GREEN LOOP
2024-2-SK01-KA210-SCH-000278989

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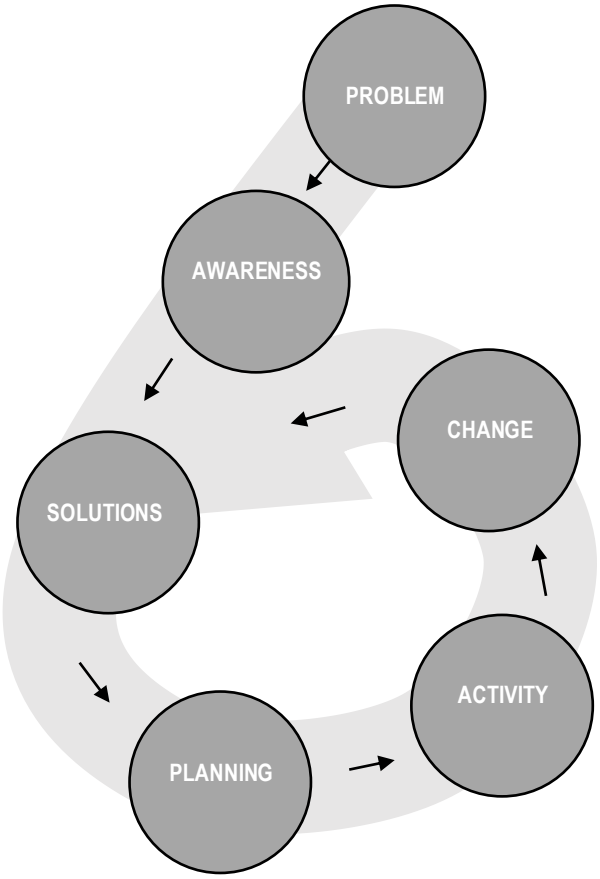
WASTE AND CIRCULAR ECONOMY

6 steps to active citizenship

- **UNDERSTANDING** the problem that waste causes at the local, regional, and global levels and the extent of its impact on other environmental threats, such as degradation of environmental components, biodiversity loss, climate change, etc.
- **REALIZING** that we are co-creators of these problems and taking responsibility for their solutions.
- **SEEKING SOLUTIONS** on how we can eliminate and minimize the waste problem and its impact on the environment.
- **PLANNING CONCRETE ACTIVITIES** through which we can participate in solving waste problems.
- **PRACTICAL IMPLEMENTATION OF ACTIVITIES** in our daily lives.
- **MONITORING CHANGE**, sharing results, experiences, and spreading awareness.



Target group: pupils of 6th to 9th grade of primary school and secondary school students

Minimum required time: 90 minutes

Aids:

- Self-stick notes in blocks - two colours (e.g., red and blue)
- Waste Journey cards with icons
- Waste decomposition timeline with 5 categories: 2 weeks – 1 year, 1 – 10 years, 10 – 100 years, 100 – 500 years, 500 – 5000 years
- Sample of diverse waste materials that students encounter daily, with a total weight of 1.4 kg (average daily production of municipal solid waste per EU inhabitant)
- Cards with waste disposal options (coloured containers for plastics, glass, paper, metals, multi-layer composite materials/Tetra Pak, compost, biodegradable kitchen waste, textiles, deposit-return machine for beverage packaging, and collection yard)

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- Thumb images to express the recyclability of individual waste materials

1. PROBLEM

PROCEDURE:

- The teacher brings a large transparent plastic bag full of rubbish into the classroom and asks the students if they know what the bag represents.
- They guide the students to arrive at the answer that the given plastic bag represents the average daily amount of waste produced by each citizen of the Slovak Republic (1.4 kg). (In the case of Turkey, it is 1.14 kg, Estonia 1 kg, Romania 0.83 kg).
- Subsequently, they ask the students what danger waste poses to humans and other living organisms on this planet.
- The teacher writes each student's idea on a separate red self-stick note and attaches it to the plastic bag. After such brainstorming, the plastic bag will be covered with notes of one colour (e.g., red), listing the threats that waste poses.
- With the next question, the teacher focuses on the journey of waste. They ask the students where all such waste can end up.
- The first option that comes to mind for students is landfilling. In Slovakia, the landfilling rate has decreased from 75 percent to the current 41 percent over ten years, meaning that only less than half of the produced waste ends up in landfills.
- However, the problem is that the quantity (volume) of landfilled waste is not decreasing, which is due to the very rapid growth in waste production.
- It is also a problem that not all waste ends up in containers, thus becoming a threat to the environment. This leads to the creation of illegal dumpsites (black, wild), which can contaminate the soils on which they are located, and there is also a risk of groundwater contamination. One mobile

DISCUSSION QUESTIONS:

- What do you think this plastic bag represents?
- How much do you think it might weigh?
- How long does it take to produce this amount of waste?
- Almost one and a half kilograms of waste per day per EU inhabitant – do you think this is a small or large amount?
- What threat does waste pose to life on this planet?
- Where does all the waste we produce end up?
- What threat does an illegal dumpsite represent?
- What dangerous substances can be found in a landfill and how can they endanger soil and groundwater?
- How can discarded waste harm wild animals?

phone battery can contaminate up to 60,000 litres of water.

- Another example is when freely discarded waste enters our rivers. In this way, in 2012 alone, 4200 kg of plastic waste entered the Black Sea daily from the Danube. This plastic threatens aquatic animals and gradually breaks down in the water into microparticles (so-called microplastics - diverse plastic fragments ranging from 100 nanometres to 5 millimetres in size), which then become part of the water cycle and thus part of our food chain.
- The last example of the danger of waste is its impact on climate change. The amount of discarded food (because of our food waste) ends up in landfills, where it undergoes anaerobic decomposition (not composting), releasing carbon dioxide and methane, dangerous greenhouse gases that are one of the main causes of global warming and climate change.

- Can a plastic bottle we throw away threaten marine animals?
- How is the waste problem related to biodiversity loss and climate change?

2. AWARENESS

PROCEDURE:

- At the beginning of this phase, the teacher challenges students to reflect on who creates this problem and to what extent we contribute to its exacerbation.
- It is appropriate for the teacher to refer again to the plastic bag full of waste and to the fact that this is our contribution to the issue, and we are the ones who can influence it and help solve the problems.
- In this phase, it is important to realize that we are the ones responsible. Responsible for the current state, for the problems arising from ubiquitous waste, and equally responsible for resolving this situation and these problems.
- It is important to know that we hold the solutions and that we are the ones who must start acting. But how to start? And what options do we have?

DISCUSSION QUESTIONS:

- Who is to blame for all the problems associated with waste?
- What is our share of the blame?
- Who should solve these problems?
- Should we also be responsible for solving waste problems?
- So, what should we do, how and where should we start?

- To model waste management options, the teacher can use the Waste Journey cards, which can be found at the end of this manual.
- The teacher will print all cards multiple times, place them on a table in an accessible spot, and introduce them to the students.
- Subsequently, the teacher will form student groups, ideally consisting of 3 to 5 students. Each group will be provided with a piece of string and, if necessary, clothespins or adhesive tape.
- The task of the groups will be to create a model that reflects the entire life cycle of waste, specifically plastic waste, from crude oil extraction, through its processing, to a product that becomes waste and ends up in the bin. However, the teacher will not tell the groups anything about the possibilities of involving sorted collection, recycling, and reuse of waste as a raw material. It is up to the students whether they create a linear or a circular waste management model.
- Students select cards with specific phenomena or processes and use the string to express their connections. The cards can be attached to the string with clothespins, adhesive tape, or any other original method.
- When creating the model, students can use any number of available cards and express the gradual journey from card to card using the string.
- We recommend including blank cards among the picture cards, through which students can add any new process or phenomenon to their models.
- Finally, the student groups will present their models.
- If none of the groups create a circular model, the teacher will encourage them to try again, but this time to minimize the amount of waste at the end of its journey as much as possible.
- Students can then present their innovated models, which implement the ideas and processes of the circular economy.

- Before any item becomes waste, it goes through a long journey. Could you describe it?
- How could we modify the waste journey to minimize it and simultaneously prevent its impact on the environment?

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3. SOLUTIONS

PROCEDURE:

- After students understand the basics of the circular economy using the example of a plastic waste journey, the teacher can focus on other types of waste, their negative impact on the environment, and their recycling possibilities.
- Students can remain in the same groups. Each group will receive a set of waste items consisting of one piece of waste from each of the following commodities: plastic, paper, metal, glass, bio-waste, battery, textile, and mixed waste.
- The group's task is to consider how long specific waste items would decompose in a landfill or in nature.
- Meanwhile, the teacher will place the timeline in a visible spot.
- The group's task is to place their waste items into the individual categories of the timeline, according to how long they think the given waste would decompose.
- Once all groups have placed their waste on the timeline, the teacher will ask students to check the correctness of other groups' decisions. If something seems incorrect, they should point it out and, at the same time, propose a different decomposition time category for that waste.
- Finally, the teacher will check the correct placement of individual waste types on the timeline and evaluate which types of waste decompose the fastest and which will decompose for hundreds to thousands of years.
- **Decomposition times of individual waste items:**
  - Cardboard box – 0.5 to 1 year
  - Textile (cotton) – 0.5 to 1 year
  - Bio-waste (branch) – 3 to 5 years
  - Cigarette butt – 5 to 10 years
  - Chewing gum – 5 to 10 years
  - Aluminium can – 100 to 200 years
  - Disposable battery – 200 to 500 years
  - Used respirator – 450 years

DISCUSSION QUESTIONS:

- How often do you encounter the waste you received in your group?
- Do you also produce these types of waste?
- How long do you think these waste items will decompose?
- To what extent does the decomposition of individual waste types endanger the environment?
- Which type of waste is most dangerous during its decomposition?
- Which types of waste decompose without negative effects?
- Can decomposition also have a positive impact on the environment?
- How else can we manage our waste?
- What needs to be done for waste to be recycled?
- Do we know how to sort waste correctly?
- Into which container would you throw the waste you have in your group?

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  - Disposable diaper – 500 to 550 years
  - Plastic bottle – 450 to 1000 years
  - Glass bottle – more than 4000 years
- This is a simulation of a scenario where waste ends up in a landfill after being disposed of in a black container for mixed municipal waste, or is freely discarded in nature, e.g., in an illegal dumpsite.
- The teacher can point out that this principle, where waste ends up in landfills without the possibility of being reused as a secondary raw material, is specific to the linear waste management model.
- The teacher will challenge students to come up with another solution so that waste does not end up in landfills. The solution is its sorting and subsequent recycling.
- For the next task, the teacher will distribute 2 sets of cards to each group. The first set contains coloured containers and other images reflecting various waste management methods. The second set of cards consists of two thumbs, a green "like" and a red "dislike". Students will use these two thumbs when deciding on the recycling possibilities of individual waste items present on the timeline.
- When introducing the circular economy, waste recycling is fundamental. If we want to recycle waste, one important condition must be met: the waste must end up in the correct container. This means we must sort (separate) it correctly.
- The teacher will gradually show students individual types of waste from the timeline, and students will raise container cards according to where the given waste belongs. At the same time, they will also choose one of the two thumbs. They will use the red thumb if they think the given waste cannot be recycled at all. The green thumb not only indicates recycling possibilities but can also be adjusted on a scale. A thumb pointing completely upwards means the best, greatest recycling possibility, and the gradual downward pointing of the green thumb expresses a

- What is their recycling potential?
- Do all these waste items have the same recycling potential?
- What is the advantage of waste recycling?
- Does waste recycling have any disadvantages?
- How does recycling help our environment?
- How would this affect waste fees if we all sorted waste thoroughly?

progressively lower recycling possibility. If using the green thumb, students must also decide on its direction.

- It is advisable to maintain dynamism throughout this activity. This means the teacher allows only a short time for thinking, then counts down 3-2-1, and when the teacher says NOW, all groups simultaneously raise the appropriate card with the waste management option, as well as the appropriate thumb expressing the recycling possibilities of the given waste.
- Differences in recycling possibilities reflect the specific nature of the materials from which the waste is made. For example, glass can be recycled many times without losing raw material quality. In contrast, paper can only be recycled a few times, as its structure deteriorates with each recycling.
- In this way, all waste from the timeline will gradually be placed into the appropriate containers.
- Once the waste is sorted, the teacher will ask students to consider what will happen next with the sorted waste. If waste is reused as a raw material, we call this recycling. For example, sorted paper can be used in the production of new paper, old glass bottles can be made into new ones, or plastic PET beverage bottles can be made into plastic flakes that have various uses, old textiles are made into fibres with special finishes for the automotive and furniture industries, insulation for buildings, etc.
- The teacher will further ask students if they know examples of recycling, and the teacher will quickly evaluate each example, possibly adding an interesting fact. For example, that to produce 1 tonne of paper requires more than 15 adult trees, 240,000 litres of water, and more electricity than one household consumes throughout the year. In addition, the process of producing new paper pollutes the air and water used in production. To produce 1 tonne of recycled paper, only half the water is used, only 30% of the energy, and air pollution is reduced by 75% and water pollution by 35%.

- The activity simulates what would happen if we all sorted waste as we should, how little waste would end up in black containers, and thus in landfills. This would also be reflected in the fees for waste collection to landfills and for its landfilling (the so-called "waste fees"). In contrast, sorted waste is bought as a raw material, meaning we do not pay for its collection and disposal.

4. PLANNING

PROCEDURE:

- It is good to start the planning phase by introducing all possible ways to combat the waste problem.
- The teacher can once again use self-stick notes, but this time of a different colour (e.g., blue), and through brainstorming, elicit many ideas from students on how the waste problem could be solved.
- All student ideas written on the notes can be re-attached by the teacher to the plastic bag of waste.
- To summarize the options for solving the waste problem, the teacher can introduce the philosophy of waste prevention and minimization, known as Zero Waste. This philosophy is built on the 6 R's:
  - **REFUSE** – refuse what we don't need,
  - **REDUCE** – buy less or borrow items,
  - **REUSE** – use items again,
  - **REPAIR** – repair items before throwing them away,
  - **RECYCLE** – recycle, utilize waste as a secondary raw material,
  - **ROT** – compost.
- Finally, it is necessary to emphasize that the best way to combat the waste problem is to not create (or minimize) waste.
- The teacher can lead a discussion with students about the production of everyday waste, whether it is truly

DISCUSSION QUESTIONS:

- What other ways to combat the waste problem do we know?
- Have you ever managed to repair something and save it from being thrown away?
- Do you avoid being influenced by advertising and only buy what you truly need?
- Which of these waste items could we easily give up reducing the amount of waste we produce?
- What could we replace with more suitable alternatives that do not produce so much waste?
- What activities can we organize at school, in our

unavoidable or necessary, or whether we could replace it with more sustainable alternatives.
- This step involves thinking about what we want to change in our personal lives.
- Students should come up with a vision, some goals, and procedures through which they will contribute to solving waste problems.
- It is good if the class initially sets a smaller number of realistic goals, which if successful, can then be expanded with further ones.
- In this way, the entire methodological procedure can cycle, activities can be expanded at each step, student activity can develop, and student awareness can deepen.
- It is appropriate for students to define indicators in advance that will reflect the success rate of their efforts. For example, reducing the amount of waste produced by one-third, sorting 80% of all household waste produced, etc.
- It is equally important to think about the necessary cooperation, define the required materials, and possibly plan individual partial activities over time.
- If students map the current situation at the beginning, they can precisely quantify how much change they have managed to achieve. This way, change can become an interesting student project.

5. ACTIVITY

PROCEDURE:

- This step represents the practical implementation of specific activities that students have planned.
- Students can carry out activities directly at school (e.g., implementing sorted waste collection in the classroom or school, creating a composting site, cleaning the school surroundings, awareness campaigns for classmates about waste minimization, a swap meet for used clothes, books, or toys...), as well as at home (waste minimization, improving

homes, and in our immediate environment?
- Whom do we need to contact to successfully implement the activities?
- What material resources do we need for this?
- What specific steps must we take and in what chronological order?
- How can we measure the success of our implemented activities?

DISCUSSION QUESTIONS:

- What have you already managed to achieve?
- How are tasks divided within your group?
- Have you encountered a problem you can't solve?

waste sorting rates, donating unnecessary toys, clothes, or books to charity, etc.), or in the school/home vicinity (mapping and reporting illegal dumpsites, preparing and organizing a clean-up event...), and so on.
- An important part of the implementation is the documentation of the individual phases of activity realization. Students can take photographs, record observations and measurements, create video recordings, record voiceovers, etc.
- If necessary, students should have the opportunity to discuss their problems, ideas, or partial results with the teacher.

- How do you plan to solve this problem?
- What will be your next step?
- What results do you expect?

6. CHANGE

PROCEDURE:

- Change is the fundamental goal of the entire endeavour. Without a change in our thinking and actions, no environmental problems will be solved, and the same applies to waste issues.
- Therefore, it is necessary to bring the entire program to the point of change, in which students see meaning and which will gradually become a habit that students will automatically perform in their daily life situations.
- It is equally important for students to realize the importance of the change made, what they have achieved, how they achieved it, and to want to continue.
- The teacher should seize the opportunity to provide feedback. Not only should the teacher evaluate, but ample space should also be given to students for self-assessment. The success of the activities carried out, the suitability of the chosen procedures, group cooperation and communication, problems students had to solve and the way they solved them, feelings about the work done, etc., could be assessed.
- The final step of the program should be the sharing of results that students have gained during the implementation of activities. Options include peer education – i.e., presenting project results to younger classmates, creating a reportage, a

DISCUSSION QUESTIONS:

- How satisfied are you with the results of your work?
- What all did we manage to achieve?
- What, on the other hand, failed or was not completed in time?
- What problems did you have to contend with and how did you solve them?
- What are you most proud of?
- What would you do differently?
- What significance do you see in what you have achieved?
- Do you feel like continuing with your activities?

short video clip, an article for the school magazine, a social media post, etc.

- The successful implementation of an activity, which students have carried through to the desired change, does not necessarily mean the end of the waste issue. Students can seek further solutions, plan and implement new activities, and bring about further changes.
- The entire process can thus cycle, bringing students new challenges, further experiences, and, most importantly, a deepening sense that they are doing something that helps not only themselves but also their environment.

- How could your activities be continued?
- What of what you have learned should your classmates and people in your surroundings know?
- How can we present our outputs, findings, and recommendations to them?

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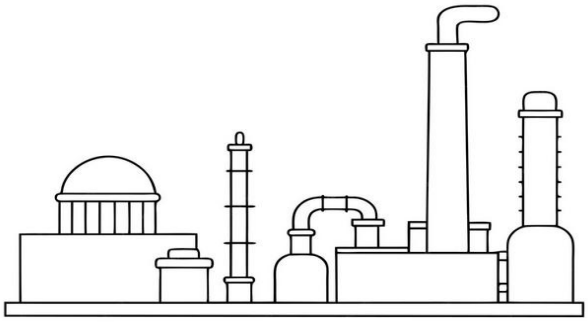
Waste Journey Cards

RAW MATERIAL EXTRACTION



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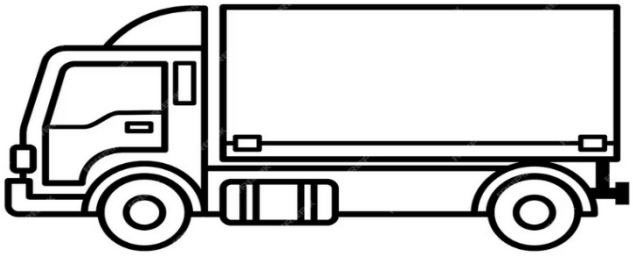
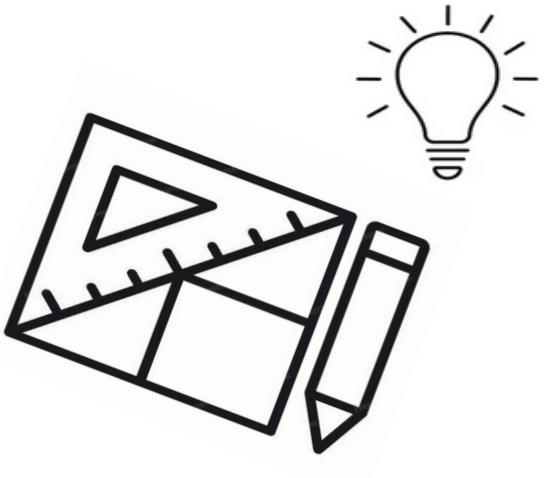


TRANSPORT /DISTRIBUTION



DESIGN

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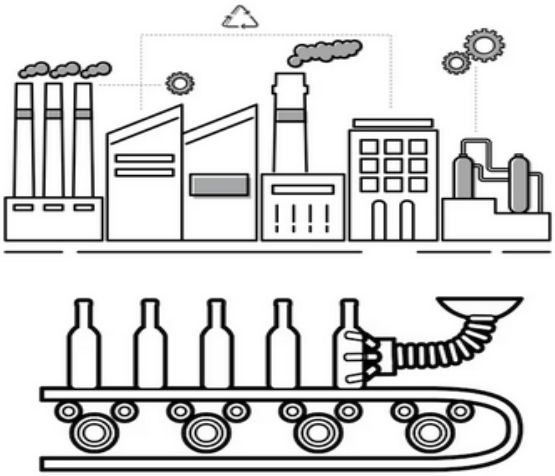
RESEARCH



MANUFACTURE /PRODUCTION

SHOP

CONSUMPTION

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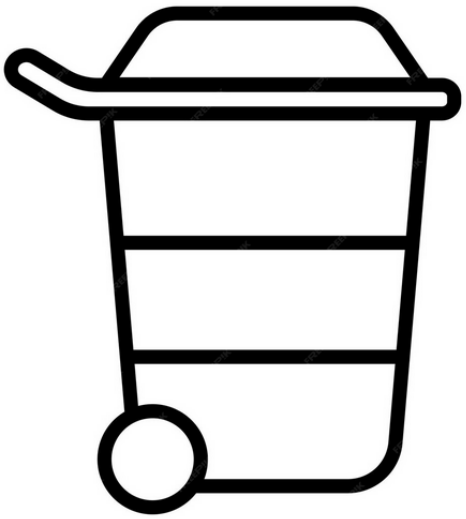

WASTE

LANDFILL

ZERO WASTE

INCINERATOR

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RECYCLING

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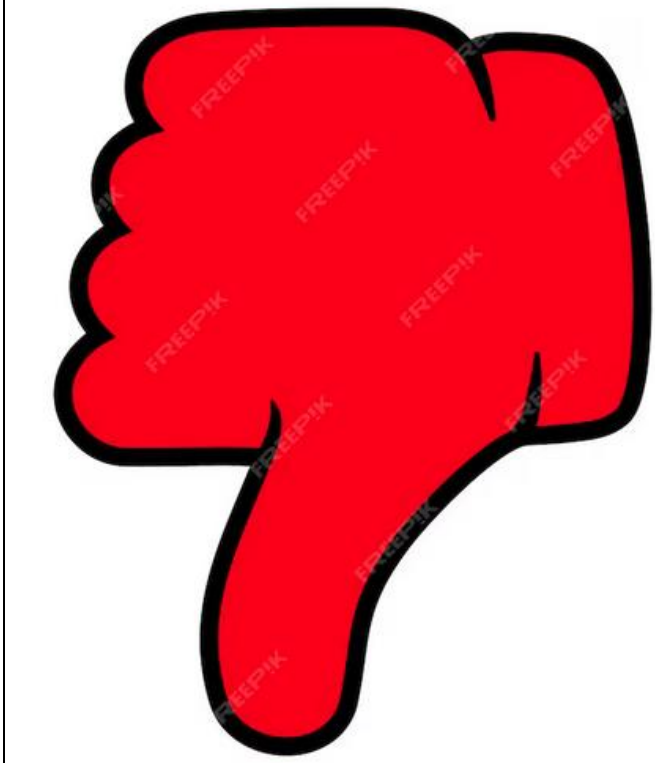

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How to make a bag from an old t-shirt?

We will need: an old t-shirt, scissors and chalk

1. step

2. step

3. step

4. step

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5. step

Done!

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