Ecosystems tell us stories

GLOBE		Associated SDG	Type of Activity
Sphere	**Protocols**		
Biosphere	Land Cover Classification Phenology	15: Life on Land 13: Climate Action	Communication

Overview

Stories are remembered, stories connect and that is why they can be a very good educational tool to improve students' understanding of facts or aspects that we would like them to know. Reconstructing the history of a place helps to understand why it is the way it is and, based on that, to design the future that is expected. With this activity, students will reconstruct the history of a place and dream its future using local observations and techniques such as storytelling and stop motion.

Time

60 minutes

Prerequisites

None

School level

All

Purpose

With this activity, students will detect the changes that a place has gone through to become what it is today and will document the changes that are happening today to dream the future scenarios they would like to see in the selected site.

Student Outcomes

- Students will describe the most important historical events in their community
- Students will record the changes that some element of their ecosystem goes through over time
- Students will construct a story from real events in their ecosystem and observed changes to plan for the future they would expect to see in the place where they live

Background

In general, scientific topics are usually difficult to understand. Most of the times this happens because they are presented as a collection of facts with a lot of information that must be analyzed at the same time. This does not facilitate learning on the part of the student, since a great memory and reasoning capacity would be necessary for many elements in a short time (Negrete and Lartigue 2004).

According the above mentioned, storytelling is considered a powerful educational tool because it improves the understanding of a series of facts, transforming reality into a sequence of events (with cause-effect analysis) that includes emotion (Rowcliffe,2004). Writing stories... "helps the writer consolidate ideas and stimulates creativity, encouraging the development of new hypotheses and the creation of new challenges"... (Mantas, 2016).

In this regard, a story could be defined as.... "a narrative unit that can fix the affective meaning of its component elements... by orienting our feelings about its content" ... (Peterat and Egan, 1988). This emotional connection to the facts makes a story easier to remember and therefore helps to enhance the learning of what is told.

Storytelling and science have things in common: they both need a narrator (observer), a story (connecting the facts through cause-effect analysis about the most important observations, facilitating their incorporation within a context) and an ending (results and conclusion). Good stories allow us to connect things and to discover what is going to happen in the future step by step (scene by scene), something that is interesting for our memory. Stories are not only facts, they are also creation, inspiration and fun. It is important to remember that some facts stay in our mind longer depending on how exciting they are.

Ecosystems, defined as spatial and temporal units where living beings interact with one another, as well as with the abiotic environment that surrounds them, are characterized by a constant flow of energy and a cyclical movement of nutrients. An ecosystem is an open system in which there are inputs and outputs of energy that ensure its stability and permanence over time (Starr & Taggard 2004; Odum & Barret, 2006). Energy flow and nutrient cycling make it possible for ecosystems to change over time. Sometimes these changes are gradual and sometimes they occur from one moment to the next (Folke, 2006). Recording these changes reveals a lot about a place and helps us know what we might do to redesign the space we would like to live in. Ecosystems tell us stories and that is why the technique of storytelling can be of great help to connect us more with the environment in which we live.

Guiding Research Questions

- What are the changes that the place where we live has gone through in the last 10 years?
- How long does it take to change some aspect of the ecosystem in which we live?
- What changes would we like to see in our ecosystem?

Scientific Concepts

- Ecosystem
- System
- Stability
- Emergency
- Resilience
- Transformability
- Adaptability

Materials and Tools

- Paper
- Pencils
- Camera
- Photographs of the place from any period
- Color Pencils
- Books of the local area

What to Do and How to Do It

- ***Beginning***
  - Teachers ask their students to bring in pictures or images they can find of the place where they live.
  - The students in groups share opinions about the photos they brought, analyzing whether the locations remain the same or have changed over time.
  - Next, the class identifies a place in the school or city that they like best and justifies their choice.

- ***Development***
  - The students ask their parents and grandparents about what the chosen place was like before and take notes on what they gather from older people.
  - Students then assemble a story of the place they chose. The following sequence of steps is suggested for this purpose (Richie et al., 2008; Norris,2020).

    - <u>To decide what they want to achieve with their story</u>: What is their goal?
      - To motivate?
      - To persuade listeners to do something?
      - To report?
      - To entertain?

    - <u>To identify the most important message they want to convey and the main characters of the story.</u>
      - What relevant information did they find about the place?
      - What important data supports the information?
      - Will the main characters represent local people? Or will they be local plants or animals?

    - <u>To identify the audience for the story:</u> Who are they? What do they do? Where do they spend most of their time? What places do they visit to entertain themselves?
      - Schoolmates?
      - City neighbours?
      - All of them?

    - <u>To design the plot of the story:</u> For this they can use a story arc (see suggested resources), which is the basis of many of the stories known.

- The beginning: In this part it is very important to connect with the audience. For this the students can start with the motivation to tell the story, involving the audience "...Remember when..." starting with something known by everyone will help, it will set the stage for what follows. In the beginning it is important to say where the story takes place, that is to describe the setting.
- Presentation of the issue: To tell the audience what is happening with the place they are presenting. What has happened to it in the last few years? Has it changed? How has it changed? "... over time this place stopped having green areas and now there are not enough plants...". Data can be used here. Data to be meaningful must be compared to things the audience can understand.
- Failed attempts: To say if there have been any problem-solving initiatives that did not work well. Some metaphors can be used here to categorize, associate or infer information.
- The solution: Based on the story put together, to converse with the audience about what they would like this place to be like, contrasting the ideas with some facts or examples from other places. This process enhances metacognition.
- The end: The students can establish some agreement about how to start transforming their selected place the way they want.

- As students tell their stories, they can use photographs of the place or images to help them give more meaning to their words. To work on their images, students can use the stop motion technique. This is a technique that allows them to make static objects appear to move by making a sequence of photographs. Through this technique they can create stories.
  - The students choose a special place and create a photo shooting station '.
  - The students take photographs of any element of the ecosystem at the same time every day and from the same angle for a month.
  - They animate the photographs using video programs. Some are suggested in the Resources section.

- ***Closing***
  - The students present their stories using a socio-drama. They need to remember that socio-dramas are performances to showcase an aspect of reality using gestures, actions and words. For the socio-drama they only need to choose the topic to be represented and have the group members talk about the topic, what they know about it and how they live and understand it. Finally, they create the plot by assigning roles to each person in the group.
  - The students make an exhibition of sequential photos and/or videos to show the changes they captured of the ecosystem.

Frequently Asked Questions

What if we don't identify a place to take pictures anywhere near the school to record changes?

You can plant some seedlings in pots and take photographs to see how they grow over time, document the changes they go through from germination, and tell their story.

Why do we talk so much about stability in ecosystems and why is it so important?

Above all, ecosystems are systems: a set of biotic and abiotic elements that related to each other in a coherent way help to form a whole. All these elements must have the ability to regulate each other, so that they can cope with disturbances and keep functioning properly (this is stability).

Do ecosystems always remain stable?

Ecosystems always tend to be stable. However, this does not mean that they stay the same. Stability is dynamic with small changes that allow for novelty. When new components appear in the system, often times as a result of human actions, the possibility of new properties emerging in the ecosystem is greater. These properties can be positive or negative. The good news is that ecosystems are resilient (maintain their essence) to a certain level of disturbance.

What is resilience?

Resilience can be defined as the capacity of an ecosystem to absorb disturbances and reorganize itself as it undergoes change. The resilience of an ecosystem ensures that it continues to hold the same function, structure, identity and feedback as before the disturbance (Walker et al., 2004). If disturbances are very large, then ecosystems are transformed and, in the face of these transformations, the only thing left for living things to do is to adapt to the changes.

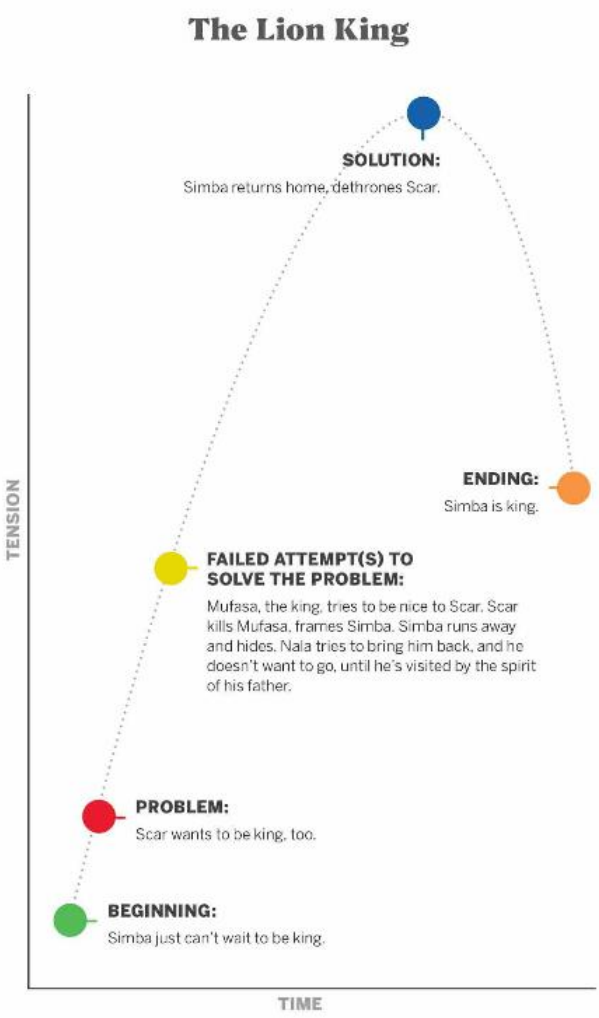
There are several activities proposed, do we have to do them all?

Of course not. A few options have been presented so that you can select the one that best fits your reality. On the one hand, maybe you just want to document the change of some aspect of your ecosystem, such as the growth of a flower, On the other hand, maybe you just want to reconstruct the history of a place by interviewing the elderly or, as a third option, you have decided to talk about the future you would like to see in the place where you live.

Resources

- Stop motion animation app: Stop Motion Studio - Apps on Google Play

- ***Plot Type Arc to elaborate stories***



Source: Norris, 2020

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