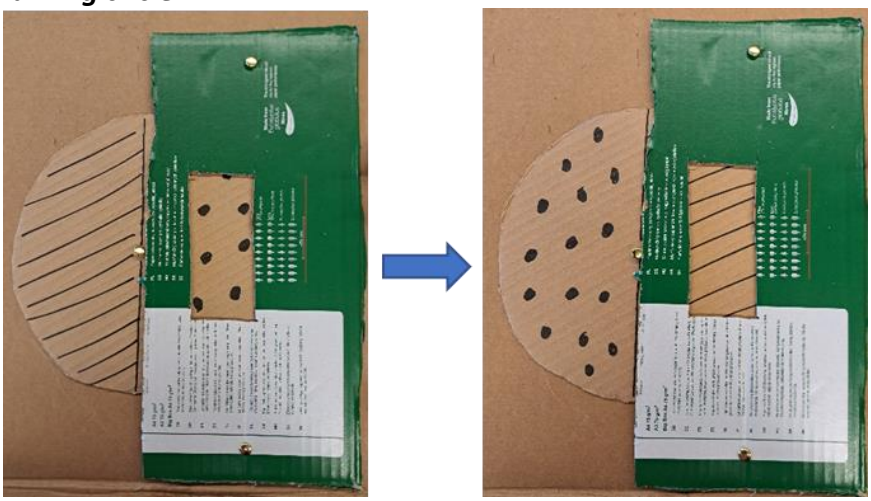
Appendix Examples of paper techniques

Slide

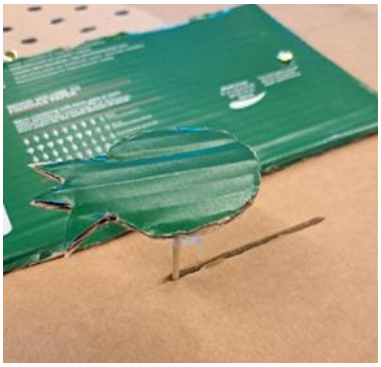


By placing two images on a strip, the image changes when you pull the strip.

Turning circle



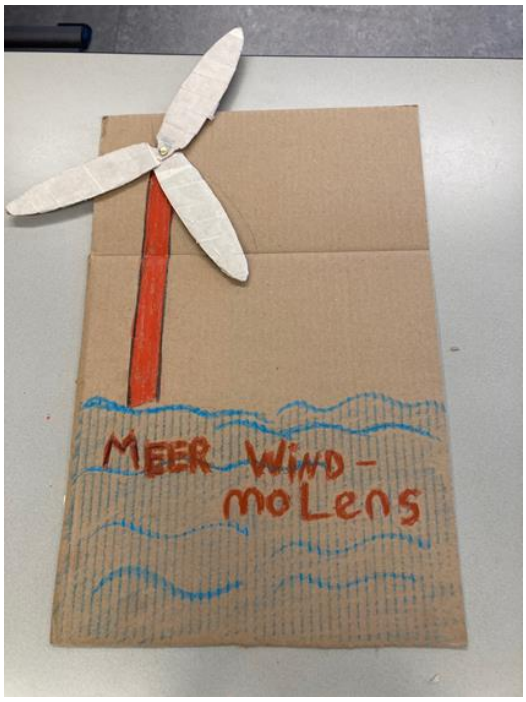
The sign changes by turning the circular disc.

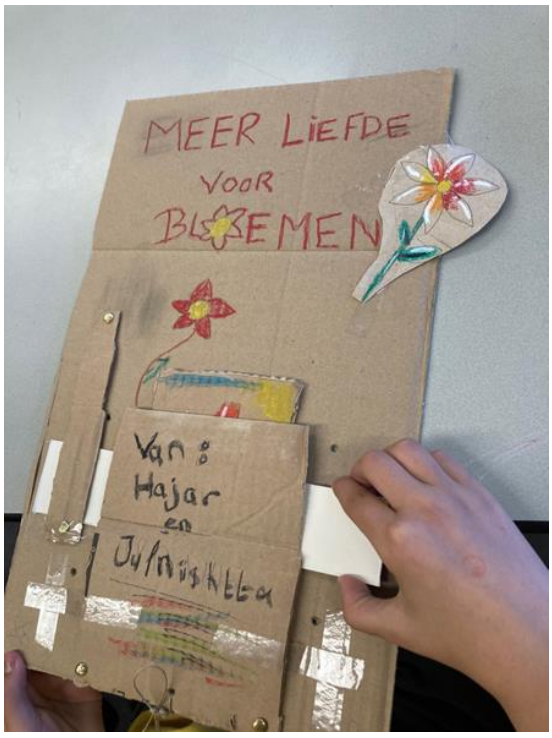


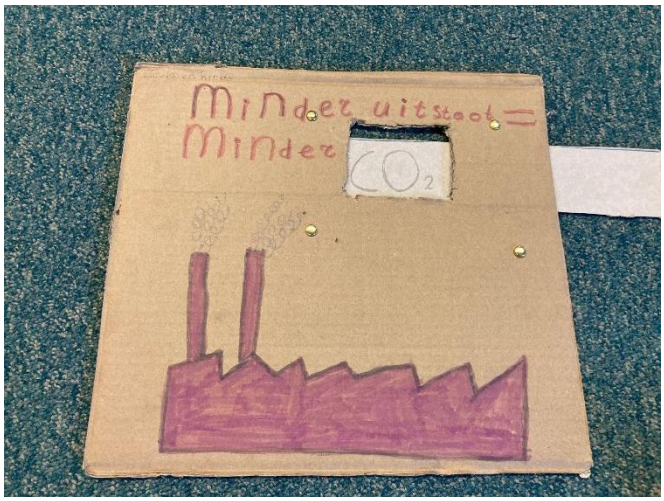
Skewer slide

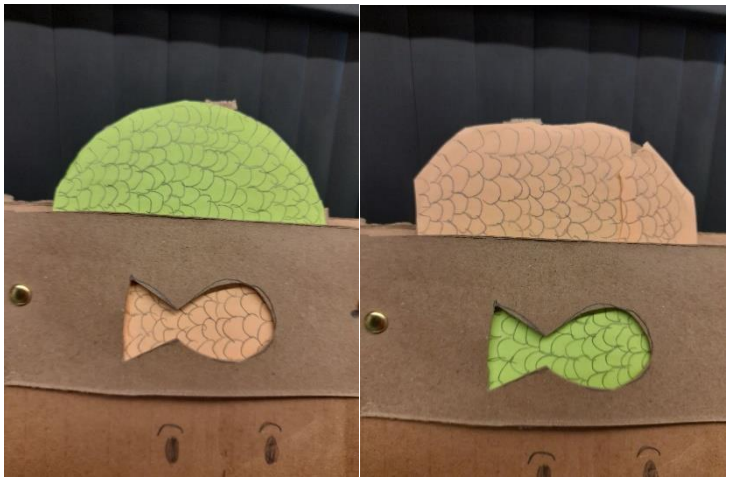
The balloon is attached to a skewer sticking through the sign. Moving the skewer back and forth moves the balloon across the sign.

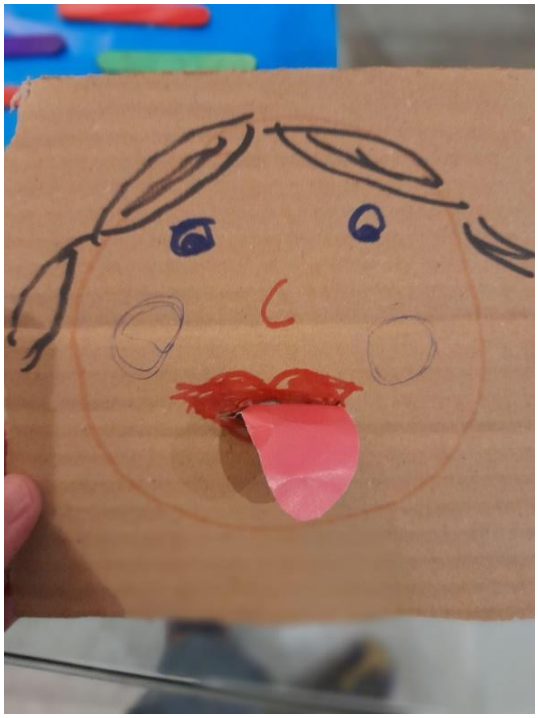
Appendix Examples of outcomes












MOOD DETECTOR

Colophon

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This activity is authored by Judith Bal (NEMO Science Museum) and Denise Kool (NEMO Science Museum)

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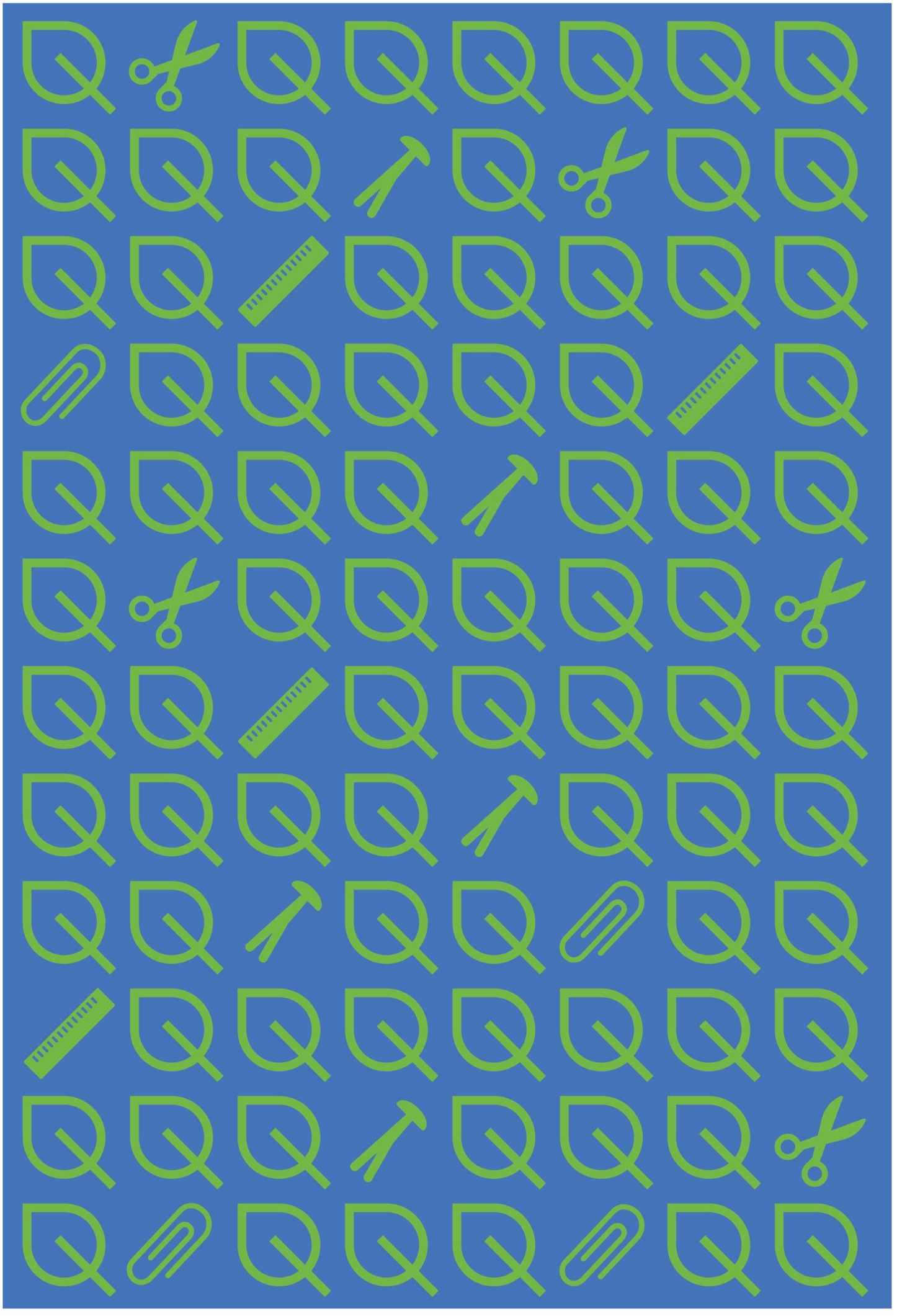


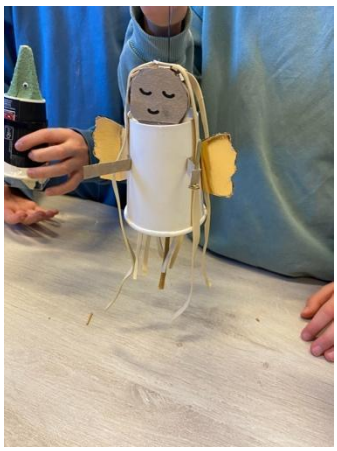
Tinker Sustainable Decoration

TINK@School

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

Tinker Sustainable Decoration

Duration	*90 minutes*
Target group	*Students that can use scissors safely (approximately ages 8 and up)*
Connection to curriculum	*Art, sustainability, (fine motor skills and coordination)*
Particulars	*Collect cardboard boxes and other packaging material a few weeks beforehand so there are enough materials available for the students.*



Outline

In this tinker activity, students create sustainable festive decorations for an upcoming holiday. People like to decorate their homes for the holidays. With each holiday come various decorations. These decorations generally do not last long and are often bought new. With this tinker activity, students will make sustainable decorations that ties in with an upcoming holiday celebration. Everything is made with recycled materials.

Connection with sustainability

- They become aware of the fact that buying decorations for each holiday is wasteful.
- The students work with recycled materials and see that waste can be reused.

Health and safety

Hazard	Controls
Box cutters are very sharp, students can cut themselves.	*Do not let all ages use the box cutters, do not leave them lying around, instruction in advance on how to use them, always slide them in when not in use. Always use a cutting mat.*
Glue guns get very hot.	*For young ages use the glue guns only under supervision. Let the students use them in a designated place, and keep an eye on it.*

Essential materials

Item	Comment	Total (for 30 students)
Rubber bands		2 boxes
Cocktail sticks / popsicle sticks		1 or 2 packages
Paperclip		2 boxes
Rope/string		2 balls
Cotter pins		2 boxes
Cork		15
Recycled cardboard (solid)	Large packing boxes. If possible, cut in the same shapes and sizes.	Enough for all students to tinker with.
Recycled cardboard (thinner)	Materials such as: egg cartons, toilet rolls, tea boxes, biscuit packaging, cardboard cups	Enough for all students to tinker with.
Other optional recycled materials	Bubble wrap, plastic packaging, candy wrappers, chip bags, foil, wrapping paper	Enough for all students to tinker with.

Essential tools

Item	Comment	Total (for 30 students)
Scissors		15
Painter's tape		15 rolls
Glue		15
Box cutters	Use only if students can work safely.	15
Cutting mat		15
Pens/markers/pencils/wasco		30
Fret drills		5
Glue gun	Optional	1

Preparation

- Make sure there are examples to show the students, these can be homemade examples or the examples from the Appendix.
- Collect enough cardboard and other recycled materials beforehand. Make sure you don't offer too much, scarcity in materials allows creative outcomes. Provide a good variety in the materials.
- Choose a prompt for the activity and if you want the students to work in pairs or individually.

Preparing room:

- Place enough work tables throughout the classroom. The number depends on the number of the students. The students are allowed to work individually or in pairs.
- Set up two tables divided in the room. One table for all the materials, and one for the tools. This way, students have to discover the materials and tools. While walking to get the materials and tools, they can be inspired by other groups by seeing what they are working on.
- At younger ages, create a designated place for the hazardous tools (box cutters and glue gun), so that they can be used under supervision or by an adult.

Tip: Make the materials more attractive to use by cutting them the same shapes and sizes beforehand and display according to shape and size. This also works great for stimulating creativity.

Activity plan

Introduction (10 min)

Ask the students if they know the term sustainability and what it means. Explain that the term sustainable is used for products that do not harm earth and nature, and that sustainability is the concept that stands for living with happy people and animals on a healthy earth now and in the future. Small changes in daily activities can make an impact and increase awareness. Like making people more aware about an issue, recycling trash or buying secondhand clothes.

Explain to the students that people like to decorate their homes for different holidays. Engage students in conversation about different types of decorations that are hung or put up. Comment on the fact that these decorations generally do not last long and are often bought new. You can make a connection to recycling waste as mentioned earlier and pay attention to what effect buying plastic decorations has on the environment. In this activity the students are going to make sustainable decorations.

To engage the students with STEM, there are different prompts you can add to the activity:

- Create a sustainable decoration in 3D style
- Make sure there is a moving component in your sustainable decoration
- Work with balance
- Make something really big

Divide the students in pairs. Show the students the materials and tools, explain shortly.

Instruction: Create sustainable decoration (5 min)

When the students know whether they will work alone or with a partner, they can start tinkering. Encourage the children to look at the materials and tools. Let them gather the supplies and let the creativity flow. You can consider a certain theme for the decoration, which ties in with upcoming holiday celebrations.
Each student/group walks around the room and grabs the necessary materials and tools. Then they can start trying things out. It can be useful to have a few examples so students can be inspired. They have around 60 minutes to make the decoration.

Managing the activity once it is in progress (45-60 minutes)

- Pay attention to safety, students work with box cutters or scissors, which are sharp, and glue guns, which get hot.
- Indicate every 10 minutes how much time is left.
- Observe the group and see what students are working on, and whether students are frustrated or stuck.

- Ask questions to get students thinking about possible solutions or to help them articulate their goals or problems. Then ask questions that make them see for themselves where things might be going wrong or encourage them to come up with solutions.
- Encourage students to look at other groups or the material tables for inspiration.
- If applicable, put down a material that you think could move the person forward.
- Write down during the activity:
    - Funny remarks they make
    - Things that strike you
    - What they are struggling with
    - What solutions they come up with
- Let the students know when the final 10 minutes start.
- Tips for guiding this particular activity:
    - If students wish to use the glue gun, it is recommended to only use it in the last 15 minutes. (They often enjoy it so much that they start gluing for the sake of gluing and lose sight of the rest of the materials.)
    - Materials cut in the same shapes and sizes work well.
    - Scarcity in materials allows creative outcomes.
    - Show some examples to encourage creativity.
    - Focus your remarks on the process not on the aesthetics.

Clean up, make sure that materials that can be used again are not thrown away and paper scraps are collected in the paper trash.

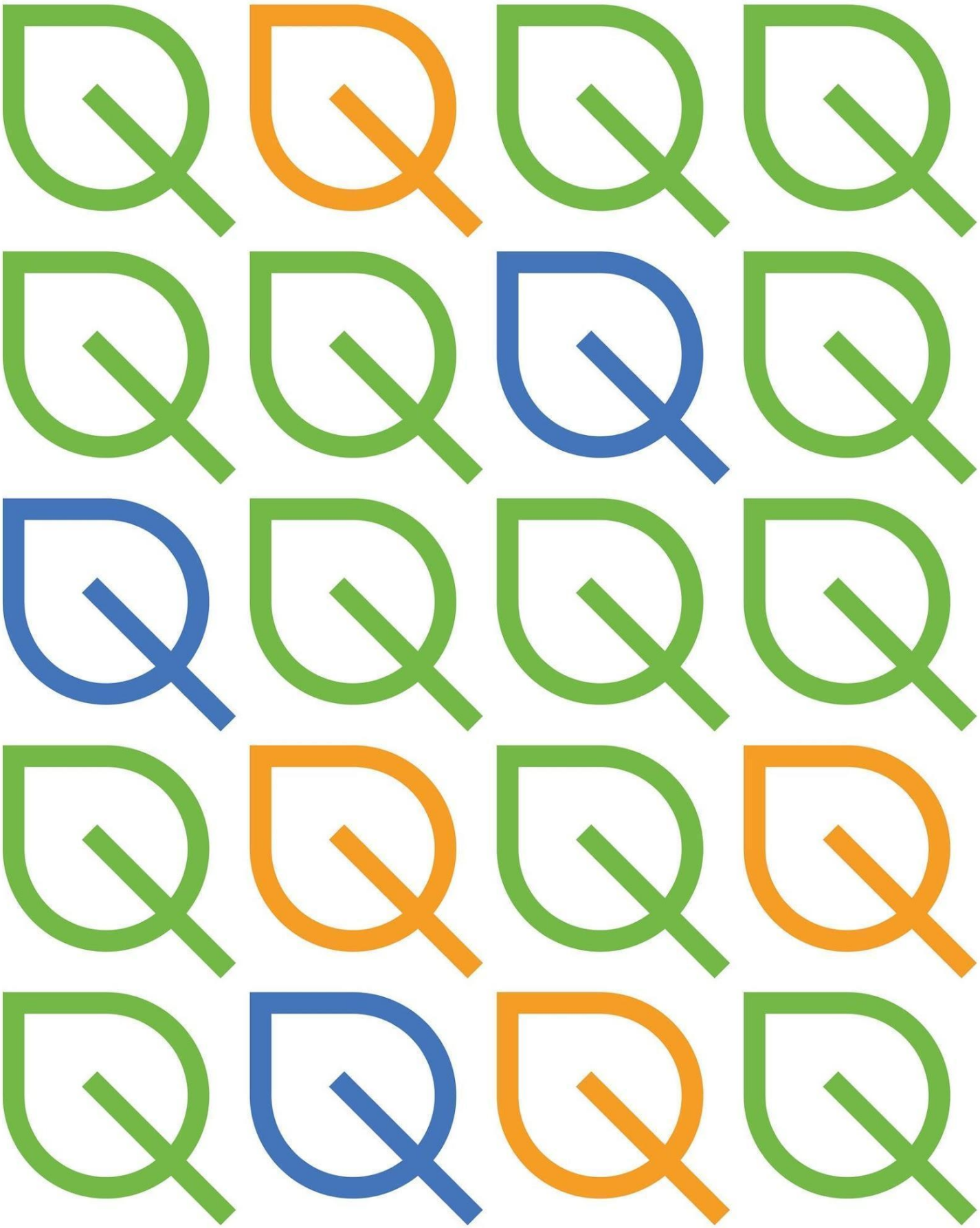
Conclusion (15)

Evaluate the activity together with the students. Give the students the opportunity to present their decorations and discuss the process. Use the notes you made during the activity in the evaluation with the students.

- Were there any difficulties?
- How did they solve them?
- What are they most proud of?
- What they found frustrating ?
- What problems did you solve? Try to not discuss the products in terms of aesthetics but focus on the tinkering and technical parts.

Ask the students why their made decoration is durable and what it might be a substitute for. Have the students explain what prompt they added to their decoration and how they did it.

Tell the group that sustainability is an important topic and put the focus on plastic. Explain to students that plastic is polluting the oceans, with all its consequences, and that this serious problem needs to be addressed. Many decorations are made of plastic and break down quickly or are thrown away after little use. Conclude the lesson with the message that the students have made decorations from recycled materials and therefore are not polluting the oceans with these decorations!



Appendix

Appendix Examples of outcomes

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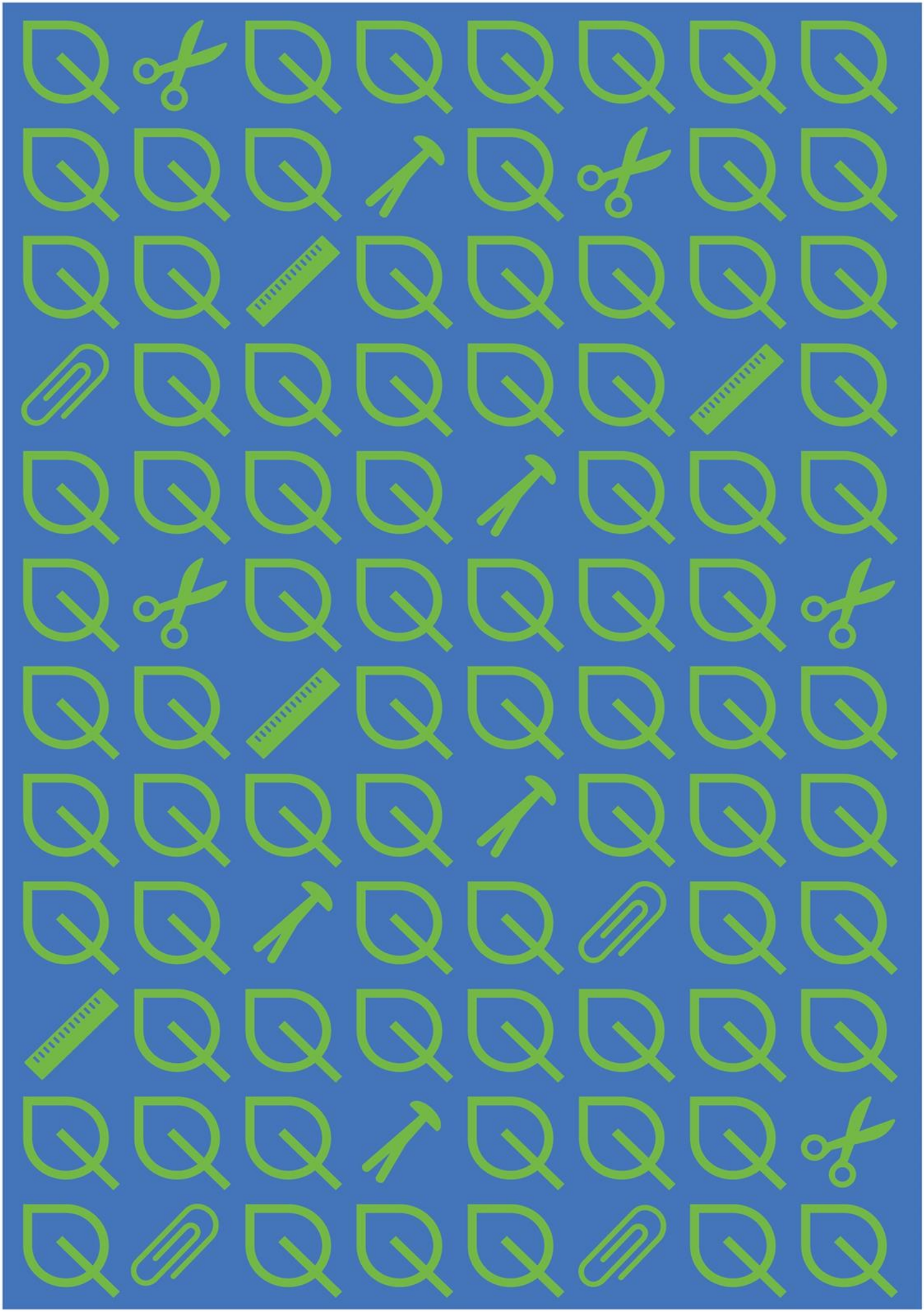

Balancing Sculpture

TINK@School

Co-funded by the
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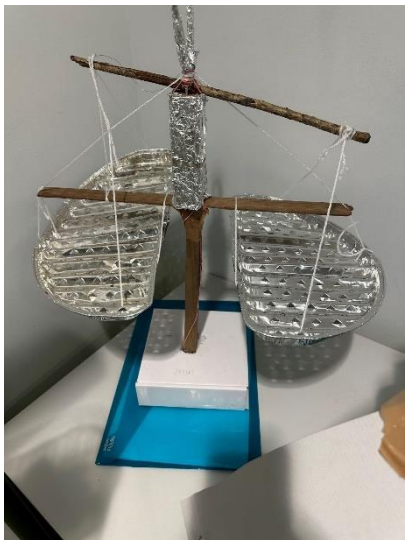
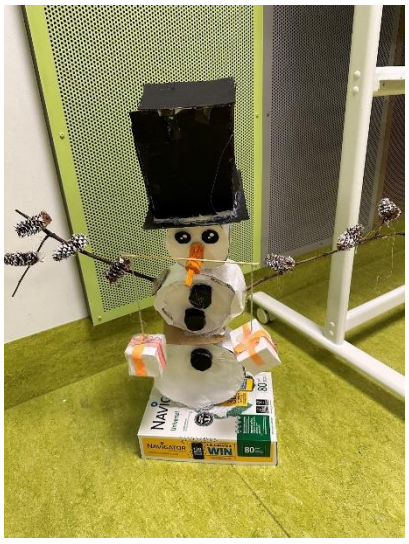
of the European Union

Balancing Sculpture

Duration	*75 minutes for activity;*
Target group	*Students age 9-12*
Connection to curriculum	*This activity can be linked to social studies, sustainability goals, environment studies, physics and arts*
Particulars	*Two weeks before activity start to collect waste from home* *Activity can be done both inside or outside, depending on circumstances*







Outline

The project is to create a balancing sculpture from reusable resources, packages, waste from home, natural materials and other things that might be suitable for each place. The participants collect material for the sculpture, packaging, scraps and various renewable materials (plastic, paper, metal, wood, fabric, glass) that are produced in the home one week prior to making the sculpture. They can also go on a field trip around the local area and collect natural material from the environment, small stones, branches, pine cones, straw, sand, gravel, shells. If the project is part of ongoing class work, it can be related to something that the students have already been doing.

Connection with sustainability

The goal of the project is to connect the Balancing sculpture, for example regarding the materials used or result, to a theme related to sustainability goal or goals. It could be on climate change, poverty, equality, food waste, consumption, generation of trash, etc. Thus, objects within the sculpture can reflect specific goals or the sculpture itself.

Health and safety

Hazard	Controls
Sharp edge materials, for example glass, cans and wire	Use gloves, point out the danger of sharp materials to the students; watch out for sharp edges and put those things to the side and not in a pile with other material. Have first aid kit in room and make sure there is enough bandaid
Use of sharp tools, for example knives, scissors and pliers	Emphasize caution in handling. Some sanitiser and band aid can allow students to continue after a scratch or a small cut.

Essential materials - Base, objects to explore and connectors

Item	Comment	Total
Waste materials e.g.: paper, plastic wrap, sushi sticks, metal cans, stoppers, lids, toilet paper rolls, glass jars, bottles, plastic containers etc.	Collected at home for about a week. Ask the students to clean the waste before bringing it to school	Enough for each group to create a sculpture.
Fabric	Students can bring old and worn out clothes	
Variety of paper, cardboard	To cut out patterns or make a sign. Facilitator provides or found in waste	
Magazines and other materials with different pictures, styles, etc.	Cut out pictures or text to reflect the sustainability goals	
Connectors: rubber band, string or yarn, tape, glue stick, paperclips, wire, clothespins	To connect things together	Enough for each group to play with.
Natural materials: stones, sand, gravel, branches, pinecones, shells, straws	Just an example of things, depending on the surrounding area	

Essential tools

Items provided by facilitator	Comment	Total
Scissors	To cut things and make holes	4
Pliers	To bend wire	4
Hammer - nails	To fasten things together	3
Screwdriver	To fasten things together	2
Hole puncher	To be able to fasten things together or hook onto one another	4
Pens – pencils – paint brush	To decorate the sculpture	10
Crayons, coloured pencils, paint	To decorate the sculpture	Plenty of variety
Scale	To explore the weight of things	1
Measuring tape	To measrue things, e.g. to estimate where the balance will be	2

Preparation

Ask students to collect usable waste materials 1 or 2 weeks in advance.When the material has been collected, it is important to group similar things together in boxes, on a shelf or a table. The facilitator needs to be sure to allow a space for the material in boxes or baskets to sort in when the gathering of material takes place. The students take part in sorting the material they bring from home.

Make a balancing sculpture yourself to try out different techniques and to have examples to show students.

To give the student the opportunity to explore what materials are available, it is good to spread them around the classroom sorted according to kind of material, color or size. For example, make one table with cardboard and paper materials, another with the tools and connectors and two tables with the other materials. This makes the material more attractive for the students to use and encourages the groups to go around the whole space and see what others are doing.

The room needs to have distinct workspaces for each group.

Make an introduction poster (see appendix).

Activity Plan

Introduction

Explain tinkering, what it is about in a few words.

The facilitator tells the students that they will be working in groups (3 to 5 students per group) to make a balancing sculpture. It is important that the facilitators have decided in advance how to divide into groups, e.g., through play, according to areas of interest, students decide for themselves, or the facilitator decides.The facilitator has made an introduction poster(see Appendix) and a couple of photos as an example of sculpture that show some ideas and possibilities.

Address the topic of sustainability and how the students can connect the balancing sculpture they make to one or more of the UN sustainability goal. Have a poster of the sustainability goals in sight for the group to look at.

If the facilitator is meeting the students for the first time, they can open a dialogue on sustainability or some aspect of sustainability such as climate change or food waste – and collect different ideas or questions on a board (whiteboard, flipchart, post-it stuck to a wall, etc.).

Ask the students how they can connect the balancing sculpture they make to sustainability goals. They can choose which goals they relate to before they begin or decide after the sculpture is made. When the sculptures are all ready each group can show their sculpture to the class and the whole class can reflect on which sustainability goal they "see" in the sculpture.

Managing the activity once it is in progress

Tell the students how much time they have to build the sculpture. Emphasize thinking about the base for the sculpture and what material that should be, what kind of objects they want to explore, maybe with different weight or form, and think about connectors to connect things together.

The facilitator supports the participants in their work and observes the work and process of each group. They are careful to browse around the area, watch each group closely, provide feedback, help, and support. It is important to address that in Tinkering projects, there is no such thing as "stealing" an idea from others and everyone can get inspiration from other groups.

Since the work gives an opportunity to get immersed in the work, make sure to remind the students about the time so that they can finish their work.

Here are few guidelines you can use to support your students:

- ***Pose questions instead of answers:*** *could you use anything else instead of the box?*
- ***Create a supportive and inspiring environment****: I really like how you are using the material.*
- ***Help in case of frustration and failure in a positive and productive way:*** *why do you think this is not working for you? Or hand them a material you think might help.*
- ***Encourage learners to pursue personal interest:*** *don't worry if you think it might not work, have a go anyway.*
- ***Encourage collaboration:*** *maybe you can ask them how that worked for them.*
- *Encourage them to walk around and look at the work of other groups for inspiration*
- Give heads up on time frame like reminding that there are 20 more minutes left. When an hour has passed, everybody helps with cleaning up around the sculptures.

Conclusion

Each group shows and tells about their sculptures. During the presentations have these questions in mind:

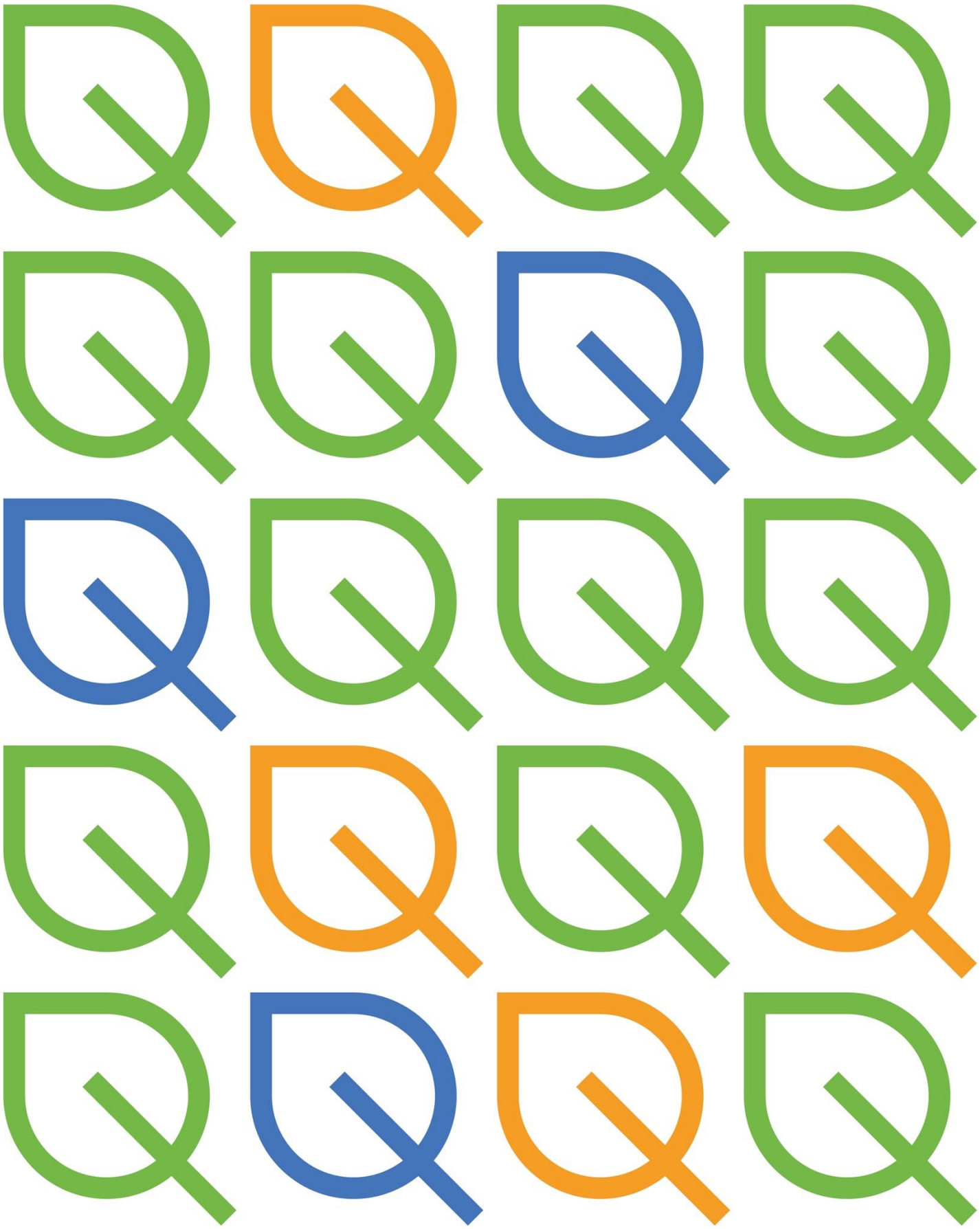
- **How did it go to find balance with items used?**
- **What are you most happy with regarding this project?**
- **What was difficult and why?**
- **What sustainable goals do you think your sculpture represents?**
- **Do we need balance? What happens if we don't have balance? How can we support balance?**
- **And most importantly - was the activity enjoyable?**

It would be great if the sculpture could stay in the classroom for a few days, remember to take photos and think about how you can clean up the activity in a sustainable way.

Go deeper

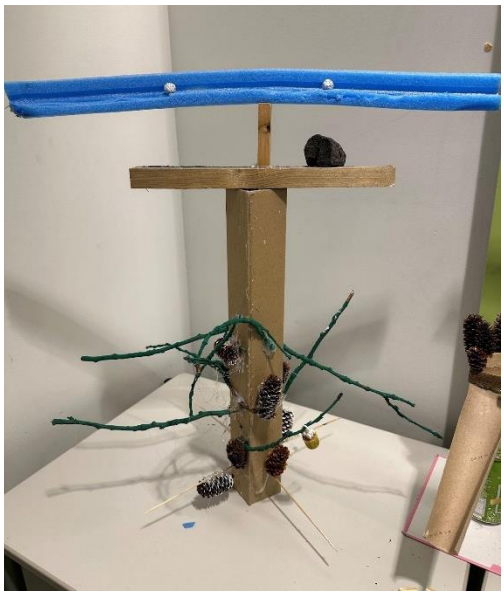
The balancing sculpture can only be the beginning of much more, or part of something bigger. You can think of it as a playful introduction into tinkering or the continuation of otherwork.

- Connect this activity to a stop-motion project, make a stopmotion about the process of making the balancing sculpture.
- Make a balancing sculpture that moves – blow or poke to make movement.
- If the sculpture is already set up, can something be removed without interrupting the balance?
- Make a balancing sculpture outside, only with natural objects.
- Let the balancing sculpture "speak" through having the group present it to the class or parents and discussing how it relates to the sustainability goals.

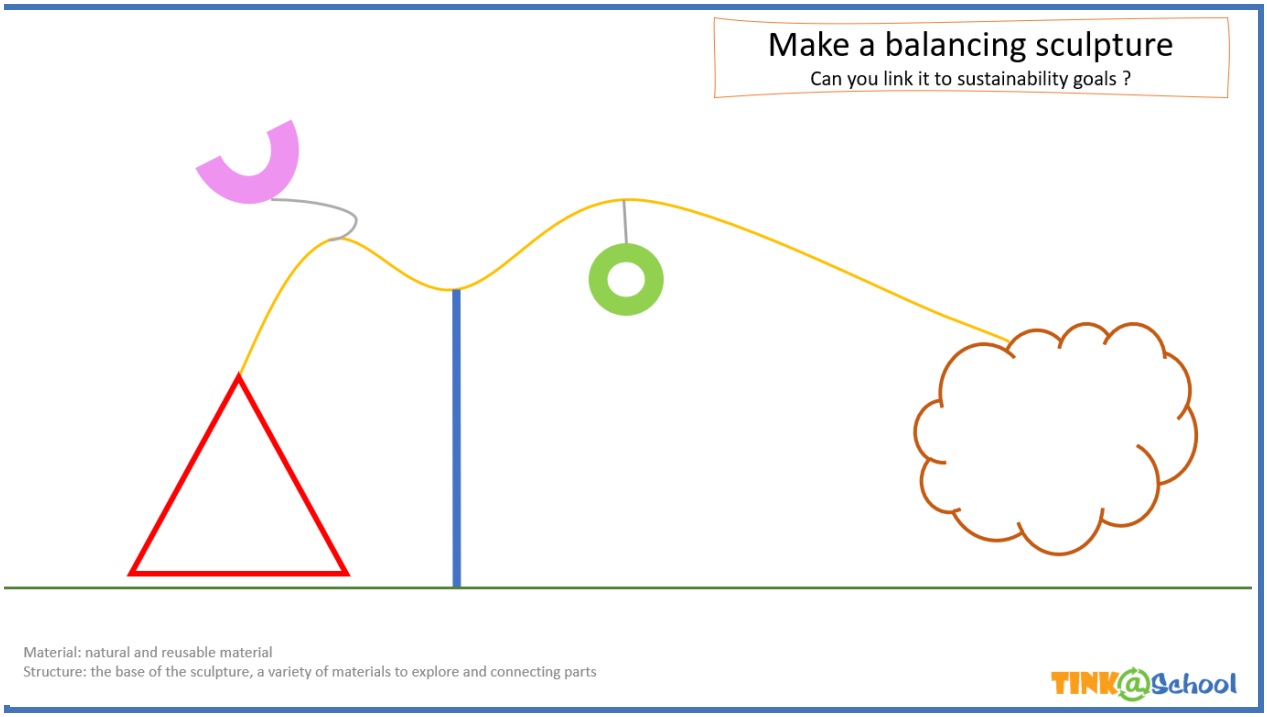


Appendix

Examples of possible outcomes



Example of an introduction poster



Links to related material:

Exploratorium

https://padlet.com/TinkeringStudio/balancing-sculpture-gallery-7t2lcaaema74zl90

https://www.exploratorium.edu/tinkering/projects/balance-explorations?asset=3140-tw-1316901889989115908-0

https://www.exploratorium.edu/tinkering/projects/balance-explorations?asset=3140-tw-1320791032682876929-0

Colophon

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This activity is authored by Anna Bjarnadóttir (University of Iceland) and Ólafur Páll Jónsson (University of Iceland)

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CRES Centro di Ricerche e Studi Europei - future business, Italy

NEMO Science Museum, Netherlands

MIO-ECSDE, Greece

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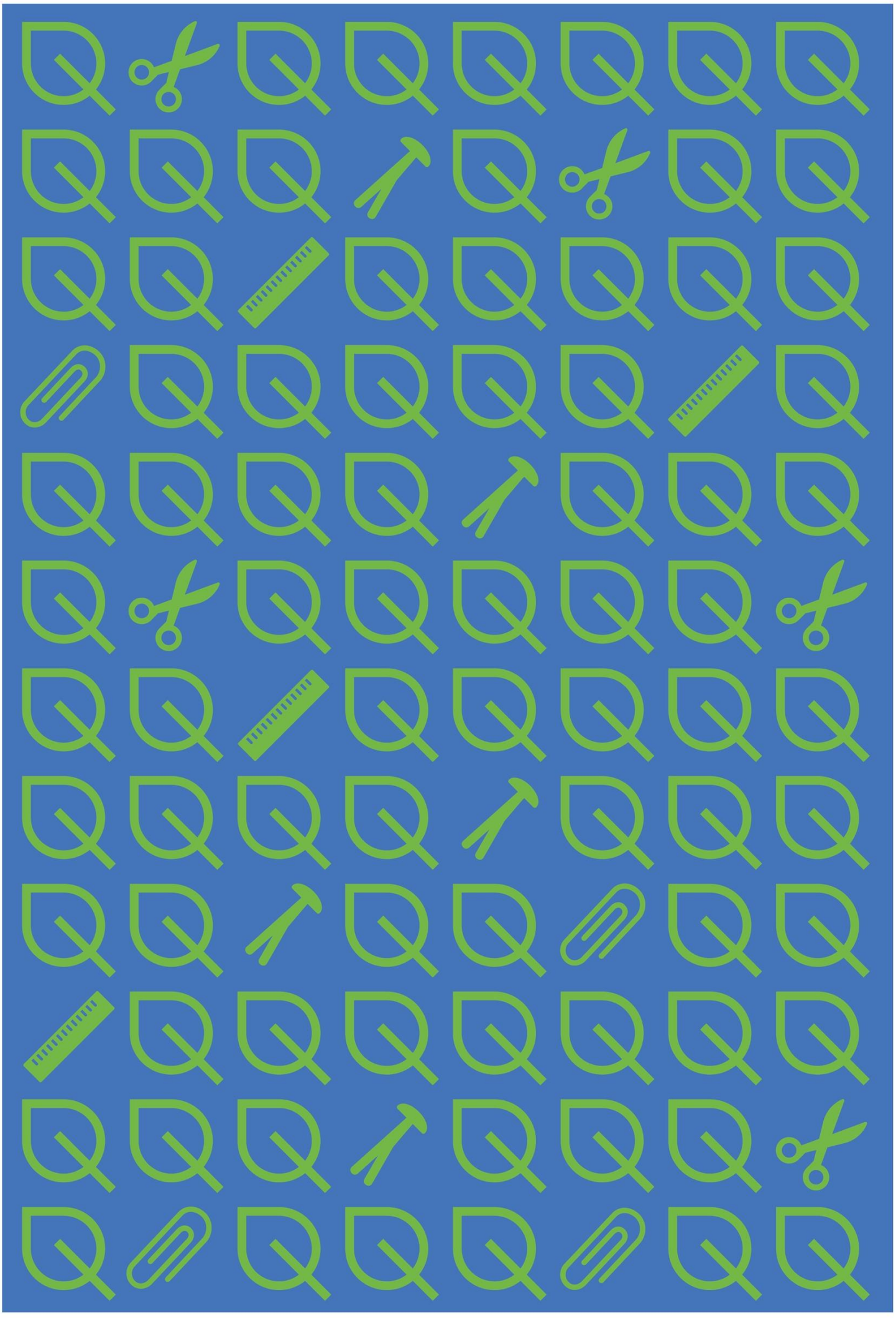


Stop motion

TINK@School

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

Stop motion

Duration	*60 minutes, several weeks or even a whole school term*
Target group	*Students from the age of 8 and up*
Connection to curriculum	*This activity can be linked to many subjects in the curriculum, for example social studies, sustainability goals, environment studies, science and arts.*
Particulars	*The format of the work is very flexible although it results in a product that is a short stop motion film.*

Outline

The goal is to make a stop motion on a theme related to sustainability. It could be climate change, poverty, food waste, consumption, generation of trash, etc. For the technical aspect, an ordinary smartphone and a tripod are sufficient.

The project combines a narrative aspect with hands-on production of the film setting, the materials used in the film and the taking and editing of the final product.

Connection with sustainability

The theme of the stop motion is related to sustainability for example regarding the story line, materials used and scene design. Entry point could be a question to the students about what aspect of sustainability they want to work on. If the project is part of ongoing class work, this may be related to something that the students have already been doing (the tinkering activity is embedded into other activities). If the teacher is meeting the students for the first time, they open a dialogue on sustainability – or some aspect of sustainability such as climate change or food waste – and collect different ideas or questions on a board (whiteboard, flipchart, post-it stuck to a wall, etc.).

Health and safety

Hazard	Controls
There are no particular risks to the activity	It is always good to have first aid kit in the classroom

Essential materials

Item	Comment	Total
Carton (A3)	The simplest way to make a setting for the film is to draw and colour a reasonably large paper. A cardboard can also be used to create a green screen which can then be changed at will, for instance with pictures showing effects of climate change.	At least one for each group of 3 to 5 students
Colours (crayons, coloured pencils, paint, ...)	To paint the background and to create moving items for the film.	A variety of materials, some for detailed drawing and some for large background areas.
Fabric	Can be used as background.	
Magazines, newspapers, etc.	To cut out things for the story or the setting of the story	A variety of materials with different pictures, styles, etc.
Cardboard boxes	Could be ideal for creating a setting for the film.	At least one box for each group
Paper mass or clay	For more advanced work to create 3D figures or settings for the film.	
Lego, Playmobil, and other toys	If the film is going to use 3D figures, then using toys found at home can be a good source.	
Natural elements such as flowers, grass, stones, etc	If the film is going to use 3D figures, then creating the setting can be a good opportunity to explore the environment of the school.	
Various waste materials - containers, plastic packaging, boxes, etc.	For adding details to the setting and making a variety of materials available for the scenery.	
Connectors: rubber band, string or yarn, tape, glue stick, wire, paperclips, clothespins	To connect things together, either to create a background (scenery) or to have the characters move around.	

Essential tools

Item	Comment	Total
Smartphone or iPad	Necessary to record the film	One for each group of 3 to 5 students
Tripod	Necessary to keep the camera stationary and in the same place during each scene.	One for each group of 3 to 5 students
Scissors, pliers, hammer, screwdriver and more that could be useful	Depending on the provided materials, tools to attach things to each other or make the background, etc. Things to create both a setting for the film and the 'characters' in the film.	Scissors for all and a toolbox accessible for all with various other tools.

The list of materials and tools is not exhaustive, it is important to have a variety of materials available. Adapt it to the materials/assignment you give the students.

Preparation

The room needs to have distinct workspaces for each group, where they can both prepare materials for the film and do the filming. If the film is narrated, then there must be a separate quiet space where sound recordings can take place. Materials, such as paper and colors should be easily accessible to all groups and spread around the room on tables. For the filming, light must be sufficient and stable. The group is given time to explore the material offered to be used for the film.

Try out the technique so you know how shooting and stop motion work.

Activity Plan

Introduction

The facilitator tells the students they will be working in groups (3 to 5) to create a stop motion film about sustainability. Some students may not know what this is, so some explanation is in place. If the facilitator feels the students need to see an example of a stop motion film, show them several short clips exemplifying different ways of making a film so that the students do not get the idea that there is a one right way to do this.

Ask the students questions about what aspect of sustainability they want to work on. If the project is part of ongoing class work, this may be related to something that the students have already been doing (the tinkering activity could be embedded into other activities for example the balancing sculpture). If the teacher is meeting the students for the first time, they open a dialogue on sustainability – or some aspect of sustainability such as climate change or food waste – and collect different ideas or questions on a board (whiteboard, flipchart, post-it stuck to a wall, etc.).

The facilitator introduces a few basic steps in the process, such as:

1. deciding on a theme
2. making a narrative for the film
3. deciding on how to create the setting and the 'characters' of the film
4. filming
5. editing the film

Managing the activity once it is in progress

Encourage students to think about different stages in the process and whether they want to complete one stage before moving to the next. Thus, one task for the facilitator is to help each group to complete each stage, such as creating a storyboard and helping them develop the issue which will be addressed by the film.

When the students are ready to begin filming, the teachers might need to help them with some technical aspects of the film, such as deciding on how many frames per minute they will make and how long the film will be. This helps the students calculate or estimate how much the moving elements in the film should move from one frame to the next.

Photographs or frames per second	photographs per stop motion
15	450 for 30 second movie
12	360 for 30 second movie
10	300 for 30 second movie

Several apps are available to make a stop motion movie from photos on phone or a padlet, such as Stop Motion Studio. Look for "stop motion" in the app store and see what comes up. Photos can either be taken directly within the app, or they can be imported into the app from another folder on the phone.

Before students begin to make their movie, advise them to make a short test movie, just to see whether things work. This will also give them a sense of how many frames they will need, i.e. how much change they should make from one frame to the next.

The facilitator supports the participants in their work and observes the work and process of each group. They are careful to browse around the area, watch each group closely, provide feedback, help, and support.

Here are few guidelines you can use to support your students:

- ***Pose questions instead of answers:*** how would you like to have the background? Is the camera stationary?
- ***Create a supportive and inspiring environment****:* I really like how you are using the material.
- ***Help in case of frustration and failure in a positive and productive way:*** why do you think this is not working for you?
- ***Encourage learners to pursue personal interest:*** don't worry about the others, remember what it is that you want to convey.
- ***Encourage collaboration:*** maybe you can ask the other group how that worked for them. Do you see something you would like to borrow from some other group.
- ***Be aware of the time:*** *remind the students when there are 20 minutes left.*
- ***Untangle the knots:*** *If students seem stuck, ask them about their story. What do they want to tell? What is their main message? It might also help them to write it down or draw it.*

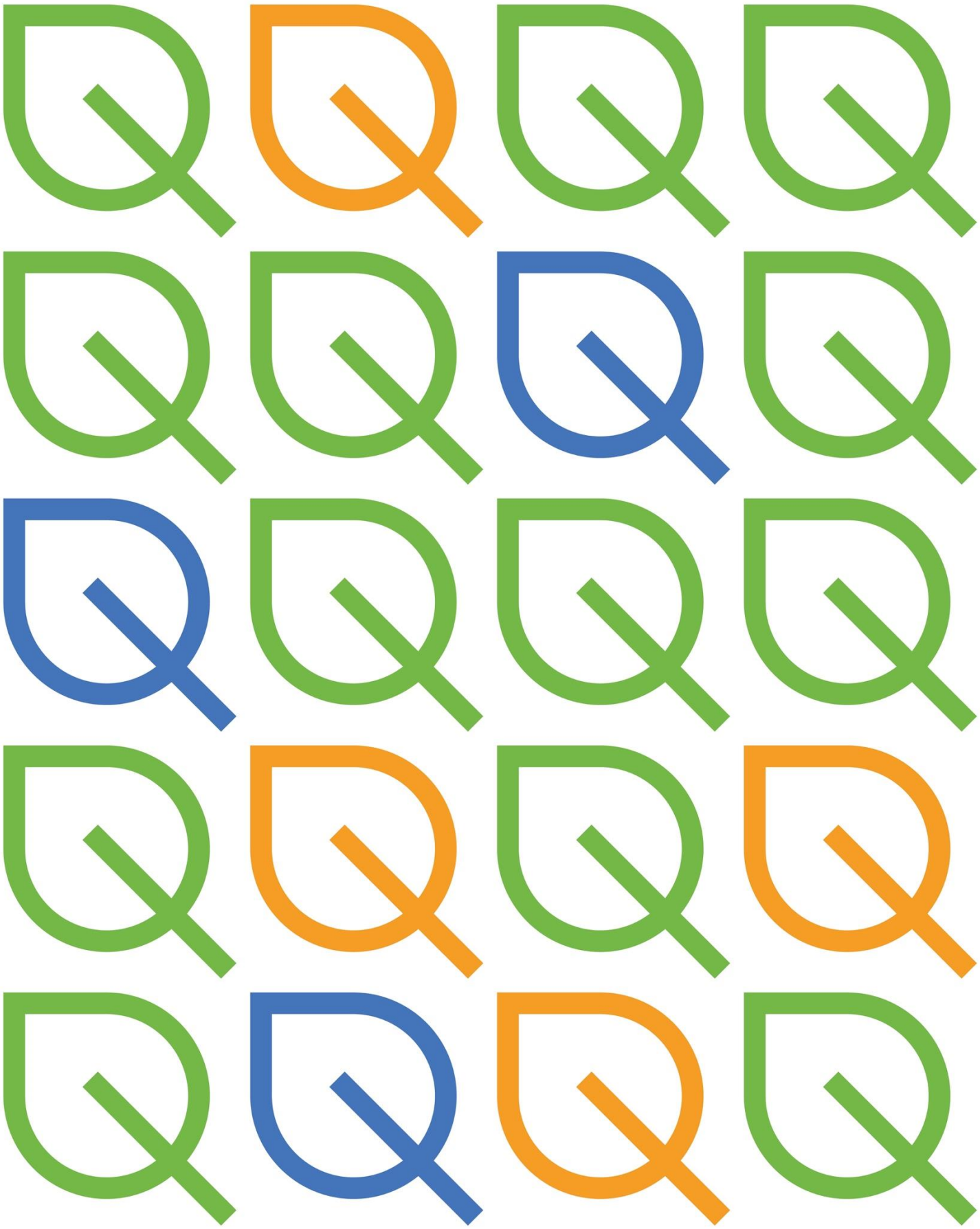
Remember to take pictures of the students doing the project, of the work process.

Concluding the activity

At the end of the hour, everyone helps to clean up before each group shows and tells about their stop motion pictures. During the presentations keep these questions in mind:

- **How did you decide what the film should be about?**
- **What are you most happy with about this project?**
- **What was difficult and why?**
- **What sustainable goals do you think your stop motion represents?**
- **and most importantly - was the activity enjoyable?**

If possible, it would be nice to have the stop motion posted on the web to be able to show others and look at them together. Think about how you can clean up the activity in a sustainable way.



Appendix

Planning the story board

When planning the story, it is good to think about different aspects of the film that will eventually be produced.

The stop motion needs	We need to make or get (materials)
Scenery - where does it take place, background	
Characters - who are the main characters	
Props	

Links to related material:

Various websites discuss stopmotion movies and explain how this method can be used and implemented in relation to different subjects:

Exploratorium: *https://www.exploratorium.edu/tinkering/projects/stop-motion-animation-explorations*

Getting Started with Stop Motion Studio | Exploratorium

Icelandic webpage: *https://veita.listfyriralla.is/title/stopmotion/*

Tinkerlab: *https://tinkerlab.com/easy-stop-motion-animation-kids/*

Learning by inquiry: *Easy and Creative Stop-Motion Animation Project for Kids - Learning by Inquiry*

Examples of more complicated stopmotions:

Eldhús eftir máli: *https://www.instagram.com/stillakynnir/* - *Stilla (vimeo.com)*

Plastic pollution: *THE FISH by PES // Corona x Parley - YouTube*

Examples of stop motion apps:

Stop motion studio (Android, IPhone, IPad)

IMotion (iphone, ipad)

Colophon

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