Educational Knapsack:

Student Health and the Microbial World

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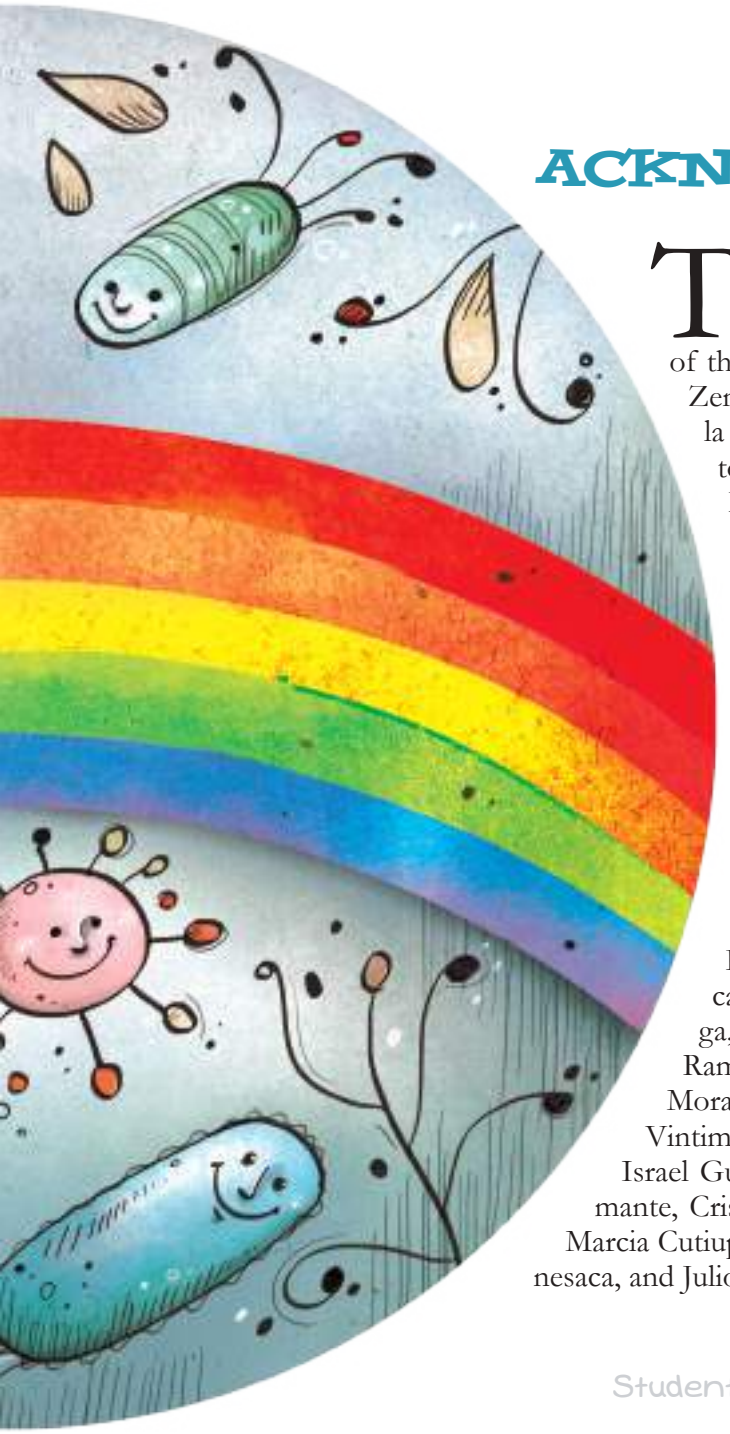

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FOREWORD

For The Child to Child Foundation (Fundación Niño a Niño)[1] and ReAct Latin America, it is an enormous pleasure to formally present this publication to promote child health to school teachers, educators, health care professionals, communicators, parents, as well as organizations interested in child wellbeing.

The "Educational Knapsack Student Health and the Microbial World" is a rich, diverse, and harmonious set of teacher or training guides that are the result of a collective effort spanning many years.

It all began in 2012 when ReAct proposed a project aimed at involving health promotion organizations in the containment of antibiotic resistance. The project was developed in Thailand, Malaysia, Indonesia (Asia), Ghana (Africa), Nicaragua, and Ecuador (Latin America).

The Child to Child Foundation accepted the challenge in Ecuador and, with the support of ReAct

1 The Child to Child Foundation is a civil society organization devoted to the promotion of child health education for more than 30 years in the province of Azuay, Ecuador. ReAct is a global network dedicated to the problem of antibiotic resistance with offices in Latin America, Africa, Asia, Europe, and North America.

and the Faculty of Medical Sciences of the University of Cuenca, conducted a training program for elementary school teachers on antibiotic resistance and use of antibiotics. The initiative was executed within the framework of microbial ecology and Sumak Kawsay[2], key components of the Child to Child educational strategy.

After four years of hard work that involved educators, artists, communicators as well as health professionals and researchers from Ecuador and other countries, today we are pleased to share this collection of guides that are the result of the debates and initiatives of teachers and their schools.

We invite you to use and enjoy this valuable material with your children, neighborhood youth, or students. It will provide access to a fun learning process oriented towards change that will enable us to live a healthier life all while containing antibiotic resistance through the appropriate use of antibiotics, re-establishing our relationship with the microbial world, and helping build Sumak Kawsay.

- Kléver Calle, Regional Coordinator for the "Student Health and the Microbial World" Project

2 Note: Sumak Kawsay, a Quechua word for "good living," is an ancestral concept that speaks of a harmony with oneself, with other humans, and all other living beings. The concept was added to the Constitution of Ecuador in 2008 as a guiding principle for public policy actions. Source: http://www.secretariabuenvivir.gob.ec

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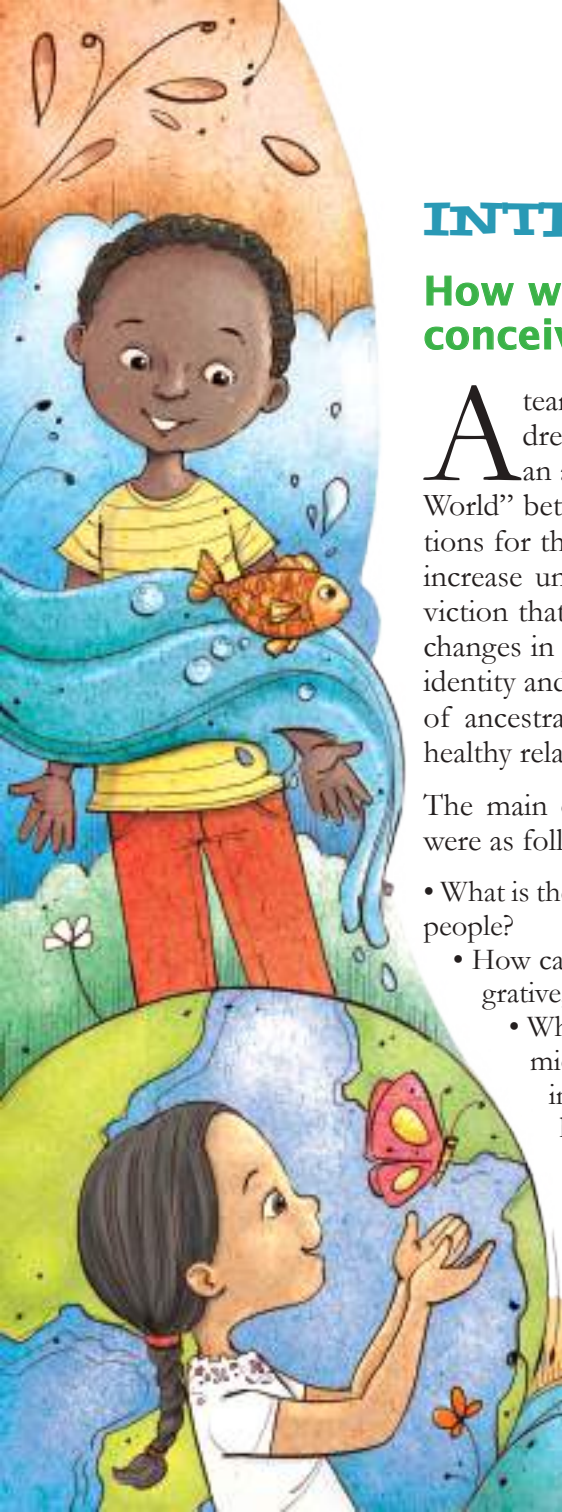


INTRODUCTION

How was the Educational Knapsack conceived and developed?

A team of health and education researchers from the Children to Children Foundation (www.children2children.org) and ReAct developed an action-research project called "Student Health and the Microbial World" between 2012 - 2015 in the city of Cuenca, Ecuador. The motivations for this project were based on a shared goal of raising awareness and increase understanding of the complex world of bacteria and on a conviction that the current global ecological and social crisis needs substantial changes in the way of feeling, thinking and living; the need to reaffirm our identity and sense of belonging with nature; and to acknowledge the beliefs of ancestral people, who maintain that health is governed by harmonious, healthy relationships with oneself, other people and all life forms.

The main questions to be answered through this action-research project were as follows:

- What is the conceptual and philosophical foundation of the views of ancestral people?
- How can we understand the microbial world from the context of the integrative, comprehensive, and holistic vision of the Sumak Kawsay?
- What does the microbial world have to do with me? What function do microbes have in my local ecosystem and my body? How can we live in harmony with microbes? What is really important to maintain the health of the ecosystem, children and the community?
- How can we approach the topic of antibiotic resistance at home, at school, and in the community? What significance can this have for children? What is the relationship between the use of antibiotics and resistance?

To explore these questions, the project featured a training program[3] called "Education in School Health with emphasis on infectious diseases and antibiotic resistance through the Child to Child Strategy in the context of Good Living and Alegremia"[4] with an underlying goal to promote active participation among children and teachers through the transformative learning process in the Child to Child Strategy. This included the participation of researchers, artists, communicators, community members, children and 42 elementary school teachers from 17 schools in the city (public, private and intercultural).

This training program covered six monthly training modules with different formative, recreational, theoretical and practical activities, where it was possible to observe issues around antibiotic resistance and generate spaces for reflection, action, and debate. Participants created video scripts, organized puppet shows and theatrical plays, debated on the different concepts of health, the principles and practices of the Child to Child Strategy, the vital elements of the Alegremia,[4] the world view of our ancestral people, the microbial world and antibiotic resistance, antibiotics, and the mechanisms to guarantee their access by everyone.

The Educational Knapsack: Student Health and the Microbial World (originally called the Alforja Educativa) is the result of this collective experiential process.

The word Alforja (Knapsack) in Spanish has a special meaning among the rural communities in the villages of Abya Yala, where it is used to refer to a small knapsack where important elements are kept in order to continue along a journey: medicinal plants, good luck charms, foods including candy that children from the community await eagerly, as well as other representative objects.

3 The project led by ReAct (www.reactgroup.org), public institutions and NGOs was executed with different educational and communications characteristics in various regions around the world: Thailand, Malaysia and Indonesia in South East Asia, Ghana in Africa, and Nicaragua and Ecuador in Latin America.

4 To be explained further in this booklet pages 16-17.

What is the Educational Knapsack?

The Knapsack tells stories that are part of everyday life and brings dreams, knowledge, exchanges, and wisdom through a source of ideas, suggestions, and communication techniques that can be used in different ways.

It is a technical, artistic, scientific, social, and recreational guide with practical, fun activities for children to research, obtain more information, take action, experiment, discover, learn, communicate and become more aware about different health related topics.

It is aimed at all audiences and institutions with an interest in child education, health, and communication.

Purpose

The Educational Knapsack aims to help rediscover and re-learn the connections between human beings and the microbial world. It also aims to achieve greater reflection about the planet as a great ecosystem that needs solid interactions and connections among all the beings that inhabit it. In other words, it aims to help see ourselves as part of the earth to continue building healthy roads grounded in support and freedom, all while visualizing and promoting an education that is committed to life itself.

It proposes a change of perceptions towards bacteria in order to perceive the world as a network of interrelationships among all life forms.

This training module was developed to feature educational material and practical learning tools to support the work of school teachers and health promoters in classrooms, learning spaces, and communities to disseminate, communicate, share knowledge and propose actions to tackle the issue of resistance to antibiotics.

With this toolkit we also strive for the following:

- Strengthen the ability of children and teenagers to FEEL and THINK about the health of ecosystems from a vision centered on holistic health, thus respecting all life forms, including bacteria.

- Drive actions aimed at enhancing health and advancing a harmonious relationship with the local ecosystem; that is, at home, at school, in the neighborhood, and the community.

- Improve health conditions at school and in the community, and develop greater awareness and respect among children and adults towards Mother Nature to adopt planet-saving measures.

- Promote encounters that enable new learnings aimed at stopping antibiotic resistance through games, ideas, concepts, experiments, research, feelings, emotions, and images.

- Involve parents more closely in health activities for the ecosystem.

- Promote participation and dialogue among children through artistic and communicative activities that allow them to deal with problems and needs in their environments through educational themes related to health and nature.

CONCEPTUAL AND METHODOLOGICAL BASIS

The philosophical principles, conceptual basis, lines of action, and methodological applications are briefly described as follows:

Child to Child Strategy

Child to Child has conceived and developed a set of actions through which teachers and children can learn about topics related to health and nature. Children can take a position on their health and that of the ecosystems, with information that generates interest, is useful for daily life, and enables them to participate actively in the search for knowledge with simple, accurate, and relevant messages according to their needs.

Child to Child has a pedagogical axis based on stimulus that promotes active participation of children and teachers in the learning process and in gaining awareness of the difficulties and needs of their communities. This, in turn, fosters communication within the community that favors the dissemination of acquired knowledge to

other children, their families, and other people in the community so they can also pass on what they have learned.

In other words, it is a strategy to generate learning with children, among children, parents, schools, communities, and others.

Child to Child stimulates knowledge of health protection and promotion mechanisms by articulating school learnings with the needs of the home, the community, and the environment.

The Child to Child Learning Process

Child to Child uses an active learning method that includes questionnaires, debates, experiments, demonstrations, research, and artistic activities like poetry, storytelling, legends, movies, theater, puppet shows, painting, and drawing, among others. These activities emphasize concepts of health, good living, and healthy ecosystems as fundamental pillars in our lives, all while reiterating that being healthy is essential for studying and learning.

Child to Child, through its activities, aims to stimulate action, reflection, free expression, creativity, enjoyment, and the joy of learning and sharing. As active subjects, children participate in the betterment of their own quality of life as well as their families and community.

The Child to Child Strategy, through its educational process, provides new knowledge and tools to children so they can better understand what they are doing every day when they take care of themselves and others. This approach served as the foundation for the development of the different materials in the Educational Knapsack and, in particular, the Activity Guides, each of which develops proposals for activities in a process that comprises five stages.

1. ***Selection and understanding:*** this is a diagnostic stage in which problems and needs of the school, family, or community are identified and selected. During this stage, participants propose objectives, desired changes and impacts, goals to be achieved, and expected learnings by the end of the process of each activity.

2. ***Research and discovery***: in this state, the children search for information about the selected problem or need. During this period, tools are tested with the children to obtain information that can be collected, selected, and organized. This way, the children can reflect on causes and consequences, as well as interpret, discuss, and analyze how the information found can serve as a pathway to a better understanding of the problem.

3. **Planning**: children discuss the possibilities, propose the actions that will be taken, and plan the communications and educational activities to face the problem or needs that have been clearly visualized.

4. ***Taking action:*** in this stage, the children apply their plan and execute practical educational and communications activities at school, at home, and in the community.

5. **Follow up and evaluation:** the children discuss the results from the actions taken and reflect on the changes generated. They also discuss the possibilities of continuing further. The children evaluate the need to repeat or improve what they have done.

HOW TO USE THE EDUCATIONAL KNAPSACK

This document present six educational activity guides. Each guide is independent and can be used separately, although they are deeply linked to one another because they are parts of a whole. The activities and themes can also be worked on simultaneously.

The guides and activities are designed in such a way that they can be easily and freely adapted according to the conditions of the community, time, space, number of participants, and ages. They are not designed to be completed within a predetermined time frame; rather, they respect the time of each child or group of children and thus constitute a process. Also, stories, communications products or other materials that are produced by the children and other participants can be adapted and integrated into future teaching sessions, in this way continuously evolving the program and its content.

The activities contained in the guides are intended for use in and outside the classroom, at home, and in the community.

Each activity guide is divided into various sections. Its use must be guided by the following steps:

- Read carefully the IDEA located at the beginning of each guide, which explains the concept, objectives, and general contents.
- Read and reflect on the information for educators
- Select the correct material considering the interests and needs of the participants.
- Select the activities jointly with the children.
- Identify and organize the selected activities that require support and coordination from adult representatives of the children.

The role of teachers

The important role of teachers at school and in the community cannot be underestimated. They are the pillar that helps build the social fabric through the learning process. Their work is crucial to establish the foundations of a more aware, dignified, and just society.

Teachers can disseminate existing knowledge about how to prevent inadequate use of medications and antibiotic resistance.

Teachers can develop a learning process through the active participation of children, thereby making the school a healthy place and contributing to the promotion and defense of all life forms.

Teachers can foster training of children through an understanding of the role they play in the family unit and the community, as well as dynamic agents of their own learning.

Teachers can motivate, foster, and develop abilities that enable children to take care of their own health and apply their knowledge and skills for the benefit of others through learning based on scientific knowledge linked to the most frequent health problems in the community.

What can children do?

Children can take care of and live in harmony in their own environment, help to improve their own health and that of others, and participate in awareness building activities related to taking care of Mother Earth. They can also research the use of antibiotics in health centers and create messages with their teachers or health care professionals about the dangers of inappropriate use of antibiotics.

Teacher and/or parental support is necessary in the use of the guides for optimal learning of key concepts and for greater use of the information in case more detailed explanations of certain themes is required. Likewise, it is important that an adult be part of the process to provide context that will make it easier for each child to understand the topics from the perspective of his or her own environment and community.

Hope and Alegremia

In 1998, social activist Julio Monsalvo, along with a group of rural women from northern Argentina, met to identify the basic components of the ecosystem that play a part in having a healthier life, taking into account that health not only refers to the body, but also the mind and the spirit. They started with the following question: "What is indispensable for life; what can we not do without to live healthy?" They arrived at the conclusion that there are six fundamental components to having a healthier, happier, and more dignified life. These components are water, air, clothing, food, love, and art. From then on, the discussion revolved around the "6 A's of Hope" (for the first letters of each component in Spanish, agua, aire, abrigo, alimento, amor y arte), and the

concept of "Alegremia" was discovered. Reflections on health continued. After this encounter, health began to be visualized as a process, not as a state. In other words, we can progressively be healthier. From here the word ALEGREMIA was born: a whole health that can be perceived with the joy (alegría) circulating through the blood.

Alegremia, Happiness, and Dignity:

Feeling the joy that circulates through our blood is an energy that reminds us that we're alive. It fills us with hope to be able to overcome fear, uncertainty, and selfishness. This joy that makes us irradiate positive thoughts that enable us to disseminate hope to our families, our society, and our institutions – is the essence of Alegremia.

The 6 A's of Hope

Alegremia is a way to promote eco-literacy in children by discussing, analyzing, and ensuring food self-sufficiency, as well as the care, distribution and protection of water sources. It also generates awareness of air pollution, solidarity, love, and the practice of art as an interactive and expressive model for learning, thus consolidating the notions of clothing and housing for all children on the planet.

AN INVITATION

We invite all teachers, community leaders, and parents to read and share the information compiled in this guide and to motivate children to become more aware of their own health, the health of others, and the health of the ecosystems through the activities proposed in this guide.

Your opinion is very important to us. Any questions or concerns can be sent to the following email address:

ninoanino@gmail.com

NOURISHMENT

"Nourishing ourselves in a healthy way is the right of all living beings who inhabit the Earth."

THE IDEA

Nourishing ourselves in a healthy way is the right of all living beings who inhabit the Earth. It is an inheritance from rural people, indigenous villages, fishermen, and those grandparents who care for Mother Earth with love and respect. However, nowadays there are millions of human beings who go hungry and millions of children in the world who suffer from malnutrition. Many low income families cannot offer their children a rich, balanced diet with all the necessary nutrients for their normal development.

It is the right of all people to nourish themselves in a healthy way, continue to grow their lands as they always did with their own seeds, and raise their animals with the fruits derived from the soil without antibiotics or chemicals that disrupt the natural growth of plants and animals.

"Storing seeds is very important; it has served as the basis of agriculture for thousands of years."

INFORMATION FOR EDUCATORS

Foods that nourish

Food protects us from disease, helps us grow strong and provides us with energy. This is why food must be available to all so that no one goes without.

Nowadays, there are plenty of "foods" that we consume on a daily basis, but not all can be considered nourishing and not all provide the necessary nutrients for our growth and development.

A balanced diet

A balanced diet is a meal that contains the right amounts of different food groups (containing carbohydrates, proteins, vitamins, fats, dietary fiber, minerals and water) so your body gets all the nutrients and calories it needs, while maintaining a healthy weight. Eating a diet in which one or more nutrients are either not enough or are too much can cause health conditions like anemia and obesity. In addition, without good nutrition, your body is more prone to infection, fatigue, and poor performance.

Bacteria and food

Our body is populated with bacteria that are beneficial for us. For example, these bacteria help strengthen our defenses against illness. They also help our digestion so we can adequately absorb the nutrients from the foods we eat daily. In fact, much of what we eat is processed by the bacteria in our microbiome and some of the things we eat can lead to illnesses that are usually associated with digestion. Learn more about bacteria and food in the activity guide "The bacterial world."

Hunger

The Food and Agriculture Organization of the United Nations (FAO) states that the world's agriculture could feed 12 billion people. This is practically double the current population. Still, many people around the world do not have enough to eat.

- 1300 million people live in poverty. Half of the world's poor are children.
- There are 840 million people around the world who suffer from chronic malnutrition.
- Around the world, there are 35,000 victims who die from malnutrition and diarrhea every day – most of whom are children.
- Every 12 seconds a child under five dies because of hunger or malnutrition. According to UNICEF data, 6400 children die every day, mostly in low and middle incoming countries.
- Global warming is changing weather patterns in way that is harmful to food production – through floods, drought or extreme weather events.

"Poverty is not an accident. Like slavery and apartheid, it is man made and can be removed by the actions of human beings."
Nelson Mandela: anti-apartheid revolutionary, philanthropist, former President of South Africa and Nobel Peace Prize Laureate

COMPREHENSION ACTIVITIES

A delicious meal:

- Participants are asked to sit in a circle. Each will have a paper and pencil to draw their favorite food after thinking hard about what they will draw or paint.

- Afterward, everyone will show their classmates their drawings and explain why the food is their favorite and how often they eat it.

- Next, a large plate will be drawn on bigger paper; the foods of everyone will be then stuck onto it.

- The children can observe and discuss:
  - Are all the foods that have been drawn food that is good for our health? Which ones should be on the plate? Which ones should not be on the plate?
  - What happens when we eat foods that are good? What happens when we eat foods that are not so good?
  - What would our stomachs tell us if they could speak?

"I am food; I am owed to the belly of the world. To the hands of beggars, to the table of everyone. To the blood of the people, to the fertile mother. I give myself in a natural state, nutritious, with color, and shine: milk, fruit, leafy vegetable, legumes, and live cereal. Eat me, and you will be lucid, strong, and creative."

Gladys Cantos

What do you eat?

All children are placed in rows, one next to another. A classmate in front of each will direct the game.

All will be members of a community that will either advance or go backwards according to the color of their clothing and instructions from the classmate guiding the game. This classmate will instruct the person to take a step forward or backward.

For example:

Color RED: all those children who have red in their clothing and who ate three fruits during the day will take two steps forward.

Color GREEN: those who like green leafy vegetables like Swiss chard and spinach (which provide iron) will take two steps forward.

Color BLUE: those who did not want to have breakfast in the morning before going to school. Take one step backwards.

The children can make up more instructions before starting the game.

DISCOVERING THE PROBLEM

Nunkui, creator of plants (Shuar Legend)

Many years ago, when the Shuar people were just starting to inhabit the Amazon Region of Ecuador, the jungle did not exist. In its place was a prairie spotted with a few herbs. One of these was the "unkuch," the only food for the Shuar. Thanks to the "unkuch," the people were able to survive the dryness of the soil and the suffocating heat of the Equatorial sun for long periods of time.

One day, the herb disappeared, and with it, the Shuar also started to disappear very slowly. The elders, remembering old tragedies, blamed the Iwia and the Iwianchi, diabolical beings who stripped the earth by eating everything in existence. But others continued their efforts to find the long-awaited food.

A woman named Nuse, overcoming her fears, searched for the "unkuch" among the most secret and sinister places, but to no avail. Without losing her spirit, she returned to her children and, spreading her courage, they began the search once again.

They walked for many days following the flow of the river. But as time passed, the oppressive heat ended up crushing them. This is how Nuse and her children ended up collapsing in the sand.

In dreams, Nuse thought she saw small slices of an unknown food in the river's clarity. Nuse threw herself into the water and grabbed them. They were yucca. As soon as she tasted that sweet and savory root, her spirits mysteriously returned and she soon ran to her children's aid. Nuse began to shake when she felt someone was watching her. Unsettled, she focused her gaze around all corners, but only to see the immense solitude of the desert.

Suddenly, she encountered a beautiful woman standing in front of her. Scared, Nuse took a step back, but the woman smiled sweetly at her.

"Who are you?" asked Nuse fearfully.

"I am Nunkui, the owner and Queen of the vegetation. I know your village lives in a naked, sad land, where the "unkuch" barely grows."

"The unkuch no longer exists," replied Nuse. "It was our only food and it has disappeared. Please, lady, do you know where I can find it? Without it, everyone in my village will die."
"No harm will come to your people. You have demonstrated courage and because of this, not only will I give you the "unkuch," but all kinds of foods as well."

Within seconds and before Nuse's surprised eyes, lush vegetable gardens with fragrant plants and multi colored fruit appeared. Muse was entranced, since she had before seen anything similar. The landscape was majestic and the music sung by the flowers had stolen her heart.

Nunkui went on to say, "And for your people, who are today fighting death, I will offer a prodigal child who has the virtue of creating the "unkuch," the yucca you have just eaten, plantain, and all other foods you need."
"Thank you, Nunkui, thank you!"

Nunkui disappeared, and in her place, the promised child emerged.

Nuse had not yet come out of her amazement when the little one guided her through the thick vegetation. She soon felt so pleased in it that she wished to stay there forever. However, the memory of her village brought her sadness.

Then, the little girl and daughter of Nunkui, as she was later called, announced that far into the Shuar territory, the vegetation would also grow majestically.

This is how Nuse, filled with joy, raised her children's spirits and returned to their village. It has been said that the child fulfilled her promise and the lives of the Shuar changed completely. Pain was forgotten. Plants emerged from the vegetable gardens and hope covered the soil.

Source: Tales and Legends from the Amazon (Blog).
http://cuentosyleyendaorientale.blogspot.com

Discussion and reflection with children

What could have happened to make the "unkuch" disappear?

Could something similar happen in our community? What could cause it?

What would happen if all the food disappeared from our community?

Children can identify which foods are grown in their community. Where are they grown?

How are they grown? What nutrients do they have? What is their purpose?

RESEARCH

Talking to adults

Children can do research by interviewing adults within the family and the community. A list of questions can be made with everything we wish to know about food practices:

How was the earth cultivated before? How were seeds taken care of? How did people eat? We ask you to tell us all that you remember. What other questions come to mind?

Now, among all of us, we can write a story with the information obtained. With all the sheets the children can put together a book that covers all school levels so the rest of the children can learn more about nourishment.

Comparing

Children can create a comparative chart that answers the following questions: how were seeds cared for before? How were they cultivated? What was used to fertilize the soil? How were plagues prevented and how is it done today? What differences and threats to our health can we find? What has changed?

TAKING ACTION

At school:

Children can create a story about all they learned about nourishment, as well as a puppet show. The puppets could be made with fruits and vegetables. The play could be presented at the school for all the children and teachers.

The children could also be encouraged to bring a healthy food to eat at recess and make a large circle to share with others.

At home:

The following questions could be posed to the person responsible for food preparation at home: What are the nutrients contained in the prepared food? Why are they good? Which ones do you buy more? Which are more expensive? Which are eaten the most in the house?

Each day, one child could take home the book about nourishment and share it with his or her family.

In the community

The children can speak with a school or community authority to ask if there is space where a vegetable garden could be built. To build the garden, help could be sought from a parent who knows how to cultivate soil.

Building a vegetable garden

We ask all children and parents to recycle plastic bottles. Once all the bottles have been collected, with the help of an adult, they can be cut vertically.

These bottles will serve as planters that can be decorated or painted with many colors and hung with rope.

A place at school or in the community must be selected to build the vegetable garden. Light availability must be checked because at least two hours of sunlight is needed to stimulate the photosynthesis of the plants.

Fertilized soil must be found so seeds in the previously cut plastic bottles can be planted. Plants must be chosen so that they do not require excessive care, are not too large, and that are easy to acquire, for example, basil, rosemary, mint, parsley, coriander, onion, and garlic, among other local medicinal plants.

The outer layer of the onion, which is usually discarded, can be planted; likewise, a clove of garlic can also become a seed to produce more garlic.

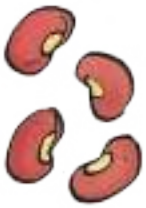
"Let's foster in children a routine of basic care for our vegetable garden, for example, watering, not adding chemicals, and ensuring there are no pests."

EXPERIMENT

What do we need?

Glass jar

Beans



Cotton

How do we do it?

- Place the cotton inside the glass jar.
- Place the beans on each side of the jar to see how they grow at the same time.
- Afterward, wet the cotton with water without overdoing it and leave it next to the window so enough sunlight can reach it.
- Observe with the children how a small bean can sprout life and how its roots are born.

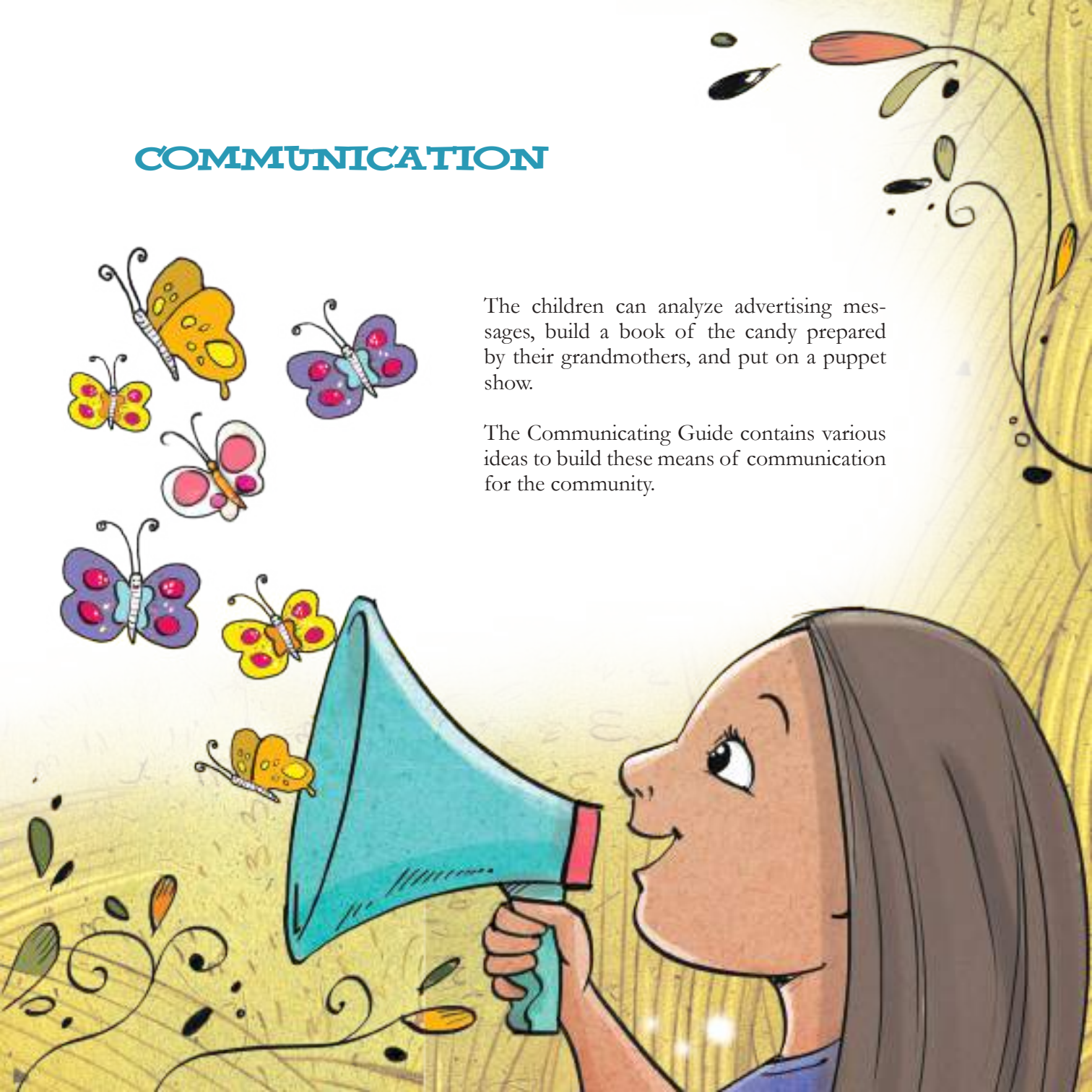
Having fun with Mr. Grass Face: What do we need?

- An old nylon stocking. The foot part will be used.
- Grass or bird seed.
- Soil to plant.
- A plastic container.

How do we do it?

- Cut off the foot of the nylon stocking.
- Add the seeds to the bottom of the stocking and later the fertilized soil so that the emerging leaves can be seen between the fine material of the stocking.
- Close the stocking in the shape of a ball and tie a knot to prevent the soil from falling out.
- Place the stocking in the shape of a ball in a plastic container with water in such a way that the knot remains completely embedded in the container.
- Place a pair of fun plastic eyes with adhesive and add ears, a mouth, and a nose (previously drawn)
- In a few days, Mr. Grass Face will be ready for play. He will germinate and his green hair will begin to grow.

COMMUNICATION



The children can analyze advertising messages, build a book of the candy prepared by their grandmothers, and put on a puppet show.

The Communicating Guide contains various ideas to build these means of communication for the community.

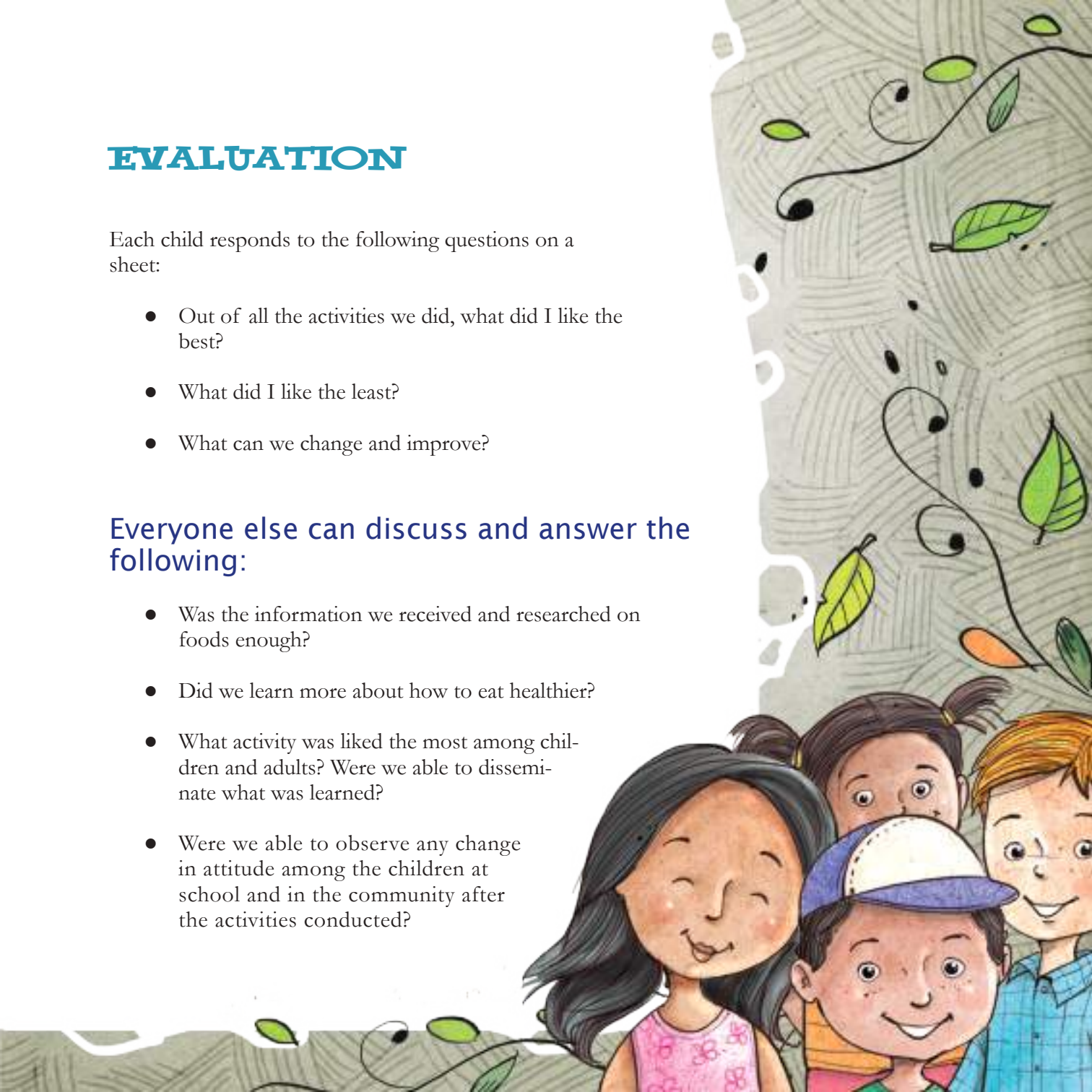
EVALUATION

Each child responds to the following questions on a sheet:

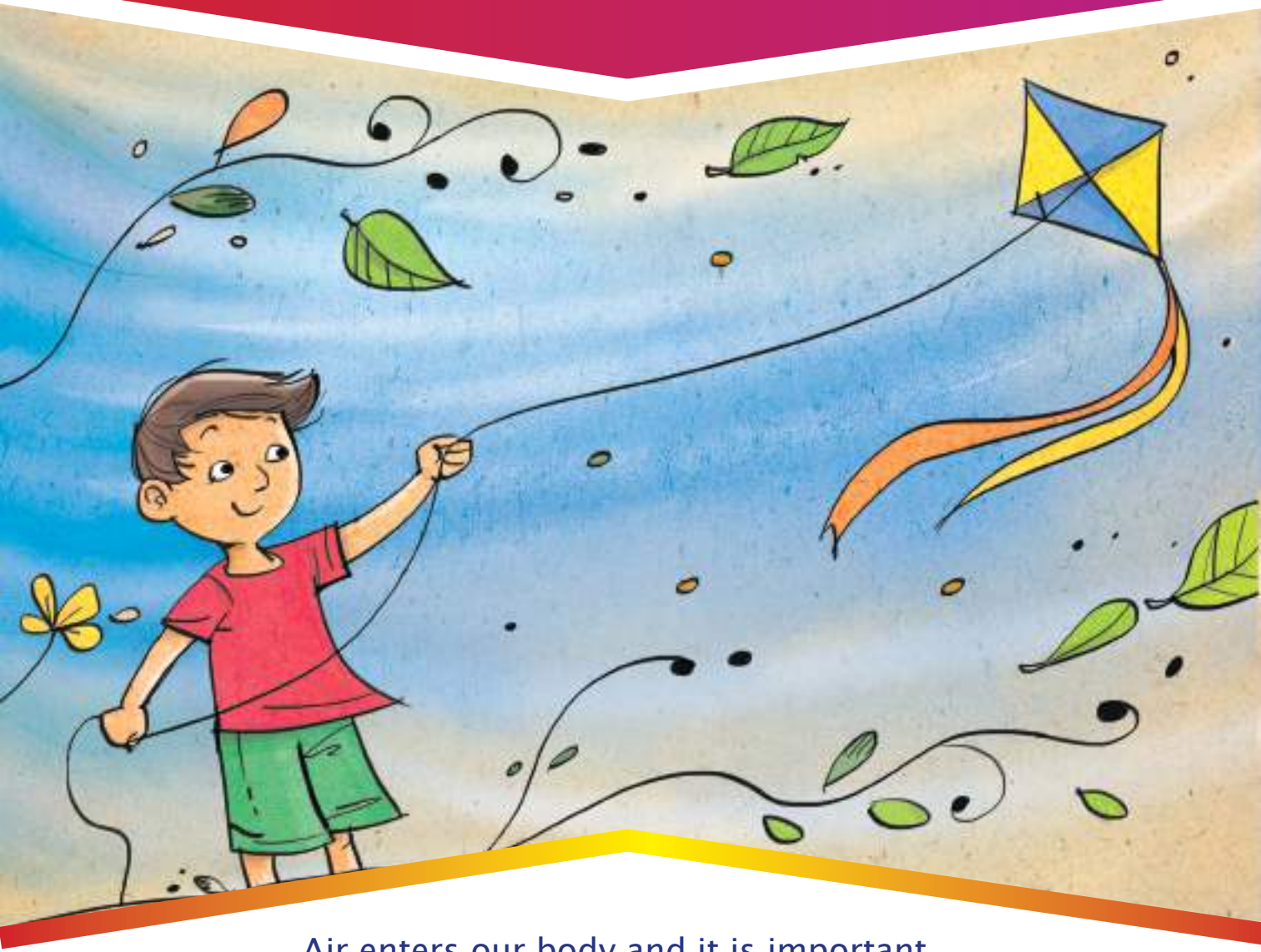
- Out of all the activities we did, what did I like the best?
- What did I like the least?
- What can we change and improve?

Everyone else can discuss and answer the following:

- Was the information we received and researched on foods enough?
- Did we learn more about how to eat healthier?
- What activity was liked the most among children and adults? Were we able to disseminate what was learned?
- Were we able to observe any change in attitude among the children at school and in the community after the activities conducted?



AIR



Air enters our body and it is important
that it is clean.

THE IDEA

Our life depends on the air we breathe just like other living beings in nature. Without air, we would not be able to live.

Air comes and goes everywhere, carrying with it sounds of music, water, wind, animals, the sounds we make when we speak, smells of the environment, the leaves that fall from treats, pollen from flowers, the oxygen we breathe, water drops that evaporate to become clouds and the birds that raise their wings to cross the wind…

Trees help clean polluted air. Each tree cleans the air breathed by approximately 10 people; however, 10 million trees are cut down every day around the world.

We human beings are polluting our air little by little through deforestation, toxic gases, aerosols, and the smoke from cars and large-scale industries. It is our responsibility to care for the air we breathe.

According to the World Health Organization (WHO), air pollution presents a health risk and it is estimated that it causes around two million premature deaths per year around the world.

"We can help achieve cleaner air and a less polluted atmosphere."

INFORMATION FOR EDUCATORS

No being can live without air

Air is vital for all living things.

Air is a mix of various gases, mainly nitrogen and oxygen. It is a floating material without shape that cannot be seen nor caught with our hands. But it can be felt with every breath in each of our cells and in every part of our body. Air is all around us and inside us.

Air is needed for the existence of life on Earth because, thanks to its composition, it maintains the necessary conditions of humidity and temperature so that plant life can be germinated and so that animals and human beings can inhabit the planet.

We generally don't think about air. We assume it's well protected and does not require any care at all. However, this is not the case. We must be aware that air enters our body and it is important that it is clean.

The purpose of air

The fundamental purpose of air, for most living beings, is to enable us to breathe.

Thanks to this, most living beings obtain the necessary oxygen for their survival. Just as plants need carbon dioxide from the air to perform photosynthesis and eat, certain plants also need air with the strength of the wind so they can reproduce through spores.

Likewise, steam from water contained in the air generates precipitations through condensation and cloud formations, which thus provides water for living beings.

Unfortunately, excessive consumerism has cause natural resources to become slowly exhausted, thus generating a considerable reduction in green spaces that keep oxygen clean and safe. We are losing our quality of life. As nature becomes more and more destroyed, more and more problems surface for humans and other living beings. These problems are of all types: social, economic, climatological, and psychological, among others.

Who owns the air?

Air is a common resource of humanity and of each living being. In other words, it belongs to all human beings, animals, plants, and to no one in particular. It belongs to everyone and is for everyone.

When is air polluted?

Air pollution is generally produced by human beings through activities that dump a number of elements into the atmosphere: chemical substances, toxic gases, dust from moving sources like cars, and static sources such as factories and mining and/or agricultural processes.

While air cannot run out, it can become ill

Factories, cars, burning forests, destroyed forests, exterminated jungles, chimneys…more factories, more cars, more burned forests, more destroyed forests, more oil, and more mining exploitation means more poisonous waste intoxicating our atmosphere and life.

Our planet is losing its color; it's turning gray. Nature took more than 3 billion years to paint the color of the ocean, sky, and earth. However, human beings only took a few decades to pollute the environment, stain the water, and change its colors.

Air pollution has a variety of effects that range from respiratory illnesses to climate change.

These pollutants are dangerous not only for the environment, but also for our own health. While it is possible to identify different pollutants, gasoline combustion, diesel, and other oil derived products are the predominant contaminating agents.

Global warming

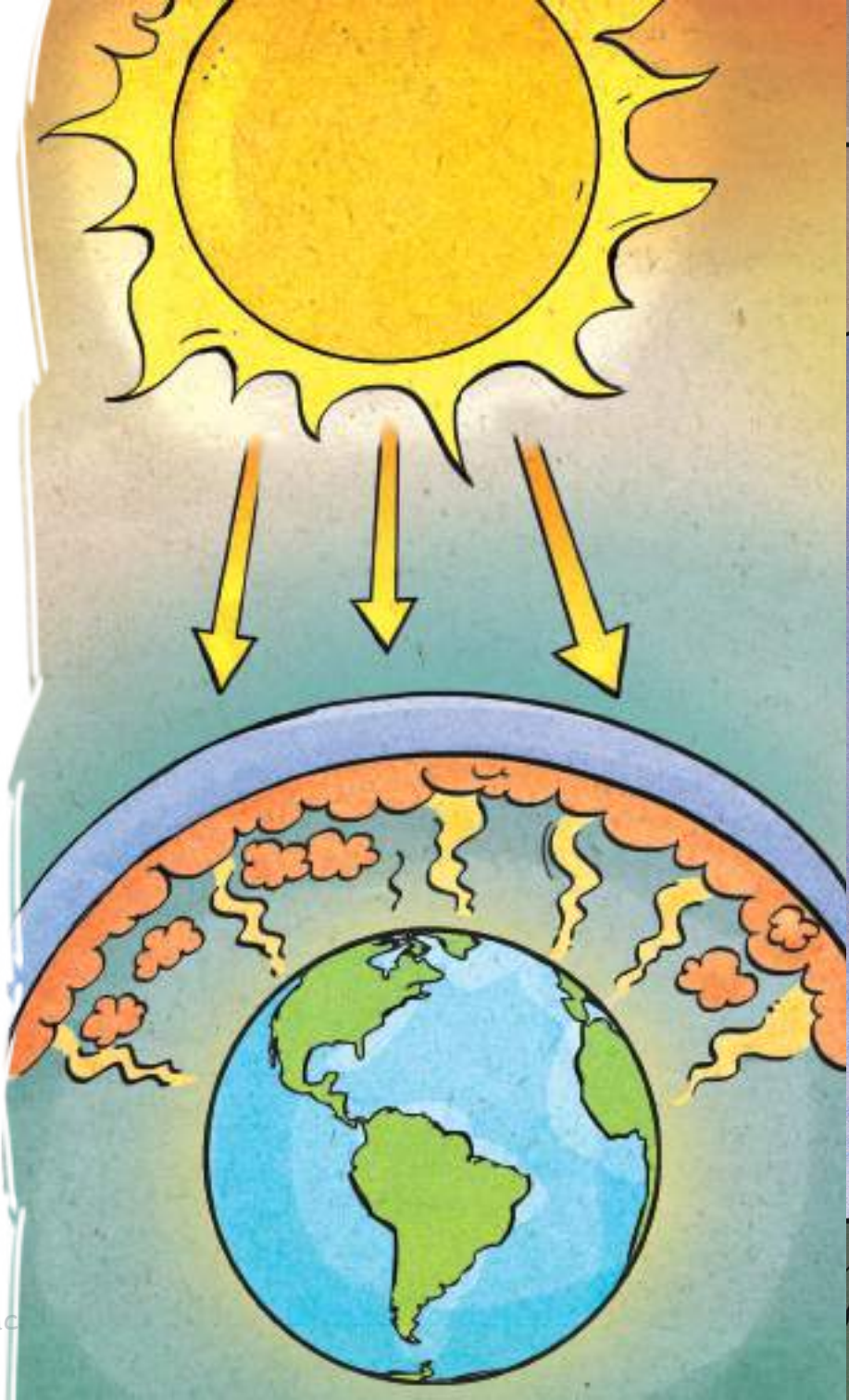
Global warming occurs when certain gases, carbon dioxide, and methane, mainly, form a layer that covers the Earth as if it were a coat. This layer keeps the heat of the sun in the atmosphere, reheating the surface and the oceans.

The Earth is heating up. We have caused an increase in Earth's temperature by half a degree Celsius during the 20th century. In the snow caps of the Andes, the increase in temperature is occurring at an even more rapid pace – one third of a degree Celsius every 10 years. Andean countries have begun to experience water supply problems for drinking and agriculture.

Meanwhile, storms, hurricanes, floods, droughts, as well as extreme heat and cold waves are on the rise.

How can global warming be avoided?

- All countries must have policies and enforce those policies to protect the planet from gas emissions.
- The most effective method would be to stop burning fossil fuels like petroleum, carbon, and natural gas.
- The Kyoto Protocol is an international treaty committing governments to reduce greenhouse gas emissions, which all countries should sign.



Reduction of the ozone layer

- The ozone layer is 25 km above the Earth's surface and is a type of umbrella that protects the planet's surface from ultraviolet radiation generated by the sun. This radiation affects all living beings, causes skin cancer and other illnesses, and deteriorates the environment.

- The ozone layer is like a sunscreen for the skin of the planet.

- Thanks to air pollution, the ozone layer has progressively disappeared. This disappearance can neither be heard nor seen, but can be felt around us.

- Today, this layer covering the Earth is broken and has various holes.

- In the Antarctic, the hole in the ozone is gigantic. At almost 25 million km^2 in size, it is larger than the entire territory of Latin America.

- The reduction of the ozone layer has resulted in the penetration of large quantities of ultraviolet rays that harm people, wildlife, vegetation, and aquatic life.

- Chlorofluorocarbons are compounds directly linked to the destruction of the ozone layer. They are present in sprays like deodorants, hairsprays, air fresheners, and aerosols in general.

Acid Rain

Acid rain is produced when nitrogen oxide or sulfur dioxide, which are produced in electricity generation plants, factories and automotive plants, combine with the humidity in the air. This causes the acidification of soil and water, loss of farming zones, and the death of forests, among other consequences.

Air and bacteria

The action of wind and rain on plants, land, rivers, and oceans cause the air to become permeated with plant pollen granules, insects that fly from one place to another, and bacteria that live in animals and in our bodies, which are then shared through daily activities and contact with other living beings and the environment. These bacteria contribute to some of nature's processes, live with us, and are not damaging for our health.

Air pollution and its health effects

- Air pollution is caused by the presence of dangerous and poisonous substances in the environment.
- Carbon monoxide produced by petroleum, carbon dioxide, chlorofluorocarbons, lead, sulfur, and nitrogen oxide are among the main contaminants.
- Living in a polluted environment causes annoyances in human beings like throat irritations, breathing problems, burning eyes, itching, and problems in the cardiovascular system.
- When the level of pollution is very high and people have been exposed to it for a long time, serious illnesses can also become apparent such as congenital defects, cancer, disorders of the nervous system, and brain damage, among other problems.
- This pollution is particularly harmful to children who may develop severe cases of asthma and pneumonia, as well as respiratory infections.
- Besides affecting humans, polluted air causes serious damage to flora, fauna, rivers, oceans, and lakes.

What can we do to prevent air pollution?

- Reduce the use of cars.
- Try to use public transportation or car sharing with a friend.
- Make sure to conduct regular car maintenance.
- Stimulate the use of bicycles.
- Avoid using tools that require gasoline.
- Consume ecological products when possible, avoiding those produced with agro toxins..
- Reuse and recycle.

- Avoid using too much electricity.
- Avoid using pesticides.
- Become organized to take care of the air.

COMPREHENSION ACTIVITIES

Let's relax…

If this activity is to be conducted at school or in a closed space, soft music can be played in the background. If it is to be conducted outside, the sound of nature is best.

Lie down on the floor or ground. Each person selects a comfortable place to close their eyes and be silent. Inhale deeply. Exhale slowly. Once more…this can be repeated several times. Always feel how the air enters and exits the body and how it travels through our organs and in our cells.

Release the air strongly and make a sound with our mouths.

The children can be told that the meditate activities linked to breathing have been practiced in the East long ago to meditate.

Emphasize the importance of breathing when we feel air enter our body and travel through our organs.

Reflection

- How do you feel?
- What do you think about doing this exercise every time we feel sad or tired?
- Would this help improve our mood?
- What would happen if we covered our nose and mouth for a few seconds?
- Could we last? Why?

Poems for the air

Air

Know me, feel me, take advantage of my healing gift. You need me, I need you. If you breathe me consciously, I will open your mind with my warmth, my delicate intervention.

I give life. Although you ignore me, I am a slight breeze, a soft caress, the wind that plays in your vacation.

Take care of me, protect me. Plant and value the life of all living things, recycling, and sunrises.

-Gladys Cantos

Ode to the air

Air, allow me to breathe you, do not chain yourself, do not trust anyone that comes to examine you in an automobile, leave them, laugh at them, blow their hats off, do not accept their proposals. Let's go together dancing around the world, knocking the flowers down from the block, entering windows, whistling together, whistling melodies from yesterday and today.

-Pablo Neruda

Drawing, discussing and writing about the poem

- Make sure the children pay attention to the poem. Any words that are not understood can be looked up in a dictionary.
- Ask the children, "What is the poem trying to tell us?"
- Disassemble the poem to collectively put together a new poem with the same words.
- Add a new phrase to each verse.
- Ask the children to draw the phrase they like the most or are most impressed by.
- Illustrate the poem.
- Search for poems about air or nature in general in magazines, books, and on the Internet.
- Encourage the children to write their own poem dedicated to the air.

DISCOVERING THE PROBLEM

"Where will I go?"

"The forest was dark and very, very green. The tree trucks, larger than a person, were straight, tall and stretched to reach the sun, whose light shone weakly on the ground of the forest. Through the roof of leaves, vines crept up with colored flowers that matched the green of the ferns and moss. The shiny plumage of the humming birds sparkled like jewels as they visited the sweet red flowers. The air filled with the humming of the bees while they flew over the perfumed flowers searching for nectar and pollen. A monkey shook the branches as it jumped from one tree to the next spraying the ground with a deluge of sweet yellow fruit. A lizard moved among the brown leaves and earth as it laid ten white long eggs in a hole. It was now looking for insects as it ignored a butterfly that looked like a dead leaf, and a cricket splattered in gray and green like a recently loosened leaf. The butterfly, however, was caught by a stick insect that was also camouflaged to look like the tiny branch on which it was perched. An agouti scoured the wet soil in search of insects, worms, and seeds. Upwards, among the leaves, a spider wove its web.

On one end, it had prepared a silk bag for the eggs from which its offspring would emerge. It hung on a branch with a nest of orioles. The parents returned frequently to the nest to feed their defenseless and featherless young. They brought them many caterpillars that had not yet spun their cocoons.

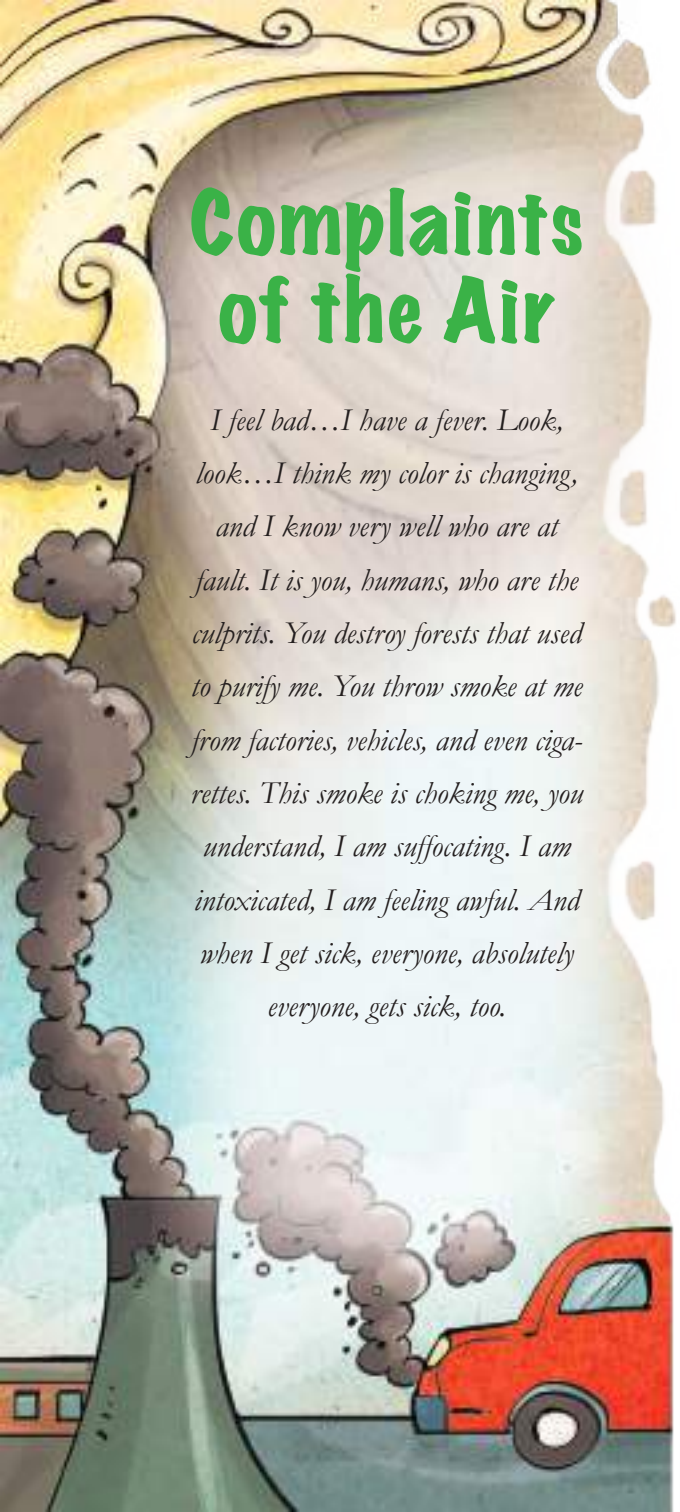
The forest was full of life – everything was color, sound, texture, and beauty. The only thing that did not appear to move was the sloth hanging by its feet from a lush tree branch. The upper part of the tree was dry; a pair of woodpeckers took advantage of this to build a hole. Slowly, the sloth moved its head to look down and see the things that were happening in the world of the forest. Slowly, slowly, step by step, it advanced along the lower part of the branch until it reached a group of green leaves and little by little it started the search for a mate – a mate that would birth a baby sloth and take care of it for many months in the tree tops. It started to move slowly, slowly…but its path was interrupted by strange sounds: men's voices, the bang of tractors, the clinking of machetes, the smell of gasoline, and the sound of a chainsaw. The large trees creaked as they fell to the ground; the vines came loose and their flowers broke. The web tore and the eggs flew into the wind while the orioles nest was crushed. The agouti's hole was buried as a tractor took the trees that had once been the home of many animals.

Finally, the tractors and trucks left with a racket, taking the men's voices, the sound of the machines, and the tree trucks with them. All that was left of the forest was quiet – only the sound of the crunched leaves drying in the sun, a hot sun that now reached the ground. The only tree left standing was the one with the sloth. This one was not cut down because the upper part was dry and thus considered useless. The woodpeckers remained there. But, where would they find food for their offspring? All the other trees had disappeared. A hummingbird reached a flower that shone in the vine of a large, old tree, but it wasn't enough to feed itself and its family. Where would it go? No bee went to visit the flower, for its hive had fallen with the tree. And the sloth? There were still quantities of leaves it could eat slowly, slowly, slowly, for a while. But, where would it find its mate? The forest on the hill was far away; it was a long way, with no trees or leaves. Besides, one could already hear the distant sound of chainsaws…"

"¿A dónde iré?" (Where will I go?), taken from the Teacher's Guide, Environmental education activities by Grace M. Liberman, Gerald A. Liberman, Gail Schroeder, Carol Lobo y Melody Leithold, San José de Costa Rica, Editorial Universidad Estatal a Distancia, 1984."

Reflection on the reading

- How do we feel about what happened in the forest?
- What could the animals have done? What could we have done?
- Why are trees cut? Who does this?
- Search for information in newspapers, magazines, on the Internet, about deforestation in our community, province, country, and the world.
- Create a plasticine mock-up that represents the story. What was the forest like before and after the events that took place?
- Encourage the children to use chalk to draw the part of the story that most affected them on black cardboard.
- Create two collages: one made with images from newspapers and magazines that suggest the destruction of nature, and another with images that suggest care for the planet. Compare both collages and reflect.



Reflection on "Complaints of the Air"

The following questions can help:

- Do we agree with the complaints made by the Air?
- Do you think trees help with air? How?
- What happens if we cut down trees and do not re-plant?
- Do we like air that is dirty and polluted?
- What happens with people if the air feels bad?
- What happens with plants? Animals? Life?

After reflecting on these questions, the children can put on a brief play where the Air appears as a character demanding its care and protection.

Before and after

Think about a situation in which air is polluted.

Draw a scene that is either made up or known to have happened in some place.

Now Think

- What happened for the community to look as it does?
- What will happen later?

Masks of truth

- It will be necessary to make masks to play the game.
- Select three children who will hold the masks.
- "These are the masks of truth. When I am wearing this mask, I am very truthful." This is why each child must speak and act according to the mask he or she is holding. The rest of the children will be observers of the dramatization.
- One child holds the "I am Air" mask.
- Another child holds the "Cut Tree" mask.
- A final child holds the "I am the owner of everything" mask.
- The scene begins with a discussion among the three children, with each one defending his or her way of life.
- Afterward, each child will talk about what he or she felt while wearing the mask. The others will also offer opinions based on what they observed in the scene.
- The masks can be given to other children.

RESEARCH

Doing research

Take a stroll through the community to observe if there is something polluting the air.

If something is found, search for information about this form of pollution and its effects on our health.

Another option is to visit a health center and speak with a doctor to ask questions such as:

- What are the health effects of air pollution?
- What are the effects in children?
- What respiratory illnesses are looked after the most in the health center?

It is now possible to analyze if the cause of pollution we have discovered has made the community ill. If this is the case, we must inform everyone we can by making posters, speaking with smaller children, at home, and with our families…perhaps they are not yet informed.

The children can also make cards with drawings to explain what is happening with air pollution and give them to people who live in the community.

EXPERIMENT

What do we need?

- The car of a trusted person.
- A white sock no longer in use.

How do we do it?

- This activity can be done with children and people from the community who wish to participate, so as long as care is taken so that no one is burned.
- Place the old white sock in the muffler of the car. For this, it is imperative that the owner of the car has given permission and that the tailpipe is not hot.
- The owner of the car must turn it on and leave it running for a minute.
- Ask him or her to remove the sock from the tailpipe.
- Observe the sock. How does it look? Has it changed color? Sometimes pollution is invisible to the eye.
- This can be done in one single car, in one minute.
- This black smoke goes directly into our air. Imagine the pollution that comes from millions of cars turned on for many hours.
- What would happen if we placed socks in all the cars in the city?

Student H

TAKING ACTION

At school

- Hold a "kite day" where each child can make his or her own kite, write a message for the air, and then let it fly in a "Great Kite Encounter."

At home

- Observe whether polluting actions are taking place in our homes and those of our families such as using aerosols, smoking, and cars that generate a lot of smoke…

- Children can discuss what they have learned at school and participate in activities.

In the community

- Visit spots that are close to the community such as hills, mountains, rivers, forests…breathe deeply and feel how the air is in these places.

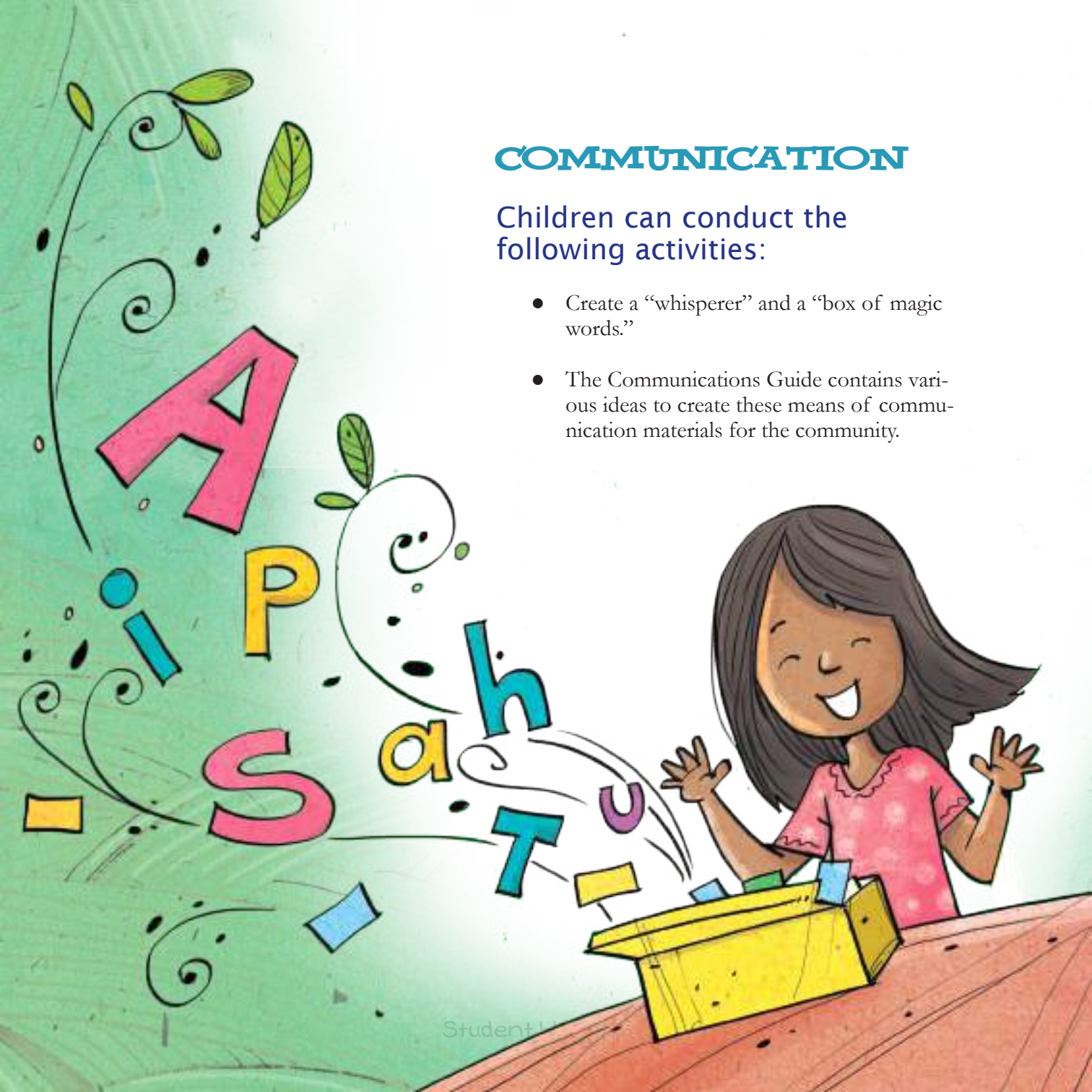
- Collect leaves, stones, and branches to show classmates and family members and tell them where they are from.

- Create objects, characters, animals and anything else in between. Create a story and dramatize for a presentation in the community.

COMMUNICATION

Children can conduct the following activities:

- Create a "whisperer" and a "box of magic words."
- The Communications Guide contains various ideas to create these means of communication materials for the community.



EVALUATION

Self-evaluation

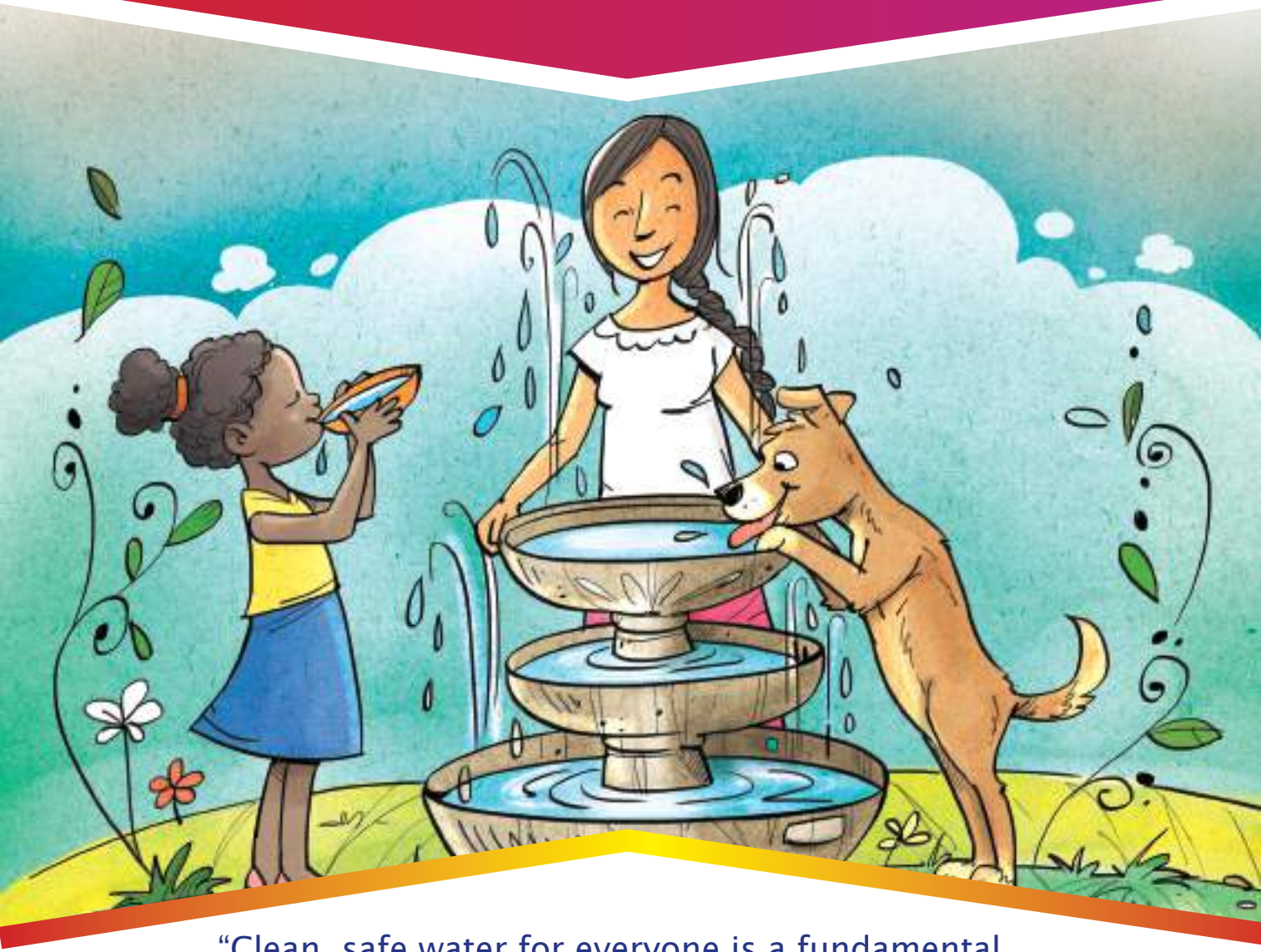
Each child answers the following questions on a paper:

- Out of all the activities we did, what did I like the best?
- What did I like the least?
- What can we change?

Discuss and respond

- Was the information we received and researched on air enough?
- Did we learn more about how to prevent pollution?
- What activity was liked the most among children and adults? Were we able to disseminate what was learned?
- Were we able to observe any change in attitude among the children at school and in the community after the activities conducted?

WATER



"Clean, safe water for everyone is a fundamental, universal, and communal right."

THE IDEA

No living being can live without water. This is why we say that water is fundamental for life and is a right of all of those who inhabit the planet.

Plants, animals, and people need water to live. For these reasons, taking care of and protecting water sources is our responsibility.

The water we drink must be clean. Otherwise, our health will be compromised as well as the wellbeing of other living things in nature.

Other consequences of pollution and scarcity of water are linked to the reduction in food production, the increase of infectious diseases, destruction of the ecosystem, and social conflicts.

"No being can live without water."

INFORMATION FOR EDUCATORS

Water is a living being

Water may be viewed as the "blood" of the earth. This is why water gives us life. This is well known among inhabitants of native and rural villages. This is why they speak with the water, they treat it with kindness, they protect it, and they take care of it. According to them, water should also be viewed as a living being.

Much of what we know about the appropriate use of water has been learned throughout centuries thanks to our ancestors who have shared their knowledge from generation to generation.

Who owns water?

Water belongs to the earth and all the living beings that inhabit it. Water belongs to everyone. Therefore, it must be distributed equitably according to the needs of each living being according to their customs and community living customs.

The climate and specific conditions of each territory also influence the procedures employed by communities with respect to the use, treatment, and distribution of water.

Some rural communities have community water systems from where it is distributed to each family through canals coming directly from the source all the way to each house. In these systems the cost of water is very low and helps ensure it can be accessed by everyone.

In cities, the water distribution method is a little more sophisticated with underground tubes that cross the city to deliver water to houses. Most people pay for access to drinkable water; however, even though water is a fundamental right, not everyone can afford it.

Therefore, water belongs to everyone and it is a fundamental, universal and communal right.

WATER IS NOT A COMMODITY

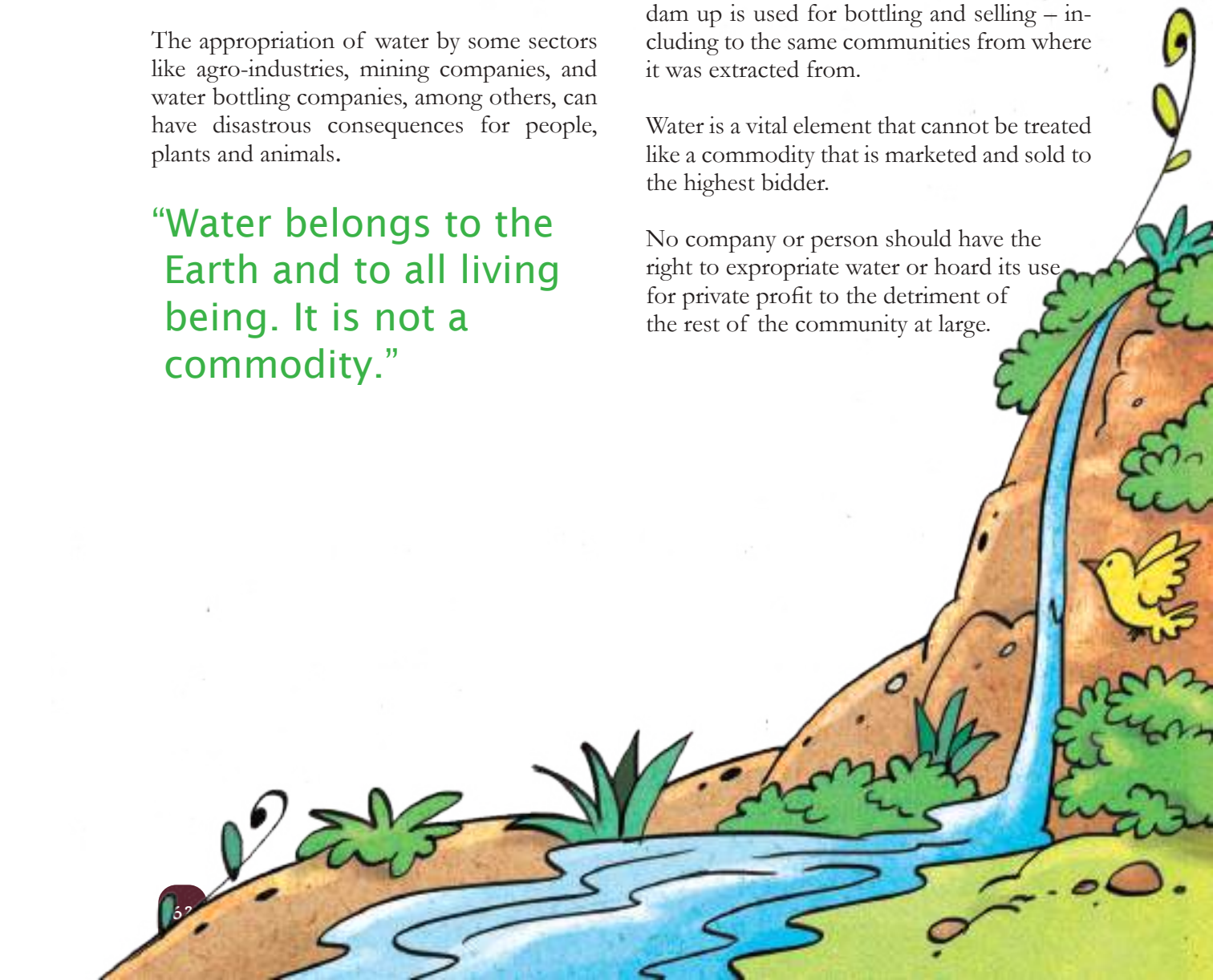
The appropriation of water by some sectors like agro-industries, mining companies, and water bottling companies, among others, can have disastrous consequences for people, plants and animals.

"Water belongs to the Earth and to all living being. It is not a commodity."

For example, some companies have taken control of many rivers that are water sources for various communities. This water that they dam up is used for bottling and selling – including to the same communities from where it was extracted from.

Water is a vital element that cannot be treated like a commodity that is marketed and sold to the highest bidder.

No company or person should have the right to expropriate water or hoard its use for private profit to the detriment of the rest of the community at large.



Conflicts over water

It is estimated that one third of the world's population lives in countries that experience conflicts over water.

Some regions, especially in the arid and semi-arid areas, have seen grave and dangerous confrontations over access to water. Nomadic communities and pastoralists, already living in water scarce areas have armed themselves to keep their water from other communities that have often traveled from far to come to these water sources. This has resulted in death of people and animals leading to loss of livelihoods.

Where does the water used in cities come from?

It comes from water sources, wetlands, hills, natural springs, brooks, rivers, and lakes. But these sources have become polluted and exhausted little by little. For this reason, water has had to be brought in through tubes from more and more remote areas. In many cities it is no longer possible to bring water from a nearby place.

We all need natural clean water to protect our health

How is water polluted?

- Every day, large quantities of waste are produced by households, business, factories, workshops, and farming activities. The amount of waste is higher in urban and industrial areas than in rural areas. If this waste is not treated properly, it pollutes the environment and affects the lives of all living things.

- As the result of agrochemicals used in farming.

- The oil industry is one of the largest polluters of water, mainly due to spills occurring during extraction or transportation of hydrocarbons. Rivers and seas have been polluted by large amounts of oil and its residues have affected aquatic flora and fauna, and communities linked to these ecosystems.

- Mining is another large polluter of water. To separate metals from rock extracted from mines, water is used in extreme quantities with chemicals like cyanide, in the case of gold mining, and arsenic, in the case of copper mining. The resulting residue causes acidification and pollution with heavy metals.

- When factories use clean water for their industrial activities and then spill it in a polluted state in ravines, streams, rivers, and oceans.

- Organic waste that comes from slaughterhouses.

- Waste discharged from sewers and sanitation systems into various water sources contaminates it with microbes that can be harmful to humans and animals.

- The processing of fruits and vegetables that require large amounts of water for washing, peeling, and whitening.

- Chemical components from medications and antibiotics that are released through human and animal feces and urine that reaches rivers and oceans.

- When people, hospitals and pharmacies dispose of medications improperly.

When water is polluted, it becomes our worst enemy. It can cause illnesses such as cholera, typhoid fever, dysentery, and diarrhea sickness.

Pollution, water, and antibiotics

There are many forms of pollution of water with antibiotics. The first is through urine and feces of animals and humans who consume antibiotics, since a part of these medications are excreted. When our water supply comes into contact with these residues, it becomes polluted. Also, many pharmaceutical manufacturers producing antibiotics, discard their waste in rivers and other bodies of water.

What can we do?

- We must not throw garbage in any public place, park, beach, plaza, or street. We also must not throw garbage in rivers, streams, lakes, and ravines. When going to the countryside, take a large bag and try to fill it with the garbage found and later dispose of it in an appropriate manner.

- If we encounter cans, bottles, cardboard or other materials that can be recycled, we must separate them from organic waste like egg shells and food leftovers, among others, so they can be re-used by recycling companies.

- Used batteries should be deposited in a container, sealed and deposited in a suitable place. Under no circumstance should this type of waste be thrown directly in the garbage.

- If in doubt as to what to do with a can of oil, paint, or gasoline, the best thing to do is cover it well and keep it in a safe place until a toxic waste deposit can be found. Garages may also know what to do. Under no circumstance should this type of waste be thrown in the garbage because the oil or paint will end up spilled in the earth.

- Animals like horses, cows, and sheep should not be close to water sources to prevent them from being polluted with their feces and urine.

- Water sources must be protected.

- Be aware of how to use water to avoid wasting it. Close all faucets if not in use.

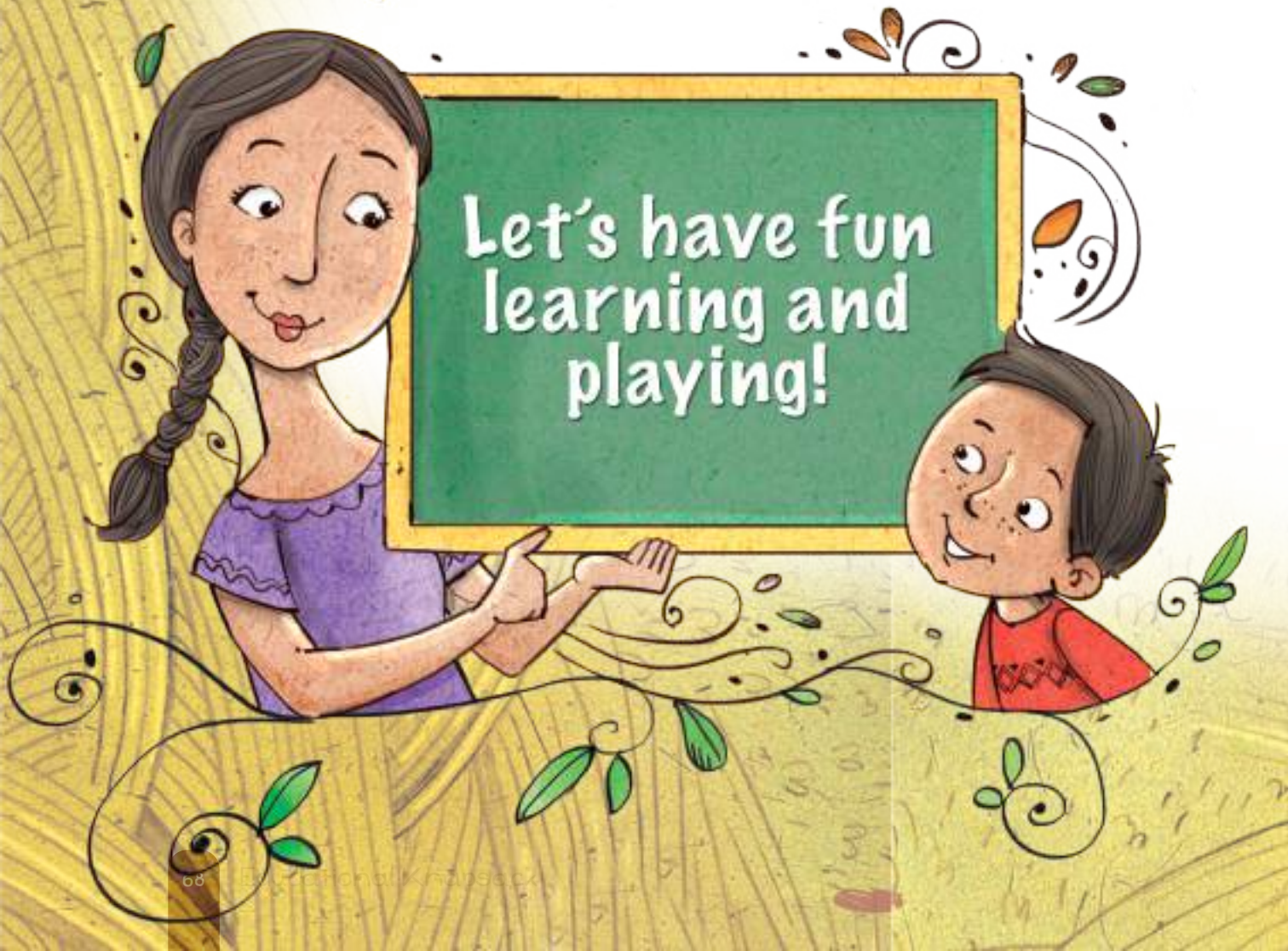
- If you notice that a factory is throwing its waste into the water supply, report it.

- We can collect rain water in buckets or vessels, much in the same way our ancestors did to use it to flush toilets, mop the house, or conduct any other activity that does not require drinking water.

What should society do?

- Mother Nature could be viewed as a living being and, as such, has rights that must be respected.
- Access to water should be considered a fundamental human right.
- Water should be guaranteed for all living beings for their personal use and for food production.
- Aquatic ecosystems must be protected around the world and companies that turn water into a business must be regulated.
- The use and care of fresh water must be based on participatory criteria involving communities, citizens, technicians, and governments.
- Let's take care of our water; don't waste it and don't let it become polluted.
- Tell other people about the importance of taking care of our water so we can become more aware that it is the responsibility of everyone.

COMPREHENSION ACTIVITIES



I LIKE TO DRINK CLEAN WATER. ALL CHILDREN ALSO LIKE IT. BUT... DID YOU KNOW THAT ONE IN EVERY FIVE CHILDREN LIKE YOU AND I DON'T HAVE CLEAN WATER FOR DRINKING?
I LIKE TO BATHE... BRUSH MY TEETH... WASH MY HANDS. SADLY, ONE IN THREE WITH CHILDREN LIKE YOU AND I DON'T HAVE CLEAN WATER TO DO THIS
YES, IF THINGS CONTINUES LIKE THIS, IN THE YEAR 2025, WHEN YOU GROW UP, TWO THIRDS OF HUMAN BEINGS WILL NOT HAVE ENOUGH WATER TO LIVE!
WHAT CAN WE DO? IS A GOOD QUESTION! WE WILL HAVE TO PROTECT OUR EXISTING WATER SOURCES OURSELVES!

Children can discuss the following:

- Where does water come from?
- Why is water important?
- Name activities for which water is necessary at home, at school, and in the community.
- How is water polluted and how can it become dangerous to our health?
- What illnesses do you think are caused by polluted water ?

Feeling the water

Play a game: listen, touch, and drink water.

- Find a good spot to relax. It can be next to a river or another water source. If there is none nearby, use music with sounds of water or rain.
- Lie down, close your eyes and start to listen to the sound of water. Imagine we are in a forest with many friends. We went on a trip to enjoy nature, warm sun, and pure air.
- Unexpectedly, clouds come in, the sun goes away, and the entire sky turns black. We suddenly feel very small drops. We all look at each other, surprised, and do not know what to do. Soon, the drops become bigger and bigger. We all start screaming and running. We need a place to cover ourselves from the rain. When we're all covered, someone realizes a classmate who was playing with the water is missing. This person had his hands up in the sky and was feeling the water on his face.
- Two seconds go by and we all want to do the same. We jump over puddles and feel the water on our faces, foreheads, and hands. We sing and dance. The game is very fun.
- We spend several minutes playing, laughing, enjoying the water, but we later grow tired. So, we decide to sit under a tree to see the water fall and listen to its sound.

Children can conduct the following activities:

- Search for objects like bottles, sticks and dry leaves to organize a water orchestra that imitates its sound.

- Create a rain stick with tubes of cardboard paper no longer in use. Create holes with a nail and insert toothpicks into the tube from side to side. Finally, fill the tube with rice and cover both ends. Through soft motions, feel how the rain sounds.

- Take a sip of water to feel it entering the body and write on a paper what it feels like to drink water.

- Create a song to express what we feel for water. We can use the musical instruments we made to create the melody.

- All thoughts can be posted on a large paper so it can be placed on a wall at school or in the community so it can be shared with others.

The Hummingbird that saved the Earth

(Legend of the Andes)

Grandparents have said that, many years ago, a terrible drought extended over the lands of the Andes.

Rivers and ravines turned to dust, plants wept and dried up, and people no longer had tears to cry. Not a single drop of water fell, there was not a single cloud, the sun was very hot, animals could no longer walk and they dragged themselves through the dust. Everything was permeated by sadness as it seemed that the end of life was near.

In the midst of this immense sadness, a large flower refused to dry out. It then let a bloom fall. As it fell, the bloom became a beautiful hummingbird.

The little hummingbird flew away humming and flew for various days without rest. It traveled over ravines, rivers, hills, and the lagoon of the Culebrillas, where beautiful falls of clean, transparent water emerged. The hummingbird became very, very thirsty; its body grew weak, and it could no longer continue. However, it did not stoop to drink and rest and instead, continued to fly even higher. It went farther and farther away.

Now with no strength left, with its tiny wings and multicolor body completely fatigued, it arrived at its destination – the peak of the Andes, where the Great Taita lived.

The Great Taita was resting when, suddenly, he felt some tickles on his left hand. It was the little hummingbird that had lain down. With its sweet voice, the hummingbird told Great Taita what was happening in the Andean lands and after asking for help, soon fell fast asleep.

Glossary:

Taita: a word in Quichua that means father; a spiritual and wise father who is respected by all the community.

Runas: men in Quichua

Warmis: women in Quichua

After reading the legend, children can conduct the following activities:

- Search for recycled materials, tree leaves, soil, branches, and flowers to recreate in a mock up what they liked the most to represent the hummingbird's mission.
- The mock ups can be displayed in the school courtyard or in a place frequented by many people.
- Place papers and pencils so each child can write down what he or she considers has been best represented by the mock up.
- Once enough comments have been gathered, place them on a larger paper and read them.
- Have the children analyze the messages and reflect on what their other classmates think.

DISCOVERING THE PROBLEM

The game of the communities

- Create groups (communities) of 4 or 5 people. Give a name to the community.
- One classmate directs the game and instructs everyone that one community is about to run out of water.
- Everyone who lives in that community must run to another community.
- The director of the game continues to name a community one by one and its people must run to another community.
- The game continues until everyone is inside the last community.
- Each community reflects and answers the following questions on paper:
  - How did we feel when our community ran out of water?
  - What was it like for all of us to be inside the same community?
  - How did the people of the last community feel when receiving everyone else?

RESEARCH

Where does water come from?

Research in the community. Where does the water we receive everyday come from? To answer this question, the children can do the following:

- Interview a relevant authority figure in the community.
- Speak with parents or grandparents at home.
- Research newspapers, books, and the Internet.

Let's take a walk

We can take a walk to go in search of water sources. In other words, find the place where water is born. This can be planned with the support of parents, or a neighborhood or community leader.

Observe the rivers and shores.

- What is water like?
- What color is it?
- Is there garbage along the river banks?

We can then tell our friends what we have seen.

We can also search in newspapers, on the Internet or on the news about water problems. We can create a list of problems and later have children identify which of them occurs in our community or nearby place and how it can affect us.

EXPERIMENT

What do we need?

- Two white carnations.
- A vase with water to place the flowers.
- Blue or red aniline dye.

How do we do it?

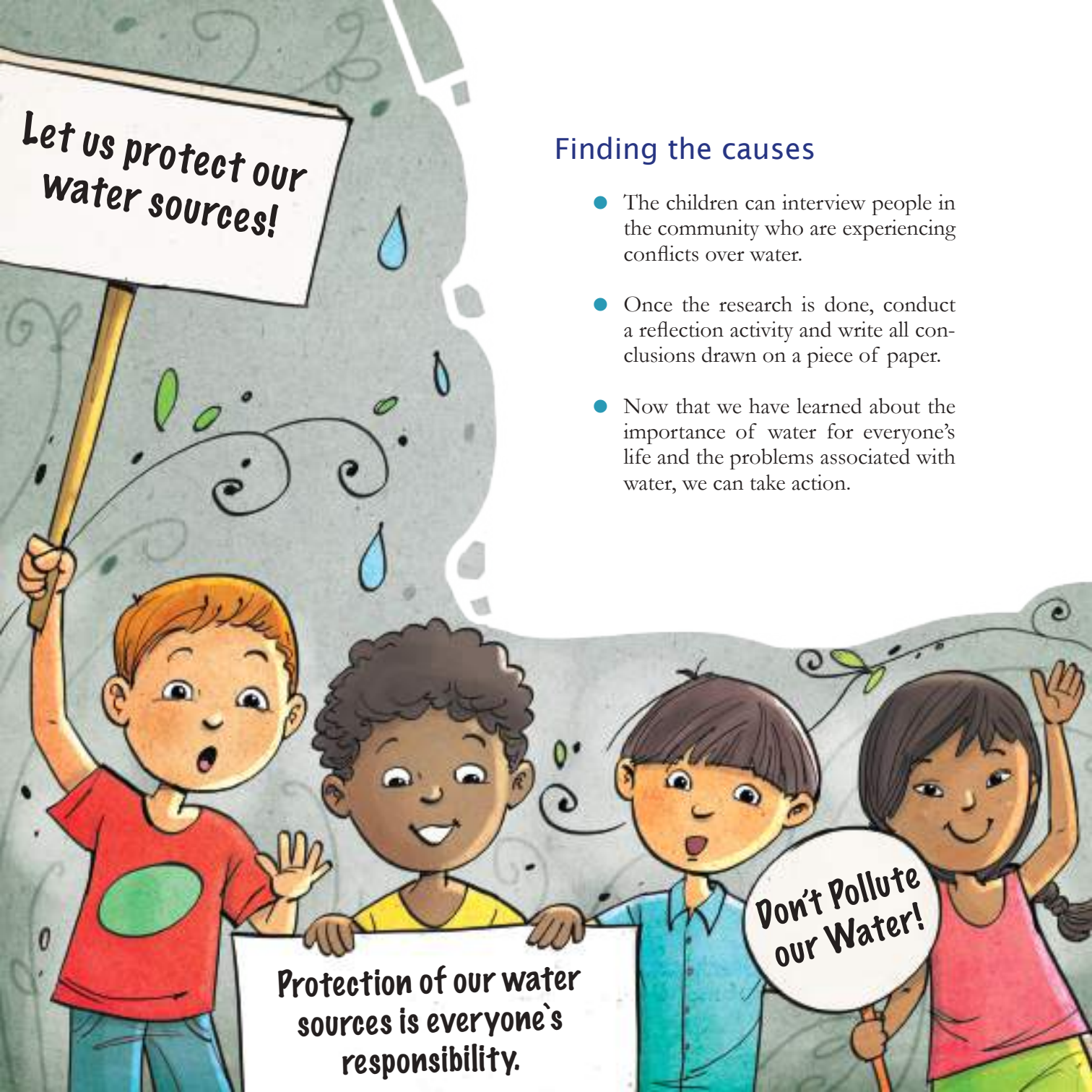
- Place water in the vase with a little of the aniline until the water is well dyed. Place the carnations and leave them until the next day.
- Imagine that this is the water that is used to wash vegetables and that the carnations are food.

Observe and reflect

- What does the water look like?
- What happened with the carnations?
- What would happen to us if we ate this food?

Finding the causes

- The children can interview people in the community who are experiencing conflicts over water.
- Once the research is done, conduct a reflection activity and write all conclusions drawn on a piece of paper.
- Now that we have learned about the importance of water for everyone's life and the problems associated with water, we can take action.



TAKING ACTION

At home

- Prepare questions about everything that has been learned about the problems associated with water and interview people who live with us. This way, we can learn if people are informed about the problems associated with water and the consequences. We can then talk about all we have learned.

At school

- Organize a group to ensure that all water faucets are turned off every day after recess.

- Place signs to indicate what happens if a faucet is left to drip or if there is a water leak some place.

In the community

- Organize a group called "Water Guardians" to stay informed about everything that happens with the water sources in our community and whether it is possible to conduct a tour every so often to take water samples and see its color.

- Go to the community health center and speak with doctors to learn whether children and adults are inquiring about any illnesses transmitted through water.

Conducting surveys

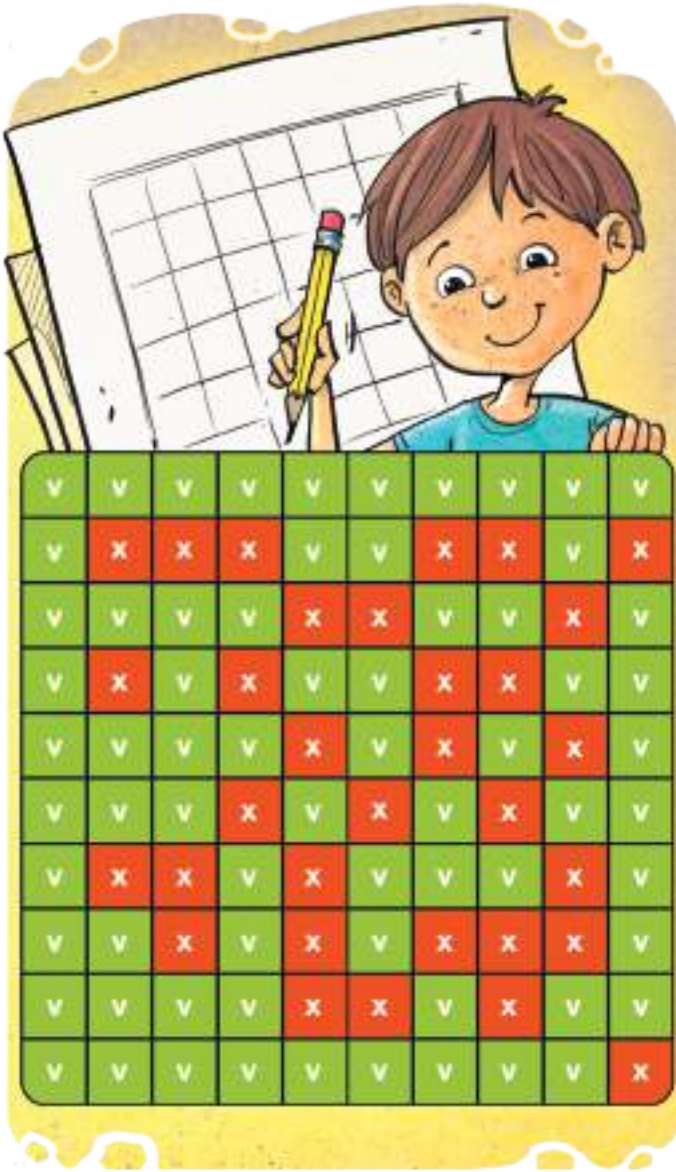
Conduct a survey about water pollutants to 100 children.

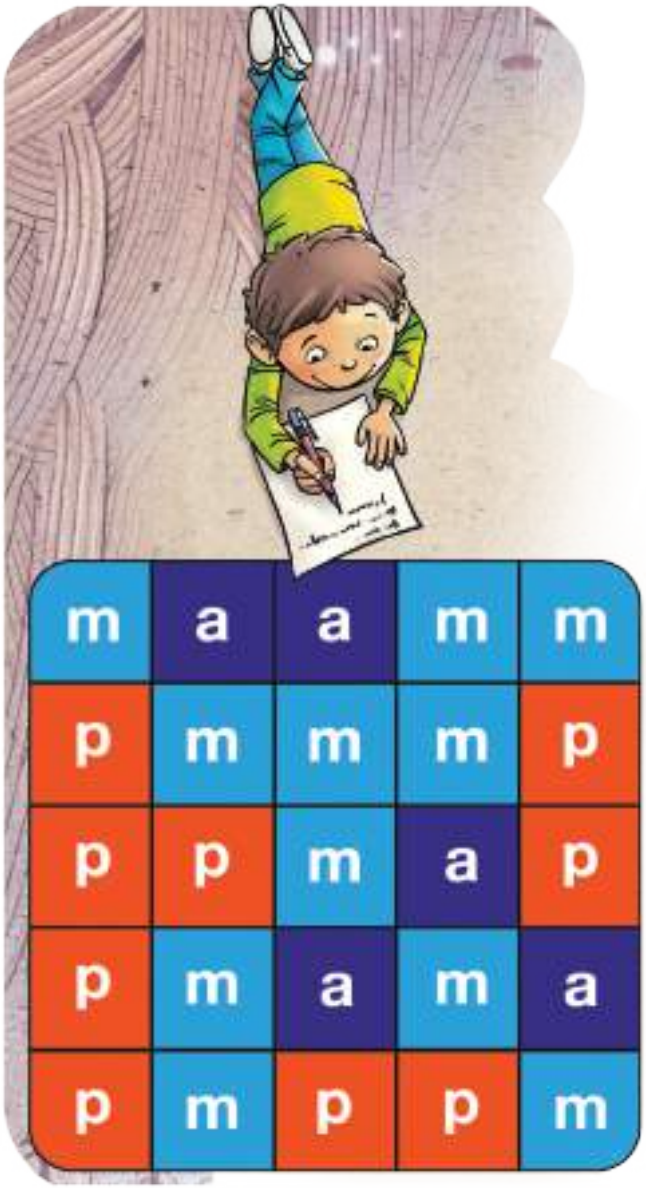
To create percentage charts, children can conduct the following activities:

- Draw on gridded paper a 10 x 10 square.
- Survey 100 children.
- Ask, for example: Do you know how water is polluted?
- Record each answer in one of the squares with a V when the answer is YES and an X if the answer is NO.
- Color the squares marked with the different responses. This will help determine the number of answers out of 100.
- Write the result in fraction and percentage form.

32/100 is equal to 32%: do not know how water is polluted.

68/100, which is equal to 68%: do know how water is polluted.





Another example of a survey

- Ask 25 children who pollutes more.
- Prepare a grid with 5 x 5 squares.
- Select 3 options, for example, mining companies, oil companies, and farmers.
- Ask 25 classmates to choose one option and fill in each square with the corresponding symbol according to the answer:

Mining companies=M, Oil companies=O, Farmers=F.

11/25, which is equal to 44%: chose mining companies.

5/25, which is equal to 20%: chose farmers.

9/25, which is equal to 36%: chose oil companies.

- Afterward, the children can discuss and compare their results.

Other examples of surveys and polls can be found in the Communications Guide, page 135.

COMMUNICATION

Put together a bulletin board, a board game, a play, puppet show, and posters. Write stories, take photos, create a video…What other ideas can we come up with?

The Communications Guide contains various ideas on how these forms of community communication materials can be made.

EVALUATION

Book of dreams

Let's create a book with many pages of recycled paper to write down everyone's dreams.

Each child will write and draw his or her dream on paper.

The papers will be collected to form the book titled "Everyone's Dreams."

The book can be passed around so everyone can read each other's dreams.

Self-evaluation

Each child answers the following questions on a piece of paper:

- Out of all the activities we did, what did I like the best?
- What did I like the least?
- What can we change?

Discuss and respond

- Was the information we received enough?
- What did we research about water?
- Did we learn more?
- Were we able to disseminate what we learned to other children and adults at school and in the community?
- Were we able to observe any change in attitude among the children at school and in the community after the activities conducted?

THE BACTERIAL WORLD

THE IDEA

The planet is a world filled with relationships. The world is made up of over 8,7 million species that interact, live together, and depend on one another.

The smallest species are microorganisms, which include bacteria. These are incredible beings that have been in our bodies since birth and are with us constantly, working and fighting for our lives.

But in the ecosystem they interact with other beings and take part in agricultural processes of water and even in food development!

However, even with all the benefits they bring, every day people grow scared of them and try to eliminate them because a few of them can also make us ill.

But it is important to know that all species on the planet are needed, and the relationships between them should be respected. When the balance in nature is broken, illnesses follow.

INFORMATION FOR EDUCATORS

Microbes are little beings that can only be seen through a microscope and are found by the millions in nature; this is why we say that the world is "microbiotic."

At this point in time, only one percent of microbes in the biosphere have been studied and of those only a minuscule percentage are pathogenic microorganisms. The majority of these have essential purposes and without these there would be no life on earth.

Bacteria

Bacteria are unicellular organisms, and are the oldest known lifeforms. They appeared on the earth's surface around 3,500 to 3,700 million years ago. They are also the most numerous life form. After millions of years of existence, bacteria have evolved and adapted. This allow some bacteria to resist very cool and hot temperatures, which is something no other type of organism can do. Today, many thousands of species of bacteria have been identified, but it is believed that there may be millions.

Not all bacteria are equal; they are classified by their shape, coloring, grouping, and whether they are beneficial or cause disease. The shapes of bacteria vary and can be round, long like a spiral or rod, can be joined in groups, in pairs or be on their own. They seem to act like human beings, don't you think?

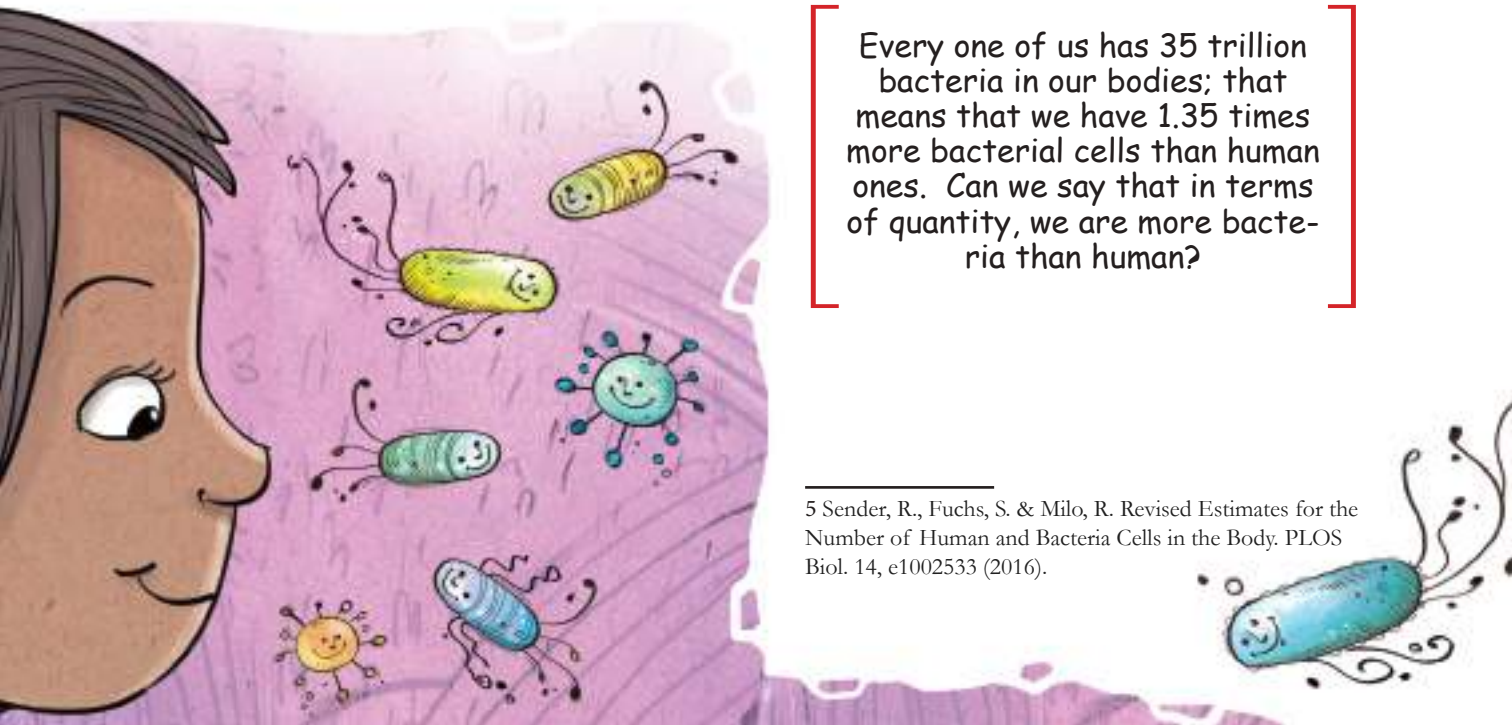
My bacteria and me

When we are in our mother's womb the environment is sterile (there are no microbes), but when we are born, we receive our first bacteria from our mothers.

Bacteria are with us from the beginning and when we are born they start to colonize our skin. The lactobacillus makes its way to our intestine through our first meal, while breast milk will increase our chances of growing up healthy.

An adult human being has about 0.2 kg[5] of bacteria in their body; also known as a microbiome, without which none of us could live, just as a heart. This so called microbiome is a community of bacteria that is all over our bodies: in the intestine, in the nose, in cavities, and on skin. What do these bacteria do? They are fighting for our lives, defending us and helping us to be healthy.

Every one of us has 35 trillion bacteria in our bodies; that means that we have 1.35 times more bacterial cells than human ones. Can we say that in terms of quantity, we are more bacteria than human?



5 Sender, R., Fuchs, S. & Milo, R. Revised Estimates for the Number of Human and Bacteria Cells in the Body. PLOS Biol. 14, e1002533 (2016).

How do they help?

The vast majority of bacteria that live in our bodies help keep us alive.

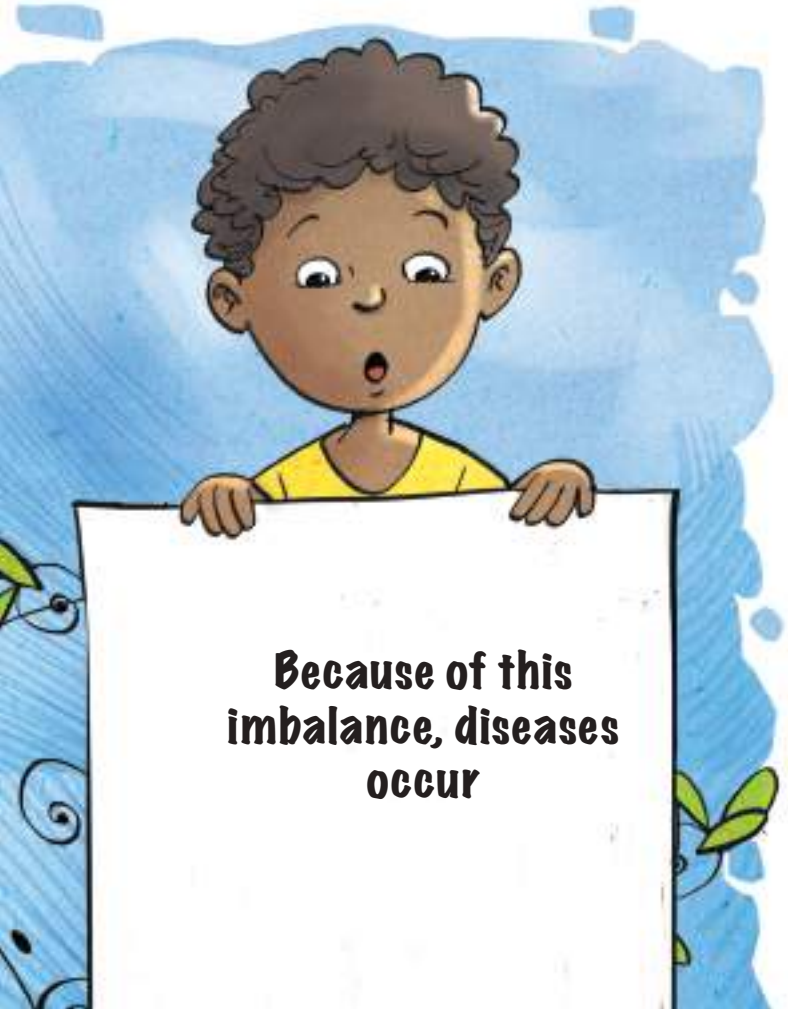
- They synthesize vitamins (like vitamin B and K that are essential factors for blood coagulation)
- They are in mucus in the intestine and stop foreign bodies from causing inflammation and harm.
- They help out the metabolism by easing the digestion of food, and generally, help the transformation of the food into nutrients to have energy to live.
- They make up the microbiome and microbiota that represent the first line of defense against the microorganisms that cause illness. Our bacteria will fight for their space and won't let other microorganisms inside it.
- They contribute to the maturing of the immune system.
- They help with the fermentation of non-digested food residues.

On top of that, microbes help make certain foods like cheese, yogurt, chocolate, certain meats, bread, the fermentation of beer, wine, liquor and more!

Stude

Bacteria in the ecosystem:

When we talk about ecosystems we must include the species that live there, but also the relationships these species have with the ground, the air, the water, and with each other.



The human body, thanks to years of research, has ceased to be considered an independent island capable of regulating its own laws. It is considered to be closer to an ecosystem where every organ has their purpose, just like how cells and the trillions of bacteria in our skin have a purpose. They all coexist and interact within our organism.

Bacteria can communicate, cooperate, collaborate, and help each other, but they also compete for space and resources. This interaction is what maintains a balanced relationship between bacteria and keeps the ecosystem healthy. But when the ecosystem is changed, they also change. When the balance is broken the relationships are not the same, every living thing, including bacteria, when threatened looks for survival. When this happens, disease may occur.

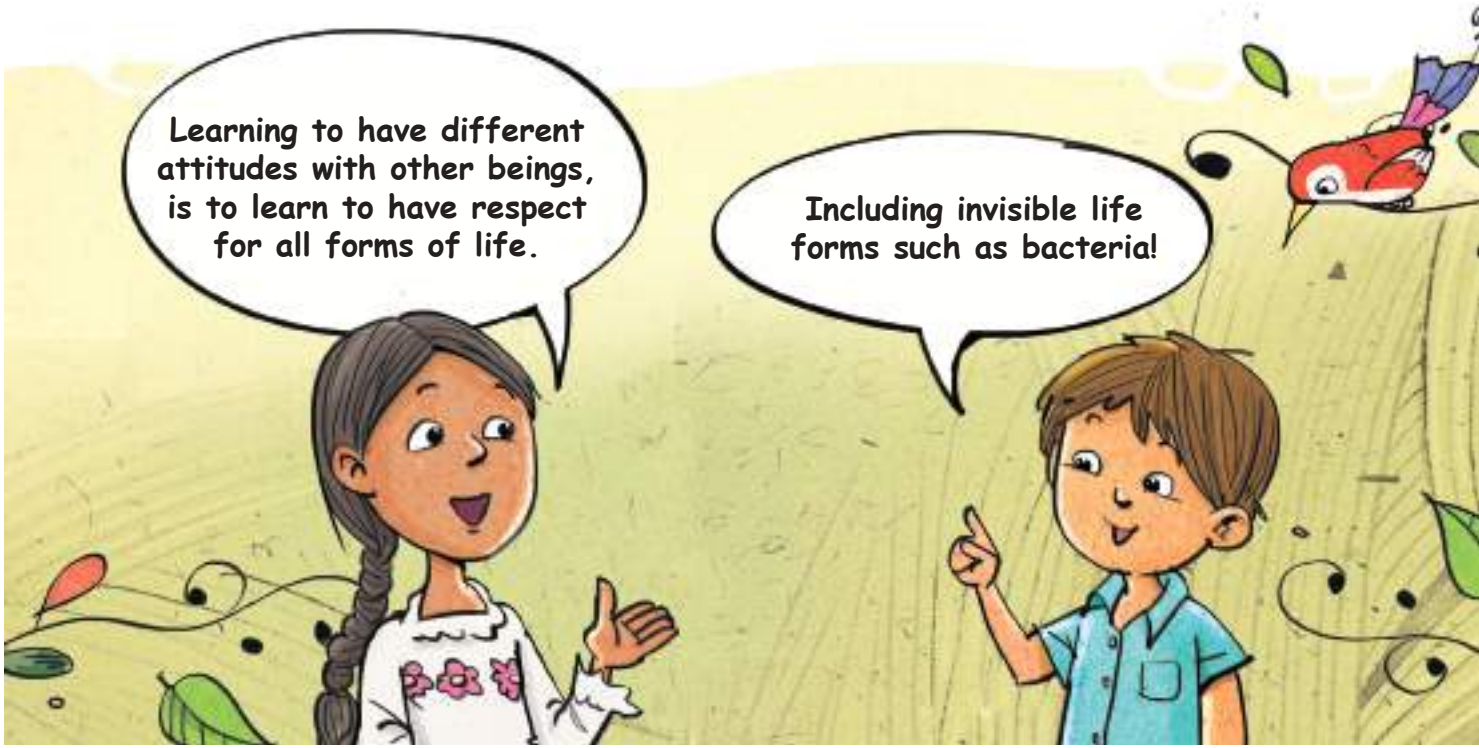
In nature, bacteria, in addition to collaborating with human life, also do more essential actions for life on the planet:

- Bacteria help decompose dead plants and animals. This is a process that allows elements like carbon to go back to the earth to be reused.
- There are bacteria that are fundamental for plants because, through them,

the plants obtain nitrogen, which is essential for growth. The oxygen of these plants is largely created by sea bacteria called cyanobacteria.

- Bacteria have an essential purpose in the creation of residual water.
- There are millions of bacteria in every handful of soil pushed by a child or a gardener. But if we look at this in the grand scheme of things, when large chunks of earth are moved to another place, the micro ecosystem changes completely. Imagine what happens when the earth is poisoned with chemicals. What would happen to the bacteria? Contamination with these bacteria could result in new diseases, because humans are destroying the natural ecosystems.

To learn to have different attitudes with other beings is to learn to have respect for all forms of life.



Living together is living in harmony:

Living together and living in harmony is something that is taught to us by native tribes who shared their wisdom, and their outlooks on life: Sumak Kawsay, respect for all forms of life. Living with others implies maintaining respectful, cooperative, and reciprocal relationships.

There is only one life and we are part of this grand world of relationships. We are just another species in nature, where we are all interrelated. Therefore, our actions as humans have consequences on the planet. Deforestation, contamination, oil exploitation, and mining to name a few, all effect our ecosystem because they disrupt the natural harmony and break relationships between species. Some species are at risk of extinction and others, sadly, are already extinct.

But the alteration of the ecosystems also causes diseases, natural disasters and global warming among other consequences.

Why do we want to eliminate them?

In the bacterial world, similar things happen as in the human one. In the human world, the overwhelming majority of human beings are born, grow up, have good intentions, and are willing to work for the benefit of all. There are however some who are selfish - people who believe that they are the center of the world and life itself, causing harm and destruction along the way. A similar thing happens in the bacterial world. Let us examine some data:

- *Very few species of bacteria cause illness*

- Bacteria can form part of our microbiome, also called normal flora, or cause illness; this depends on bacterial virulence as well as the unique properties of each person such as malnutrition, prematurity, age, deformities, medication, general anesthesia, the base illness, or lifestyle.

We already know that the microbiome, the bacteria that inhabits our bodies, most often do not pose any health risk; on the contrary, they are what defend our body. However, if a person's defenses are altered, this could cause infection (the multiplication of an infectious microorganism inside the body).

It is accurate to say that human health is largely based on the health of the planet.

Some will change rules of living in harmony and make us ill.

The War Metaphor

Bacteria have a very bad image in the eyes of people; they are synonymous with sickness and death. This dates back to when, through a microscope lens, scientists discovered the role of microorganisms in infectious diseases. In the twentieth century, Alexander Fleming discovered penicillin, after which came a long list of antibiotics – "weapons" against bacteria. In the present, this problem continues in daily life, where people have developed a fear and phobia of these diminutive creatures.

The media have a large responsibility in this perception of bacteria and cleaning products. If we pay attention to the TV advertising, we can see that cleaning products for home and even paintings are now antibacterial. The truth is that, even as we are aware of the importance of personal hygiene, we have yet to find evidence that these products are better than other ways of dealing with bacteria.

The important thing to understand is that not all bacteria are dangerous; there are very few that can cause illness. Most of them are very good for our health and the planet.

Do we fear them and want to eliminate them? NNOOOOO!!

COMPREHENSION ACTIVITIES

Let us imagine a bacterium

Ask the children to imagine a bacterium with a face and expressions. Then they will draw it. The important thing is that each is an individual drawing.

Everyone can imagine: What is its name? What color is it? Where does it live? Does it live with other bacteria?

When everyone is done each will present their bacterium. What expression does it have? What colors are predominant? Is it telling us something?

We can classify them using a chart and at the same time ask ourselves, are there more bacteria with bad expressions than good ones? The chart can be done on the board, but we could also make two columns on the floor, one for the good expressions and one for the bad ones. There the children can place their drawing where it belongs.

Biography of a bacterium

Kids can conduct the following activities: Look for a stone that they like, and then paint it with colors of their liking.

Afterwards, every child, imagining bacteria inside their body, will create a biography for it represented by the stone. What is its name? When was it born? In which part of the body does it live? With whom does it live? What is its job? What is its diet? What benefits has it brought to the children's body and health?

Finally, each participant will present their stone and biography to the rest of the class.

Understanding Bacteria

In order to learn more we can listen to the song "Like bacteria," by the Ecological Group of Cubans on the web.

There are many activities that can be done with the song: representations, dances, include it in a festival, or put it on the speakers at recess.

"Bacterial Stories: From the smallest to the most diminutive of the planet"

Sixty children from five different schools in Cuenca, Ecuador, gathered one morning to create bacterial stories. The result of this was the book "De los más pequeños a los diminutos del planets," which is available in print in Spanish here: https://www.reactgroup.org/wp-content/uploads/2016/11/De-los-más-pequeños-a-los-diminutos-del-planeta.pdf

Or can be searched here: https://www.reactgroup.org/news-and-views/educational-material/

One of the stories created was "My house, the intestine."

"My house, the intestine"

There was once a bacteria called Flora and another called Bacter who were great friends. Their house was the intestine of a lady named Karla, a very playful and greedy lady who loved to eat sweets and junk food. One day, Karla ate so much junk food that her stomach got upset. To Flora and Bacter, it felt like one big earthquake. Everything went dark, and after a few seconds Bacter opened her eyes and realized that she wasn't home anymore and Flora was nowhere to be found. Bacter was very angry and decided to try to tear down the walls that separated her from Flora. At that moment, giant spears started coming from Bacter's body that went on to hit and scrape the intestinal walls. At the same time, Karla's screams could be heard.

"Oh God what pain, what do I do, my tummy hurts! It's like someone is biting my stomach," she yelled to her daughter.

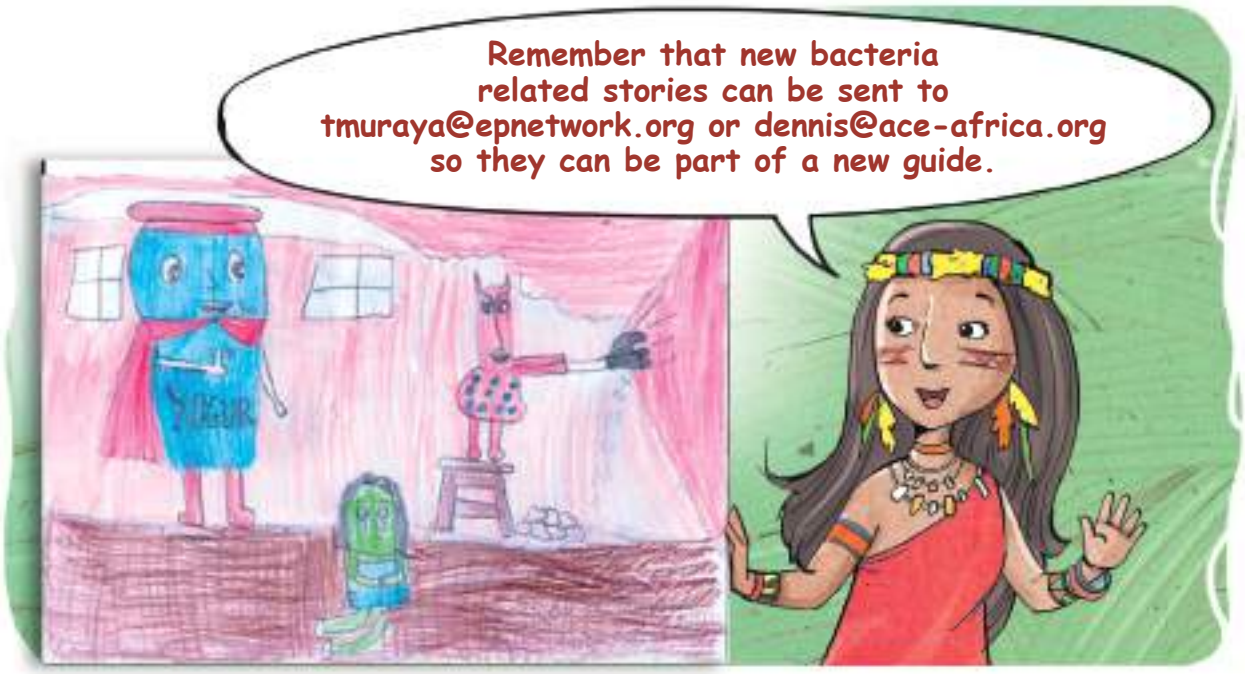
Her daughter, worried, and came back with a glass of yogurt and told her mother, "Drink some, this will make it better."

Meanwhile, Lactus, bacteria that can be found in yogurt and that helps protect the intestine, spoke with Bacter and tried to get her to understand the harm she was causing Karla. After a lengthy conversation, Lactus agreed to take Bacter to her friend. Bacter accepted and, after a brief walk, the two friends found and hugged each other. Karla, on the other hand, promised her daughter that she would eat healthier.

Authors:
Liseth Morocho, Cristina Tigre, Elizabeth Orbe, Helen Apolo, Emily León, Natasha Saldaña. Unidad Educativa Zoila Esperanza Palacio – Cuenca, Ecuador.

Apart from reading that story, kids can do the following:

- Create their own stories with bacteria.
- Depending on the grade level, the stories could be used to learn how to write a story to learn how to craft a proper introduction, body, the importance of a title, and identify primary and secondary characters.
- Kids can write a paragraph detailing the plot of the story and draw a picture to go with it.
- Organize a school reading marathon.
- Every group can pick a story and change the ending.
- With grandparents: A lot of grandparents love to read stories, so they could be invited to class to read the bacteria stories to the kids.



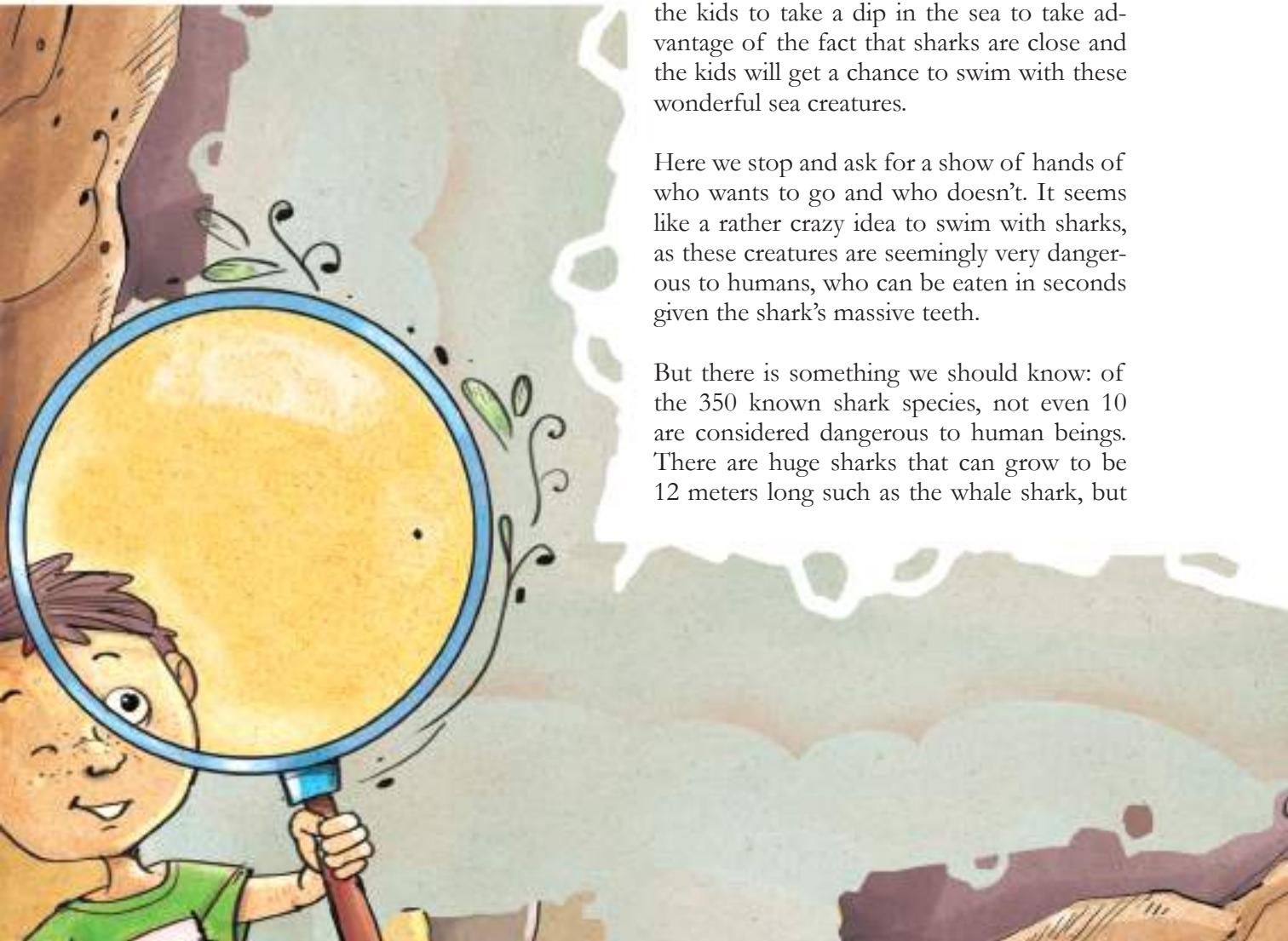
DISCOVERING THE PROBLEM

A new Adventure

Imagine we are on the beach with our family, enjoying the sun and the sea. On the beach is the lifeguard, taking care of everyone. Suddenly, he takes the microphone and invites the kids to take a dip in the sea to take advantage of the fact that sharks are close and the kids will get a chance to swim with these wonderful sea creatures.

Here we stop and ask for a show of hands of who wants to go and who doesn't. It seems like a rather crazy idea to swim with sharks, as these creatures are seemingly very dangerous to humans, who can be eaten in seconds given the shark's massive teeth.

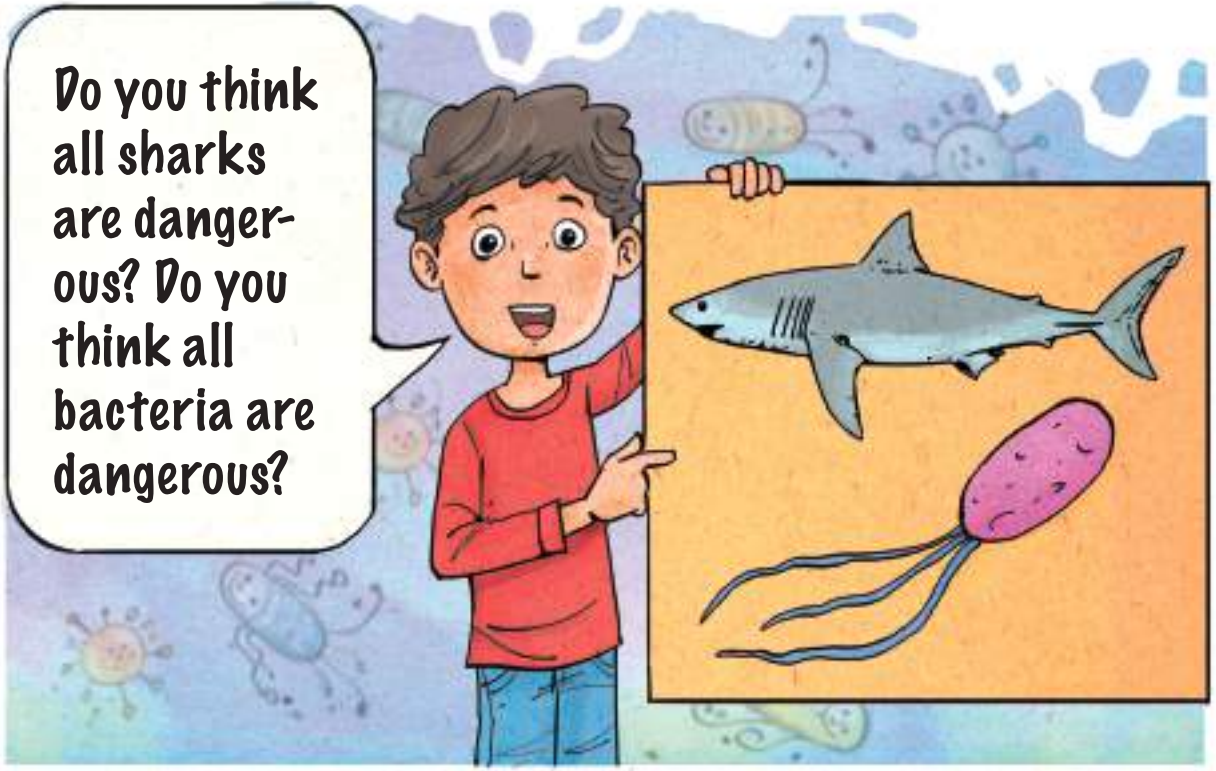
But there is something we should know: of the 350 known shark species, not even 10 are considered dangerous to human beings. There are huge sharks that can grow to be 12 meters long such as the whale shark, but



there are also medium and small- sized sharks that can fit in the palm of one's hand. There are many people who dive with sharks and confirm that not all of them are dangerous to humans because they are not part of their diet.

Sharks attack when humans enter their habitat making them feel threatened, or when the shark has changed.

We can organize a debate with the children with the following ideas: Are all sharks dangerous? Are all bacteria dangerous? Why? Why do they have this image? Who helped create this concept? If we think about bacteria, will something similar happen?



RESEARCH

Kids can research the following:

What are bacteria? How many bacteria are there?

How many bacteria are good for humans and how many can be dangerous?

In what ecosystems processes do bacteria intervene?

Researching our own bodies

Let us build

We invite you to discover that our body is an ecosystem of microorganisms. For this we will need the following materials:

- Chairs
- A glass jar with a lid
- A hyssop
- A shoe box or cardboard
- Flavorless gelatin

Every participant will have to prepare gelatin, but make it thicker than what is suggested (using less water so it comes out more solid). They will put it in the jar, lay it down, and wait for it to solidify. In the meantime we will make juice.

Let's play "Collaborative Musical Chairs"

Place the chairs in a circle, with one less than the number of people playing the game. When the music starts, everyone dances around the chairs. When the music stops, everyone sits down immediately. Everyone should be sitting, not standing. Another chair is taken out, but all the players stay in the game until there is one chair left and everyone dances around it while touching some part of the chair.

The game is collaborative because no one is eliminated. There is no competition, but everyone has to work together to finish the game.

In this game we have fun, we laugh and we will have worked out a little. So now is the time to start this experiment.

Everyone takes their jar of solid gelatin. With a hyssop, take a sample of some body part that is sweating: hands, feet, arm pits etc. Rub it on the hyssop in the gelatin, close the jar, and put it in the shoe box.

What will happen to the gelatin as we mix it with a body sample?

Every child will write a hypothesis about the results to later compare and debate them.

Day by day, they will see the gelatin change and start to get stained. Inside this stain will be the microorganisms that are in your body! These are bacteria!

Everyone can complete a checklist of the growth of the bacteria.

Timeline of my bacteria

Name of child: _____

School: _____

School grade: _____

Name of my bacteria: _____

Day 1	Day 2	Day 3	Day 4
Day 5	Day 6	Day 7	Day 8

Additional remarks: _____

Obtain Conclusions

Do we agree or disagree with our hypothesis?

Everyone can make a list of ideas contribute with a conclusion.

Research: On which parts of our bodies are there bacteria? Which are they? What are they doing there?

TAKING ACTION

Bacteria food fair

Organize a bacteria food fair at school. Different groups of children investigate about foods that are created through bacteria, make posters, songs, poems, costumes, presentations about said food and organize the fair for the whole community.

Recycled art expo

Creating bacteria out of recycled materials: children can create and present their bacteria at recess and invite the rest of their classmates to come and see the bacteria art pieces. They can also get into groups and make stories, tales, poems, songs, and plays about bacteria as protagonists.

Comparing results

Boys and girls can create posters to show the results of their research, of the growth observed, and everything they have learned so they can share it at school and in the community.

Comparing new ideas and messages with the family

We have learned a lot about bacteria in our bodies and in the ecosystem. Now, the children can share their experience with their family and friends from the neighborhood.

COMMUNICATION

There are many communication activities and tools that can be used to share what we have learned so that others may learn as well. For this purpose, we have designed the Communications Guide where you will find many activities to do together. It can be found in Part 1 of the Educational Knapsack.

EVALUATION

To evaluate the journey we have been on, we can go back to the beginning and draw a bacteria. We once again, classify it. Has it changed our perception of bacteria? In our families and with the rest of the kids at school we can do the same exercise and have them draw bacteria, and learn.

APPROPRIATE USE OF ANTIBIOTICS AND RESISTANCE

THE IDEA

Antibiotics are medicines that cure infectious diseases caused by bacteria. If they didn't exist, many people would die. This is why they must be administered in an appropriate manner.

When antibiotics are used to treat illnesses that are not bacterial, are not administered appropriately, bacterial resistance is the result.

This is how common treatments become ineffective and infections persist, and thus passed on to other people.

INFORMATION FOR EDUCATORS

At some point we have all used medication. Some people, when they fall ill, wait for a health worker to prescribe a lot of medication. However, in most cases, the illness is caused by a virus. Therefore, to get better it is often enough to rest, drink liquids, and eat healthy food. This way, the body can fight off the illness.

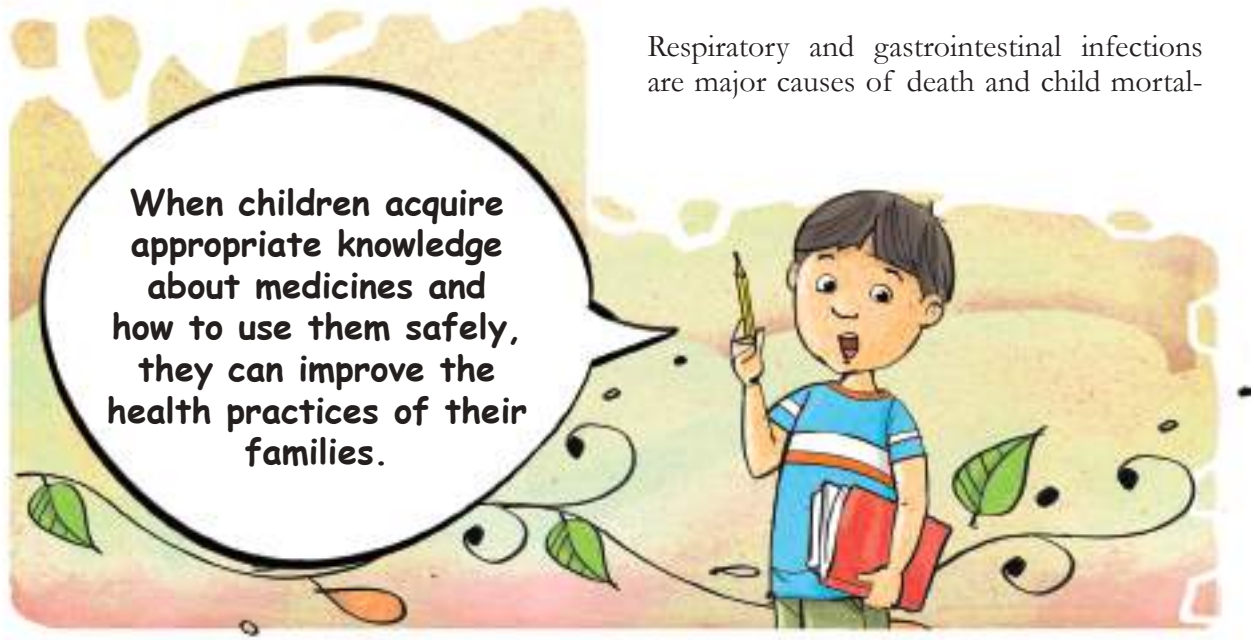
When we're about to take medicines, we must be aware of where they came from and how they should be taken.

If children learn the right information about medication and how to use them safely, they can improve their family's health habits.

What is an infectious disease?

We have all fallen ill at some point: a cold, sore throat, ear pain, or a cough. These illnesses can be generated by viruses or bacteria.

Respiratory and gastrointestinal infections are major causes of death and child mortal-



ity in the world.[6] They largely affect lower income children in developing countries and indigenous populations.[7,8]

They make up 60% to 80% of visits to pediatricians. In children, the most common infections are viral in origin and do not require antibiotic treatment. However, one third of patients end up receiving antibiotics, from which approximately 50% are unnecessary.[9]

Among the most common infectious diseases in children of school age are the following:

- Acute respiratory infections, whether they are upper, such as the common cold; or lower, like pneumonia.
- Gastrointestinal infections
- Urinary tract infections
- Skin infections

6 OMS. La contención de la resistencia a los antimicrobianos. Perspectivas políticas de la OMS sobre los Medicamentos. Ginebra.

7 Comisión Económica para América Latina y el Caribe (CEPAL), Fondo de las Naciones Unidas para la Infancia (UNICEF), Oficina Regional para América Latina y el Caribe (UNICEF TACRO). La reducción de la mortalidad infantil en América Latina y el Caribe: avance dispar que requiere respuestas variadas. Desafíos 2007; (6): 6-8.

8 Muñoz G, Mota L, Bowie WR, Quizhpe A, Orrego E, Spiegel JM, et al. Ecosystem approach to promoting appropriate antibiotic use for children in indigenous communities in Ecuador. Rev Panam Salud Publica. 2011;30(6):566–73.

9 Ruvinsky S, Mónaco A, Pérez G, Taicz M, Inda L, Kijko I, et al. Motivos de la prescripción inadecuada de antibióticos en un hospital pediátrico de alta complejidad. Rev Panam Salud Publica. 2011; 30(6):580–5.

Antibiotics

Antibiotics are a special group of medications that cure illnesses caused by bacteria. They play an important and necessary role in our health system because they cure most bacterial infections among the population.

Antibiotics can be administered in different forms:

- Tablets
- Ointments or skin creams
- Syrups and drops

When the illness is caused by a virus, taking an antibiotic is useless because it does not have any effect.

An antibiotic should only be prescribed by a doctor, who will provide instructions on the dosage, frequency of intake, and number of days of treatment. It is the right of all people to receive complete and accurate information about treatment.

"Inappropriate antibiotic use is also driven by public misunderstandings about the difference between bacterial and viral infections, and an ill-informed fear of bacteria in general. It is essential to promote understanding of the critical importance of bacteria for all life forms, in order to use antibiotics only when necessary to deal with the small fraction of bacteria that, at times, threaten to harm us. Prudence and restraint from excessive consumption must inform a new paradigm for how to live well and what 'good health' means." – *Declaration of resistance to antibiotics, Antibiotic Resistance Coalition (ARC).*

"An antibiotic should only be prescribed by a doctor, who will provide instructions on the dosage, frequency of intake, and number of days of treatment."

Resistance: a natural response

Resistance is a natural response of all living beings. It is the capacity to stand, tolerate, or oppose. It is about defending oneself against something that attacks the integrity of life.

We have learned that our body is inhabited by millions of bacteria and they are also in everything that surrounds us, taking care of us, keeping us healthy, and fighting for our lives and for the planet (See, Bacterial World Guide page 83).

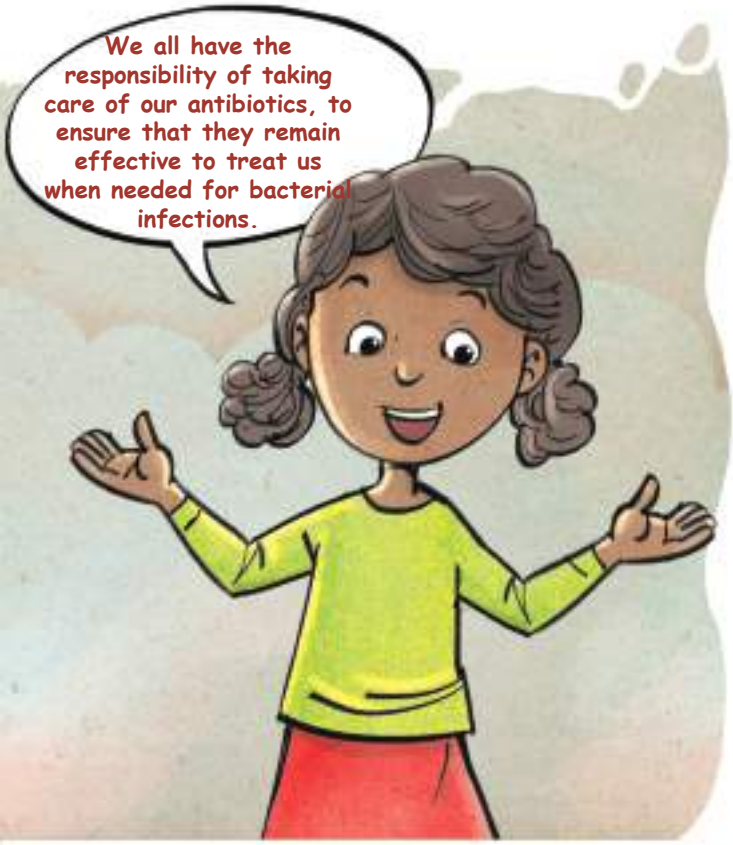
When a person feels ill and sees a doctor, the doctor should determine if the illness is bacterial (when it is produced by bacteria) or viral (produced by a virus). Only if it is determined that it is generated by a bacteria should the doctor prescribe an antibiotic. If it is generated by a virus, another treatment may be given and it may not require medicines.

When the antibiotic enters the person, it will eliminate many of the bacteria it encounters, whether they are the cause of the illness or not. Therefore, the bacteria, like all living things, will try to defend themselves. How do they do it? By RESISTING the effect of the antibiotic through mechanisms that will hinder the medication's effect.

Causes of antibiotic resistance

- The inappropriate use of antibiotics: taking them when it isn't necessary.
- Taking antibiotics incorrectly: in other words, taking an incorrect dosage, not completing the treatment, and not respecting the indicated time of dosage.
- Self-medication.
- Using antibiotics in the raising of animals indirectly reaches humans.

How is antibiotic resistance formed?



Development of resistance can be likened to communication and community life. For example, one bacterium may carry genetic information on how to resist particular antibiotics, and this information may be shared with others.

Upon entering the organism, the antibiotic acts against bacteria. Most bacteria will die, but those that have created or acquired the necessary resistance mechanisms will survive and can continue to reproduce. This process is known as selection. If a bacterium carries various resistance genes, it is called multi-resistant or super bacteria.

"Effective action on antibiotic resistance requires that the social and economic determinants of infectious diseases be addressed. In many parts of the world, these are manifested through poverty, exploitation, international power relations and local inequities, as well as through poor access to nutrition, safe drinking water and sanitation."

Declaration on Antibiotic Resistance - Antibiotic Resistance Coalition (ARC)

Appropriate use of antibiotics

Using an antibiotic appropriately means the following:

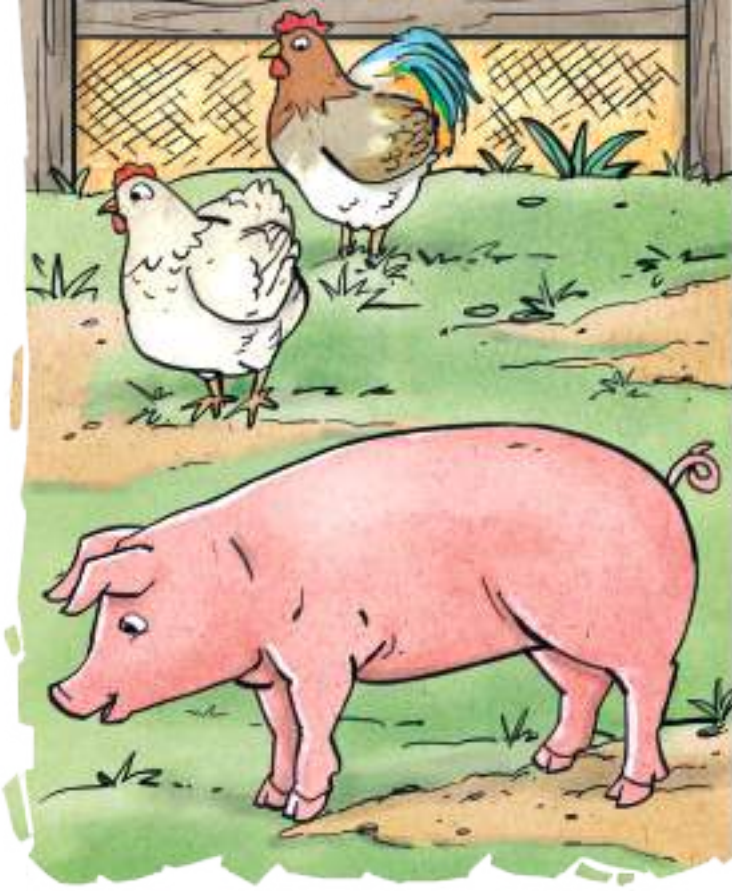
- Using it according to instructions from a doctor.

- Taking the antibiotic for the number of days recommended by the doctor, even if we feel better.
- Respecting the recommended dosage (5 ml, one teaspoon, etc.)
- Avoiding self-medication, which is when a person takes medication without seeing a doctor first. Self-medication can lead to serious health matters such as poisoning, but can also cause worsening of the infection itself since it is unclear whether the treatment is appropriate and timely. Moreover, self-medication may promote antibiotic resistance development.

Antibiotic resistance is a global health problem that affects all countries and has large impact on both economy and mortality and morbidity due to infectious diseases.

Use of antibiotics in the farming of animals

Antibiotics are used on some farms where animals are kept. They are used to treat diseases in the animals, but can also be administered in small quantities as a means of preventing certain illnesses and to accelerate growth.



"The preservation of effective antibiotics for human health should take priority over their use for commercial gain in food production. A disproportionately high amount of antibiotics is used in animals, particularly in the industrial production of food animals. Antibiotics should only be used for treating animals when indicated by a genuine therapeutic need and based on antibiotic therapeutic guidelines."

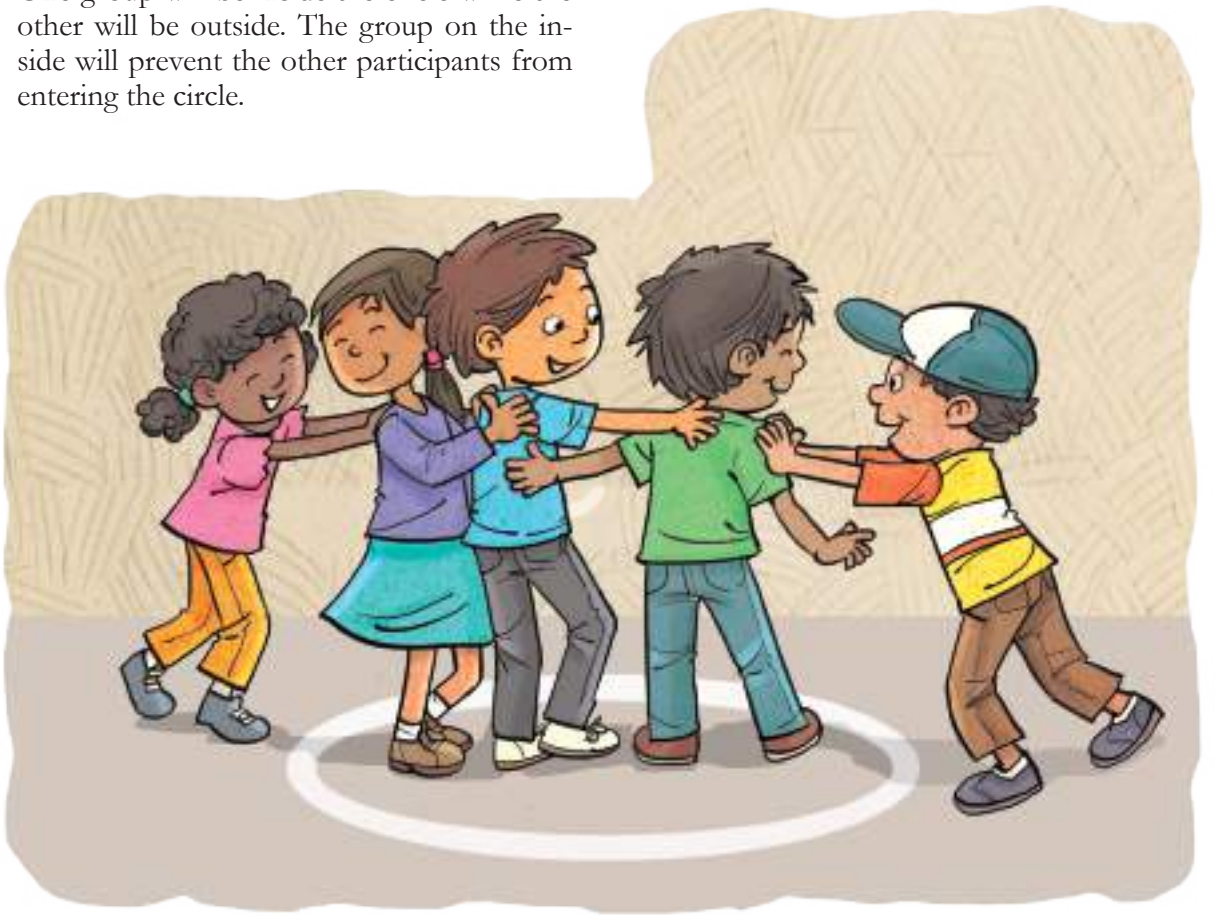
Declaration on Antibiotic Resistance - Antibiotic Resistance Coalition (ARC)

COMPREHENSION ACTIVITIES

What is resistance?

To start this activity, draw a circle on the floor and divide the participants into two groups. One group will be inside the circle while the other will be outside. The group on the inside will prevent the other participants from entering the circle.

Reflection: what happened with the group inside the circle? What happened with the group outside the circle? How did they feel by resisting? How did they feel when they wanted to attack?



DISCOVERING THE PROBLEM

To understand the problem of bacterial resistance to antibiotics, a video debate can be held. To do it, play a video on antibiotic resistance and after viewing it, everyone can discuss what they learned and think about the issue.

"Truth Masks" (see page 53). We can carry out this activity with one playing the role of an antibiotic and another, the role of a bacterium.

Analyze advertising messages (see page 92).

This activity can be developed to analyze advertisements that relate to bacteria and self-medication.

RESEARCH

As a group, conduct a research project about "Medications in the home," to determine what medications are in our homes. To do it, create a list with the names of all the medications in a family's medicine cabinet. Afterward, the children can create work groups.

Each group will search for information about each of the medications and will classify them according to type: analgesic, antibiotic, antifungal, expectorant syrup, etc.

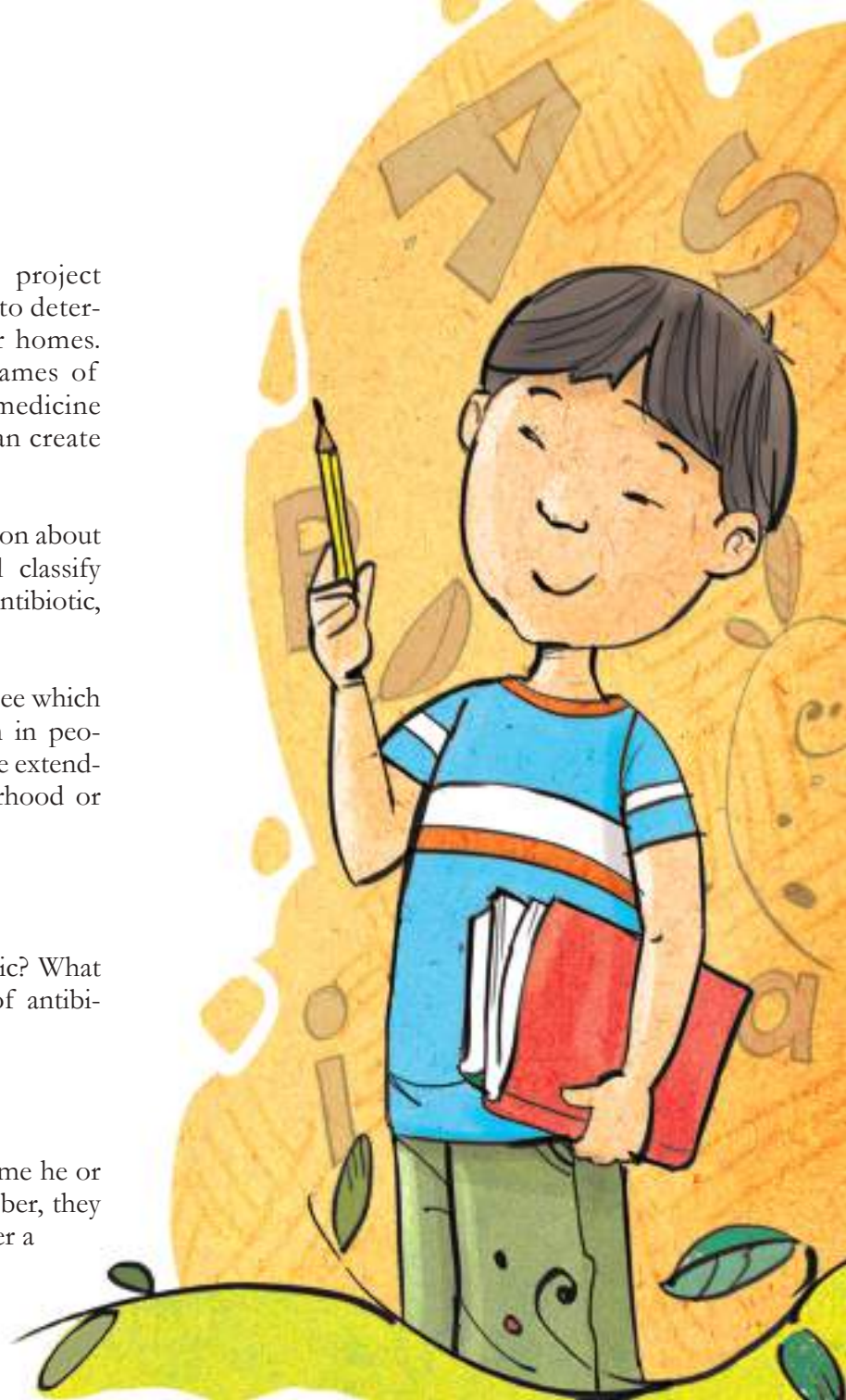
A statistical chart can be created to see which medications are the most common in people's households. The research can be extended to other people in the neighborhood or community.

Further learning

Internet search: What is an antibiotic? What is it made of? What is the history of antibiotics?

Medication and me

Each child will remember the last time he or she became ill (if they don't remember, they can ask a family member) and answer a



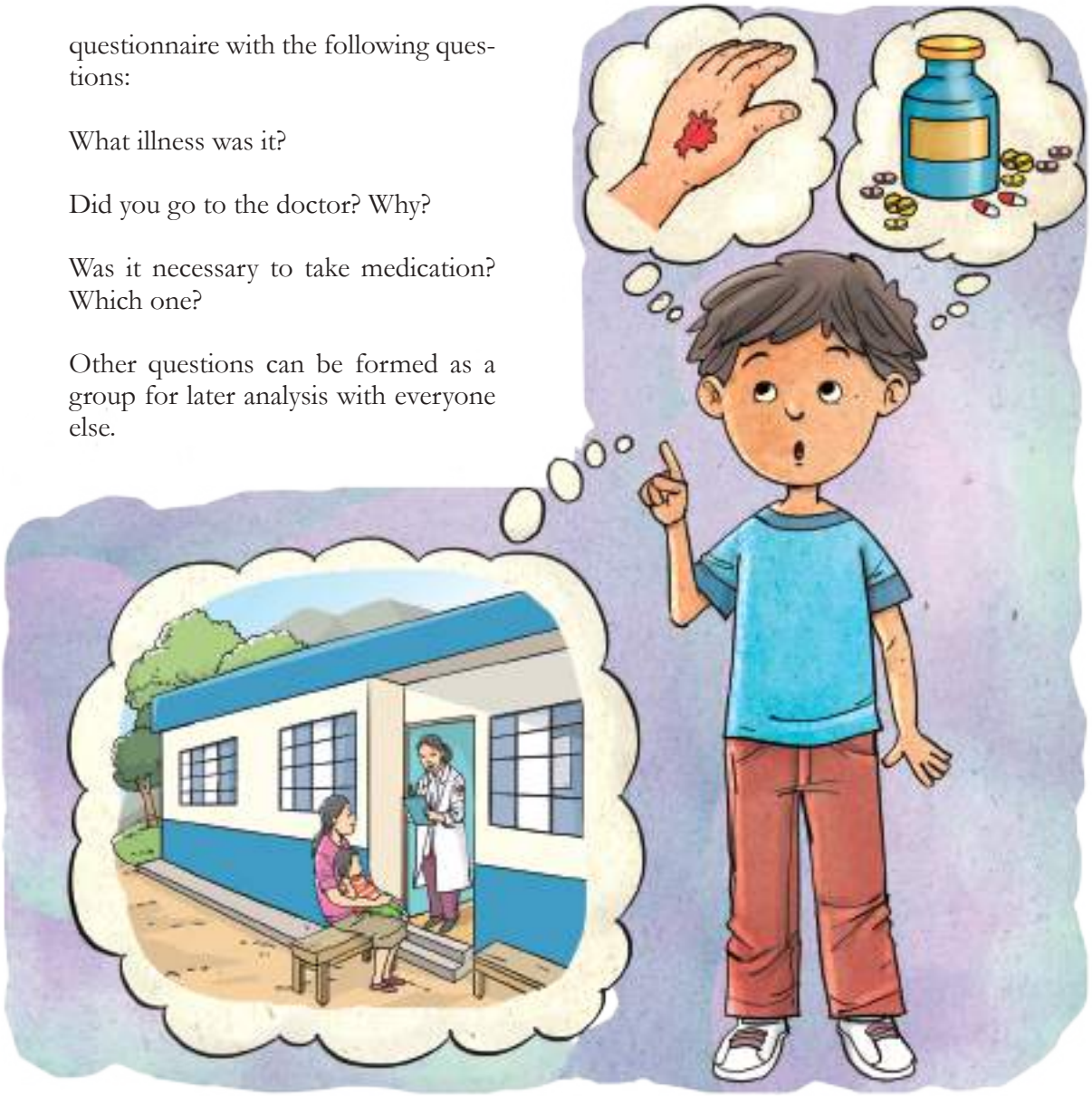
questionnaire with the following questions:

What illness was it?

Did you go to the doctor? Why?

Was it necessary to take medication? Which one?

Other questions can be formed as a group for later analysis with everyone else.



COMMUNICATION

"The how, why, and for what purpose of communication"

THE IDEA

Children are excellent communicators. They are constantly active. They play, talk, discuss, transmit, and learn about the world around them to create stories and narrate…If children can learn about simple communication techniques for the community they will be able to do the following:

- Collectively create communication materials for the community where they can show what they have learned and inform the community about facts, situations, feelings, knowledge and stories that occur daily in the environment…
- Show what they have learned and deploy their creativity and imagination through artistic activities.
- Better understand their environment and incorporate skills and attitudes to help defend their health and nature.
- Share information with their families, neighbors, and other children. They can disseminate what they have learned through fun activities that allow them to communicate with greater freedom.

New forms of communication

The arrival of new technologies has changed how we communicate with others. With the internet, we can acquire a lot of information about an issue in very little time or meet other people who are also interested in the same issue. This has made it easier to disseminate information and broaden the communicative panorama.

The internet and social media are frequent habits of children nowadays. They are the ones who surf the net and are therefore the most at risk. For this reason, it's important to emphasize the responsible use of the internet and social media.

We can take advantage of the internet as a tool that complements our learning. We can conduct research, search for videos linked to previously learned topics, chat, share information with other children around the world, share files, photos, drawings and work we have done at school or in the community.

There are many pages and links on the Internet with programs and educational projects in the areas of health and the environment that can complement the activities proposed in each of the guides in this kit.

Communication in the community

There are many situations in our environment that generate communication acts. For example, conversations that emerge from an event held in the community like a transit accident, a soccer game between neighboring schools, a neighborhood party, or discussions that come from social, economic and cultural events proposed by local media involving communities. All of these things, which are a part of our daily life, help shape our attitudes and opinions.

The spontaneous and natural communication that occurs at home, at school, or in the community is recognized by all of us as the communication that takes place in the community and represents different people and groups.

For all this communication to be appropriately disseminated we must start by designing a communication plan with the children that enables us to understand our environment and share what we have learned.

The communication plan: of utmost importance

There are situations that make it difficult to communicate. For example, abrupt interruptions in the middle of a conversation, distortion of information, or inappropriate use of words. For this reason, it's important to reflect on these aspects with children before starting any communications activity.

Communicational analysis of the community

It is necessary to analyze with children some elements before starting our dialogue with the community.

To conduct this analysis we can interview different people who form part of our community and involve parents so they can also reflect about these communicational issues.

We can use drawings, cartoons, oral and written stories, as well as a play to allow us to conduct a communicational analysis of the community in a fun way.

Ways of communication in the community

Megaphone: it is a communication tool that allows sound to be amplified. It's used by some communities to promote social and cultural events.

Word of mouth: this term is used to describe a form of communication that is done from person to person, generally when referring to current events. It is very effective in promoting a cultural activity or some other important event.

Oral tradition: this is a fundamental resource for memory reconstruction and community identity. It involves telling and recreating stories from a specific region.

Community bulletin board: this is a tool that informs the community about cultural, economic, social, and historical events. Placed in visible place for everyone, this tool can include images and photographs to better illustrate messages.

Local magazine: some communities employ a printed or digital magazine to disseminate information, which is updated periodically.

News releases: these tools can inform, convene, or invite the community to participate in some important social activity, generally to make decisions.

Posters and flyers: these are communicational resources used to promote an event or product, or search for information about a person, animal, or job.

Car with speaker: these are vehicles equipped with sound amplifiers that drive through the streets of the community to announce an event or promote a product.

There are many more. What other forms of communication do we use in our community? What other communicational means have we stopped using in the community?

Photographing my community

Through images we can also tell many stories and create important spaces and situations for our neighborhood or school.

- We can motivate children to identify the most representative places in the community.
- We can take photos or create drawings to tell detail about the places we have identified.
- We can ask, "What did these places look like in the past? What will they look like in the future?
- We can also create a sequence of images and make up stories about the places depicted in them.
- Finally, we can propose an exhibit of the photos, drawings, and stories written by the children, perhaps in one of the identified places.

Creating a community bulletin board

This can be done with the following steps:

- Search for a place that is sufficiently large and visible where the bulletin board can be placed.
- Search for the necessary materials: papers, pencils, markers, colored paper, photos, news clippings, etc.
- Children can be divided into groups. One group can handle news while the others can handle photos and drawings made by them.
- The bulletin must be updated every so often.

- Some important sections can be determined as follows: cultural, social, economic, sports, and health, etc. Another section could be added where positive stories about the community or school can be posted.

Debate

This communications tool allows us to reflect on a particular issue. It enables children to acquire a stance and augment their argumentative capacity. This activity can also be used to complement other activities, for example, after researching a topic or prior to writing a message that will be disseminated in the community.

- After identifying a topic to reflect on, we place ourselves in a circle so we can all see each other. This makes the conversation more fluid, thus generating an environment of trust among the participants.

- For this activity, a secretary can be named in charge of taking notes of what the participants say. A moderator can also be named to determine the time allotted for participants to share their opinions and keep track of everyone's turn.

- Questions that will be answered as group during the debate can be prepared in advance.

- It is important that the children reflect on the differing points of view.

- Finally, all agree on the conclusions drawn from the debate.

Creating a board game

Through play, we can share and discuss living norms. That is, the conditions that must be present to be able to conduct certain activities. This will allow children to improve trust among them and strengthen both community and communicational bonds.

How do we do it?

- Divide children into groups.
- Search for a cardboard that can serve as the board for the game.
- Draw a rough sketch of what the game will look like on a piece of paper.
- Propose to the children a large path to cover where we must answer questions about water, advance or go back, jump bridges, rivers, and mountains…Anything that comes to mind!
- Remember everything learned about the importance of water and the problems associated with it. Now put it into the game!
- On a piece of paper, write out the rules of the game and the questions that must be answered.
- Transfer everything to the cardboard with many colors and drawings.

Creating comic strips

Comic strips allow us to recreate, through images and short texts, situations and facts from our community.

To begin a comic strip there are a few things that we need to be aware of.

- The sequence of the comic strip.
- Follow the order of the scenes in each of the squares.

- When speaking, we all have different expressions. For example, when we speak in a normal tone of voice, when we scream, when we think of something or when we speak in a low tone of voice. In the comic strip these representations are drawn with speech balloons.

- We must also be aware of how we draw characters. Then can reflect the situation that is being represented.

A musical band with recycled materials

- We can motivate children so they can collect a good amount of recycled material like bottles, bottle caps, paint cans, paper, cardboard, and anything else that comes to mind that can be turned into a musical instrument.

- We can make a maraca out of plastic containers by placing a small amount of rice in each container and covering it with its cap, or small drums made from plastic containers placed inside out.

- Once the instruments are ready, they can be painted and create "The recycled music band."

- We can encourage the children to practice and differentiate the sounds that are made by each instrument.

- The band can play a song made up by the children as a group that allows them to tell a story or express what they think and feel about what they have learned.

Student He

Reflecting on a poem

Aside from moving and expressing emotions and feelings, poetry suggests images made with precise words about a landscape, a person, or a situation…

- Select poems written by the children or those linked with the themes studied such as nature, love, health…
- We can also take into account poetry written for children where word plays and rhymes are emphasized.
- Be aware that it is not necessary for the children to memorize poems.
- Poems can be read individually or as a group to express some emotion, all while being aware of punctuation symbols. For example, read a poem while crying, laughing out loud, or angry…and later reflect on the differences.
- If there are words that are not understood, their meanings can be looked up in a dictionary or they can be drawn. What is important is that the children themselves are the ones who interpret the poem.

- We can also suggest that the children change the order of the phrases and discuss the new meanings the poems acquire.
- Poems can contain terms related to nature and the environment. We can create a list of them and add other words that the children know of and that do not appear in the poem.
- We can also motivate participants to create a drawing of the landscape they like the most or are most impressed by.
- With the help of an adult, the children can do research and find other poems about taking care of the air or nature in general.

Writing my poem

Encourage participants to write words with each letter of the alphabet and then select the ones they like the most so they can write their own poem.

W for water
D for drink
A for …….

I write my poem

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The book of candy from yesteryear

Children like candies and sweets, so we will invite grandmothers, grandfathers, and parents who know how to make the homemade candy from their childhoods and share it with their children.

Pay close attention to write down the recipe, the ingredients, and how the candy is prepared.

Collect all the recipes and perhaps search for a few more. With them, we can compile a book to share with the rest of the children at school and in the community.

How to create a flyer

We can start by explaining to the children that when we walk in the streets of our neighborhood, it is very common to see papers stuck to posts and walls with announcements of people who have lost their pets, puppet shows, and Don Mario's fried fish for Saturday…These papers are called flyers and they can be effective at informing people about different things. For the flyer to work, we must manage for people to notice it and become interested in the information it contains.

Title or heading

- It must be simple and large.
- The size of the heading must be larger than the rest of the text. The idea is that people are able to read it quickly from a distance of approximately three meters.
- If possible, it must fit in one line and have no more than five words. It is better that it is centered.
- Simple, upper case letters should be used, since they make reading easier. Do not use handwritten letters because they disrupt reading.
- Use a color that matches the image of the flyer.

About the message

- This must be simple, so let's not complicate it. People have to be able to capture the message immediately.
- Add a photo or image. This will strengthen the message and help people remember it better.
- The photo must be centered and should not occupy more than ¾ of the page.

Use one single image. If it is absolutely necessary, we can include two images one next to the other, but anything beyond that will overcrowd the flyer, this making it less probable that it will capture people's attention.

Place a description under the image. Once readers' interest has been captured, they will come close to see more details. Try to make this descriptive text as concise and as detailed as possible; it should have a maximum of two or three lines. To emphasize keywords, use upper case letters, a slightly larger or darker font size, italics, or some other format change that will help highlight the phrases. Do not use these options all at once because, instead of highlighting these words, this will ruin the flyer.

Add contact information. If it is important to be contacted, place the contact information of a parent or teacher, with their permission.

Testing our flyer

Let's make sure our flyer works. To do this, we'll conduct various tests.

- Place it on a door and stand away three meters to try and read it.
- We will ask ourselves, do we really like this? Does it grab our attention?
- Place the flyer among other advertisements to see if it stands out.
- Ask friends or parents to give us their opinion on the flyer and try to listen to the comments from a few readers.

Making a poster

Posters combine colors, images, and words. It is a great means of communication that works very well to generate emotional impact and interest in what is being announced.

To make the poster, we should be aware of the following:

- It is better if one single idea is presented.
- Be aware of who it is intended for.
- It must be understood at first glance.
- Strengthen it with drawings or photos.
- The text must be short, clear, precise, and easy to understand and retain.
- Words should strengthen the image, not repeat what it says.
- It must be able to be seen at a certain distance.
- The size can vary, but we must consider the spaces to which we have access.

Studen

What our poster should look like

- It must be catchy.
- It must be understood at first glance.
- It must communicate a concrete message.
- It must be recorded in the memory of the reader.
- For the letters, be aware of the size and font so they are legible.
- Do not forget that people read from left to right and from top to bottom.
- Let's remember that too many dispersed elements distract readers' attention, so we should try to create a central point for the eyes to focus on easily. We can use paints, collages, felt-tip pens, chalk, etc.

Where to place our poster

- Search for a place that has enough lighting and ensure that any surrounding elements do not distract one's attention.
- If there are other posters or elements that we cannot remove, place our poster away at a good distance.
- Do not place it too high or too low.

Masks

- Masks are another way to approach "delicate" topics.
- They are easy to make and its characteristics must be exaggerated.
- We can make a very effective mask using a piece of paper or cardboard that covers the face, eyes, and part of the nose. Draw eyes, a nose and mouth on the paper or cardboard, according to the cut out.
- The mask can have an elastic band or a stick to hold it upright.

Good tips for the actors

- Since the mask has only one main expression, the actors must use their body, posture, movements, and gestures to express what they are feeling and saying.
- It is important to practice in front of a mirror and look at how others move when they are wearing their masks.
- Slow and precise movements are the most effective.
- Motivate the children to practice by demonstrating different emotions with their body. For example, love, respect, aggression, distrust, with very little or no physical contact.
- Use music to motivate movements among the participants. We can accompany these actions with drum sounds or any other percussion instrument made by the children.

Playing with real masks

- This also requires making masks.
- We also need three children to wear the masks.
- One of the children says, "These are truth masks. When I am wearing this mask, I am truthful."
- A child wears the "I am air" mask.
- Another wears the "Cut down tree" mask.
- A final child wears the "I own everything" mask.
- The child who wears the mask says what he sees through it, what he or she feels, what he or she feels about others.

REFLECTION

How did I feel being Air? How did I feel being the tree? How did I feel being the owner of everything?

What did you not like about what the tree said? About what the air said? And about what the owner of everything said?

RESEARCH

Let's conduct surveys at school, at home, or in the community to learn more about the topic we are about to communicate.

How do we do a survey?

A survey is a very effective form of research that helps us gain awareness about an issue or problem. We also learn more about the topic we are researching.

To conduct the survey in the best manner, we can do the following:

There are four stages in the development of the survey.

1. **What do we want to discover?**
2. **How will we collect the information?**
3. **How will we present and disseminate our findings?**
4. **How will we learn from the results of the survey?**

We can participate actively in each of the stages by creating questions, gathering information, creating charts to show the results and obtaining conclusions about the data we have discovered.

- To learn more about how a survey is conducted, we can do one among ourselves first.
- Each child can draw a picture on a piece of paper.
- We can take as an example of the following picture and the question will be, "Who makes the air sick?"

- To gather the information, we create a data table. We make a mark according to the answer we receive from those surveyed.

Who makes the air sick?

We then place questions on the table and write phrases about the data we have obtained. For example:

- How many children say that factories make the air sick? How many children say cars? How many children say people? How many say animals?

- Once we are familiar with the survey we can conduct one at home or in the community. We then create questions and a data table once again.

Surfing the net

Children can do the following:

- Open an email account to share information on the topics learned.

- Learn how to search for information on the browser. The most popular is Google, but it is not the only one available.

- Create a blog where writings, drawings and projects created at school or in the community can be shared.

- Chat and share experiences with other children around the world.

- Conduct interactive forums and debates where people from around the world can participate.

- Conduct social media campaigns to raise awareness about the importance of caring for nature.

- Create digital drawings through specially designed programs such as Paint.

- Make banners, signs and advertisements in digital format and disseminate them through social media and via email.

TAKING ACTION

The neighborhood and community need to know what antibiotic resistance is. To this purpose, different edu-communication activities can be conducted:

Play the video in different classes at school.

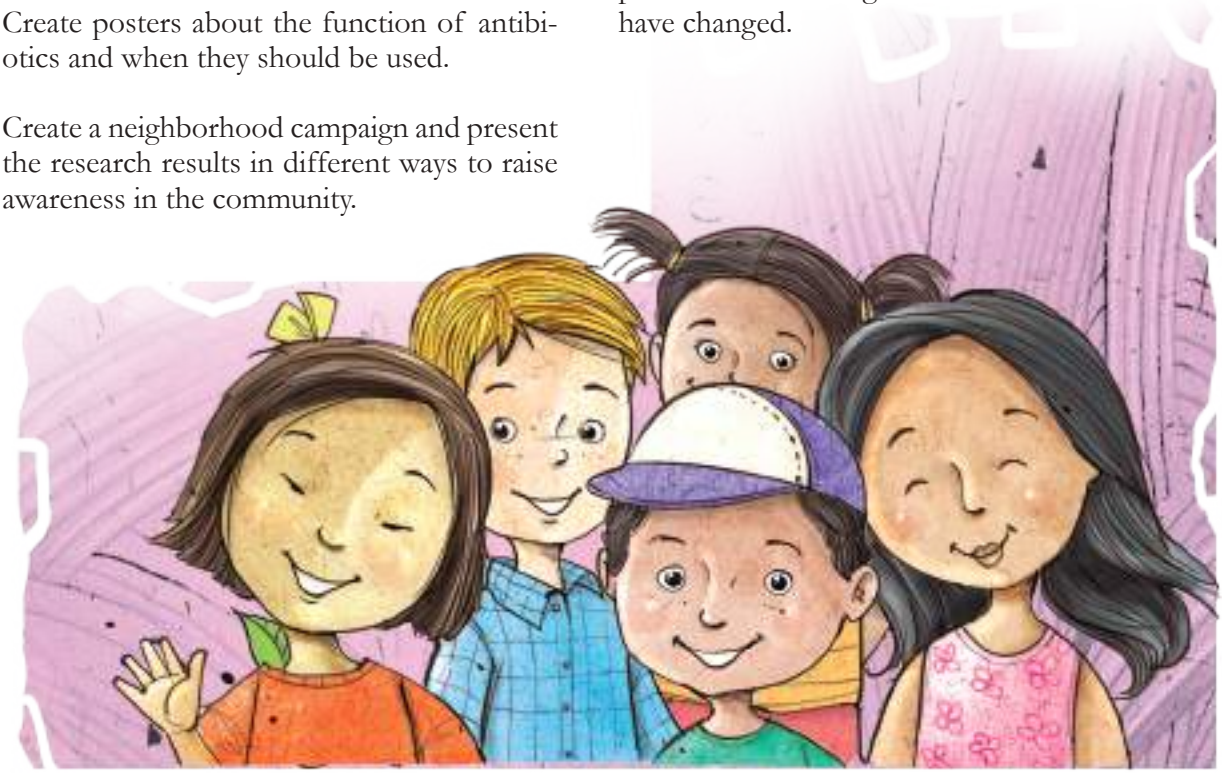
Create a puppet show about self-medication.

Create posters about the function of antibiotics and when they should be used.

Create a neighborhood campaign and present the research results in different ways to raise awareness in the community.

EVALUATION

Reflect on the different activities conducted: Were the messages clear?

Did we receive comments about our activities?

Surveys in the community can be conducted to uncover what was learned and whether any practices concerning the use of medication have changed.