



**DISCOVER WITH
POTATO TATA
ABOUT THE
ENVIRONMENTAL
IMPACT OF
PRODUCTS**



POTATO TATA



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JRC130685

Print ISBN 978-92-76-59134-4 doi:10.2760/962591 KJ-04-22-201-EN-C

PDF ISBN 978-92-76-59132-0 doi: [10.2760/013714](https://doi.org/10.2760/013714) KJ-04-22-201-EN-N

Luxembourg: Publications Office of the European Union, 2022

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How to cite this publication: Caldeira C., Gusmini, G., França, C., Gusmini, M., Potato Tata, Sala, S. (Eds), Publications Office of the European Union, Luxembourg, 2022, doi:10.2760/013714, JRC130685.

SCIENTIFIC BACKGROUND

This book aims at sharing the basic concepts of Life Cycle Assessment (LCA) with the youth and stimulating reflection on the environmental impact of products. The environmental impacts of *Potato Tata* presented are based on a study on the environmental impacts of European citizens' consumption, carried out by the European Commission's Research Center. The environmental impacts are assessed with life cycle assessment.

LIFE CYCLE ASSESSMENT (LCA)

For its holistic and multidimensional approach, life cycle assessment allows to assess the environmental problems caused by the products over their life cycle, from the extraction of raw materials used for its production until its disposal. To know more about life cycle assessment, see the section Notes in page 38.

ACCESS HERE:



[HTTPS://EPLCA.JRC.EC.EUROPA.EU/
SUSTAINABLECONSUMPTION.HTML](https://eplca.jrc.ec.europa.eu/sustainableconsumption.html)

ACKNOWLEDGMENTS

We deeply thank those who helped with the realization of this project. Among them, Sara Colucas, Felicidade Mestre, Silvia Machado, Sofia Moura, Heitor Ferreira, Maria Dias, and Carla Rodrigues who contributed to the content development and Valeria De Laurentiis for the text revision.

Stephanie Chaudron and Gillian O'Neill for their advice on the pedagogical and communication aspects of the editorial project.

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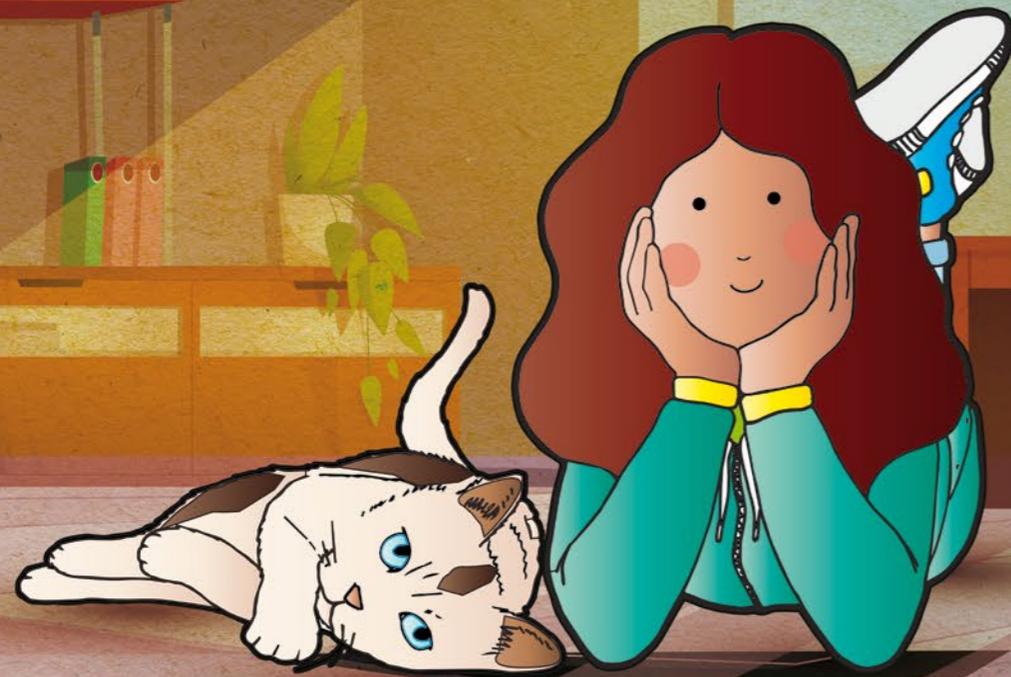
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*HELLO, JOIN BIA IN DISCOVERING THE STORY POTATO
TATA HAS TO TELL. YOU WILL LEARN VERY INTERESTING
THINGS THAT CAN HELP SAVE OUR PLANET.*

BIA IS A 10-YEAR-OLD GIRL, WHO WAS BORN AND GREW UP IN LISBON. BIA IS VERY CURIOUS. SHE LOVES ANIMALS, DANCING, PLAYING WITH HER COUSIN INÉS, AND LEARNING NEW THINGS. SHE HAS A LOVELY KITTEN CALLED LUZINHA.



6

ONE MORNING, BIA WAKES UP, SEES IT'S A SUNNY DAY AND DECIDES TO GO FOR A WALK IN THE PARK NEAR HER HOUSE...

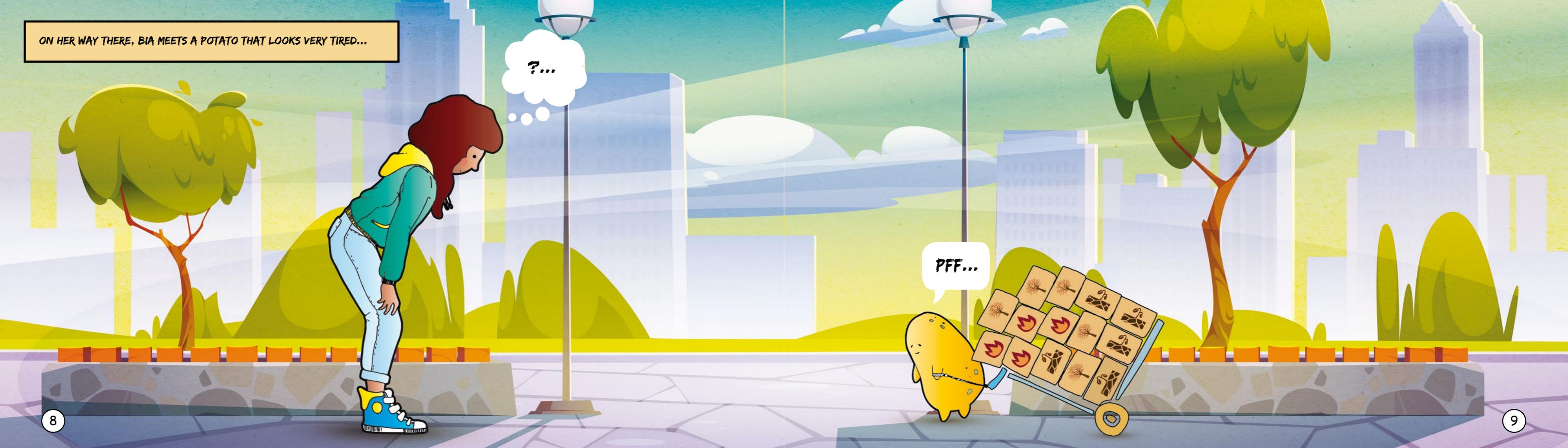


7

ON HER WAY THERE, BIA MEETS A POTATO THAT LOOKS VERY TIRED...

?...

PFF...



OH DEAR POTATO, YOU LOOK SO TIRED! WHAT IS YOUR NAME?

AND WHAT IS IT THAT YOU ARE CARRYING IN THAT HANDCART THAT SEEMS SO HEAVY?

UFF... YES I AM...

I AM POTATO TATA!

I AM CARRYING MY **ENVIRONMENTAL IMPACTS*** ON THIS HANDCART.

* NOTES - PAGE 38

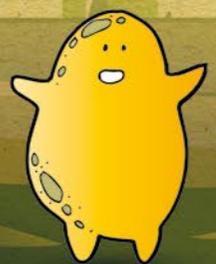
POTATO TATA IS A VERY TASTY CRISP THAT WAS GROWN IN ELVAS. SHE IS FRIENDLY AND KNOWS A LOT OF INTERESTING THINGS TO TELL BIA. SHE HAS A FRIEND CALLED PACKET.

YOUR WHAT???

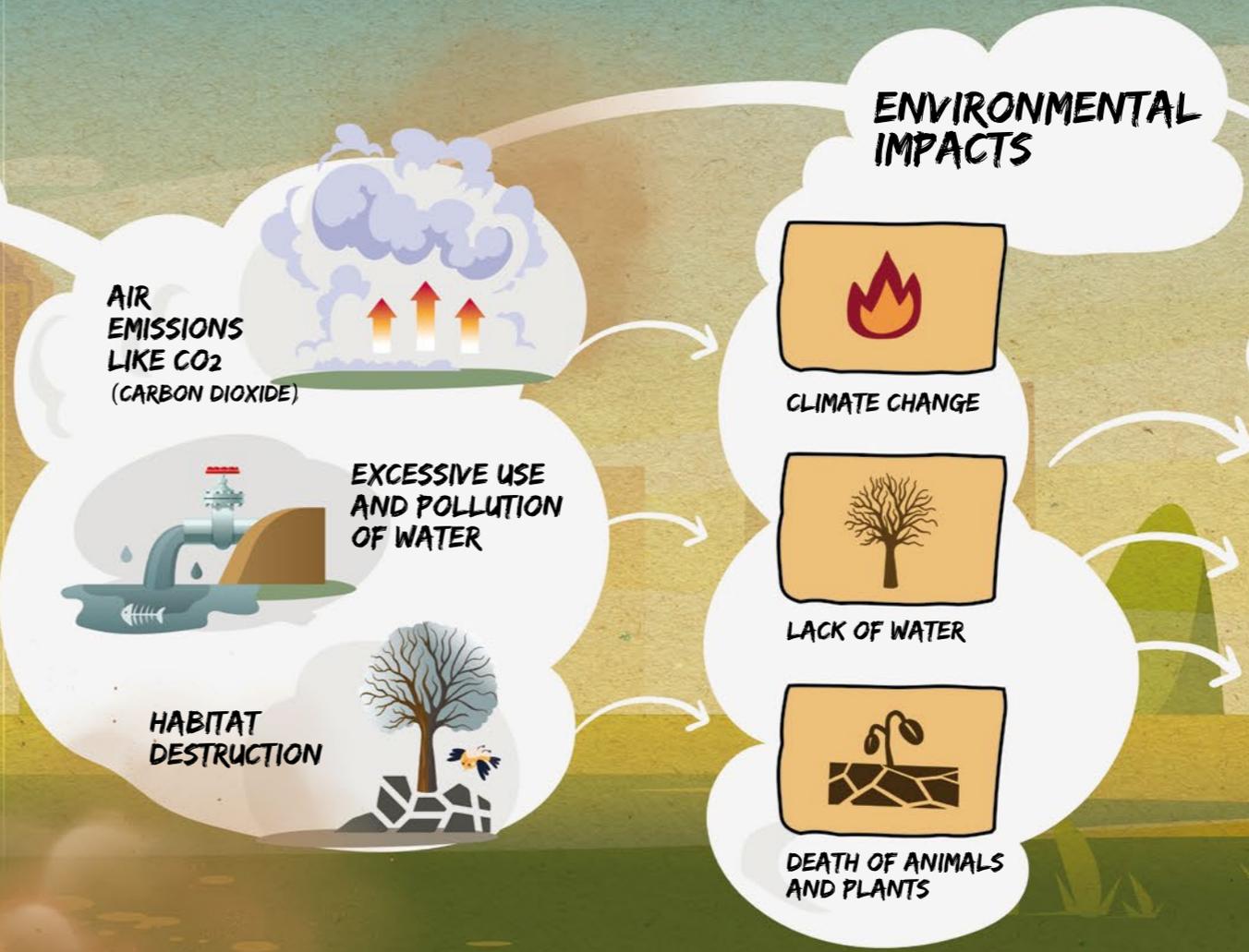
MY ENVIRONMENTAL IMPACTS!

LET ME EXPLAIN: "ENVIRONMENTAL IMPACT" IS THE NAME GROWNUPS USE TO TALK ABOUT THE CHANGES IN THE ENVIRONMENT CAUSED BY HUMANS. MANY OF THE ACTIVITIES DONE BY HUMANS ARE PUTTING OUR PLANET IN REAL DANGER.

POTATO TATA GIVES EXAMPLES OF ENVIRONMENTAL IMPACTS.



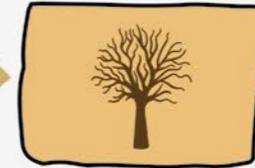
HUMAN ACTIVITIES



ENVIRONMENTAL IMPACTS



CLIMATE CHANGE



LACK OF WATER



DEATH OF ANIMALS AND PLANTS



MY HANDCART

BIA WAS A BIT CONFUSED WITH WHAT POTATO TATA WAS TELLING HER...

THE ENVIRONMENTAL IMPACTS TAKE PLACE DURING THE WHOLE PRODUCTION OF A PRODUCT, SOMETHING GROWNUPS CALL ITS **LIFE CYCLE**.

AS I AM A PRODUCT, I AM CARRYING IN THIS HANDCART THE ENVIRONMENTAL IMPACTS THAT HAPPEN ALONG MY LIFE CYCLE.



UI, I AM SO CONFUSED!

LIFE CYCLE??
WHAT IS THAT??
AND WHAT DOES IT MEAN THAT THE ENVIRONMENTAL IMPACTS TAKE PLACE ALONG THE LIFE CYCLE?

* NOTES - PAGE 39

RELAX, DON'T WORRY. I WILL EXPLAIN EVERYTHING. I JUST NEED TO SIT BECAUSE I AM REALLY TIRED...
HERE IS HOW IT GOES: THE LIFE CYCLE OF A PRODUCT IS THE LIST OF ALL THE THINGS THAT NEED TO HAPPEN FOR A PRODUCT TO BE BOUGHT AND CONSUMED AND ITS PACKET TO BE TREATED AFTER IT HAS BEEN THROWN AWAY.



FOR EXAMPLE, MY LIFE CYCLE BEGINS WHEN I AM PLANTED IN A FIELD.



CULTIVATION



PRODUCTION



DISTRIBUTION AND RETAIL



CONSUMPTION



DISPOSAL

...AND ENDS WHEN MY PACKET IS DISPOSED OF.

LIFE CYCLE



TO MAKE ME GROW, THE FARMER WATERS ME, GIVES ME NUTRIENTS THROUGH FERTILISERS AND USES PESTICIDES TO PROTECT ME FROM DISEASES.

BUT FERTILISERS AND PESTICIDES POLLUTE THE SOIL AND THE AIR, CAUSING CHANGES IN THE ENVIRONMENT, WHICH ARE ENVIRONMENTAL IMPACTS.

IF THE FARMER USES TOO MUCH WATER FROM A RIVER TO IRRIGATE THE FIELD WHERE I AM GROWING, THERE WILL BE NO WATER LEFT FOR THE FISH TO LIVE IN AND THEY WILL DIE. THIS IS AN ENVIRONMENTAL IMPACT.



CULTIVATION

WATER

PESTICIDES

FERTILISERS



FOR THIS REASON, I HAVE ALREADY SOME ENVIRONMENTAL IMPACTS IN THE FIRST STAGE OF MY LIFE CYCLE — **THE CULTIVATION.**

ENVIRONMENTAL IMPACT OF CULTIVATION



WHEN I AM GROWN, THE FARMER HARVESTS ME AND TAKES ME TO THE FACTORY WHERE I WILL BECOME A CRISPY CRISP!
SADLY, THIS MEANS THAT I NEED TO TRAVEL A LONG WAY.



CULTIVATION
IN PORTUGAL



WAREHOUSE
AT UNCLE'S
JOHN FARM



COLLECTION POINT
IN SPAIN



STOPOVER
IN FRANCE



FACTORY
IN GERMANY



SUPERMARKET
IN BRUSSELS

FOR THIS LONG JOURNEY, FOSSIL FUELS, LIKE GASOLINE OR DIESEL, WILL BE BURNED TO POWER THE TRUCK WHICH WILL RELEASE GASES, DUST AND PARTICLES THAT POLLUTE THE AIR AND CAUSE CHANGES IN THE ENVIRONMENT, WHICH ARE ENVIRONMENTAL IMPACTS!

FOR THIS REASON, WHEN THE JOURNEY ENDS, MY ENVIRONMENTAL IMPACTS WILL BE HIGHER...



VERY INTERESTING TATA! AND THE NEXT STAGE, WHAT IS THAT?



ONCE I ARRIVE TO THE FACTORY I STEP IN THE SECOND STAGE OF MY LIFE CYCLE – **PRODUCTION!**

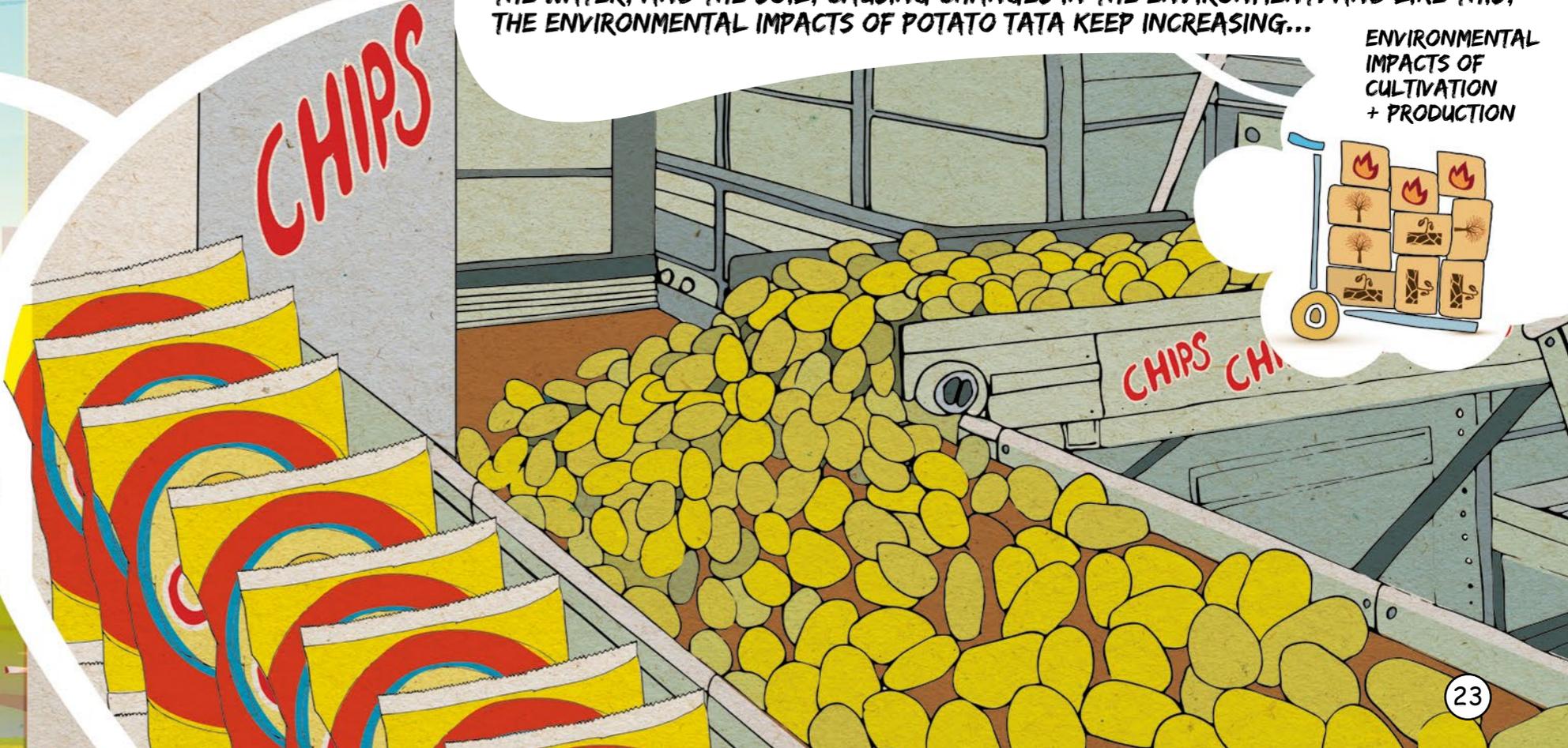
AT THIS STAGE I BECOME A CRISPY CRISP! AND IT'S ALSO AT THIS STAGE THAT I MEET MY FRIEND – THE PACKET!



PRODUCTION

TO RUN THE FACTORY YOU NEED WATER, ENERGY AND MATERIALS. WHILE RUNNING, THE FACTORY WILL EMIT GASES AND OTHER SUBSTANCES THAT POLLUTE THE AIR, THE WATER, AND THE SOIL, CAUSING CHANGES IN THE ENVIRONMENT. AND LIKE THIS, THE ENVIRONMENTAL IMPACTS OF POTATO TATA KEEP INCREASING...

ENVIRONMENTAL IMPACTS OF CULTIVATION + PRODUCTION



THEN WE GO TO THE SUPERMARKET. ALSO THERE WATER, ENERGY AND MATERIALS ARE USED.

AND WE ALREADY KNOW THAT THIS CAUSES THE EMISSION OF GASES AND OTHER SUBSTANCES...

...THAT CAUSE CHANGES IN THE ENVIRONMENT, WHICH ARE ENVIRONMENTAL IMPACTS!

THE SUPERMARKET

SNACKS

ENVIRONMENTAL IMPACTS OF CULTIVATION + PRODUCTION + SUPERMARKET

THE SUPERMARKET ALSO NEEDS WATER, ENERGY AND MATERIALS TO RUN, AND THIS MEANS THAT IT WILL RELEASE GASES AND OTHER SUBSTANCES THAT WILL POLLUTE THE AIR, THE WATER, AND THE SOIL, CAUSING CHANGES IN THE ENVIRONMENT.

AFTER EATING THE DELICIOUS CRISP, YOU HAVE TO THROW AWAY THE PACKET, RIGHT? WHERE SHALL WE THROW IT?

WELL, WE SHOULD THROW THE PACKET IN THE RECYCLING BIN, SO THAT IT CAN BE RECYCLED AND NOT END UP UNSORTED.

EXCELLENT, RIGHT ANSWER!



CONSUMPTION

AFTER EATING THE CRISPS WE WILL NEED WATER TO WASH OUR HANDS. AND IT'S IMPORTANT TO CHOOSE THE RIGHT DESTINATION FOR THE PACKET: **RECYCLING!**





AND WE ARRIVE AT THE LAST STAGE OF MY LIFE CYCLE: THE FINAL **DISPOSAL**, WHERE LEFTOVERS ARE MANAGED. RECYCLING IS THE BEST DESTINATION FOR THE PACKET.

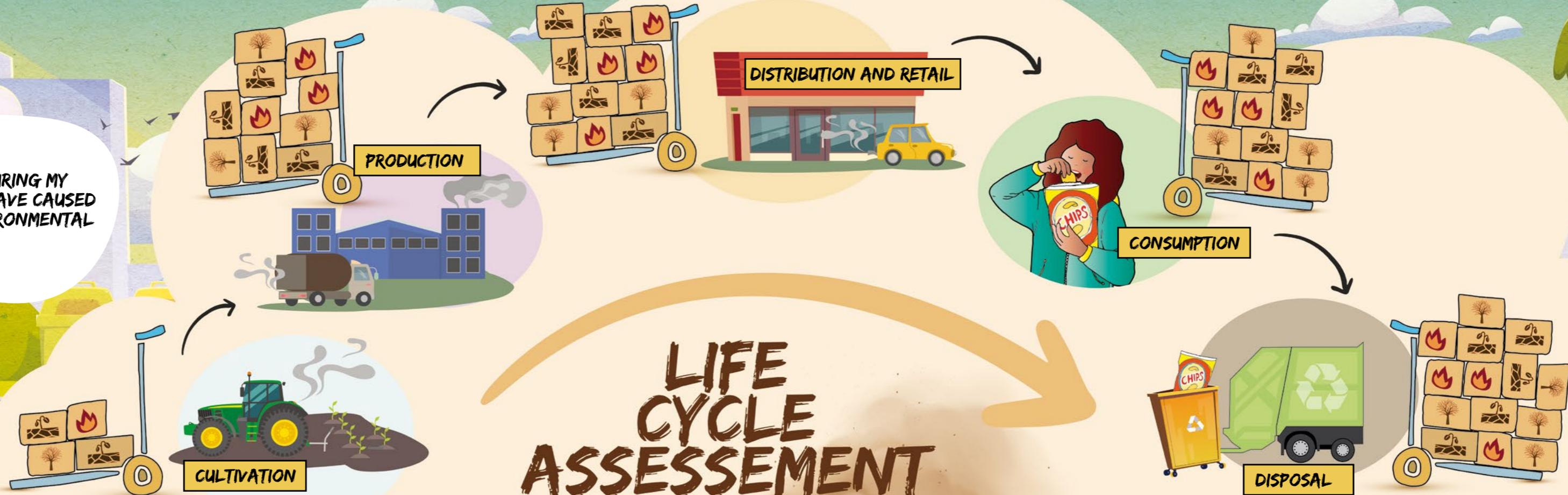
DISPOSAL



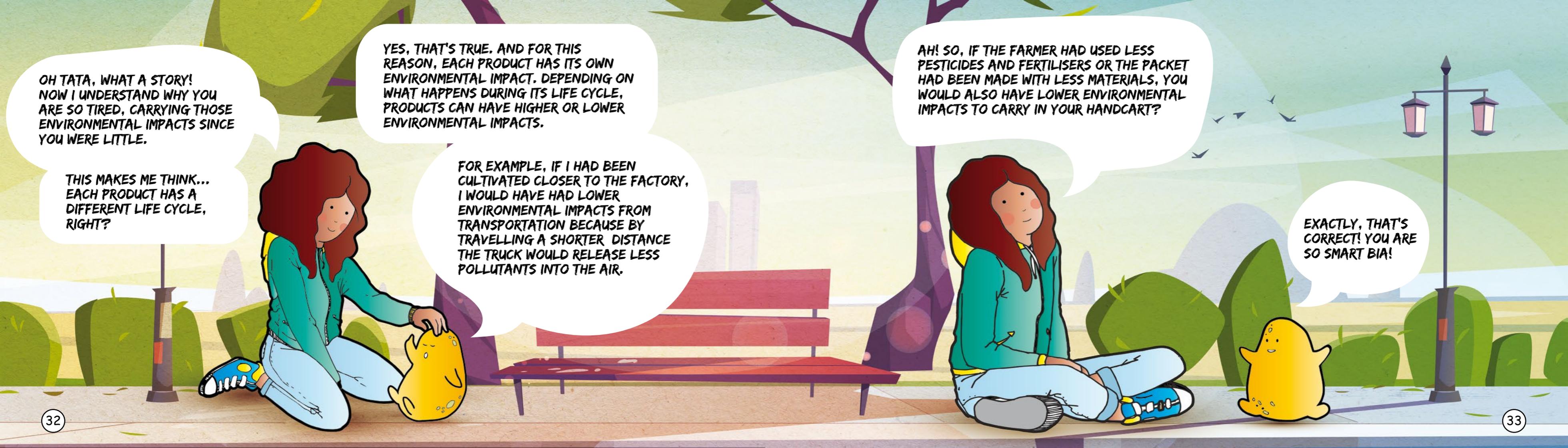
ENVIRONMENTAL IMPACTS OF CULTIVATION + PRODUCTION + SUPERMARKET + DISPOSAL

BUT ENERGY AND WATER WILL ALSO BE USED TO RECYCLE THE EMPTY PACKET, AND THE RECYCLING PROCESS WILL RELEASE SUBSTANCES THAT CAUSE ENVIRONMENTAL IMPACTS.

AND THAT'S IT!
THIS IS HOW DURING MY
LIFE CYCLE I HAVE CAUSED
SEVERAL ENVIRONMENTAL
IMPACTS.



LIFE CYCLE ASSESSEMENT



OH TATA, WHAT A STORY!
NOW I UNDERSTAND WHY YOU
ARE SO TIRED, CARRYING THOSE
ENVIRONMENTAL IMPACTS SINCE
YOU WERE LITTLE.

THIS MAKES ME THINK...
EACH PRODUCT HAS A
DIFFERENT LIFE CYCLE,
RIGHT?

YES, THAT'S TRUE. AND FOR THIS
REASON, EACH PRODUCT HAS ITS OWN
ENVIRONMENTAL IMPACT. DEPENDING ON
WHAT HAPPENS DURING ITS LIFE CYCLE,
PRODUCTS CAN HAVE HIGHER OR LOWER
ENVIRONMENTAL IMPACTS.

FOR EXAMPLE, IF I HAD BEEN
CULTIVATED CLOSER TO THE FACTORY,
I WOULD HAVE HAD LOWER
ENVIRONMENTAL IMPACTS FROM
TRANSPORTATION BECAUSE BY
TRAVELLING A SHORTER DISTANCE
THE TRUCK WOULD RELEASE LESS
POLLUTANTS INTO THE AIR.

AH! SO, IF THE FARMER HAD USED LESS
PESTICIDES AND FERTILISERS OR THE PACKET
HAD BEEN MADE WITH LESS MATERIALS, YOU
WOULD ALSO HAVE LOWER ENVIRONMENTAL
IMPACTS TO CARRY IN YOUR HANDCART?

EXACTLY, THAT'S
CORRECT! YOU ARE
SO SMART BIA!



I GOT IT!
ALL PRODUCTS HAVE ENVIRONMENTAL IMPACTS* BUT WHAT MATTERS IS THAT WE CHOOSE THOSE THAT HAVE LOWER IMPACTS.
IN THIS WAY WE WILL HELP TO PROTECT NATURE AND OUR HEALTH!



THE END

10 TIPS TO REDUCE YOUR ENVIRONMENTAL FOOTPRINT



IF YOU CHOOSE PRODUCTS WITH FEWER ENVIRONMENTAL IMPACTS, YOU WILL REDUCE YOUR ENVIRONMENTAL FOOTPRINT AND HELP TO PROTECT NATURE AND OUR HEALTH.

DO YOU WANT TO KNOW MORE AND CALCULATE YOUR ENVIRONMENTAL IMPACTS?

ON THIS SITE YOU CAN AND A QUESTIONNAIRE THAT YOU CAN FILL IN WITH THE HELP OF YOUR TEACHERS OR YOUR FAMILY TO AND AND OUT HOW MANY IMPACTS ARE DUE TO THE PRODUCTS YOU CONSUME!

WHAT CAN YOU DO?



1. Buy products that are produced close to where you live to reduce impacts due to transport.
2. Select seasonal products, avoiding energy and resource consumption.
3. Consume more cereals, vegetables, and fruit. These products typically have lower impact than, for example, meat.
4. Consume bulk products to reduce the impacts associated with the production and the packet recycling.
5. Consume products that last a long time and avoid superfluous purchases. That way you won't have to buy new products that you don't need.
6. Don't waste food.
7. Use less water.
8. Use reusable shopping bags.
9. Choose environmentally friendly products.
10. Walk or cycle and use public transportation.

CALCULATE HERE YOUR ENVIRONMENTAL FOOTPRINT:



[HTTPS://KNOWSDGS.JRC.EC.EUROPA.EU/CFC](https://knowsdgs.jrc.ec.europa.eu/cfc)

*NOTES

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ENVIRONMENTAL IMPACTS

Are the changes in the environment caused by human activities.

These changes can be positive or negative and cause positive or negative environmental impacts. Unfortunately, the majority of the environmental impacts caused by human activities are negative.

Positive impacts

Are caused by positive changes in the environment like for example the recovery of degraded land or the creation of protected areas. These changes improve the quality of life for humans and other beings.

Negative impacts

Are caused by negative changes in the environment like for example pollution or habitat destruction. These changes can have very serious consequences such as climate change, loss of biodiversity and soil fertility. A stable climate, biodiversity and fertile soil are essential for our survival.

Human activities

Are practices that can cause changes in the environment (positive or negative) like for example: construction of roads or airports, industrial activities, tourism, hunting and fishing, deforestation.



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PRODUCT LIFE CYCLE

Are all the stages of the production of a product from the extraction of raw materials up to its disposal.

Life Cycle Assessment (LCA)

Is a methodology that assesses the environmental impacts of products, analyzing the effects on the environment of the activities that occur along the life cycle of a product.

To quantify the environmental impacts using LCA 4 steps should be followed:

Step 1 - Define the goal of the study and the boundaries of the system that will be analyzed (that is the list of activities considered). For example, in the case of Potato Tata the goal is to study the environmental impacts caused along its life cycle and the activities considered are: cultivation (the use of fertilisers, pesticides, agricultural machinery,...), the

transportation to the factory, the processes happening in the factory (peeling and slicing the potatoes, frying, packaging), the packaging production, transportation to the supermarket, storage, waste collection and recycling.

Step 2 - Collect data for each of the different activities. For example, in the cultivation stage we will collect information about the quantity of pesticides, fertilisers and water used, the diesel used and the emissions released by the machinery.

Step 3 - Calculate the environmental impacts using the information collected and scientific models. There are different scientific models for each environmental impact category. For example, to know the impact "Climate Change" there is a scientific model that quantifies how much all greenhouse gases impact climate change. With LCA we can quantify several environmental impact categories such as climate change, water scarcity, land use or biodiversity loss.

Step 4 – Analyze the results and see which are the highest impacts and in which stage of the life cycle they occur. For example, we can see that the category climate change is very high in the production because the factory uses energy from fossil origin. So, if we want to reduce the impact on climate change we can use renewable energy in the factory.

Recycling is the process of transforming used materials (or waste) into materials or products of potential utility. Each type of recyclable material requires a specific treatment, but in general the recycling process includes the following steps: separation, compaction, decontamination and cleaning, and chemical-physical transformation. The main types of materials that can be recycled are paper, plastics, cardboard, glass, metals, fabrics and electronic components.

Although recycling is a good way to give a new life to used materials and brings many advantages, you should pay attention to some aspects:

1. Not all materials can be recycled. For example, many plastics, as they are a mixture of plastics, cannot be recycled.
2. To be recycled, materials must be cleaned and decontaminated.



3. The recycling process can have high environmental impacts.

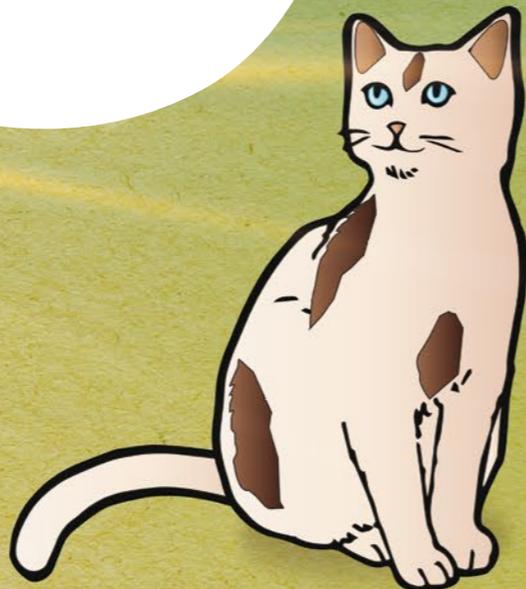
4. When a country does not have the capacity to recycle materials, it sends its waste to another country that may not have the capacity to recycle it and ends up disposing it in the environment.

It is essential to recycle as it helps to preserve the environment and reduces the amount of waste we produce. But, to really solve the waste problem and its environmental impacts, we must reuse materials and, above all, reduce our consumption!

A product's environmental impacts occur throughout its life cycle and can be referred to as a product environmental footprint. Each product has its own environmental footprint as, depending on the life cycle of each product, its associated impacts are different. To protect the environment, we must choose those products that have less environmental impacts, that is, a smaller environmental footprint.



LET'S PLAY?



FIND THESE ELEMENTS IN THE BOOK AND WRITE THEIR DESCRIPTION IN THE WHITE BOX. MARK WITH A CROSS THE ENVIRONMENTAL IMPACTS.

1. 

2. 

6. 

7. 

3. 

4. 

5. 

8. 

9. 

10. 

MEMORY GAME



LABYRINTH

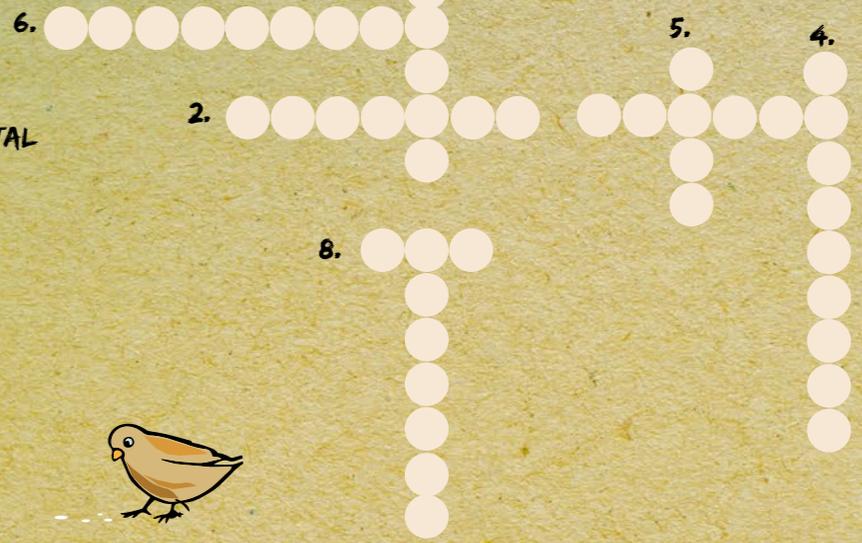
HELP TATA TO FIND OUT THE CORRECT FINAL DESTINATION FOR THE PACKET!



DISCOVER THE HIDDEN WORDS!

CROSSWORDS

1. CHANGES IN THE ENVIRONMENT CAUSED BY HUMAN ACTIVITIES
2. ONE OF THE NEGATIVE ENVIRONMENTAL IMPACTS CAUSED BY HUMAN ACTIVITIES
3. THE FOOD WE ARE TALKING ABOUT IN THE BOOK
4. THE PROCESS OF TRANSFORMING USED MATERIALS (OR WASTE) INTO POTENTIALLY USEFUL MATERIALS OR PRODUCTS
5. WHO TEACHES THE GIRL ABOUT THE LIFE CYCLE AND ENVIRONMENTAL IMPACTS OF PRODUCTS
6. CHANGES IN THE EARTH'S ATMOSPHERE, SOIL, AND WATER THAT HAVE AN IMPACT ON THE ENVIRONMENT AND/OR ON HUMAN HEALTH
7. ALL THE STAGES OF THE PRODUCTION OF A PRODUCT FROM THE EXTRACTION OF RAW MATERIALS UP TO ITS DISPOSAL
8. NAME OF THE GIRL IN THIS STORY





DISCOVER WHAT IS BEHIND THE DOTS...

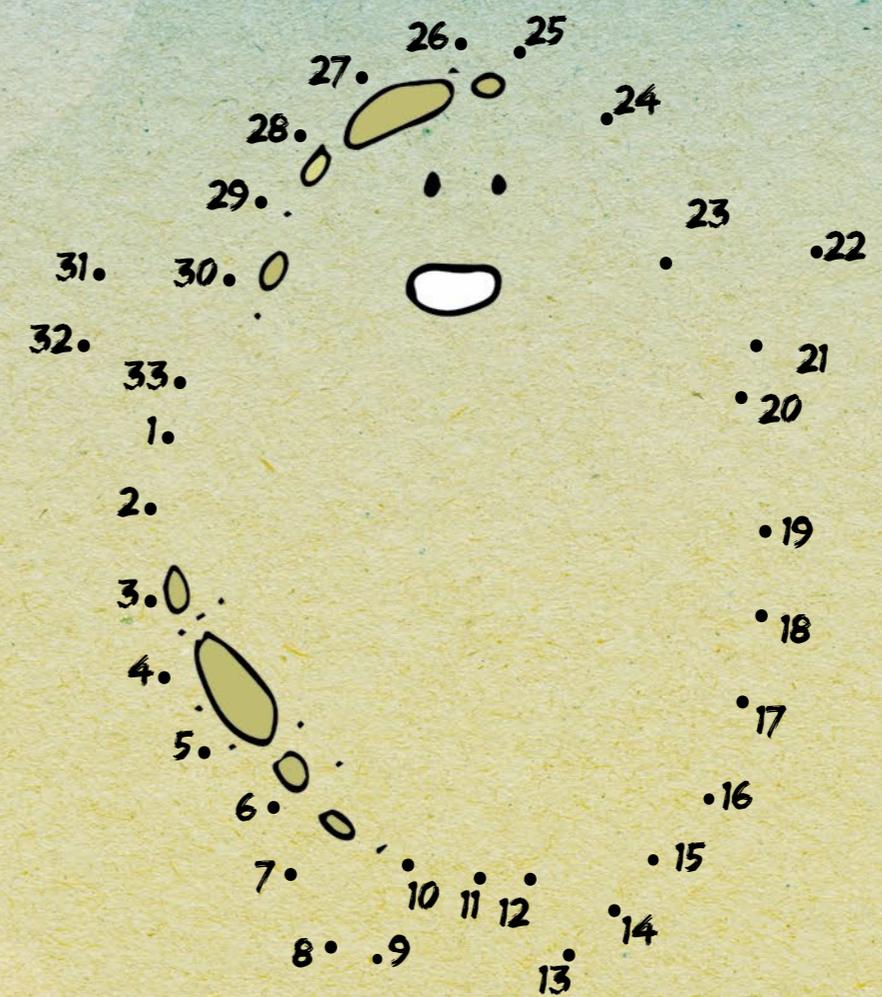
AND THEN YOU CAN COLOUR IT!

MEMORY GAME: 1. EXCESSIVE USE AND POLLUTION OF WATER; 2. CLIMATE CHANGE; 3. PACKETS; 4. LACK OF WATER; 5. RECYCLING BIN; 6. BIA AND LUZINHA; 7. HABITAT DESTRUCTION & CULTIVATION; 9. DEATH OF ANIMALS AND PLANTS; 10. AIR EMISSIONS.

CROSSWORDS: 1. ENVIRONMENTAL IMPACTS; 2. CLIMATE CHANGE; 3. POTATO; 4. RECYCLING; 5. TATA; 6. POLLUTION; 7. LIFE CYCLE; 8. BIA.

SOLUTIONS:

CONNECT THE DOTS



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