Workshop – Guidelines on STEAM BOX and upcoming STEAM LABS

Iro Alampei, MIO-ECSDE

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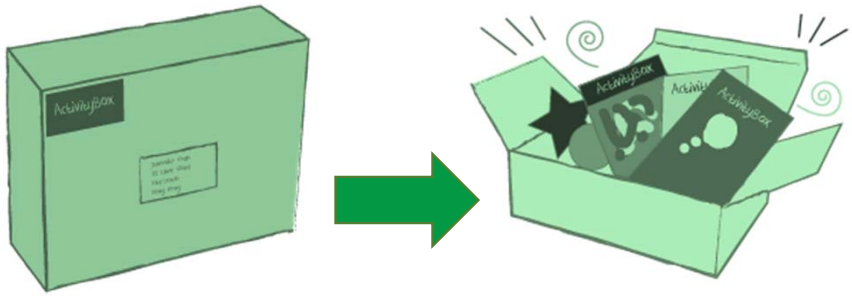
In the next 1,5 hour we will …

- Browse in the STEAM BOX activities (scope & content)
- Share tips / guidelines for teachers
- Share ideas that may be useful for your upcoming STEAM-LABS
- Q&A for clarifications
- *INTERACTIVITY through using the Microphone and the CHAT. You will be often asked to take the floor!*
- Video recording will be upload in PLASTEAM website



WARM – UP

- Draw a hypothetical circle around your body with a radius of 1 meter, and count the number of objects in it that are made of plastic or that have plastic in them.
- !!! Count objects like shoes, back-packs, clothes with Polyester, tables, even the sticker on your banana!
- *Write the answer in the CHAT!*
- *(You have ~ 1 min)*

Act No 1. Burning questions on Plastics

- Students start making a mind map on things they already know about plastic.
- Some concepts in the mind-map may generate new questions. They note them down individually in post-its.
- Students share their questions, group them and find trends.
- After grouping and ranking the questions, the class may run a project to delve deeper in the issues raised.

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Examples of Questions*...

- *How is the raw material for plastics being processed?*
- *Does plastic need to be clean in order to recycle it?*
- *Are there other materials to safely preserve food (air & water proof)?*
- *Why does so much plastic end up in the sea? What can I do to avoid it?*
- *What is bio-plastic? Is it bio-degradable?*
- *How many years does it take for plastic to break down?*
- *How many types of plastic are there?*
- *Why is plastic not compostable?*
- *Are there plastic microfibers in our drinking water?*

** These were shared by PLASTEAM partners during a project meeting (March 2022)*

Why do the activity?

- As introduction, to check your team's interest and level of knowledge
- To realize how plasticized our lives are, and wonder what we can do about it

Tips

- Some questions can be answered on the spot, others require a thoughtful reflection, a survey, or an expert opinion
- Encourage wild, unexpected questions. There are no "wrong" questions
- Beware on the exchange of arguments during the ranking process. Are all students' voices heard?

WARM – UP

- What is happening here?
- Why might he be doing that?
- Explain orally!

www.RobGreenfield.org/Trashme

Act No 3. My plastic footprint diary

- Students guess the quantity (number of items) of plastic waste generated in their homes within an average day/week.
- They hold a plastic waste monitoring for one or more days, with their families.
- They keep this waste clean, store it in transparent bags and bring it to class, to check their initial assumption.
- They wonder what they could have done differently to avoid some of this waste.

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Why do the activity?

- To create a shocking experience, through the amount of plastic waste we create
- To differentiate single use plastics (SUPs) from other plastics
- To check how our act of self-monitoring can inspire reduction
- To engage at a family level

Tips

- Before starting, clarify what you will measure and how (e.g. lid – bottle), so that you all count the same way.
- The activity does NOT target food leftovers, paper, glass nor metal; only plastics
- Invite parents to take part, send them a note in advance
- Keep all selected items CLEAN
- Link to the **PLASTEAM-FOOTPRINT APP**

WARM – UP

- What does this symbol mean?
  Write in the CHAT: A, B, or C:
  A. The producer financially contributes to a recycling scheme.
  B. The packaging material can be recycled and should be placed in the proper bin.
  C. I don't know.

WARM – UP

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Act No 4. Labels in plastic and other products

- Students bring in class some empty & clean packaging items.
- They pick items randomly and attempt to decode all the SYMBOLS in the labels
- Based on the symbols on each item they figure out how to dispose it.

Why do the activity?

- To learn to decodify the symbols in product labels
- To be more label-conscious as consumers
- To realize that not all types of plastics can be easily recycled (only two or three types, depending on the factory)
- To manage our waste responsibly

Tips

- Have a variety of packaging items (and labels)
- All packaging should be empty and clean
- Avoid glass with younger students

WARM – UP

- “Plastics are polymers which, once heated, melt and lose their shape”
- Write in the CHAT: Right/Wrong

Act No 6. Make your own plastic

- Students experiment to make casein-plastic by heating a cup of milk and adding some vinegar.
- They give form and shape to their creations and let them dry for 1-2 days.
- They discuss the difference between:
  - Thermoplastics: can be re-melted to new products once heated (e.g. PE, PET, PP, PVC etc) and
  - Thermosets: cannot be re-melted (e.g. PUR, silicone, resins, Bakelite, etc)
- Is their creation a thermo-plastic or a thermo-set???

Why do the activity?

- To practice chemistry /experimentation (STEM) skills
- To get accustomed with polymerization
- To differentiate **bio-based** from **petroleum-based** polymers
- To realise that not all polymers can be easily melted and therefore recycled (thermosets)

Tips

- Before doing the experiment, watch tips and videos online
- Do the experiment in the school LAB
- Link with lesson of chemistry (for older students)
- Bio-based plastics (from milk, corn, soy etc), does not mean they can be recycled. Usually, these may bio-degrade through an industrial composting process (not a domestic compost pile)




- How many of these are plastic creations?
- Write in the CHAT: 1, 2, 3,or 4

WARM – UP

Act No 7. Make sth wearable from plastics

- Collect a wide range of plastic materials and some items to help connect these, e.g. wire, rope, needle, wire cutter, scissors; hot glue gun.
- Expose students to the plastic collection, and ask them to make something they can wear from these plastics.
- Apart from clothes, wearable items could be hats, crowns, belts, bracelets, rings, pins, buttons, earrings, etc.
- Give them time to experiment with their ideas and their creations.

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Why do the activity?

- To have fun
- To trigger creativity
- To explore the physical properties of plastics
- To plan, build, test and evaluate one's own creations

Tips

- Help students to work safely when using the wire, hot glue gun etc.
- Iinsist on the creative process, not the result
- Suppress your urge to intervene to help in students' problems
- Check the **tinkering approach** for more facilitation tips

WARM – UP

- If you were to create a **collection of plastic objects** to be seen by a visitor in 500 years from now, which item would each of you choose and why?
- Write in the CHAT:
  I Choose ... Because ...
- *1 min*

Act No 8. Plastic Museum Curator

- Brainstorm: Why do we often feel the need to collect things?
- In an imaginary future museum of plastics, ask students what item they would choose and why? Invite them to think on the role of plastic in 500 years from today.
- After all items have been presented, students negotiate ways to set up and communicate their collection under a single narrative, “a story that connects them”.
- Students become Curators: They set up their exhibition, make cards, and invite their schoolmates and families to walk through it.

Why do the activity?

- To imagine the distant future
- To practice analytical, creative and synthetic thinking
- To practice in organizing content and making meaningful connections
- To practice presentation and communication skills

Tips

- Activity requires abstract thinking; proposed for older students
- Curation (connecting items meaningfully) needs time. Consider spreading the activity through an entire school year project.
- Let students own the process. They should choose the items, and the links to create their narrative.

WARM – UP

- Think of **the entire process of waste management in your actual work space** (i.e. school, office, company, etc.)
- How would you rate it from 1 (with many problems) to 5 (perfect)

Write in the CHAT 1 – 5

1 min

Act No 9. School Bin Auditors

- Students in groups, using floor plans examine the actual condition of waste management in their school.
  - *How many bins?* *Of what type?*
  - *How are they used?* *What mistakes do they notice?*
- Based on the identified problems, students set up an Action Plan with proposed solutions.
- They communicate it to the administration, teachers and schoolmates and become responsible for its implementation.

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Why do the activity?

- *Change starts from small steps in our immediate environment*
- To understand the complexities around waste management
- To practice mapping skills
- To practice Enquiry Based Learning skills
- To understand that “there is no away” when it comes to waste
- To consider ways to reduce waste

Tips

- *“We are what we throw away”:* While trash can be gross, it is important to have an honest view of what we dispose!
- Stigmatize the act, not the people
- More ownership & responsibility in finding solutions => More creative solutions & greater commitment in implementation
- **Design thinking:** A useful methodology to identify solutions.

WARM – UP

- Can you name a source of microplastics?
- *Write your reflection in the chat*
- *1 min*

Common sources of micro-plastics (Φ <5 mm) at sea:

- Fragmentation of plastic objects
- Cosmetics with microbeads (e.g. exfoliators, hairsprays and gels).
- Synthetic clothes (e.g. polyester) releasing microfibers with each wash.
- Car-tyres, releasing microfibers, especially braking.
- Pellets (or mermaid's tears) the raw material from which we make plastics.

When exposed to natural elements, plastics get brittle and start to break down. With sun, wind, rain and waves they fragment into ever smaller pieces, microplastics (Φ < 5 mm). Pellets, the raw material to manufacture all plastics, is also a microplastic.

Act No 10. Microplastic Hunters

- OUTDOOR: Visit the beach, trace the winter shoreline, set a stretch area (e.g. 10-20m), split in groups and look for microplastics!
- INDOOR: Look for microplastics (Polymers) in the labels of personal hygiene products. (Usually named as “Poly ...”).

- *Alternative for schools far from sea: With the help of an adult students check the laundry machine filter or the bags that catch clothes’ fibers*

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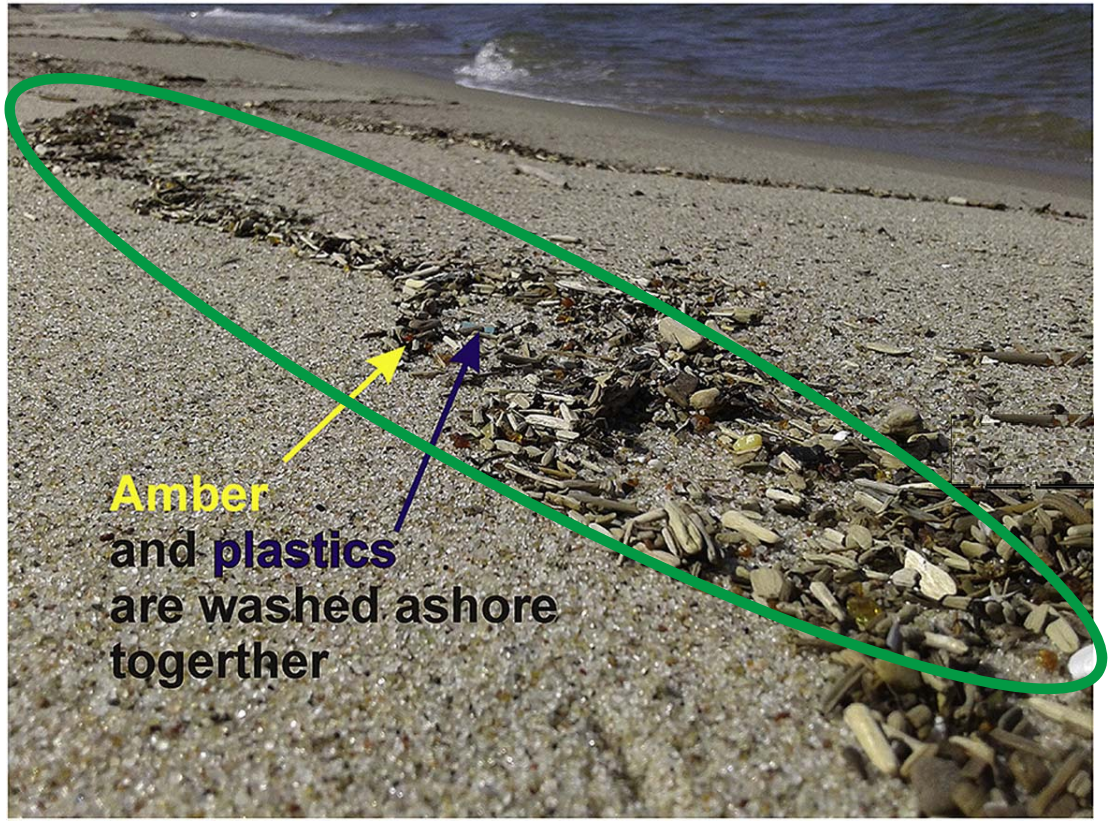
Why do the activity?

- To realise that micro-plastics are everywhere
- To practice STEAM skills (observation, field survey, math etc.)
- To practice experiential, hands-on learning
- To practice outdoor learning

Tips

- It is easier to find microplastics on a sandy beach.
- Visit the spot in advance
- Winter Shoreline: a line that is parallel to the waterfront where seaweed, branches and trash tend to pile up, due to winter waves
- In beach clean-ups we now often find fragmented plastics that cannot be identified
- Have handy 2 jars for students: One with pellets, and one with fragmented microplastics.



Learn to recognize the winter shoreline on a sandy beach

WARM – UP

1. What percentage of global plastic production is meant for packaging?
   - A. 16%
   - B. 26%
   - C. 36%

2. What is the percentage of plastics that is being recycled, globally?
   - A. 9%
   - B. 19%
   - C. 29%

Write in the CHAT: e.g. 1A-2B

(1 min)

WARM – UP

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(1 min)

Act No 11. Zero Plastic Challenge

- Students start with finding some facts on plastic items, especially SUPs (single use plastics)
- They note or sketch some daily habits with plastic / SUPs
- As a class, they voluntarily hold a Zero Plastic Challenge, for one or more days
- They note on a diary their feelings for their little ‘victories’ and ‘defeats’
- At the end they may decide to adopt permanently some of the new “zero-plastic” habits

Why do the activity?

- To realize how plasticized our lives are
- To recognise SUPs as synonymous to convenience
- To think creatively

Tips

- Can only be a voluntarily activity
- Requires good planning and finding alternatives in advance: one has to be creative and resilient for a plastic free lifestyle
- As teacher, be part of the challenge & share your own victories and pitfalls
- Avoid patronising: We don't all have the same interest, nor the same starting point

WARM – UP

- Complete the phrase in the CHAT:

"In order to help solve the problem of plastic pollution I can ....."

- Use the 1st person and propose action verbs.
- Think of your actual daily consumption habits.

(1 min)

Act No 12. The Rs of Sustainability

I RETHINK how I buy things

I often TALK about plastic pollution

I repair my broken toys

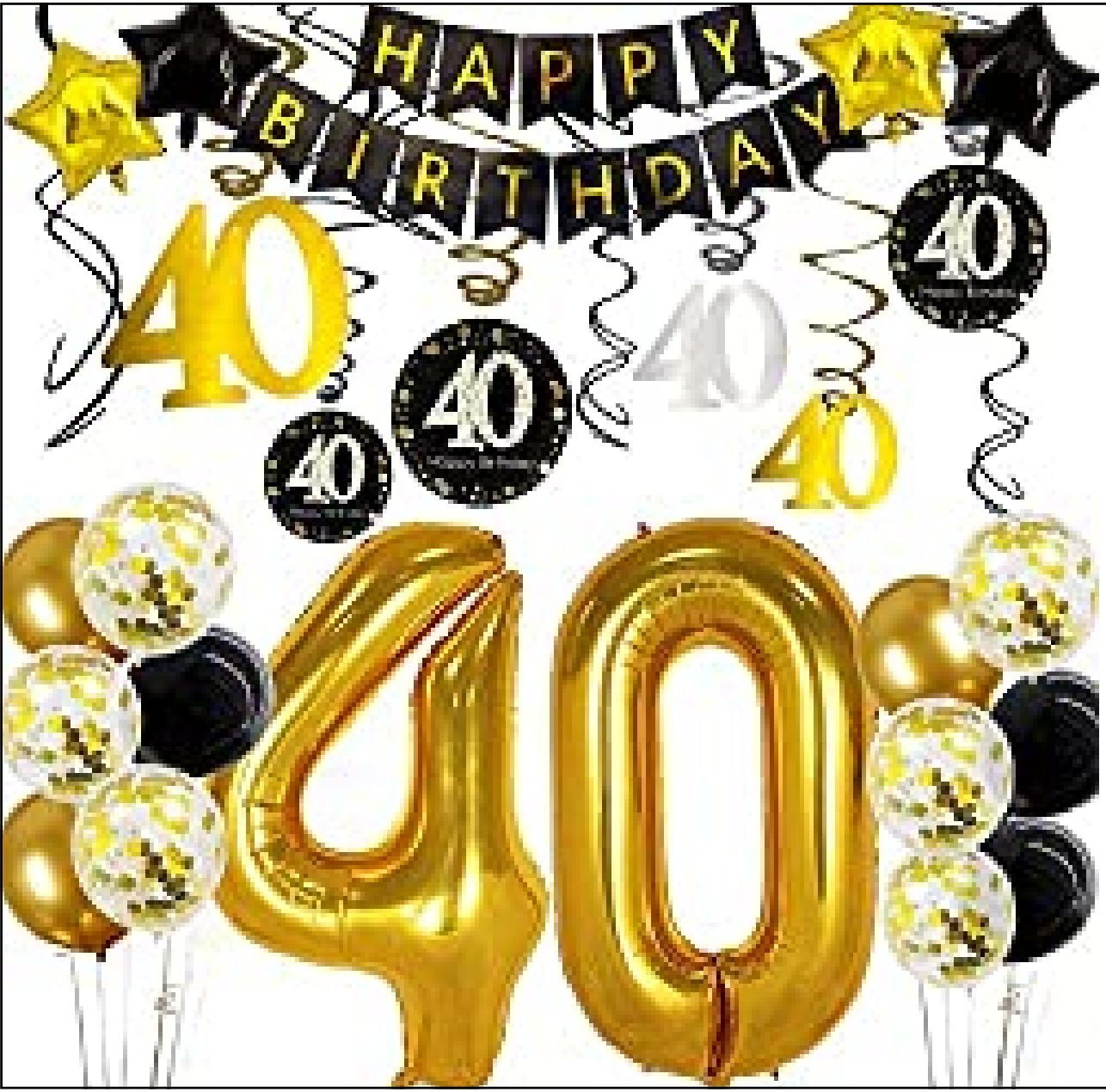
- Students consider how they dispose of common plastic objects through action verbs (e.g. I repair, I reuse, I recycle, I avoid ...)
- If needed, the teacher proposes more verbs (R-verbs and beyond, e.g. discuss, propose, insist, etc.)
- Students prioritize these action verbs. They are all positive, but some may be “greener” than others
- With discussion they consider moving up & down some verbs, in their personal hierarchies.
- Debrief: how we can be motivated to change a habit

Why do the activity?

- To discover the plethora of actions one can take against plastic pollution
- To re-think one's personal actions
- To take a stand

Tips

- Action verbs are not necessarily R-verbs
- All proposed verbs have their value, but some may be more effective than others in driving solutions.
- Each student has his/her own hierarchy and that's OK
- Try to avoid the "single action bias"
- The quality of plastics is lowered once recycled. Overall, plastics can be recycled up to 6-7 times.



WARM – UP

- Think of your next work-feast, party or family gathering.
- Name one item you could avoid, or reduce, or manage better for a less wasteful feast.

Write it in the CHAT

(1 min)

Act No 13. Plastic Free School Feasts

- On the occasion of an upcoming school feast or a party, in which a lot of people are expected and snacks will be offered, students think ways to organize it without SUPs.
- They browse for ideas for ‘plastic free parties’
- After the feast they reflect on those green practices that they could keep in the future, and practices they can improve.

Why do the activity?

- To re-think of our consumption during gatherings
- To “walk the talk” regarding minimization of Single Use Plastics (SUPs)

Tips

- Reaching zero waste will take repeated efforts, the key is to do something each time and keep improving from one event to the next.

WARM – UP

- What does “**Sustainable School**” mean to you, personally?
- Write your thought in key-words in the CHAT

(1 min)

Act No 14. Sustainability form A to Z

- Students create a sustainability alphabet for their school
- For every letter they think / write/ draw of a concrete action they can do, from now on, for a greener, more sustainable school
- Ideas can move beyond wastes and plastic pollution

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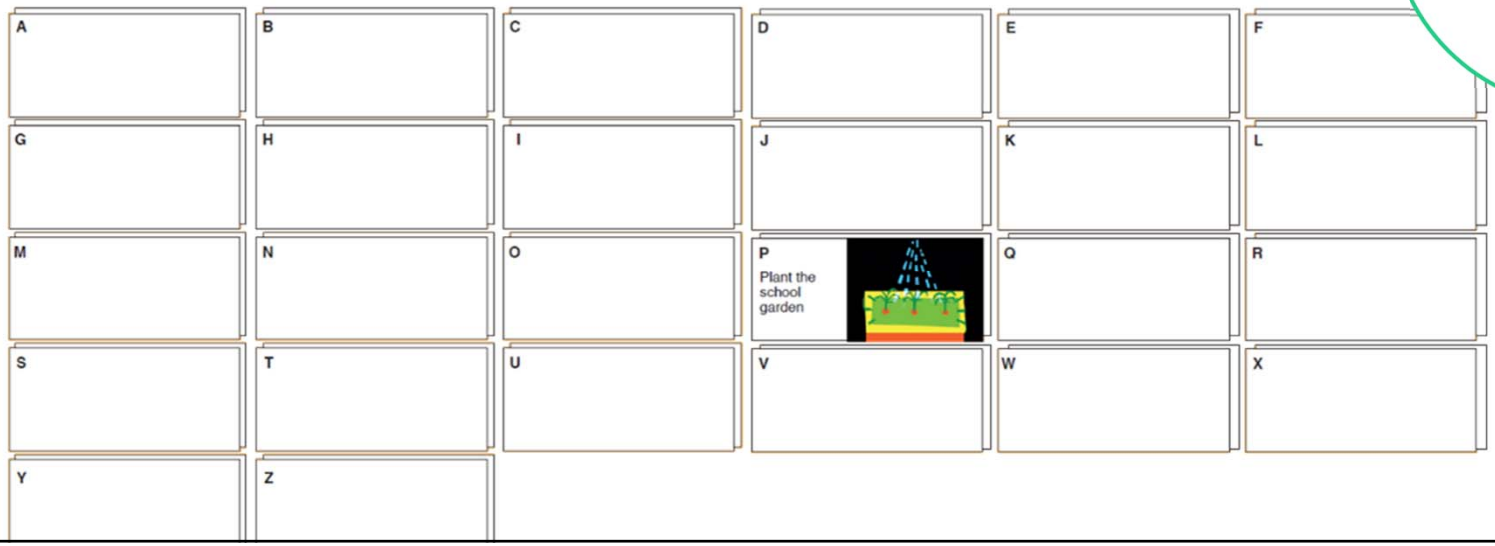


Why do the activity?

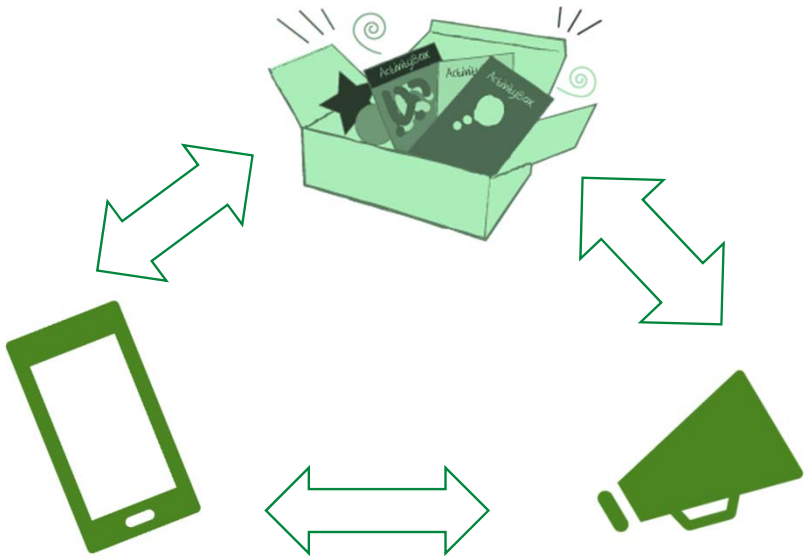
- To consider the school and its people as an entity
- To practice creative thinking
- To link plastic pollution with other Sustainability challenges (energy, water, transport, green spaces, food, relations, free time...)

Tips

- Keep in mind the wider picture of Sustainability
- The visionary “sustainability statements” need to be coupled with realistic & practical actions, otherwise they remain a wish-list


That's all Folks!

Questions???



Concluding remarks ...

- Adjust the activities according to your needs
- Activities are self-standing. There is no linear sequence, navigate your own path according to your interests
- In each activity check the suggested websites and enrich them with new ones of national relevancy (after checking their credibility)
- If you are based in a PLASTEAM country (Italy, Greece, Malta, Netherlands, or Romania) consider connecting the STEAM-BOX application to the **Plastic Footprint APP**, and the upcoming **School Contest** (Sept-Dec 2022).

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Contact us

- Questions on PLASTEAM project? https://plasteam.eu/
- Questions or on the STEAM-BOX material? https://plasteam.eu/o3-steam-box-and-lab/
- Send your suggestions to improve it / enrichment remarks in English at info@medies.net by December 2022

- EVALUATION LINK FOR THIS WEBINAR ! https://forms.gle/ASm5p9fqrsdaTaHMA

3 min evaluation

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