

World Possible / Mundo Posible Guatemala

USING DIGITAL CONTENT FOR LEARNING

TEACHER'S GUIDE



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About World Possible

World Possible is a non-profit organization that aims to connect offline learners to the world's knowledge. We are the creators of OER2Go, a digital library of the best global learning resources such as: Wikipedia, Khan Academy, Health and Medicine, Project Gutenberg, and over 100 other educational websites that we have modified to be downloaded and distributed in rural areas.

OER2Go works through a local or wireless network, and can also run on a Raspberry Pi or on a local server, so an internet connection is not necessary. Many users access OER2Go by purchasing RACHEL (Remote Area Community Hotspot for Education & Learning), a small plug-and-play server developed by World Possible to store and share OER2Go content.

End users can access OER2Go content via a web browser on any computer, tablet or smartphone. It feels similar to accessing the Internet.

OER2Go content is free to download and is available in English, Spanish, French and other languages via www.oer2go.org.

To get to know OER2Go content, please go to www.oer2go.org. To learn more about purchasing RACHEL, visit www.worldpossible.org.

This guide was developed by Mundo Posible, World Possible's Guatemala chapter. Mundo Posible aims to improve student learning and reduce poverty by bringing offline resources to remote areas across Guatemala.

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Introduction

RACHEL - *Remote Area Community Hotspot for Education & Learning*, is a digital library designed to be used in areas where there is no internet. For teachers, it is also a tool for information, consultation and learning.

Following Guatemala as an example, just 19% of the population between 10 and 18 years old have access to internet (most of them are students of private schools located in urban areas). Furthermore, 34% of the population of the same age range has access to a console and interactive games.[1]

According to Superintendencia de Telecomunicaciones, an estimated 0.7% of the total population in Guatemala has access to the internet.[2] Between 2006 and 2014, the Guatemalan organization FUNSEPA equipped 1,444 schools with computer labs, fulfilling the criteria established by the Ministry of Education.[3]

In these schools, teachers strive to help students gain IT skills, learn Microsoft Office tools and others. However, we have found that in many of these schools, the technology resources are underutilized because the schools lack both internet and quality educational content.

Word Possible Guatemala, the first country chapter of World Possible established in 2014, aims to help improve the quality of education in Guatemala by installing RACHEL in rural, offline public schools across Guatemala, and training teachers and support staff in using RACHEL to improve learning. We have found that bringing a RACHEL server to a school with a computer lab but no internet can instantly turn a room full of dusty computers into a center for learning, and that learning is especially enhanced when we equip teachers with the skills they need to incorporate technology and offline content into their lessons.

In the next sections, you will find information about how to use RACHEL in the classroom, and our most successful methodologies for using technology to promote learning. We have also included examples of instructional sessions for Primary Level classes that can be adapted for other countries.

Who is this guide for?

This guide was especially made for teachers who dream of inspiring children to use their creativity and get excited about learning.

The key to implementing RACHEL in the classroom is finding teachers that have an interest in including new ideas into their repertoire. They should be willing to try different approaches to facilitate the learning process. In order to use RACHEL in learning, teachers just need to have basic computer knowledge.

How to use this guide

The main objective of this guide is to provide ideas and examples for making the most of the contents of RACHEL Digital Library. To do so, seven pedagogical methodologies have been included to facilitate student learning. The guide presents a description of each of them, at least one example of an activity using each methodology and an example of weekly planning, which suggests additional activities using RACHEL.

In the methodology's description (see example to the right), you will find information about the researchers that developed it, the key factors of its effectiveness, its requirements, and potential applications for the development of 21st century skills.

In the examples of activities using technology, you'll find information about the activity's topic, skills to develop, the student's level, the amount of time required, and the necessary resources.

1) Self-Organized Learning Environment (SOLE)

SOLE is a place where students are free to learn collaboratively using RACHEL or the internet.

The educator raises a big question and the students form small groups to find an answer. During the session, students are free to move around and share information or change to another group at any time, learning that there may not be a single correct answer. Toward the end of the session, each small group has the opportunity to share what they learned in the group. SOLE sessions are characterized by promoting discovery, exchange and spontaneity.

The methodology as such has the following principles:

- For children:

Start with a story

Returning back home, late in the evening, I found myself on the street with three dogs. One of them was large, with smooth and black fur, small ears and a very short tail; the second dog was a very small dog, with long ears covering its eyes, and white fur so padded that it looked like a pillow. The third dog was a stray dog, skinny with brown fur, a small face, medium ears and a long tail. Suddenly I started thinking about something: why are there several kinds of dogs? What's the point? Where do all these different dogs come from?

Raise the big question.

Now I want you to help me answer the first question: Why are there several kinds of dogs?

Group formation.

Groups of three and four students are formed. Each group chooses a coordinator and is invited to seek answers to the question. The facilitator worked as a classroom coordinator. Each group receives a

Example #1 SOLE Applied

Finally, in each example of the weekly plan for using RACHEL in the classroom, there is a section where it is possible to see the learning areas, the skills to develop in the student and the table of activities and resources. The first row of the table refers to where the information is found within the RACHEL library.

Additional information about RACHEL and its contents can be found in a different document, which we strongly recommend reading: RACHEL Guide Installation.

Using RACHEL & OER2Go to enhance learning

Public schools, especially in rural areas, still do not have internet. In a few years, if no action is taken, the lack of access to technology will become an additional exclusion mechanism for children and young people from families in poverty.

World Possible has developed an alternative to the internet that offers the features of a digital library. This technology can be installed in a school or community center, to distribute information and content through wireless or wired networks, being able to connect a laptop, a tablet, a smartphone or a desktop.

RACHEL has content that can be useful at schools and in communities. RACHEL alone cannot improve the education. However, by strategically combining technology with learning needs, you will have in RACHEL an important partner in the school. Currently RACHEL is being used in over 40 countries.

Methodologies for using offline content in the classroom

Mundo Posible Guatemala has identified eight pedagogical methodologies that integrate technology and offline content to successfully improve learning:

1. Self-Organized Learning Environments (SOLE)
2. Methodology of project-based learning (PBL)
3. The spiral of creative thinking
4. Comparative tables
5. Concept Maps
6. Mind Maps
7. KA-Lite / Khan Academy
8. Discovery at School

The next section includes a description and usage guide for each methodology.

1) Self-Organized Learning Environment (SOLE)

Self-Organized Learning Environment is a methodology where students are free to learn collaboratively using RACHEL or the internet.

The educator raises a big question and the students form small groups to find an answer. During the session, students are free to move around and share information or change to another group at any time. In doing so, they learn that there may not be a single correct answer to the big question. Toward the end of the session, each small group has the opportunity to share what they learned. SOLE sessions are characterized by promoting discovery, exchange and spontaneity.

Benefits for children

- **Motivation:** Children are self-motivated because they get to work and share interesting ideas with their friends.
- **Collaborative:** Children learn first to socialize before they internalize knowledge. Learning with a group also helps to develop memory and social skills.
- **Curiosity:** All people are born with an innate sense of curiosity. Students build their own understanding of new concepts by relating them to other concepts they already know.
- **Open Mind:** Children are able to learn faster than adults, especially when they are in a flexible environment where they are encouraged to experiment and make mistakes.
- **Transforming:** Children have the ability to think critically and change their environment.

Skills for teachers

- **Encouragement:** The most effective teachers are great companions, collaborators and supportive guides who promote independent learning in students. Access to the internet or offline content can help students explore more, and gives them the tools to respond to almost any question. This encourages them to build confidence and continue solving problems themselves.
- **Patience:** It may take longer for teachers to feel comfortable with this new technique and for children to adapt to a new way of learning. If in the beginning there is no success, keep trying and don't give up!

Items and other considerations needed for SOLE

- A computer or tablet for each group of 3-5 students
- Computers must be connected to RACHEL or the internet
- Paper or notebook and pen or pencil to take notes
- Students should be able to read and share information
- Time may vary from one to two class periods depending on the question

Steps for a SOLE session in the classroom

- Create a dynamic environment: It starts by telling a little story from which the question originates.
- The Great Question: A question is presented according to the school's content or to the community, one that will raise interest and curiosity in children. This is an important task and therefore a good question should be chosen.
- Form groups: Students form groups composed of three, four or five members. The spirit behind forming groups or teams is to generate, collaborate, share, and build knowledge. In each of the groups, it is important that members get organized. The participation of all groups should be encouraged and facilitated by a student coordinator chosen on a classroom level.
- Investigation: Groups investigate on RACHEL, the internet or other mediums, content and information related to the Big Question. Members of each group have the freedom to change groups, talk to other groups, and observe each other's work.
- Building an answer: Participants build an answer based on their research. They can present their findings in drawings, diagrams, mind maps, or other ways. They can also rehearse their presentation.
- Presentation: Groups present or exhibit what they learned to their classmates. Invite them to share their learnings with the other groups..

Why create a SOLE?

These are just some of the ways in which people can benefit from SOLEs:

Teachers	Students
• Get better results when presenting big questions. • Become more aware of student interests, and can therefore adapt their teaching accordingly. • Cultivate a learning culture powered by curiosity. • Connect to students, improving personal relationships and establishing harmony and community within the classroom. • Enhance their understanding about how much students can learn on their own. • Share their students' process of discovery through an active and engaging learning environment.	• Learn to take ownership over their learning experience. • Improve reading comprehension, conduct, language, creativity and capacity to solve problems. • Improve their computing skills. • Develop learning habits for life. • Boost their memory capacity. • Strengthen public speaking skills. • Improve the ability to complement what they already know in discussions both inside and outside the classroom. • Develop a more trusting relationship with teachers and adults in general. • Increase motivation to learn about different topics and ideas.

Suggestions

- The teacher's task is minimal and should remain in the role of a facilitator. When necessary, guide the process and be present, observing and encouraging the students' achievements.
- Whenever possible, let students discover their own answers. If students keep asking questions of you during the investigation, encourage them to utilize the resources available to them (e.g. research, reaching out to peers, etc).
- If the students have issues reading material they find in RACHEL or the internet, you can provide them with ideas or techniques on how to identify the information, but without giving them the solution.
- If a student gets distracted or bored, ask the classroom's coordinator if there's anything he or she could do to motivate the distracted student. You can also

remind everyone they are free to switch groups at any time and move around freely.

- Promote perseverance and the search for alternative solutions. Remember, many big questions can have more than one answer.
- If an entire group is off task, ask the classroom coordinator to remind the students of the remaining time they have to answer the Big Question. If the group fails to complete the assigned task, have them determine what went wrong and how they intend to work in the next session.
- Presentations can be done in a following class, when time allows.
- If a group arrives at an incorrect answer, don't worry, ask the group how they reached that answer and to share their sources.
- Always ask students to explain their findings in their own words instead of repeating what they've found verbatim.
- If you need to give the coordinator any suggestions, do so away from the students.
- Computers with big screens are better since they facilitate teamwork among students and make it easier to see what they're doing.
- Have a board to write questions or comments.
- Have signs or flip-charts with markers for the students to present their findings.
- Feel free to experiment by making changes to the structure of SOLE.

How to present an inspiring Big Question

The best thing for you is to pose a big question that inspires students to investigate and formulate possible answers related to the place where you live. However, the community from the School in the Cloud has a list of great questions that you might find interesting. Some of them are:

- Why do we have two lungs?
- If we were to find life on Mars, how do you think it would look?
- How do you think our communities will be in the future?
- How do people decide what clothes they wear?
- How do we remember and why do we forget?
- How does an SMS (text message) travel from one phone to another?
- Why do we always see the same side of the moon?

Learn about other big questions at <https://www.theschoolinthecloud.org/sole-stories/>

Activity: The story of the dogs (teenagers)

Estimated duration: 2 hours

Start with a story

On the way back home, around dusk, I came across three dogs on the street. One of them was big, with straight black fur, small ears and a very short tail. The second dog was very small, with long ears covering its eyes and fluffy white fur, and it almost looked like a pillow. The third one was a mutt, slim, brown, with a small face, medium ears and a long tail. Suddenly I started thinking, why are there so many different kinds of dogs? What's the reason? Where do all these different dogs come from?

Pose the Big Question

Now I want you to help me answer the first question. Why are there several different kinds of dogs?

Form groups

Form groups of three, four or five students. Pick a leader inside each group and invite the groups to search for answers to the question. The teacher/facilitator works as a classroom coordinator. Each group gets a computer connected to RACHEL to investigate on Wikipedia or in the different modules from the library and sheets of paper to write down the answers they found.

Investigate

The participants use the Wikipedia library found in RACHEL by writing in the search engine keywords like: dogs, canine breeds, dog show, dog's origins, dog training, etc. With each search they will find answers that they could write down.

Build the answer

The facilitator asks all the groups to build a response based on the information they have found. She/he also indicates they could make use of the flipchart, pencils, markers, masking tape, scissors, and newspaper to present their answer.

Presentation

In the presentation, observe how each group chooses different ways to present their work. When we did it, some presented by singing and dancing, some through drawings and others through a story.

Weekly Usage Plan: The Story of the Dogs

Date: From ____ to ____	Subject: Different Dog Breeds	Grade: 5th Primary School
☐ Maths	☒ Communication and Language L1	☐ Civics
☒ Natural Sciences and Technology	☐ Communication and Language L2	☐ Productivity and development
☐ Social sciences	☐ Communication and Language L3	☒ Artistic expression

	Monday	Tuesday	Wednesday	Thursday	Friday
Where to find it in RACHEL?	On Wikipedia		On Wikipedia	Health and Medicine: Illustrated Health Encyclopedia	Library / Multimedia / Videos
Activities	Using SOLE methodology, investigate: Why are there different kinds of dogs?	Presentation of the work carried out by the students.	Investigate and relate the main characteristics of living beings with at least two kinds of dogs.	Why vaccinate a dog against rabies?	Make an Origami paper dog.
Resources	Computers, bond paper or flipchart, markers, pencils, notebooks.	Table, labels, markers.	Computers, bond paper or flipchart, markers, pencils, notebooks.	Computer, Wikipedia, notebook, pencils.	Computer, speakers, construction paper, scissors.
What to reinforce?	Breeding factors, climate, adaptation, and mating.	Reward them all by taking pictures of each one.	Adaptation of dogs for certain tasks, for example: Police dog.	Symptoms of rabies in a dog	Following guidelines.

Remarks: Starting Wednesday, activities are to complement the SOLE developed on Monday and Tuesday.

Skills Gained

- ✓ Identifies living being's characteristics and the influence of different factors in their evolution and development.
- ✓ Utilizing oral communication in the exchange of ideas, information and opinions.
- ✓ Utilizing technological tools to research information and solve problems.

2) Project-Based Learning

Project-Based Learning is a learning model in which students plan, execute, and evaluate practical projects, combining activities inside and outside the classroom. The research of Dr. David Moursund shows that this method:

- Enhances problem-solving abilities
- Encourages teamwork
- Develops capabilities in searching for information, analysis, synthesis, conceptualization, systematic thinking, critical thinking, investigation and prediction
- Increases the knowledge and ability in the use of ICTs
- Promotes responsibility for one's own learning

The application of the method can have at least three approaches: Solving a problem, performing research, and producing or generating a product.

Steps to Implement Project-Based Learning

1) **Choose a subject**

- Schedule a class to discuss and identify an area of focus for the project. An easy way to do it is through brainstorming.
- Ensure the area of focus is presented in the clearest way.

2) **Plan**

- Identify the purpose and learning objective of the project.
- Establish criteria that the project must meet in order for students to fulfill learning objectives.
- Create a guide and instructions on how to carry out the project. Include the program, time and short-term goals. Usually this is shown in a work schedule.
- Establish how the student's performance will be assessed. Don't forget to evaluate both the process and the final product.
- Define how the new or necessary skills and knowledge of ICTs will be acquired.
- Organize teams. Divide the project by components and assign responsibilities.

3) **Research**

Now it's time for students to research the subject using RACHEL, books, computers, interviews, etc. An easy way to organize the desired information is by splitting it in two columns: What do we know about the subject? What do we not know about area of focus?

Encourage students to deepen their knowledge and to generate some information or guide to get to the solution they need. Students deliver products such as: notes, schemes, observations, drawings, cycles or scale models. The work plan should divide the project into a sequence of tasks, each with their schedule and goal. Make sure the students complete their tasks and partial goals one by one.

4) **Execute**

Organize what is being learned and investigated in order to apply it to the solution of the problem or to obtain the desired product. This step requires all the participants to cooperate.

5) **Present**

One way to value the effort made by the participants is to present the results to specific groups (parents, another grade, or special guests). Students will be able to choose the method for presenting their work. If you wish to have students practice their computer skills, they can prepare their presentations with PowerPoint or through a video.

6) **Assess**

Consider the entire process, including difficulties that arose, how they were solved, and whether students have acquired the skills needed to meet the learning objectives.

Activity: Let's make our own book of stories (Grade 3)

Project description

The project “Let’s make our own book of stories” is intended to have all the kids reading from the computer and taking advantage of the reading material available in RACHEL. Taking into account that parents have limited resources and may not have enough money to buy books, they’ll use digital versions, once a week for a maximum of a half hour per session.

In class, the teacher and students decide to involve their parents in the reading. They’ll read some stories available in RACHEL. Afterwards, they’ll make drawings or paste cutouts of images in blank sheets of paper and retell the story in their own words. Then they’ll take them home to read them to their parents.

They will then ask their parents to tell them a story which they will write down again, adding pictures and taking it to the school as part of their homework. Put all the stories together to make a book with them.

- I. **Subject / problem to solve:** How to make a book of stories in a creative manner with recycled materials?
- II. **General Objective:** Involving the parents to create a book with stories from the community in a creative way.
- III. **Planning, Research, Execution, Presentation and Assessment**

Learning	Methodology
Ability to illustrate scenes of a story	Drawing, using picture cutouts, making silhouettes with images
Making a book or album of stories in a creative way	Watching the video “ How to make a book of stories with recycled material ”
Drawing and painting	Mixture of aniline or vegetal with whatever roots are available Using watercolors or temperas Pasting construction paper

What has to be done?	When does it have to be done?	Who's doing it?	What are we going to need?	Results
Organize groups. Read a story in the computer, rewrite it and illustrate it.	Second week of April	Teacher and students	Computer, RACHEL, stories.	An illustrated story to take home.
Learn how a story is written, parts of the story, words often used to tell stories.	Second week of April	Teacher and students	Investigate in RACHEL how to write a story, what are the different parts of a story?	Keywords to write stories.
Write stories about the community.	Third week of April	Parents and students	Paper and pen.	Five stories about the community.
Illustrate and paint scenes from the stories	Fourth week of April	Students and teacher	Video "How to make a book of stories with recycled material" Commercial or homemade paints. Brush. Construction paper. Scissors. Paper, paperboard or paper plates.	Illustrated stories.

			Needle and thread.	
Make the album of stories from the community.	First week of May	Students and parents	The illustrated stories. Paperboard, threads, nylon, fabrics.	A book of stories made in a creative way.
Present the story books made by the students and their families	Second week of May	Students, teacher and parents	Invite the parents to make the presentation. Chairs.	A presentation activity. Sense of community.
Assess the project.	Second week of May	Students and teacher	Small meeting. Index cards or sticky notes to write on. markers. Paperboard.	A sign with things learned and comments from the participant.

Weekly Usage plan: Let's make our own book of stories

Dates: From ____ to ____	Subject: Let's make our own book of stories	Grade: 3rd
☐ Maths	☒ Communication and language L1	☐ Civics
☐ Natural Sciences and technology	☐ Communication and language L2	☐ Productivity and development
☐ Social Sciences	☐ Communication and language L3	☒ Artistic expression

	Week 1	Week 2	Week 3	Week 4	Week 5
Where to find it in RACHEL	Children's stories. RACHEL / Library / Multimedia / videos		Children's stories. RACHEL / Library / Multimedia / videos	RACHEL / Library / Multimedia / videos	
Activities	Organize groups. Read a story on the computer, write it on some paper and illustrate it. Learn how to write a story.	Write stories from the community	Illustrate and paint scenes from the stories	Make the album with the stories from the community.	Present the books of stories made by the students and their families. Assess the project
Resources	Computers, videos, speakers, paper to take notes on.	Paper and pens.	Video. Recycled materials. Paint, brushes, scissors, etc.	The illustrated stories. Cardboard, threads, nylon, fabrics. Video	Chairs. Signs with the learning done.
What to reinforce	Ask students to tell their parents about the project and ask for their support and help.	Remind the students that they have to get together with their parents to hear their stories of the community.	Parents' support. Space in which to view the videos.	Remind them to tell their stories in a creative way with their parents' help.	Invite the parents to the presentations. Chairs. Congratulate children and their parents. Display board showing notes from the students on what they learned. See examples: https://www.pinterest.ca/pin/406098091371194979/

3) The Spiral of Creativity

The Spiral of Creativity[4] is a process in which students imagine what they want to do, develop a project based on their ideas and creations, play with and experience them, share with others, and finally reflect on their experiences to restart the cycle. This process can be repeated over and over again, creating a spiral of continuous improvement. This feedback should generate a reflection on the initial solution proposal and to make revisions, if necessary.



Designing classroom activities, and framing them in this strategy, helps the teacher create challenges for students.

STEPS

Imagine

- The teacher poses a problem.
- The student begins with a period of time to discuss the problem, which allows the teacher to identify the students' existing knowledge on the subject. Stimulate students' imagination through brainstorming.
- With brainstorming, students investigate the information they need to learn more about the subject.

Create

Students create a project or propose a solution based on their ideas. This allows students to demonstrate their understanding of the concepts and ability to communicate their ideas.

Play

Explain to the students that this is the opportunity to test your ideas, practice your knowledge and build your own concepts. Sometimes, you should go back to the previous step, creating or designing another idea to solve the problem.

Share

Students come together in small groups to share their ideas to solve a problem raised and discuss the results obtained from their application. Here they may also discuss difficulties or others issues they might have encountered. Classmates are expected to come up with ideas, make comments, and ask questions to contribute to the solution. Comments, new ideas and questions become feedback for the initial solution proposal.

Reflect

Students self-assess their work, recognizing weaknesses and strengths. They also analyze the wrong steps when testing ideas in the activity.

Imagine

Students imagine other contexts in which the problem occurs and a possible solution. From the feedback received, a reflection should be generated on the initial solution to make revisions if necessary.

Teachers should establish a time for reflection for all classroom activities. This way they not only assess what their students learned, but also how they learned it. This opens the way to reflection both from the students regarding their learning, and from teachers on how to improve the classroom activities that they propose in the future.

Activity: What are plant leaves used for? (Grade 4)

Estimated Duration: 2 hours

Adapted from an original idea by Elizabeth Malte, Palmira, Colombia

Imagine: The teacher asks a question: How do you think leaves are fed? Students give different answers based on their previous knowledge.

Investigate: The teacher asks students to investigate the scientific concepts related to photosynthesis (chlorophyll, ultraviolet rays, carbon dioxide, parts of the leaf, stomata, photosynthesis, etc.) in the Wikipedia section contained within RACHEL.

Create and Play: Using the MS Paint program or paper and pencils, the students draw pictures of the process of photosynthesis, according to their understanding of what they have seen in class. You can import RACHEL images into Microsoft Paint. In addition to the drawings, they will invent stories about the process of plant feeding.

Share: With a partner, students exchange their drawings and stories. Each one will give their partner an opinion, pointing out if the drawing and the story represent the process of feeding a plant.

Reflect: At the end, there is a roundtable in which each student has the opportunity to demonstrate the understanding reached about the concepts and processes of photosynthesis.

Imagine: How does photosynthesis occur in plants, according to their size?

Weekly Usage Plan: What are plant leaves used for?

Date: From ____ to ____	Subject: What are plant leaves used for?	Grade: 4th Primary School
☐ Maths	☒ Communication and Language L1	☐ Civics
☒ Natural Sciences and Technology	☐ Communication and Language L2	☐ Productivity and development
☐ Social Sciences	☐ Communication and Language L3	☒ Artistic expression

	Monday	Tuesday	Wednesday	Thursday	Friday
Where to find it in RACHEL?	Wikipedia				
Activities	Search in Wikipedia concepts related to photosynthesis. Elaborate drawings and pictures of the concepts found on the ways in which plants are fed	Start a new cycle with the previous content. Example: How does photosynthesis occur in plants, according to their size?			
Resources	Computer and RACHEL, Paint, paper and pencils, images from Wikipedia				
What to reinforce?	Recommend the annotation of important information found in Wikipedia				

Remarks: This activity is only designed for 2 sessions in class.

Skills

- ✓ Apply knowledge to propose solutions to assumptions
- ✓ Apply skills to make a PowerPoint presentation, drafting drawings and writing stories.

4) Comparative Tables

Comparative tables organize information, which helps students identify the similarities and differences between two or more objects or events[5]. They are recommended for analyzing comparative information.

Comparative tables

- Have a specific format, which is a number of columns in which information is read from top to bottom.
- Allow items to be compared, for example similarities and differences.
- Allow you to write the characteristics of each object or event.

How to make lessons more dynamic through comparative tables

- Start with a reading, video, conference, exhibition or specific content.
- Identify the items you want to compare.
- Establish the criteria or categories to compare.
- Identify the characteristics of each object or event.
- Identify the most relevant statements of the elements compared.

Comparative tables allow students to read content in several sources and then synthesize it by comparing the elements and characteristics defined above.

The comparisons can reflect differences and similarities: positive, negative, quantity, time, proportion, form, elements, etc.

Activity: Respiratory Diseases (Grade 6)

Subject: Natural Sciences and Technology

Duration: 60 minutes

Tools: RACHEL, computer, notebooks or flipcharts, pens, masking tape.

Competencies

- ✓ Apply skills to perform analysis and synthesis of the information read
- ✓ Analyze differences between the illnesses, flu and cough, and the interdependence between them.

Steps

- 1) Students are asked to complete a flu and cough reading.
- 2) The teacher presents the criteria to be compared.
- 3) Students investigate the encyclopedia of health and medicine found in RACHEL, and the criteria for comparison. They can be organized into groups to support research.
- 4) They discuss the comparative table to review the main points found.
- 5) Each group will present its comparative table and its main conclusions.
- 6) The teacher closes the activity by highlighting the most important points of the comparisons.

Comparison between flu and cough

Phases	Flu	Cough
Definition	Respiratory infection. It weakens the epithelial defenses.	Expel air produced by respiratory irritation.
Symptoms	Cough, fever, headache, sore throat and runny nose. Pains in the body, chills, headache and sore throat.	It is a reflex that keeps the throat and airways stuck.
Causes	It is spread by direct contact, by sneezing or by coughing.	It is acquired with a cold or the flu.
Treatment	Take painkillers, take antibiotics, get plenty of rest, drink plenty of water, put a damp cloth on your forehead, use steam in your room, gargle with salt and water, cover yourself with a blanket, wash your hands, cover your mouth when you sneeze.	Drink water. Steam. Antihistamines and syrups.
Similarities	They affect the respiratory tract. There is a sore throat. For treatment it is recommended to drink plenty of water.	
Differences	The way of contagion Headache Nasal mucus Chills	

This table was prepared by: _____

Weekly Usage Plan: Respiratory Diseases

Date: From ____ to ____	Subject: Respiratory Diseases	Grade: 6th
☐ Maths	☒ Communication and Language L1	☐ Civics
☒ Natural Sciences and Technology	☐ Communication and Language L2	☐ Productivity and development
☐ Social sciences	☐ Communication and Language L3	☒ Artistic expression

	Monday	Tuesday	Wednesday	Thursday	Friday
Where to find it in RACHEL	MedlinePlus / Flu Type B MedlinePlus / Cough	MedlinePlus / Flu Type B MedlinePlus / Cough	Wikipedia / vitamin C		
Activities	1) Search in MedlinePlus for the following: Definition, symptoms, causes, treatment, coincidences, and differences. 2) Make a presentation of the comparisons made.	Develop a list of prevention activities to minimize flu and cough in students' health.	Identify a list of fruits and vegetables that generate defenses to minimize the spread of the flu and/or cold. Create a presentation indicating the properties of each fruit or vegetable.	Make a tea of chamomile, lemon, cinnamon or orange, following a community recipe or downloaded from the Internet or RACHEL.	Develop a poster about prevention and hygiene rules to paste in visible places in the school.
Resources	Computer and RACHEL Notebooks or flip charts, pencils, markers.	Microsoft Office Flip chart	Microsoft PowerPoint	Fruits or herbs according to the recipe. Water, sugar. Containers, spoon, knife, kitchen.	Cardboard, pencil, markers, crayons, masking tape, stapler, glue.

What to reinforce	Recommend the importance of writing keywords or short phrases.	Paste drawings or clippings of the activities you list.	Skills to make a presentation.	Recommend preventive measures when using knives, fire and hot water.	Remember to clean the classroom after making posters.
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Observations: It is suggested to use the comparative table for one session. Suggested activities from Tuesday to Friday are complementary.

Skills:

- ✓ Participates in health and safety activities for the benefit of individual and collective well-being
- ✓ Analyzes and synthesizes information read
- ✓ Establishes differences between the illnesses Influenza and Cough and the interdependence between them.

5) Concept Maps

The concept map is a technique used for the graphic representation of knowledge, where the connectors represent the relationships between concepts.

When a concept map is made, the student must learn to relate, to play with concepts, and to immerse themselves in the content[6]. It is not mere memorization, as attention should be paid to the relationship between concepts. This technique teaches students to:

- Generate concepts or ideas surrounding a topic
- Simplify and communicate complex ideas
- Diagnose, evaluate or measure the understanding of the subject matter
- Create meaningful learning experiences and increase success

How to make a concept map

To create a concept map, consider at least three important elements: the main topic, the connectors and the secondary or tertiary concepts.

- Write the main topic within a geometric figure (such as a circle or a square), in the center of the sheet or work area. Always start in the center so you can expand outward.
- Write the words links (connectors) to generate new ideas or new concepts. Think of categories for the word links. Usually, the links do not go inside any geometric figure.
- Draw lines to link the main topic with the words links and the secondary concepts.
- Write the concepts or secondary ideas inside squares, circles, triangles or other geometric figures.
- Use different background colors and texts for each level.

How to use it concept maps the classroom

- Define whether you are going to build the map using educational software (Cmap Tools, FreeMind, and Graph Editor or another) or paper.
- Start with content that is being studied in class: a story or text.
- All students are assigned a task.
- The teacher makes sure that the students can find the information in RACHEL.
- Form groups of 3-5 students.
- The subject or content to be investigated must allow content creation and connection.

- A time is set to conduct research on the assigned topic.
- A time is established for the elaboration of the concept map.
- At the end, each group presents a concept map of the content read and analyzed.

Likewise, this technique can be used to analyze the problems of the community, which leads students to investigate different subjects, read, analyze, think and represent information graphically.

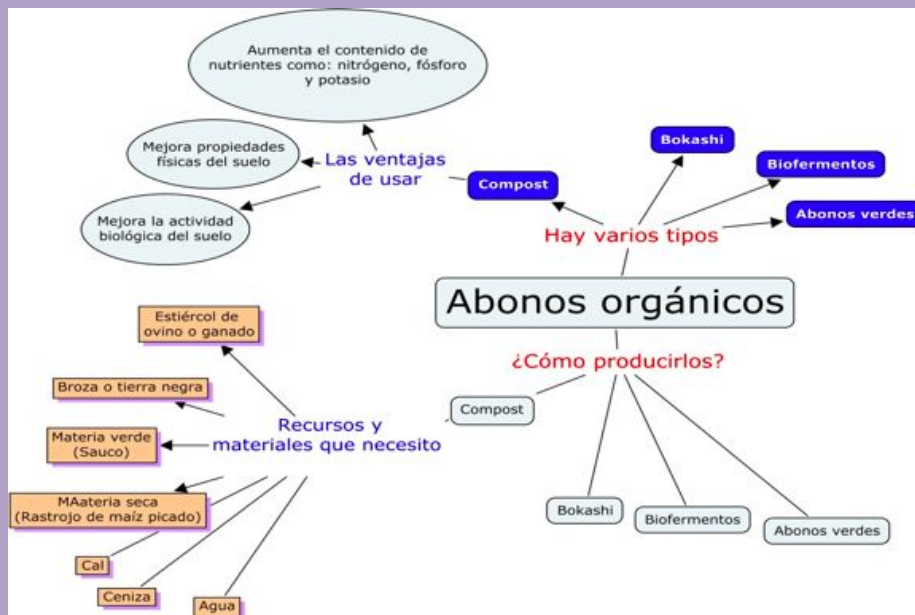
Activity: Organic Fertilizers (Grade 6)

Area: Social studies

Duration: 1 hour

Description

- 1) The teacher explains how apply the study concept map technique.
- 2) Students form work teams.
- 3) Each team identifies a reading on Organic Fertilizers in the Practical Solutions section of RACHEL.
- 4) As students read the document, each group develops a concept map.
- 5) At the end, students will paste their concept maps on the classroom walls and a member of the group must explain the map.
- 6) The teacher closes by explaining the contributions of each concept map and the use of the link words (Connectors)



Weekly Usage Plan: Organic Fertilizers

Date: From ____ to ____	Subject: Organic fertilizers	Grade: Grade 6
☐ Maths	☒ Language and communication L1	☐ Citizen education
☒ Natural Sciences and Technology	☐ Language and communication L2	☒ Development and productivity
☐ Social Sciences	☐ Language and communication L3	☒ Artistic expression

	Monday	Tuesday	Wednesday	Thursday	Friday
Where to find it in RACHEL	Agriculture	Agriculture	Agriculture		
Activities	Build a concept map on organic fertilizers, using the information read in the document "Making of organic fertilizers of compost type"	Build a concept map about the "Sheep feed"	Build a concept map on rabbits' breeding	Using the town's map, identify and label the areas of agricultural production (types) and livestock production	Present the complete concept maps
Resources	Cmap Tools, or paper Computer, RACHEL, markers and pens	Cmap Tools, or paper Computer, RACHEL, markers and pens	Cmap Tools, or paper Computer, RACHEL, markers and pens	Town map, drawings on agricultural and livestock production, scissors, glue, masking tape	Computer s, posters
What to reinforce	Provide guidance on the use of the link words (connectors)	In case of using CmapTools, provide guidance on the background colors,	In case of using CmapTools, provide guidance on file export (jpg, pdf y html). If paper was used, take	Evaluate the town's production in each community.	

		shapes, and font size	pictures of the concept maps		
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Comments: It is suggested to use the concept map for one session. The suggested activities from Tuesday through Friday are complementary or can be done using the concept map.

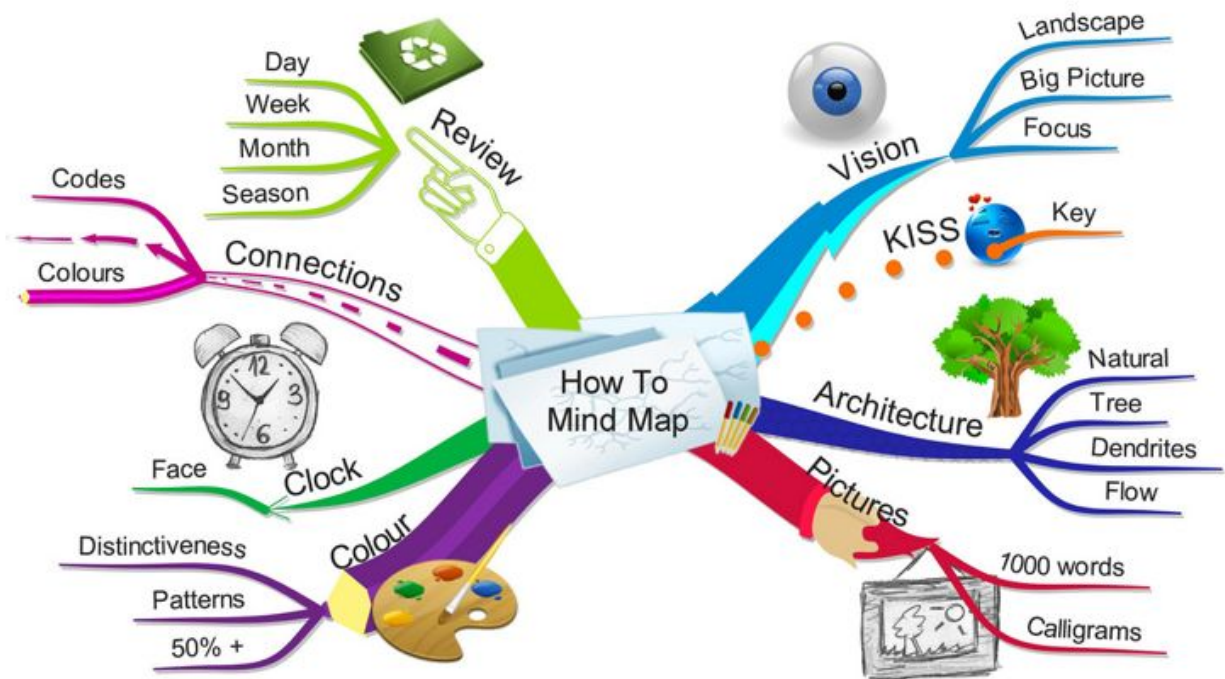
Skills

- ✓ Relates natural resources with life development and with the productive activities of his/her community or town.
- ✓ Evaluates economic activities of the town.
- ✓ Applies skills to build a concept map using Cmap Tools or paper.

6) Mind Maps

A mind map is a graphic tool that allows us to imagine, create, and discover our mind's potential by using images and connecting ideas. This technique helps students:

- Generate and introduce information in the brain in a multidimensional way.
- Use the brain to stimulate, associate, and clarify ideas.
- Foster concentration, memorization, organization and planning.
- Promote communication in a visual way.
- Easily consult and remember.
- Make decisions easily, as well as solve problems by showing new possible paths.



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<https://www.flickr.com/photos/lex-photographic/14413800892> with no modifications

Steps

1. Begin in the middle of a white paper. This way, ideas can move in every direction.
2. Draw in the middle an image which symbolizes the main idea. Remember the phrase: "An image is worth a thousand words."

3. Use many colors. Colors awaken your creativity and bring vitality and positive energy.
4. Starting from the main idea, draw branches in different colors, writing key words next to the line. Start with thick lines, but every time the lines become thinner as more ideas are generated.
5. Draw curved lines instead of straight lines. Curved lines inspire more interest.
6. Use one or two keywords for each idea. It is easier to remember a word than a phrase. Moreover, each of these keywords, by itself, can generate new branches.
7. Use as many images as possible. The more you use, the more appealing the map will be.

Activity: Cat and Dog and the Egg (Grade 4)

Areas: Communication, Language, Natural Sciences, and Technology

Activity: Reading Comprehension/Mind Map

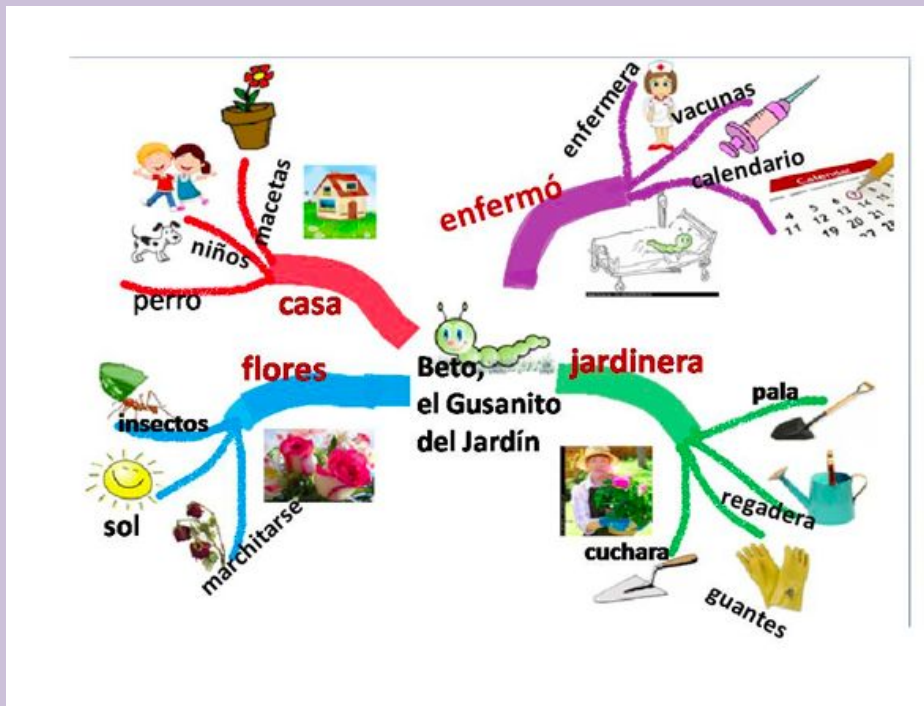
Duration: 2 hours

Competencies: Recreates the story of the tale read through images and ideas related to the keywords in a mind map.

Process:

- Teacher explains to students that they will learn to modify or recreate a tale or story using the mind mapping technique. The goal is to use their creativity to represent the main story or its details.
- In groups of four, students read the story “Cat and Dog and the Egg” in RACHEL.
- On a paper they will create a mind map starting with the story read and adding secondary ideas which are not present in the story. They can also draw and paint illustrations, or use cut outs.
- Use creativity to tell a different story.
- Once the mind map is ready, write the story on a separate piece of paper including the changes or additions to it.
- Each group must explain their mind map and read the story built upon it.
- To finalize, the teacher will congratulate everyone on their good stories.

The following is an example of a mind map:



Weekly Usage Plan: Cat and dog and the egg

Date: From ____ to ____	Subject: Animals	Grade: 4th
☐ Maths	☒ Language and communication L1	☐ Citizen education
☒ Natural Sciences and Technology	☐ Language and communication L2	☐ Development and productivity
☐ Social Sciences	☐ Language and communication L3	☒ Artistic expression

	Monday	Tuesday	Wednesday	Thursday	Friday
Find in RACHEL	Cat and dog module				
Activities	Read the story “Cat and Dog and the Egg” and based on the reading identify the scenes of the story. Draw or cut out images of the story scenes. Create a mind map adding other ideas to the story. Write the story and present it.	Make puppets based on the story and write a small dialogue created by the students themselves.	Perform a play of the story using the puppets made.		
Resources	Computer, RACHEL, flipchart/board, markers, and images downloaded from internet, crayons.	Recycled materials (fabrics, plastic, bottles, cardboard, buttons, others), glue, markers	A rope and a sheet of paper		
What to reinforce?	Recommend the use of the seven rules to create a mind map.	Guide students on the correct use of materials and resources	Provide guidance on the tone and modulation of each character's voice		

Notes: The mind map activity is suggested for 2 hours. The remaining activities after Monday are complementary.

Skills

- ✓ Recreate the story of a tale read through related images and ideas with keywords on a mind map.
- ✓ Construct mind map from a reading or story.
- ✓ Research information and images using RACHEL or the internet.

7) Learning with KA-Lite (Khan Academy)

KA-Lite is an open source software for learning that includes videos and interactive activities. The software includes math exercises from Khan Academy, where the system tracks progress and reports on each student.

Why use Khan Academy videos?

- Allows for personalized learning
- Time flexibility
- The student takes ownership of their learning.
- Allows teachers to monitor the progress of each student
- Learning based on subject mastery
- Interactive learning

This methodology is based on support for learning to master mathematical skills. Student can repeat videos and/or exercises as many times as they wish.

With KA-Lite the teacher can help students develop the ability to mentor other students, which encourages a culture of self-learning, as well as peer-learning.

Suggestions for teachers

- The teacher explores and reviews subjects and watches the videos. This will help them to suggest exercises on specific subjects.
- Create student accounts[7] in KA-Lite.
- Assign self-learning tasks based on the available content on KA-Lite. The teacher should take on a tutoring role for these learning activities.
- KA-Lite can be used inside or outside the classroom, as long as students have access to devices and RACHEL.
- Divide the class into two groups, assign each of the groups different subjects. Each group has a specific time frame to learn a specific subject with KA-Lite. When they finish they must share their learning with a classmate from another group.
- In the classroom, play a video for the class with the help of speakers. When the video is finished, ask all students whether they understood the content. The teacher reinforces the explanation after watching the video and begins a discussion about it.

Activity: Addition & Subtraction (Grade 3)

Duration: 60 minutes

Resources: Computers, RACHEL Library, notebook, pencil.

Relationship between subjects

SUBJECT	COMPETENCIES	INDICATORS	CONTENTS
Maths	Identify mathematical elements that contribute to the rescue, protection and conservation of a social, natural, and cultural environment.	Perform calculations using addition and subtraction in the set of natural numbers, in an area of up to 100,000.	Estimate sums of addition and subtraction operations.

Objective: Students will be able to perform addition and subtraction calculations using appropriate mathematical operations

Process

Introduction

- Create groups of 3 or 4 students. Half of the groups will learn addition by carrying, while the other half will learn subtraction by regrouping.
- Ask each group to enter the KA-Lite section (in RACHEL). Then enter the following path: Mathematics / Arithmetic and Pre-algebra / Addition and Subtraction.
- Watch the video while taking notes on the procedures for resolving addition by carrying and subtraction by regrouping. They will be free to take several pauses and watch the video as many times as needed to solve the problems.

Apply what has been learned

The teacher asks the students to log on to the "Practice This Concept" section. The software will provide equations for students to solve as well as a response box in which to record their responses. To check if the answer is correct, click on the "verify solution" button. If the answer is correct, they will move on to the next exercise.

Students can continue to practice additional exercises using school textbooks or worksheets.

Share knowledge

Students change groups to share their learning with another classmate. It must be someone who has not learned the same thing.

Conclusions

Reinforce the students' learning by opening a space for comments, questions and learning. Invite students to share their learning experiences.

- What I learned
- What I taught others
- My goals

Evaluate the learning, participation, collaboration of students and learning outcomes by observing and monitoring each group.

Weekly Usage Plan: Addition & Subtraction

Date: From ____ to ____	Topic: Addition & Subtraction	Grade: 3rd
✓ Maths	☐ Communication and language L1	☐ Civics
☐ Natural Sciences and Technology	☐ Communication and language L2	☐ Productivity and development
☐ Social Sciences	☐ Communication and language L3	☐ Artistic expression

	Monday	Tuesday	Wednesday	Thursday	Friday
Find in RACHEL	KaLite / Mathematics / Arithmetic and pre-algebra / addition and subtraction	Local math textbook	KaLite / Mathematics / Arithmetic and pre-algebra / additions and subtractions	Local math textbook	
Activities	Watch the videos about addition with two digits and addition with carrying. Practice addition with three digits and addition with carrying (exercises)	Solve the addition equations in the “Additions” section	Watch videos about subtraction with two digits and subtraction with borrowing. Practice subtraction with three digits and subtraction with borrowing (exercises).	Solve the problems in the “Subtraction section	Resolving calculations that involve adding and subtracting .
Resources	Computer KaLite / Khan Academy Notebooks and pencils	Math textbook, Computer, RACHEL, notebooks and pencils.	Computer KaLite / Khan Academy Notebooks and pencils	Math textbook, computer, RACHEL, notebooks and pencils.	Notebooks, pencils.

What to reinforce	The rules for addition with carrying and addition of rounded numbers (hundreds, tens)	Review the answers	The rules for subtraction with borrowing	Review the answers	Review the answers
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Suggestions

- Ensure that every student is logged in to the KA Lite software with their username and password. This is necessary in order for the system to register their progress.
- KA-Lite sessions in the classroom will depend on the time available, allowing teacher discretion in that matter.
- The activities outlined in this program from Tuesday onwards are supplementary.

Competences

- ☐ Carrying out additions and subtractions with numbers up to three (3) digits
- ☐ Applying rules for addition with carrying and subtraction with borrowing
- ☐ Applying the reverse relation between addition and subtraction to calculate the results.

8) Learning with Edutainment

This section will reference the Discovery at School[8] methodology, which helps incorporate fun educational videos and podcasts into your classroom activities. These types of resources are often referred to as “Edutainment” – videos or podcasts that are both entertaining and educational.

Some examples of edutainment on RACHEL are:

- TED Talks
- Radiolab podcasts

If you have access to the Internet, here are some other options to explore:

- http://english.discoveryenlaescuela.com/about_us (English and Spanish)
- <http://www.ubongokids.com/> (English and Kiswahili)

If you have access to a television in your classroom, you may also find educational programs such as Ubongo in Tanzania and Discovery en la Escuela in Guatemala. These programs often contain scientific, technological and cultural information for young learners that strive to make learning fun. Additional resources can be found on the web as well, such as videos and their descriptions, didactic guides, exercise suggestions, games and worksheets for students.

Why use edutainment in the classroom?

- Enriches curricular development
- Audiovisual media can make the learning process easier
- Develops critical thinking
- Encourages self-esteem
- Stimulates curiosity for knowledge
- Teachers can learn by watching the videos
- Combines both learning and entertainment

Guidelines for using edutainment in the classroom

Before the class

- Watch the whole video or listen to the whole podcast and decide which resources to use, why, and for what purpose.
- Do not feel obliged to show whole video or listen to the whole podcast in a single session.

- Keep a copy of the list of topics close at hand. It does not matter if the order of the lessons is different.
- Analyze which other subjects could benefit from the same video/podcast and share it with your colleagues.
- Prepare your class: decide how and when to show the selected video/podcast.
- Plan questions or activities for the three key points: before the video/podcast, during the video/podcast and after the video/podcast.

During the class

- Encourage a learning environment. Do not turn the lights off! The students are working and need to see what they are writing.
- Show the selected video/podcast to the students, providing the big picture of what they will find.
- Use the K-W-L Chart (What I **K**now, what I **W**ant to learn and what I **L**earned) in order to conduct the session.

K-W-L Chart: example of use

What I know	What I want to learn	What I learned
Before watching the video	During the video	After watching the video
Ask questions to assess previous knowledge on the topic	Ask key questions about the information that I want my students to gather from that video section	Elaborate the answers using the information I expect my students to have deduced from the video
Students write down the information they know. It does not matter if it is correct or not, as the content will be reviewed during the video section.	Students write down new information: Who? What? When? Where? Why? How?	Students compare the information in order to confirm, modify or put together and ratify the information they previously had.
Students can write down an idea or a broad sentence about the topic.	Students identify information that supports their idea or reasoning.	Students reflect on issues or questions that may arise after comparing what they found out with their initial idea.

Describe: The video is paused at the beginning, using that time to describe what they see or guess what they will see.	Infer: After having watched a video section, they will be asked to predict what will happen next.	Interpret: After watching the whole video, encourage the students to think about whether the information could be of use in real life.
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- Before watching the video/podcast, ask the students to write down what they know about the topic. Write it down in the “WHAT I KNOW” column.
- Show the video/podcast. While watching/listening, they will write down key points that they want to know about or delve into (two or three at the beginning, halfway through and at the end).
- Invite the students to solve some worksheets (questionnaires, puzzles, etc.)
- Each student must write down what they learned in the third column of the K-W-L Chart.
- Assess the effect of the presented section.
- Summarize the video at the end.

Activity: Learning Through Edutainment (Grade 3)

Title: Breathing for living (respiratory system)

Area: Social and Natural Sciences

Duration: 60 minutes

Skills: Identifying the structure and function of the human body’s respiratory system.

Resources: Computers, RACHEL library, flipcharts, sheets with questions, permanent markers, masking tape, photocopies about the respiratory system and crosswords.

Description

The goal of this activity is getting the students to reflect on the importance of developing habits such as protecting the respiratory system, preserving the environment and practicing physical activities in order to follow a healthy lifestyle. Learning the parts of the respiratory system and how it operates only makes sense if the student works on following a healthy lifestyle and developing critical thinking about their behaviors and those of their surrounding community. It also seeks to develop a critical thinking stance regarding projects or recreational spaces (green areas) in their existing city or community, as well as proposing ideas to improve the quality of the oxygen that they breathe.

This activity includes observing and analyzing a video, “Meet the Lungs,” found in RACHEL in the Khan Academy module. Then it includes solving a worksheet by using the Puzzle technique, and finally responding to questions regarding the topic and writing down the learning about how the respiratory system works.

The learning assessment is recommended through participation, collaboration, respect for peers and development of communication skills.

Approach

What I know	What I want to learn	What I learned
Before watching the video	During the video	After watching the video
Carry out a breathing demonstration (inhaling-exhaling), instructing the group to cover their nostrils with their fingers and their mouth shut. Ask: How long can a person hold their breath?	The longest time a person can hold their breath.	Check your answer.
What is happening inside our lungs when breathing?	After watching the part about the exchange of gases, ask: Which gases are exchanged in the breathing process?	Why is it important to breathe in clean air?
Why are cars said to pollute the environment?	How is the air that we breathe cleaned?	What can we do to breathe clean air?
How do the lungs provide breathing for the entire body?	How is oxygen transported throughout the body?	Write down an idea or action that would keep the respiratory system healthy.
Describe: What is the role of the diaphragm in breathing?	Infer: How would physical exercise affect the diaphragm?	Interpret: Could we use this knowledge to improve the function of our respiratory system?

Ending the activity

Reinforce this work session with a reflection on the importance of keeping environments free of air pollution, the existence of recreational parks and the physical activity needed to be healthy.

Watch the video again to summarize the topic.

Ask the students to write and share their learning and personal commitments.

- What I learned
- My commitments

Useful websites

<http://worldpossible.org>

www.theschoolinthecloud.org

www.khanacademy.org

www.discoveryenlaescuela.com/english

www.edutopia.org

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[2] SIT, 2003

[3] Funsepa, Memoria de labores, 2014

[4] Created by Dr. Mitchel Resnick

[5] Teach and Create (*Educa y Crea*). <http://www.educaycrea.blogspot.com/>

[6] Joseph Novak

[7] Read RACHEL's installation guide which includes the technical development Kit

[8] Discovery Networks Latin America /US Hispanic (DLA /USH).

<http://www.discoveryenlaescuela.com/>