

Overcoming water shortages – a task for the future for everyone!

Project with a product orientation

When the project is completed, the students will have concrete products that visualize their work and display the work results.

Appropriate media are available on the Siemens Stiftung Media Portal for completing the individual project steps.

Combining conventional and digital technologies

Depending on the school's and students' equipment, the online searches should be conducted and the work results presented using digital tools such as notepads, tablets, or desktop PCs. This of course requires that a projector or digital whiteboard be available in the classroom. PowerPoint or the freeware Impress is recommended as the presentation program or app. More specialized programs such as One Note, MyBookMachine, and MasterTool are also practical. Of course, Word and the freeware Write, for example, are also suitable for creating project newspapers. Mind map programs such as the academic ThinkBetter and the freeware Freemind and Freeplane have proven useful for organizing and evaluating intermediate results for discussion and also for presenting final results. Incidentally, simple drawing and painting programs such as Paint and freeware such as Inkscape can support the students in presenting their work.

In addition, the class should not completely give up the traditional paper format. Ideally, each student group should have its own projector or an extremely large monitor for discussion and deliberation within the group; posters and paper printouts assist further in this. (Naturally, if the students' notepads or tablets are networked via corresponding coworking software so that everyone can see the same thing simultaneously, that is an excellent solution).

Educational posters for visualization

In addition to the constant presence in the classroom, an educational poster offers the advantage that the students themselves take on the task of visualizing the content they have found in their searches.

(That is, if they do not do so in digital format, as already mentioned above.)

A summary of important content is presented clearly on a large sheet of paper; the educational poster is hung in the room (for example, on a bulletin board). Due to the fact that the students have designed the poster themselves, they will be able to remember the learned material better; later, the material will be constantly repeated because the poster is always in view.

Attention: When creating educational posters, students often spend too much time on unnecessary design details (which cannot be seen from far away). Slower students in particular need more precise instructions in separating important information from unimportant information.

A project newspaper lends itself better for providing details.

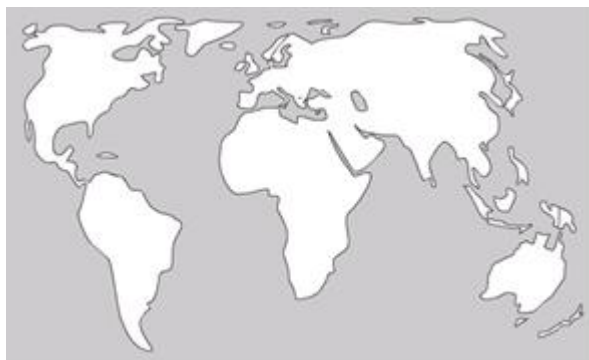
Project newspaper for details

The students will report on their project results using text and images. That can be done in classic "printed" format, but for older students in particular, a good choice is digital production and presentation, resulting in an online version on the school's internal network. That's because the chance for students to present their results to a real audience is typically highly motivating.

Making the project newspaper available on the public internet may be most appealing to the students, but this form of publication has proven unsuccessful. In this case, the risk is too great that copyrights may be violated, which can cause trouble for both the teacher and the school. (Online publication would be possible only if the students have used OER media exclusively under an open license and all texts used are presented as citations and properly identified.)

Step 1: Atlas task

Work assignment



With the aid of an atlas, the students should identify the regions and countries that are currently severely affected by a water shortage. The areas can be marked on a world map.

Solution hint

Currently, several countries of the “Old World” arid belt from northern Africa to the Arabian Peninsula and toward Central Asia (Uzbekistan) are most severely affected by water shortages. The list also includes a few Sahel countries (for example, Burkina Faso) and countries in the Horn of Africa (Somalia, Kenya) and southern Africa (South Africa, Zimbabwe); Rwanda and Burundi are also affected. Other parts of the world (Denmark, Poland, Czech Republic, Romania, Haiti, and South Korea) are currently suffering from water shortage.

Maps could also be drawn up for individual countries showing regional arid zones (the Swabian Mountains in Germany, Oklahoma in the United States, etc).

For this and the subsequent work assignments, the students could be encouraged to search on the official websites of the United Nations, UNESCO, FAO, WHO, Brot für die Welt (in Germany), Misereor, and various NGOs to find current maps, tables, overview graphics, and photos. The teacher should not mention specific links or websites to the students; rather, the students should learn to find useful information on their own by entering suitable search terms and phrases. This is the only way the students will learn that real research is somewhat different from tapping on links provided by YouTube, Snapchat, Facebook, Instagram, and other social media on their smartphones.

Step 2: Determining causes

Work assignment

Similarly, with the aid of an atlas or the sources mentioned above, the students should identify the country-specific causes of the water shortages.

The students can prepare the results as a presentation. Each group informs the other groups about the results.

Solution hint

The primary cause of the water shortages in northern Africa, the Middle East, eastern and southern Africa, and Central Asia is the arid climate conditions prevalent there. In Central Eastern Eu-

rope, the water problems are based on the specific combination of precipitation conditions and water pollution. In addition, the students should find out the extent to which climate change will increasingly play a role in water shortages.

Step 3: Finding solutions

Beginning with the media on the Media Portal and possibly independent research online, the students can look for solutions.

They can also make a distinction between measures taken by governments and nongovernmental organizations (NGOs). Would the students add any other demands?

Many organizations (such as Fastenopfer in Switzerland, Brot für die Welt in Germany, the UN) are advocating for a world water convention with the following demands:

- Each person has the right to sufficient amounts of clean drinking water.
- Water is a public commodity.
- Water needs to be protected.
- Wasting of water must be stopped.
- A secure water supply system must be guaranteed for all.
- A global water convention is necessary.

An opportunity for value formation in class

The subjects of “water shortages” and “aid for the suffering population in water-scarce areas” are ideally suited for raising questions beyond the aspects of science and technology. For example: Wouldn't it be better to fight the poverty of the elderly, unemployed, and socially disadvantaged in so-called “rich countries” rather than to spend money on aid in Africa or South America? The students could weigh opposing interests and discuss the following points: local versus regional interests, national versus international, short-term versus long-term, economic versus social. The students may independently recognize that ethical and moral principles do not necessarily conflict with rational arguments, and perhaps might even be based on them. Good information is also available from the aforementioned sources for such a value-forming dialogue.

Step 4: Visualizing the results

Designing an educational poster

The solutions the students have found are ideal for creating an educational poster.

An educational poster contains the most important information that can be grasped quickly.

Therefore, it makes sense to

- write down only the important information
- visually highlight the most important information by means of font size and different colors and shapes (for example, rectangles, circles, ovals)
- make sure the information is clearly structured.

Projected graphics, such as mind maps, can replace or supplement such an educational poster.

Designing a project newspaper

The students' search results and ideas can be presented as a newspaper with articles, photos, illustrations (also photo collages), etc. in various columns.

The main learning objectives are getting to know the “hand tools” (writing of texts, producing charts and tables, taking photos, creating graphics, etc.).

(Idea: Invite an editor from a local newspaper to report on his or her work and to answer questions from the project group.)

In addition to the formulation of content for articles, the creative design of the newspaper is also an essential component of this assignment. The newspaper can be produced by hand (affixing the articles to a sheet of paper in newspaper format) or designed using a computer.

Another possibility is creating a digital newspaper, which can then also be posted online.

Possible columns for a project newspaper:

- Areas that are suffering from water shortages (today and in the future); easy to depict on maps and in similar illustrations.
- Living and doing business in arid regions; easy to implement, for example, as a fictitious interview or “life stories” from affected persons.
- Causes and reasons; for example, news items as bullet points or in information boxes, charts.
- Solutions; this column is suitable for longer reports with images, possibly also links to additional information.