

Content package for interactive whiteboards (ES): The tropical rainforest

This guideline provides an overview of the content and didactic context of the media in the content package for interactive whiteboards entitled “The tropical rainforest.”

General information on the use and teaching concept of the content packages for interactive whiteboards is provided in the teaching method “Working with a content package for interactive whiteboards,” which is also included in the media package.

1 Introduction to teaching this topic

1.1 Motivation for the topic

The conservation of natural resources is an important topic in the teaching program of elementary schools in some countries. This includes ecological and environmental education. Specifically, the topic of “rainforests” can serve as an example to make students aware that the challenges of sustainable forestry do not cover just the forest at our doorsteps, but also the future prospects of all rainforests and the people, animals and plants that live there.

The otherwise rather abstract concept of sustainability can be conveyed in a way that students understand using a variety of approaches, examples, and illustrations based on the example of tropical rainforests. The students develop the insight to closely analyze usage systems, compare them with their own behavior, and only then to pass judgment. In this context, it makes sense to cover the topic of “tropical rainforests” using an interdisciplinary approach.

1.2 Media selection

The content package for interactive whiteboards entitled “The tropical rainforest” contains 23 individual media.

- 1 photo: Mechanical deforestation
- 3 graphics: Image for discussion on rainforests, a simple mind map on tropical rainforests, and a mandala for coloring
- 5 interactive graphics: Layer structure of tropical rainforests, one interactive graphic each on the plant life and animal life of tropical rainforests, dangers to tropical rainforests, and an interactive world map to get to know the rainforest regions
- 4 interactive exercises: On the plant and animal life of rainforests, an interactive mind map, a cloze test, and a multiple-choice test
- 1 worksheet with answer sheet for reflection upon one’s own “rainforest-friendly” behavior
- 4 information sheets: On tropical rainforests in general and one each on the plants, animals, and people in tropical rainforests
- 1 set of experimentation instructions with teacher information on the local water cycle
- 1 guideline for teachers
- 1 link list

1.3 Background information for teachers

The content package for interactive whiteboards should convey a picture of tropical rainforests to the students on the basis of a clear visual illustration and simple explanations. Graphic and textual media specifically designed to meet the needs of the age group should help the students get to know the rainforest as a habitat, its importance, its diversity, and the threat it faces from humans.

The media of the content package can be used individually and completely independently from each other. However, the lessons will certainly be livelier when the media are used in combination. This provides the chance to spark interest in the technical details, a fuller awareness of diversity, and the willingness to change opinions and attitudes, based on the meaning for the students' lives. To that end, we recommend working through the topics in the following order:

- The tropical rainforest – Introduction to the topic
- The rainforest as a habitat
- The ecosystem of the rainforest
- The destruction of rainforests
- Protection of rainforests
- Further study

It is recommended that teachers work through the topics in the following steps:

- Introduction/motivation
- Practical work phase
- Reinforcement phase

Note: The button for calling up each medium is also indicated in the following list of media.

2 The tropical rainforest – Introduction to the topic

2.1 Introduction

The cover image of the content package is suitable as a silent prompt to introduce the topic. This graphic shows a sketch of a tropical rainforest as well as plants and animals that live there. Teachers can conduct a brainstorming session with students on the subject and write the developed keywords into the medium by hand. These notes can be saved as a screenshot and always called up again as needed as a reminder or to visualize the learning progress.

Medium



“The tropical rainforest”

The developed terms could also be supplemented and compared with the terms in the mind map “Ecosystem of tropical rainforests” (see Section 4.1) included in the content package. In this way, the students are provided with an early overview of the aspects they can expect during the learning unit. They can always check what topics have already been completed and what topic will then follow. At this point, teachers can encourage the students to express their own interests by using the mind map as a “hit parade”: Possibly at the end of the class or during a break, the students could be allowed to communicate their opinions by placing red and green dots on the interactive whiteboard, thus indicating their likes and dislikes for certain content. The teachers can use the result to further structure the lesson.

2.2 Working through the topic

Tropical rainforests are not found in all regions of the world. Certain climatic conditions must prevail for a tropical rainforest to develop. These conditions are found only at and near the equator. For this reason, the large tropical rainforests are located only in these regions. This means that the tropical rainforests of the world are in Central and South America, Africa, Southeast Asia, and Oceania. The students should get to know these regions and understand the connection with the equator and its climatic conditions. The following interactive medium serves this purpose: a world

map shows the tropical rainforest regions. Certain regions can be magnified by clicking them, and typical plants and animals of those regions and the country names are displayed.

Medium



“Where are the tropical rainforests?”

A rainforest’s layers are characteristic for its structure. Its external appearance is frequently compared with a house. Some plants and animals live on the “ground floor,” some on the “second floor” known as the understory, and others live in the “attic,” the overstory. Practically speaking, this means that the layer of seedlings and shrubs is found on the forest floor, the tree layer and leaf canopy are on the second floor, and the emergent trees or forest giants are in the attic. It should be mentioned at this point that some specialist literature divides the rainforest layers even further, resulting in up to five layers. The interactive graphic provided is however restricted to the simpler division into three layers.

The following graphic picks up the main motif of the content package. The rainforest can be labeled interactively: By clicking the blue and green dots at the edge, teachers can display both the names of the layers (green dots) and the height information (blue dots).

Medium



“The layers of tropical rainforests”

Note: Teachers can ask some students to draw their own house on “The layers” interactive graphic. Then the height information can be shown, and some other students can be asked to draw their houses (true to scale). This will lead to a discussion of heights of houses, and teachers should keep a measuring stick at hand to measure the height of the classroom. This provides a basis for extrapolating to the relative heights prevailing in rainforests.

2.3 Reinforcement

We recommend a review of the learned material in class to reinforce the contents of the introduction to “tropical rainforests.” The interactive graphic on the rainforest’s layer structure and the world map on the rainforest regions can be used to name and repeat the essential content once more. Teachers can write important points on the whiteboard using the pen function. They can ask additional questions, such as “How far away from us are the tropical rainforests?” or “How long would it take to drive there?” The distances can be clarified based on the graphic. Teachers can ask the students to draw in the trees of their schoolyard on the rainforest layers graphic using the pen function, in order to convey an impression of the scales involved.

3 The rainforest as a habitat

A tropical rainforest is not only the habitat for countless plants, but also the basis of life for a multitude of animals. At least 75 percent of all currently known plant and animal species can be found in tropical rainforests, and some scientists speak of even 90 percent. The vast majority of animals are insects, such as beetles and ants. Mammals, including the familiar rainforest dwellers such as orangutans, gorillas, and tapirs, constitute the minority of tropical biodiversity.

All animals in tropical rainforests have adapted perfectly to the living conditions there. They live in certain layers and eat very specific food. This high degree of specialization resulted in the great variety of species. In addition to hosting plants and animals, tropical rainforests provide a home to people, mostly indigenous peoples. These include the Yanomami and Penan tribes, which live in harmony with nature and respect the flora and fauna.

3.1 Introduction

We recommend teachers use the image “The tropical rainforest” to facilitate the introduction to the topic of “The rainforest as a habitat.” The first thing to catch the students’ eyes will likely be the animals.

Teachers can conduct a brainstorming session to sensitize the students to the topic. The teachers could ask the question of whether other “inhabitants” live in tropical rainforests besides animals, in order to make the children aware that tropical rainforests are equally the habitat for people, animals, and plants.

Medium



“The tropical rainforest”

3.2 Working through the topic

The topic of “The rainforest as a habitat” is divided into four subtopics:

- Tropical rainforests in general
- Plants of tropical rainforests
- Animals of tropical rainforests
- People in tropical rainforests

An information sheet is available for each of these subtopics. The cooperative learning method of the jigsaw technique is therefore well suited for working through the topic. The class is divided into groups of four. Each child is the expert for his or her subtopic and can exchange information on that subtopic with the experts of the other groups, with the help of the information sheet.

(More detailed information on the jigsaw technique can be found via the link list for this content package.)

Media



“What is a tropical rainforest?”



“Plants in tropical rainforests”



“Animals in tropical rainforests”



“People in tropical rainforests”

3.3 Reinforcement

We recommend short presentations given by the expert groups from the jigsaw technique to reinforce the contents of the introduction. To integrate the acquired knowledge – also with the layer structure of tropical rainforests – teachers can use interactive graphics for visual support of the presentations on the plants and animals in tropical rainforests. “Animals in the South American rainforest” contains typical animals, and the students gain insight into the variety of species of tropical rainforests. The graphic shows the layer structure of tropical rainforests, which can be “labeled” with various animals (by clicking the dots).

Medium



“Animals in the South American rainforest”

Guideline

The interactive graphic “Plants in tropical rainforests” contains typical plants from tropical rainforests. It shows the layer structure of tropical rainforests, which can be “labeled” with various plants (by clicking the dots).

Medium



“Plants in tropical rainforests”

When all expert groups have presented their results, all students in the class will have become “experts” in the topic of “The rainforest as a habitat.” The “traffic light” method (for details, see the link list for the content package) is suitable for checking the children’s knowledge. With this method, teachers make assertions on the topic (for visualization, these can also be written on a blank page on the whiteboard using the pen function) and the children vote on them with three colored cards. If the children agree, they hold up their green cards, if they disagree, the red card, and if they partially agree, then the yellow card. Examples of assertions are “All animals in tropical rainforests live on the ground” or “The people in tropical rainforests live off of hunting and the gathering of fruits.” We recommend the following matching exercise to conclude the topic of “The rainforest as a habitat” and review and consolidate important content:

Medium



“Animals and plants in tropical rainforests”

Note: The teachers can first structure this graphic as a partner search exercise. To do so, they can print the graphic and cut it up into individual cards. Each child receives a card, either with a picture and name of an animal or with the written clue. The students must find their partner, and then together they can use the interactive exercise to check whether they have found the correct partner. Large classes can be divided into two groups for this exercise.

4 The ecosystem of the rainforest

The ecosystem of tropical rainforests is important not only to its inhabitants covering a wide range of species (biodiversity). It also greatly influences the global climate. Tropical rainforests are often referred to as the “green lungs” of the earth, because they absorb large volumes of carbon dioxide and produce more oxygen than they consume (at least the “young” growing rainforests). They can then release this spare oxygen into the atmosphere.

The global and local water cycles are especially important to the ecosystem of tropical rainforests. Three-quarters of the water circulating in a tropical rainforest never leaves the tropical rainforest (local water cycle); one-quarter is exchanged with oceans via trade winds and rivers (global cycle).

4.1 Introduction

The goal of this topic and the following experiment is to amaze the students by how brilliantly the local water cycle of tropical rainforests is structured. In addition, the topic should initiate a transfer of knowledge about the disturbances that could occur in the water cycle, what could cause these disturbances, and what global impact that would have. The mind map can be used again to introduce the topic. The class can discuss which topics have already been covered and which have not yet been covered. Teachers can guide the focus to the “functions” and have the students brainstorm. For visualization, the first ideas on the topic can be written on a blank page on the whiteboard using the pen function.

Media



“Ecosystem of tropical rainforests”



“Ecosystem of tropical rainforests (matching exercise)”

4.2 Working through the topic

In working through the topic, teachers should focus especially on the local water cycle within tropical rainforests. The “Water cycle experiment” can be used for the students to work through the topic independently. The students can work individually or in pairs, gathering insights into the water cycle by observing the experiment setup over several hours, and comparing their insights within the group at the end of the school day.

Since the experiment extends over several hours, we recommend that it be started immediately in the first hour of the school day.

Media



“Water cycle experiment”



“Water cycle experiment (teacher information)”

Note: The teachers should point out to the children that the local water cycle can also be disturbed and the negative consequences for the global climate that this would lead to. It may make sense to have the children do some additional research on the Internet. In addition, the teachers should point out the importance of water cycles in all regions of the earth.

4.3 Reinforcement

The cloze test on “Ecosystem of tropical rainforests” is used to reinforce the results of the topic. It can be worked through in class.

Medium



“Why are tropical rainforests important? (cloze test)”

5 Destruction of rainforests

The United Nations declared 2011 the International Year of Forests. And with good reason: Every year, increasingly large forest areas disappear from our planet. The global forest area in 2010 was 4,033 million hectares, corresponding to 31 percent of the earth’s total land area. The loss of tropical rainforests in particular is really dramatic. According to information from the UN Food and Agriculture Organization (FAO), in countries where there are tropical rainforests, more than 500,000 hectares of forest area were lost on average every year between 2005 and 2010 (source: FAO 2010, see link list for the content package). The most prevalent causes for the loss are the creation of pastureland and the cultivation of feed crops for factory farming and plants for producing biofuels. The consumer behavior in rich countries thus plays a key role in the destruction of rainforests.

And in 2012, the Brazilian government legalized the clearing of its rainforests.

5.1 Introduction

The intention of the topic of “Destruction of rainforests” is to sensitize the students to the topic. The photo collage on “mechanical deforestation” could be used to facilitate the introduction to the topic.

It can be used to prompt discussion in class. Teachers can write the children's ideas and existing knowledge directly on the whiteboard using the pen function.

Medium



“Mechanical deforestation”

5.2 Working through the topic

Having the students do independent Internet research individually or in pairs would be suitable for working through the content. Useful and sensible Web addresses can be found in the link list (e.g., link to the “Medienwerkstatt”). This will encourage the children to work independently, and they will process the knowledge more intensively.

5.3 Reinforcement

The interactive graphic “Dangers to tropical rainforests” is suitable for review and reinforcement of the content. It addresses the destruction through pastureland, agricultural cultivation areas, acquisition of wood as a building material, depletion of natural resources, building of dams, and expansion of the road network. The graphic provides a broad, complex view of the various types of exploitation and destruction of tropical rainforests. It first shows a picture of an intact rainforest. After “Start” is clicked, every click of “Next” displays a danger to tropical rainforests and the intact tropical rainforest is gradually “destroyed” in the picture in the middle. In addition, brief descriptions of the individual dangers can be displayed by clicking the “Explanation” button.

As one possibility, the students can name the dangers themselves and then compare their answers with the graphic.

Medium



“Dangers to tropical rainforests”

6 Protection of rainforests

An important purpose within this topic is to make the students aware of the destruction of tropical rainforests. Another purpose is to sensitize them to how everything is connected to everything else: Even a purchase decision at the supermarket can have negative consequences for tropical rainforests. That's because due to globalization in recent decades, the global economy has become intertwined in many ways, mostly to the disadvantage of poorer countries.

But it would be too short-sighted to explain just the negative extent, the consequences, and the reasons for the destruction to the children. They must learn about alternative actions. They should become aware that each and every consumer can have an influence through his or her purchasing behavior and lifestyle. The topic of “protection of rainforests” should create an awareness among the children that each individual can make a small, personal contribution to the protection of tropical rainforests and the climate. Through the worksheet “Rainforest-friendly behavior,” the children learn about opportunities they have to protect the rainforest ecosystem and learn how their own activities affect rainforests.

Medium



“Rainforest-friendly behavior” (with answer sheet)

Spotlight: Rainforest protection begins “at home.” This can be easily understood, for example, by how paper is handled. The class could conduct a mini project on paper recycling for a while and cover content such as collecting waste paper in class, documenting it, and coming up with possible

ways to save paper, the production of recycling paper, including making paper themselves. The question of how their own city deals with waste paper could also be interesting.

7 Further study and continuation

A multiple-choice test on the topic of rainforests can be given to the class as a group or individually to test the students' general knowledge on the topic.

Medium



“Rainforest experts”

These links related to tropical rainforests offer opportunities for further study and continuation. The links are divided into websites for students (WebQuests, student searches, etc.) and websites for teachers (background information).

Medium



“Link list for ‘The tropical rainforest (ES)’ interactive whiteboard content”