

AP[®] Environmental Science

ACCESS TO CLEAN WATER

Student Workbook



AP[®] with WE Service



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Getting to Know the Topic

Access to Clean Water: Globally

In 2010, the UN declared access to clean water to be a universal human right. There are more than 780 million people who live without access to clean water. Without access to sanitation facilities, diseases like cholera, typhoid, and dysentery spread quickly.

Many students—most often girls—miss school due to illness, or because they spend their days hauling water from distant sources rather than attending class. When drought strikes, farms fail and entire villages can go hungry. In times like these, access to clean water can mean the difference between life and death.

Fast facts

- ▶ In many developing countries, up to 70% of industrial waste materials are disposed of in untreated water polluting the water supply.
- ▶ Almost 900 children die every day from diarrhoeal diseases caused by unsafe water and poor sanitation.
- ▶ Approximately 70% of water taken from rivers, lakes, and aquifers is used for farming and irrigation.

Taking Action Globally

There are a number of ways that students can take action in their own school and community to improve access to clean water in developing communities around the world. Some ideas include:

- ▶ Volunteer at an organization that works with global issues—many organizations offer ways to get involved on their websites and in their offices
- ▶ Collect supplies (in consultation with the organization) or raise funds for an organization that will share the outcomes of the donations
- ▶ Create a letter writing campaign to the United Nations, government bodies, and other leaders to ask for added resources on the issue

Another option is to support and fundraise for the WE Villages program. Students can support this program by visiting [WE.org/we-schools/program/campaigns](https://www.we.org/we-schools/program/campaigns) to get ideas and resources for taking action on global water issues.



More than 840 million people do not have a basic drinking water service.

Getting to Know the Topic

Access to Clean Water: Locally

Water scarcity and water sustainability issues affect millions of Americans. There is a water crisis in the U.S. southwest, where water regulators have mandated conservation and enforced restrictions on how individuals, farms, and businesses can use water due to regularly reoccurring drought conditions.

Low rainfalls mean that above-ground lakes are falling to low levels and even drying up. One resource that is affected is the Colorado River Basin, which is essential to the daily lives of people in urban and rural areas, as well as for agriculture and economies in seven states: Arizona, California, Colorado, New Mexico, Nevada, Utah, and Wyoming. With the continuing drought, these states are in danger of exhausting their groundwater reserves which, once depleted, cannot be replenished.

Fast facts

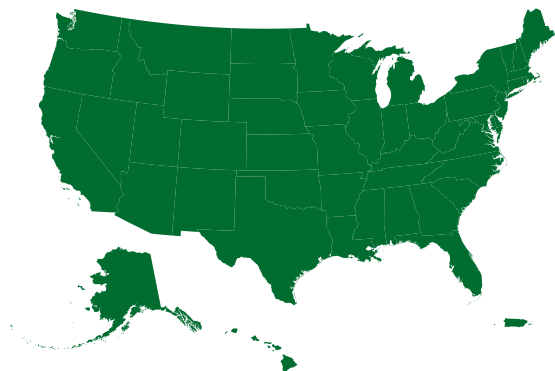
- ▶ The Colorado River Basin lost 65 cubic kilometers—or 17 trillion gallons—of water in 2004–2013.
- ▶ This river supplies water to 40 million people and irrigates 4 million acres of farmland in 7 U.S. states.
- ▶ In California, farms account for 80% of water use (cities are 20%).

Taking Action Locally

Within their local or national community, students can:

- ▶ Work with a local organization addressing the topic
- ▶ Collect goods and items that support the needs of organizations and their local beneficiaries (e.g., non-perishable items for food banks, warm clothes and personal hygiene products for the local homeless shelter, etc.)
- ▶ Create and deliver an educational workshop to raise awareness about the topic and its local impact with a strong call to action that leads to enacting change

With both their global and local actions, encourage students to be creative with the ideas they develop through their action plans.



40 out of 50 states have at least one region that is expected to face some kind of water shortage in the next 10 years.



NAME: _____

TEAM MEMBERS: _____

(1 of 1)

Problem Tree

In your Problem Tree graphic organizer, start by writing the problem in the trunk of the tree, and then look at the causes and effects of an issue. Keep digging to go deeper on the issue to find its supporting and root causes.

Leaves/branches: Effects

These are the results created by the problem. At first, this part of the issue appears easy to tackle, but when leaves and branches are trimmed, they grow back quickly. Consider the multi-layered effects, or “effects of effects,” that can arise when a problem goes unaddressed. Always ask: “Then what happens?”

Ex. Depletion of groundwater reserves

Trunk: Problem

This is the key issue that is being studied. Because it is not as apparent as the leaves, the core problem itself sometimes takes a little longer to identify.

Ex. Access to clean water

Roots: Causes

These are the situations or factors that have led to the problem. When exploring the root causes of a problem, ask yourself “Why does this problem exist?” Dig deeper to consider the “causes of causes”—the multiple layers of factors that contribute to a problem.

Ex. Climate change and extended droughts

Student Worksheet: Personal Water Use Chart

In the U.S., most of us have access to some of the safest treated water in the world. This is not the case in other parts of the world, where clean water is not as easy as turning on the tap. Water is an important part of our daily lives and we use it for a wide variety of purposes, but do we really understand how much we use?

In this activity, you will track your water use for one week. We will then calculate the average water use in the class and the community in general.

ACTIVITY	M	T	W	TH	F	S	S	TOTAL # OF TIMES	ESTIMATED WATER USED (GALLONS)	TOTAL WEEKLY WATER USE (GALLONS)
Washing face/hands									1	
Taking a shower									50	
Taking a bath									40	
Flushing a toilet									5	
Brushing teeth									2	
Drinking water									0.25	
Cooking a meal									3	
Washing dishes by hand									10	
Washing dishes using dishwasher									15	
Washing a load of laundry									30	
Washing car									50	
Watering lawn									300	
TOTAL										

Average Weekly Water Use of the Class _____

Average Daily Water Use of the Class _____

Average Daily Water Use of the Town _____

In some parts of the world, water is not readily available and you would have to walk miles to a well to retrieve water to use in your home. Would you be willing to walk to a well and carry all the water you would need for a day back to your home?



NAME: _____

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Needs Assessment

The following series of questions helps you to analyze and identify ongoing areas of need within organizations addressing your issue.

1. Identify 3-5 organizations working on issues related to the issue your team is working on.

2. What does each organization do well in response to the issue and/or related issues?

3. What could each organization do better in its response?

4. What areas of need related to access to your issue have you learned about that each organization is NOT addressing?

5. Considering all 3-5 organizations, where are there ongoing needs that are not being adequately addressed?

6. Considering all 3-5 organizations, where are there ongoing needs that are being addressed successfully, and to which you can add further efforts to support the issue?



NAME: _____

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Solution Tree

(1 of 1)

In your Solution Tree graphic organizer, start by rewriting the problem from your Problem Tree, and reframing it as a goal at the trunk of the tree. Then consider the different solutions (the roots) and possible outcomes of the solutions (the branches).

Leaves/branches: Outcomes

These are the results created by the solution. Results may appear as straightforward as having achieved goals, but when you consider the ripple effects and outcomes of sustainable results, the impact is far-reaching and long-lasting. Always ask: "Then what happens?"

Trunk: Problem

Trunk: Goal

Roots: Solutions

These are the actions needed to solve the problem and achieve the goal stated at the center of the Solution Tree. When exploring solutions, ask yourself "How will this solve the problem?" Dig deeper to think holistically, so that you are looking beyond the short-term and addressing not only the symptoms of the problem but the root causes as well.

Solution Tree Worksheet: Copyright © 2018 WE. All rights reserved.



NAME: _____

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Reflect: Investigate and Learn

(1 of 1)

Now that you have investigated problems and potential solutions associated with access to clean water, think back over what you have learned: How can what you are learning in your AP® Environmental Science class support solutions that improve access to clean water?

Record your thoughts on the lines below. If you run out of room on this page, use additional paper to write a lengthier response. As you write, think about the following questions to help shape your reflection:



NAME: _____

TEAM MEMBERS: _____

Summarizing Your Investigation

(1 of 1)

Summarize what you have learned from your investigation. Your work may be supported by multimedia or print materials that synthesize and analyze the topic and issue on local and global levels.

When summarizing your investigation, keep the following in mind:

- ▶ What are the key takeaways from your investigation of the issue of access to clean water?
- ▶ How are the problems you investigated similar at local and global levels? How are they different?
- ▶ How are the solutions you investigated similar at local and global levels? How are they different?
- ▶ Why may your investigation be important to other AP® Environmental Science students?



Approaches to Taking Action Information Sheet

(1 of 1)

DIRECT SERVICE

WHAT IS IT?	Personally engaging with and providing hands-on service to those in need (usually in conjunction with an organization).	
EXAMPLE GOAL	By the end of the semester, we will support a local food bank and shelter by packing and serving food to people in the community. We will also visit our neighboring elementary school and teach a lesson on food insecurity in our community.	
ACTIONS	<ul style="list-style-type: none"> Reach out to local shelters and food banks to arrange a day for the class to visit and provide hands-on support Once a date has been decided, make sure students all have permission to travel to the food bank (if during school hours) 	<ul style="list-style-type: none"> Connect with teachers/administration at local elementary school and arrange to visit a classroom to teach a lesson to young students on food insecurity Create and print worksheets to use with younger students

INDIRECT SERVICE

WHAT IS IT?	Channeling resources to the needs of a community—locally, nationally, or internationally.	
EXAMPLE GOAL	By the end of the year, we will create a storage and donation system for local families in need, where they can access furniture and other household items. We will develop a system for donations, pick-ups, and inventory.	
ACTIONS	<ul style="list-style-type: none"> Conduct research into which items are most needed by community members (e.g., bed frames, dining tables, household goods, etc.) Reach out to local businesses to try to get a storage space donated Connect with school social workers/administration to gain their support Put up flyers around school and in the community, asking for donations (list specific items needed), including instructions on how/where to donate 	<ul style="list-style-type: none"> Develop an online database for tracking donations and pick-ups, and maintaining inventory Share pick-up information with local shelters, churches, community centers, etc. Share the donation system with school social workers, so that they can maintain the project in future years

ADVOCACY

WHAT IS IT?	Educating others about an issue to increase visibility and following up with an action that focuses on enacting change. Actions around advocacy often look like raising awareness, but without a strong call to action within the initiative as a whole. Educating others is not considered service in and of itself.	
EXAMPLE GOAL	Through an informative art piece, we will educate our school community about the waste created by single-use plastic water bottles, and the impact they have on the environment. Then, we will sell reusable water bottles at school, and the proceeds from the sale will go toward clean water projects in developing countries.	
ACTIONS	<ul style="list-style-type: none"> Research the impact of single-use plastic water bottles around the school and in the local community Plan out and create a 3D sculpture that incorporates informative text on the issue of single-use plastics Seek permission from school administration to display the piece in a common area of the school 	<ul style="list-style-type: none"> Design and order water bottles to sell at school Research and select an international organization that focuses on clean water projects Organize a selling schedule for the water bottles, donate profits



NAME: _____

TEAM MEMBERS: _____

Creating the Action Plan

This outline serves as a basic template for your action plan. Use additional space and resources to help you build out each part with the right amount of detail and flow to ensure you have the strongest action plan that you and your team can implement with ease. Remember, this is your road map for your service project!

TEAM GOAL:

MEASURES OF SUCCESS:

Required Network and Resources

In order to complete this goal, our team will need to develop the following network and access the following resources:

NETWORK:

RESOURCES:

ROLES AND RESPONSIBILITIES

Each team member will take on the following roles and associated responsibilities:

TIMELINE

Our team will use the following timeline to complete tasks and successfully carry out the action to meet our goal(s):



NAME: _____

TEAM MEMBERS: _____

Five Action Planning Pitfalls Tip Sheet

(1 of 1)

Once your team has completed the major components of your action plan (creating your teams and setting goals, timeline, and network), review the five action planning pitfalls provided below to ensure these have been avoided. Review your plans—individually first, then together as a team. After the review, rework your action plans, if necessary.

1. Setting an unclear goal

The first and most important part of any action plan is defining the goal, or what you want to achieve. It should be clear and easy to understand, for example, “We want to collect 500 cans of food,” or “We want 200 people to learn about WE Villages.” If the goal is not clearly defined, proper planning will be difficult if not impossible. As a best practice, have a peer from another team review your goal to ensure it is as clear as you hope.

2. Planning unrealistic actions

After the goal is set, begin planning the actions necessary to achieve it. It is important that the steps make sense and are achievable. Do not plan unrealistic actions, such as working at times that will interfere with schoolwork, overestimating how many people can help out, or planning to go to places that would be difficult for you to reach. Consider each team member’s school and community schedule, such as work and extracurricular activities. Before planning an action, ask yourself, “Is this action realistic?”

3. Rushing the process

Do not be too hasty in planning actions. While you may be excited to start, proper planning takes time. The better the planning and organization, the more

success you will achieve. Even if it means slowing down to figure out details, do not rush and leave out important steps.

4. Not asking for help

Do not be afraid to ask for help. When a network is created, bigger goals can be achieved faster. Reach out to friends, parents, and mentors. People generally enjoy helping, especially if it is for a worthy cause.

5. Not learning from mistakes and giving up too quickly

We all make mistakes—it is normal and healthy. Mistakes allow us the opportunity to learn and grow. So, learn from the mistakes. Ask, “Why did this happen?” and “How can I avoid this problem next time?” Actively think about the mistakes and how it will be better the second time around. If something does not go as planned, do not stop!



NAME: _____

TEAM MEMBERS: _____

Reflect: Action Plan

(1 of 1)

Your team now has a plan for taking action globally and locally. Think back over what you have learned: What problems associated with access to education does your team's action plan address? How does your individual role in the plan support your team's action?

Record your thoughts on the lines below. If you run out of room on this page, use additional paper to write a lengthier response. As you write, think about the questions on the previous page to help shape your reflection.



NAME: _____

TEAM MEMBERS: _____

Student Log Sheet

DATE / TIME SPENT	ACTIVITY, DESCRIPTION, AND REFLECTION	VERIFIED BY (NAME, ORGANIZATION)

Notes

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