

WATER IS LIFE



VOLUME II EDUCATIONAL MATERIAL

A
JOINT UNEP / WAGGGS ENVIRONMENT PROJECT
ON THE
PROTECTION OF FRESHWATER RESOURCES THROUGH
ACTION AND BY CREATING AWARENESS AMONG WOMEN
YOUTH AND CHILDREN

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Girl Guides and Girl Scouts



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FOREWORD OF THE SECOND VOLUME

This book is the second of two volumes produced by WAGGGS and UNEP and dealing with ideas for activities related to the protection of freshwater resources. It is based on three educational points and aims at helping Leaders, young women and children **to develop a conviction** as to the importance of water on Earth, **be creative** while taking action, and be able to **involve the community** and gain its support in their efforts to safeguard this precious element of our planet.

In the first Chapter it gives a thorough analysis of the decision and action processes. The second Chapter includes activities related to the five Chapters mentioned in the first volume, while the third Chapter deals with small scale projects and games for all age groups. Twenty pages concentrate on technical designs for constructions related to water. Finally a new aspect is introduced: the survival of man in cases of lack of water or when this becomes an unfriendly element.

INTRODUCTION

Action is based on a process including many steps which assure its success. The interests, ages, skills and experiences of the Girl Guide and Girl Scout units and the local needs for protection of freshwater will help determine the best project or activity for each unit or for each individual member.

Participation in such activities brings many benefits. The knowledge, experience, and skills youth gain will last throughout their lives.

BEFORE PLUNGING INTO ACTION

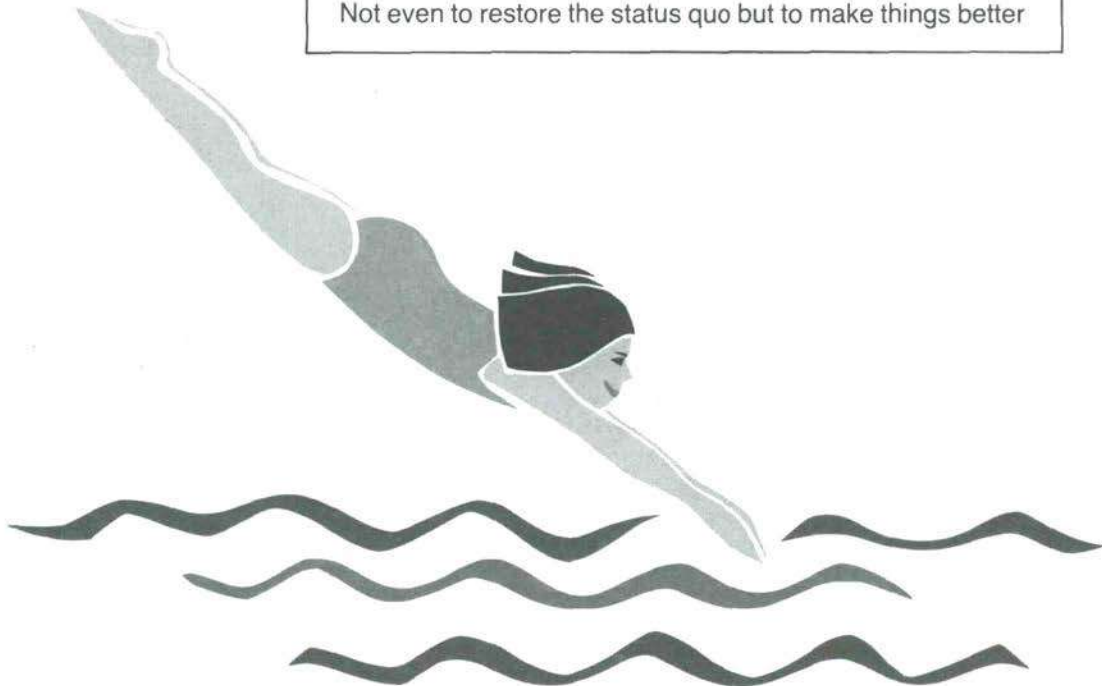
Environmental education is mainly education in problem-solving from a philosophical basis of

- holism
- sustainability
- enhancement, and
- stewardship

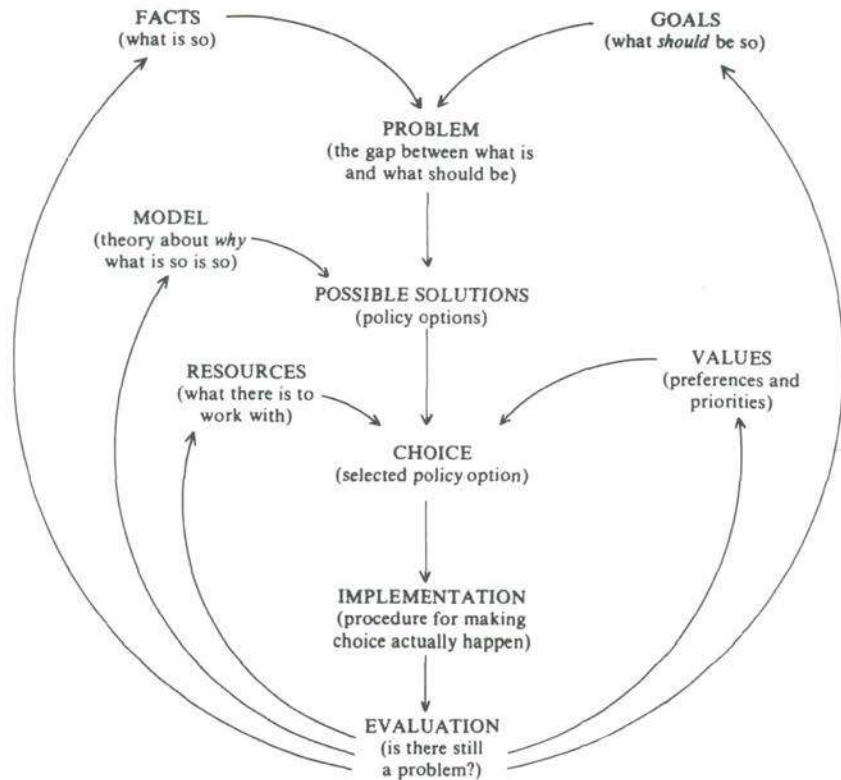
The goal is not to solve a problem but to solve it thoroughly

Not to solve it for a short time but to solve it permanently

Not even to restore the status quo but to make things better



Before plunging into action, study the following diagram which illustrates how the process of problem solving works:



- The FACTS are the objective description of what is happening.
- The GOALS express the human desires, needs or intentions; they are subjective, value-based ideas.

If the FACTS are the same as the GOALS, obviously there is no PROBLEM. Thus to define the PROBLEM means to define the FACTS and the GOALS.

- Stating the PROBLEM opens the way to action.
- Then some sort of MODEL or explanation or theory about why the FACTS are as they are is needed.
- The MODEL generates ideas of what to do; that is POSSIBLE SOLUTIONS to the problem.
- The set POSSIBLE SOLUTIONS generate the CHOICE of what solution to try.
- The CHOICE in turn requires an assessment of available RESOURCES, such as money, time, people, material, that could be applied to the problem.
- The CHOICE also requires clarity of VALUES, priorities. Some solutions may compromise other goals or they may be morally repugnant.

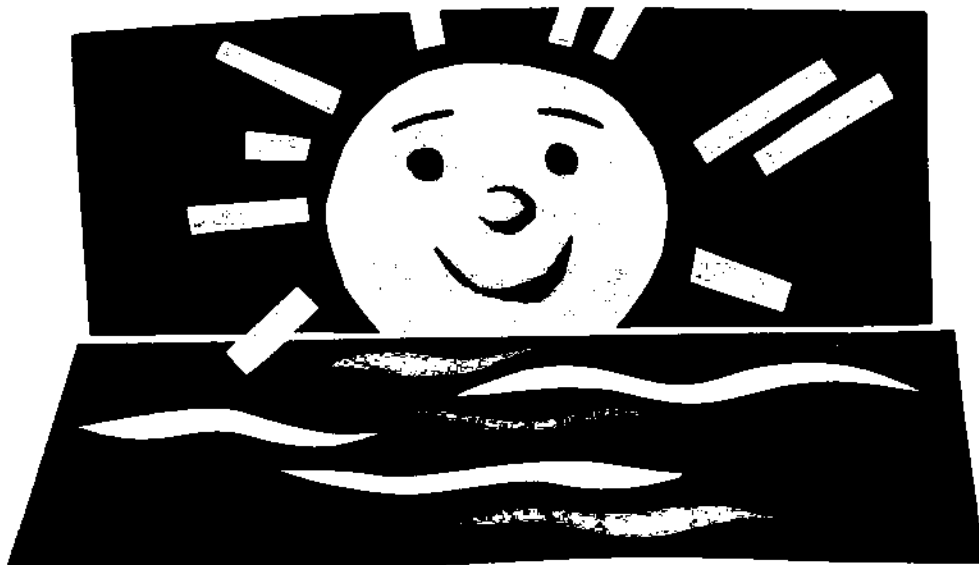
- Then the chosen policy has to be implemented. IMPLEMENTATION requires all the skills that translate a decision into reality.
- Once IMPLEMENTATION has taken place, there is a step which should never be forgotten in decision-making: EVALUATION.
- EVALUATION requires an honest reassessment of every step of the process, every item on the diagram:
 - Is there still a PROBLEM?
 - Have the FACTS changed?
 - Have they come closer to the GOALS?
 - Have the GOALS changed?
 - Could the experience acquired change the MODEL?
 - Have new POSSIBLE SOLUTIONS become apparent?
 - Has the stock of RESOURCES changed or do we see our VALUES and priorities in another light?
 - probably we reaffirm our analysis of the problem and our CHOICE of solution, and we see a better way to IMPLEMENT it.

Still problem-solving is a partial ability to develop in environmental education. And this includes:

- experience, observation, monitoring, measurement, which help to get the FACTS correctly
- understanding to increase comprehension and improve the MODELS
- management, knowledge how to work in groups and make things happen; how to assess and master RESOURCES, how to IMPLEMENT
- ethics, the ability to make conscious moral choices, how to make a CHOICE consistent with one's GOALS and VALUES
- aesthetics, appreciation of the environment for its own sake; use of the environment for play, beauty, art, inspiration and transcendence for the realization of One's ultimate GOALS
- commitment, development of the feeling of responsibility, of personal care of both human society and the environment until the FACTS approach the GOALS.

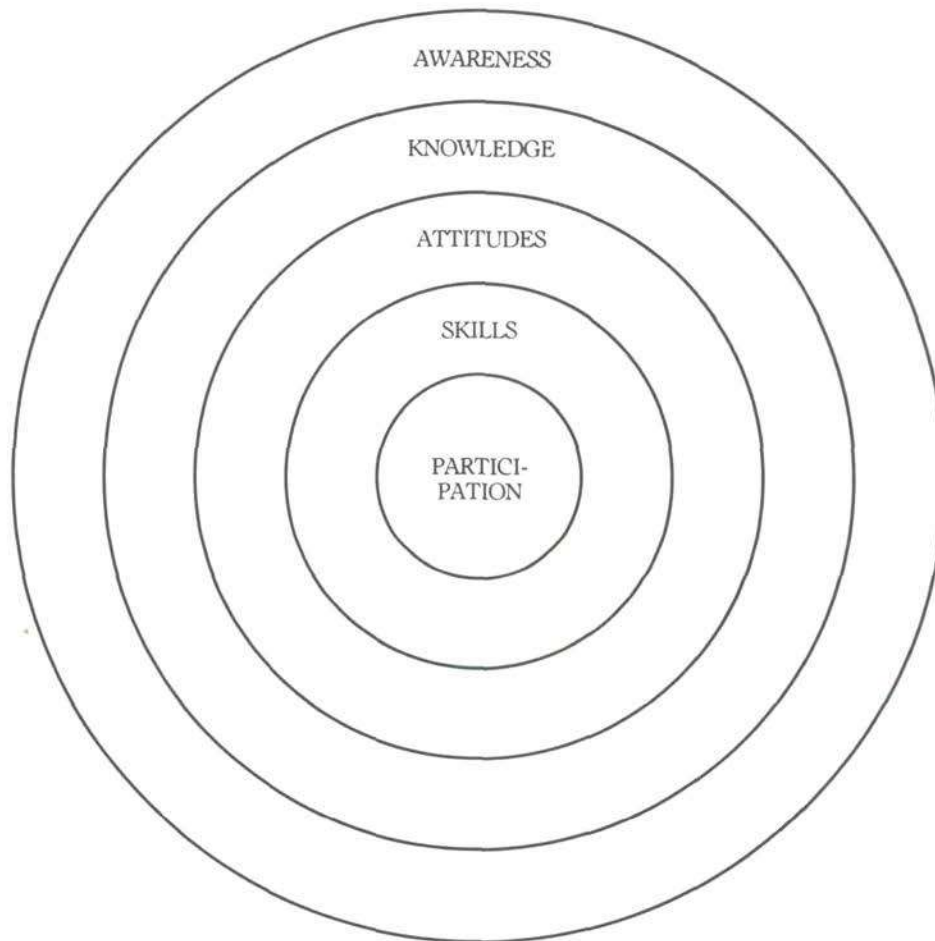
Five basic functions are needed to ensure effective participation of both Girl Guides and Girl Scouts, and of the public in our FRESHWATER PROTECTION Project:

- Identification of the interest of the Girl Guides and Girl Scouts as well as of public groups or individuals.
- Outreach, providing, accurate, understandable, pertinent and timely information on WATER issues.
- Dialogue between the incentive Leaders or those in charge, and the Guides or the public groups during meetings, workshops, hearings, personal contacts.
- Assimilation, which consists of putting together the results of the «outreach» and the «dialogue» phases.
- Feedback should include the decision for ACTION of the units alone, the Guides themselves or in common with interested public groups.



A healthy, beautiful environment is not a luxury, it is a basic human need, both materially and non-materially.

As we become environmentally educated, we generally move through a progression of objectives from the outer bands to the inner bands on the target. That is, we begin by having favorable experiences with the environment so that we can develop an **awareness** and sensitivity to it. This develops into a willingness to learn more about it (knowledge objective). Based on our **knowledge** and **experience**, we develop a positive **attitude** about it (attitude objective) and the **skills** we will need to investigate more about the environment and its associated problems (skills objective). Finally, we reach the bull's-eye on the target (**participation objective**) when we use the acquired awareness, knowledge, attitudes, and skills to try to resolve water problems and make a positive difference in the world around us.





DEVELOPING VALUES

Developing a Personal Code of Ethics

- Ask your girls, as a group or as individuals, to develop a personal credo towards the environment. The word «credo» means a group of beliefs or principles that you live by. Start out this activity by writing, «I believe ... » Girls can consider how they interact with the environment and specifically with the water resources and how they feel about them. Each girl can write down a statement or set of statements that summarize her feelings and hopes for the freshwater habitat or environment. Younger children might do this activity in a group or illustrate their feelings and beliefs pictorially instead of with words. A unit might arrive at a joint credo as a result of pursuing a water action programme trail.
- After developing a personal or group credo, girls can develop a personal code of environmental ethics. A code is a set of principles or rules of conduct. «Ethics» are a system or code of morals of an individual, group, religion, or profession. The code should be a list of ways to relate to the environment. For example, the credo may state a belief that all creatures should have the right to clean air and clean water. The personal code may state that you will not do things that pollute air and water. Encourage girls to be specific in stating their code, and to record actions that they will take.
- Ask the girls to share items from their code of ethics. It is important to verbalize this set of beliefs and rules of personal conduct in formulating values. Taking the time to apply these beliefs and rules to day-to-day living and to unit functions is essential. It will be important to have girls refer back to these as you do environmental action projects and interface with the environment in other ways. Emphasize that values may change as a result of experience, knowledge, and interaction with the environment, and provide an opportunity for evaluation of their personal credos and codes of ethics.

Values: Links to Understanding

By helping girls to develop positive values, we are making strides towards building global understanding. This is a link between people everywhere who share a commitment to each other and the environment on which all depend for survival. Helping girls to develop good feelings about themselves, others, and the world around them is the first step in that direction. With this comes hope for tomorrow.

ENVIRONMENTAL ACTION THROUGH GIRL GUIDING AND GIRL SCOUTING

What is an Action?

Environmental action is the ultimate in environmental education. Positive environmental action is taken to maintain or improve the condition of the environment. Thoughtful environmental action is the heart of the participation objective of environmental education and constitutes the bull's-eye on the target of environmental education objectives. It gives girls the opportunity to apply the knowledge and skills they have acquired in working to achieve the other objectives.

The impact of an action depends on a number of factors, including the following:

1. The number of people taking collective action.
2. How well the action is planned and coordinated.
3. The categories of environmental action that are taken.
4. The levels at which action is taken.
5. Whether or not the action targets the heart of the problem it is intended to solve.

The old adage, «There is power behind numbers,» usually holds true for environmental action. Cooperative groups of people taking action traditionally have the opportunity to make a greater impact than individuals acting alone. Action may be taken at local, regional, state, national, or international levels. Of course, the goal of the project dictates which level or levels may be the most appropriate and effective targets for action on the protection of freshwater resources.

Girls can work to make positive changes happen through environmental action. By understanding the art of taking carefully planned action, Guiders may provide girls with guidance they will need to make their actions count for the benefit of the water resources and themselves.

Girls can work to make positive changes happen through environmental action. By understanding the art of taking carefully planned action, Leaders may provide girls with guidance they will need to make their actions count for the benefit of the water resources and themselves.

THE ACTION PROCESS

There is a logical step-by-step procedure for planning, taking, and evaluating. Girl Guides and Girl Scouts may work in groups on an action project or they may work individually. Either way, the action process remains essentially the same.

A description of the process follows. A list of key questions is included with each step. The questions will act as guides to ensure that factors that may affect the success of the project be considered beforehand. The answers to some of the questions will be found through research. Other answers will come from speaking to people involved with the problem. Yet other answers will be found within the girls themselves—particularly for those questions which ask the girls to explore their own values.

Girl Guide and Girl Scout Guiders will need to work closely with young girls through the action process. With older girls, they will act as advisers, allowing the girls to identify problems, investigate alternatives, and find answers for themselves.

Step 1: Plan for action.

The first thing the unit leaders need to do is to help the girls to identify a problem that they feel strongly about. Girls should be encouraged to survey or interview local citizens for input. The following questions may help guide girls through Step 1:

Step 2: Collect information.

Next, the girls need to collect information to determine the cause(s) of the problem so that they know where to focus their efforts in solving it.

The girls must be reminded that other people may not see the same things as problems or solutions related to the issue. The girls should be encouraged to put themselves in the shoes of those affected by the problem. The following questions should be answered to complete Step 2:

- What is the cause of the problem?
- How long has the problem existed?
- Who is affected by the problem?
- How frequently does it occur?
- How do those affected by the problem feel?
- How do you feel about the problem?
- Is anyone benefiting from the problem? If so, how? How do they feel?

Step 3: Decide which way to go.

This step involves brainstorming all possible approaches to solving the problem. Each alternative is researched to determine which one provides the «best» answer to the problem. (Remember that one answer may be to do nothing.) After a possible solution is identified, the girls will need to ask themselves whether or not they can take the action dictated by the solution they have identified. Perhaps their efforts may be best directed toward solving a portion of the problem or toward solving another problem entirely. These questions will guide girls through Step 3:

- What are the possible alternatives to solving this problem?
- What are the costs and benefits of each alternative?
- What are the legal and social consequences of each alternative?
- How will each alternative affect the environment?
- What environmental action strategy or combination of strategies may be most appropriate to take?
- Do you have enough time, skills, and courage to take the action?
- If you select this alternative, will you be taking action which is consistent with your own values?
- Based on the answers to the above questions, which alternative is most sensible and realistic?

Step 4: Moving ahead.

After an alternative has been selected and the girls have determined the appropriate strategies for action, they need to let others know about it. They should be encouraged to get others involved. Ask these questions: Could your action be more effective with the support of others? If so, who else could be involved?

- Does the action require Girl Guide or Girl Scout Organization at national area or local level permission?
- Will media coverage be important to the success of your project?
- Is your plan well detailed and set for action?
- If you are planning a group action project, does each person have a role to play in its implementation? Do you understand the importance of your role?
- Do you anticipate any problems or opposing forces affecting your action? If so, have you considered how you might deal with them if they arise?

Step 5: Do it!

Put the plan into action. Ask these questions throughout the implementation stages of the project:

- What changes are needed to improve or continue taking action effectively?
- What responses have you received from those affected by your action? How do you feel?

Step 6: Look back.

Leaders should encourage the girls to evaluate their environmental action projects. Hindsight is more accurate than foresight. The girls should be prompted to ask themselves these questions:

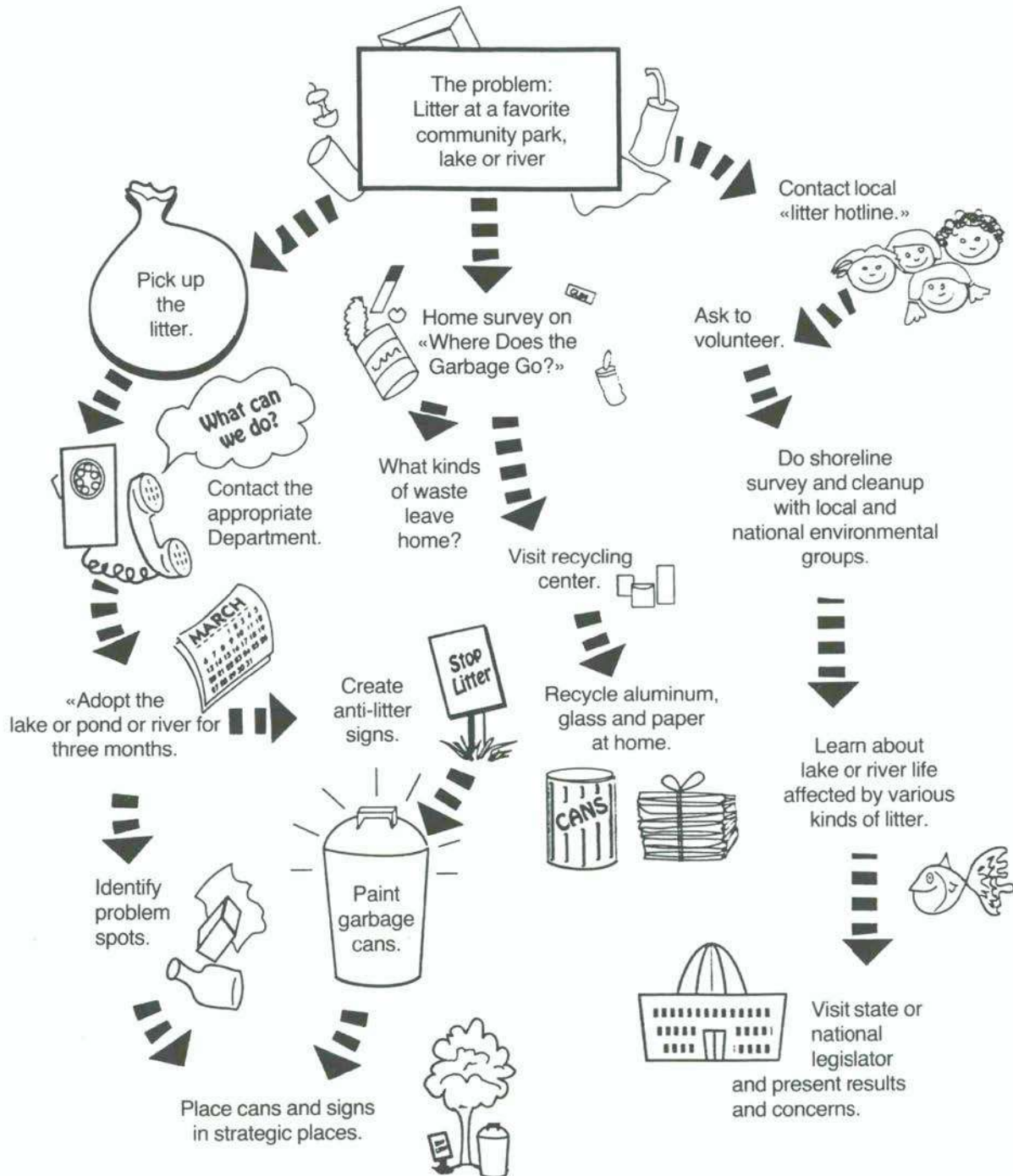
- Did the solution actually solve the problem?
- Were additional problems created?
- What would you do differently next time?
- What did you learn as a result of taking action on the protection of freshwater resources?
- Did others benefit from your efforts?
- Were others negatively affected by your project?
- How do you feel about the experience?

Step 7: Share with others.

After all this effort, why not share it with others? Encourage the girls to help others learn from their experience by sharing it with them. It may help to motivate others to try similar actions. It may also give the girls the chance to have their moment of glory. Older girls may want to follow up by helping younger girls to take environmental action. This is a marvellous opportunity for girls to develop leadership skills.

Following is an example of action based on the above process.

THE ACTION PROCESS: Schematic Example



THE ACTION PROCESS: A Complete True Story

(conviction, creativity, community involvement: 2, 3)

Introductory Remarks

A POND AT THE EDGE OF TOWN

This story describes an environmental action project that could be developed and carried out by a local youth group with some assistance from their community. Although projects will vary with the country, the group, and the issues, the process for implementing an action project will be similar to the one described below.

Each environmental issue presents many opportunities to affect the political, economic, social and ecological systems. Often, several different kinds of action and cooperation at varying levels are needed to correct an environmental problem. In this case, Chintana's unit could have approached the problem of a small, polluted pond in several ways. Rather than organizing a cleanup, they might have worked with other environmental organizations to help citizens understand water quality problems, and to vote for protective legislation. Whatever their goal, the process of taking action would have paralleled this example. Chintana was a school teacher acting at the same time as a Girl Guide/Girl Scout Leader in the same school.

The Story

Chintana was passing the last rice field and entering town when she noticed a little pond near the road. It was the first time she had noticed it, even though she had moved to this area six months before. She stopped her scooter and, walking back towards the pond, was appalled by the black rim of oil skirting the pond.

The young Leader had been alerted to environmental problems in college when a lecturer took her on field trips to different protected areas as part of an environmental studies class. She was also assigned to read reports of the World Conservation Strategy. Ever since, she had felt the urge to do something about the pervasive abuse of living resources, yet became increasingly frustrated with her inability to influence the problems she noticed everywhere.

While standing in front of that pond, it dawned on her that coping with a small problem on one's doorstep would do more for the environment than complaining about the depressing state of affairs neither she nor the enthusiastic members of the conservation club could noticeably affect. Chintana spent that Sunday afternoon riding all over town looking for environmental problems.

By the evening her list contained problems like these: a dusty market place without shade trees; a fancy restaurant which openly advertised dishes made from the meat of protected wildlife; an illegal rubbish dump at a steep embankment of the town's main road; tortoises placed in the turtle pond at the temple; goats grazing and people collecting firewood in the town park; and, last but not least, the oil-polluted pond which had sparked off the idea for local action.

Chintana mentioned her Sunday afternoon search for «small problems» in town to her unit and encouraged the girls to look for environmental problems in their own neighbourhoods. They planned to examine these problems more closely at the next meeting.

First Meeting

The girls listened to each other's observations, they quickly agreed to take their bicycles on a swift inspection tour, looking at each problem in turn. On their return two hours later, Chintana remarked that **each** of the pro-

blems could turn into a project for the unit! The problem they would eventually choose should be interesting for all, manageable, and not require too much time.

For the next half hour, the group buzzed with activity and finally chose the oil-polluted pond as a project to work on over the next few months. The choice had much to do with the fact that Nit, one of the members, remembered collecting clay there in her childhood to make little play bowls and plates. When her five-year-old sister did the same recently, she returned black with oil.

One member suggested that, instead of jumping into action right away, they should learn more about the nature of the problem. The girls saw her point and with their Leader's advice agreed to collect information about the following:

1. Condition of the Pond

Does the pond still support fish and other aquatic animals?
What changes have people observed over time?
Is oil pollution the only problem?

2. Obvious and Hidden Causes of Pollution

Where does the oil come from?
Who owns the land?
Why has nobody acted on the problem before?

3. Effects on People

In the pond there is an inlet and an outlet stream.
In what respect do people see the condition of the pond as a problem?
Do people downstream see it as a problem?
What other consequences could the pollution have which we do not yet know?

Second Meeting

The girls returned eager to report on their findings. Several spoke to local residents and other resource people to obtain more information about the pond.

Group 1. Three of the girls looked for the aquatic organisms that lived in the pond. They drew a rough sketch of the pond on newsprint to illustrate their report:

«The pond is about 12 metres in diameter and over one metre deep in the middle. We have been told by the neighbours that it never dries up completely. The pond has an inlet here in the form of a storm sewer from downtown. It drains through an outlet there, underneath the road, directly into the stream below the bridge, they reported, as they pointed to their sketch (see page 18).

«One-fifth to one-quarter of the surface is covered with black oil. The water level of the pond fluctuates by about 30 cm, as one can see from the oil caked on banana palms and grass around the edge. Uncle Saranit, who lives near the pond, had planted the banana palms and told us that some are now dying.

«The oil affects the pond in two ways. A thin film of oil covers much of it for long periods of time. We talked to a conservation officer who told us that only heavy rains break it up and sweep it down the drain with the overflow. He also said that this film prevents contact between air and water, so the oxygen concentration in the water goes

down. Animals which cannot tolerate this leave or die. Some oil sticks to floating particles, and some sinks to the bottom. A 5 to 10 cm thick layer of oil-drenched muck has accumulated around the inlet and the parts of the pond where most of the oil drifts. We took samples from both sides of the pond, as well as from a similar but unpolluted pond for comparison. Here are the results:

	Number of species in bottom sample
Most affected part of the pond	0
Least affected part of the pond	7
Clean pond	23

«People told us they used to fish in the pond during the dry season. Now fish still come in during the monsoon floods, but when the rains subside the fish leave quickly except for a few small ones. One day we saw a man wash out a plastic container and then walk over to the service station to get it filled. Soon after, small fish came up gasping for air at the surface and many died. It turned out that the man had rinsed out a container of insecticide.

«If we can prevent further oil pollution and remove the worst polluted soil in the pond, it could become as productive as it was five years ago when the oil was first noticed.»

When the group finished its presentation, Chintana firmly supported the idea that the pond should and could be restored to near its former condition. She cautioned, however, that the fish caught in the pond could not be declared safe to eat until they were thoroughly examined for residues of poisonous chemicals. At the right time the group would send samples to the University laboratory. She also mentioned how some chemicals reach higher concentrations as they are passed along the food-chain from one organism to another.

Group 2. These girls looked for the sources of pollution:

«It seems the oil reaches the pond through the storm sewer. We walked up along the road and wherever the sewer lids were missing, we looked inside to see if we could detect traces of oil. We followed the sewer uphill to the point where another system drains into it from a different direction. There are three service stations and a car repair shop along that stretch of the road, and each one of them seems to spill old engine oil into the sewer.

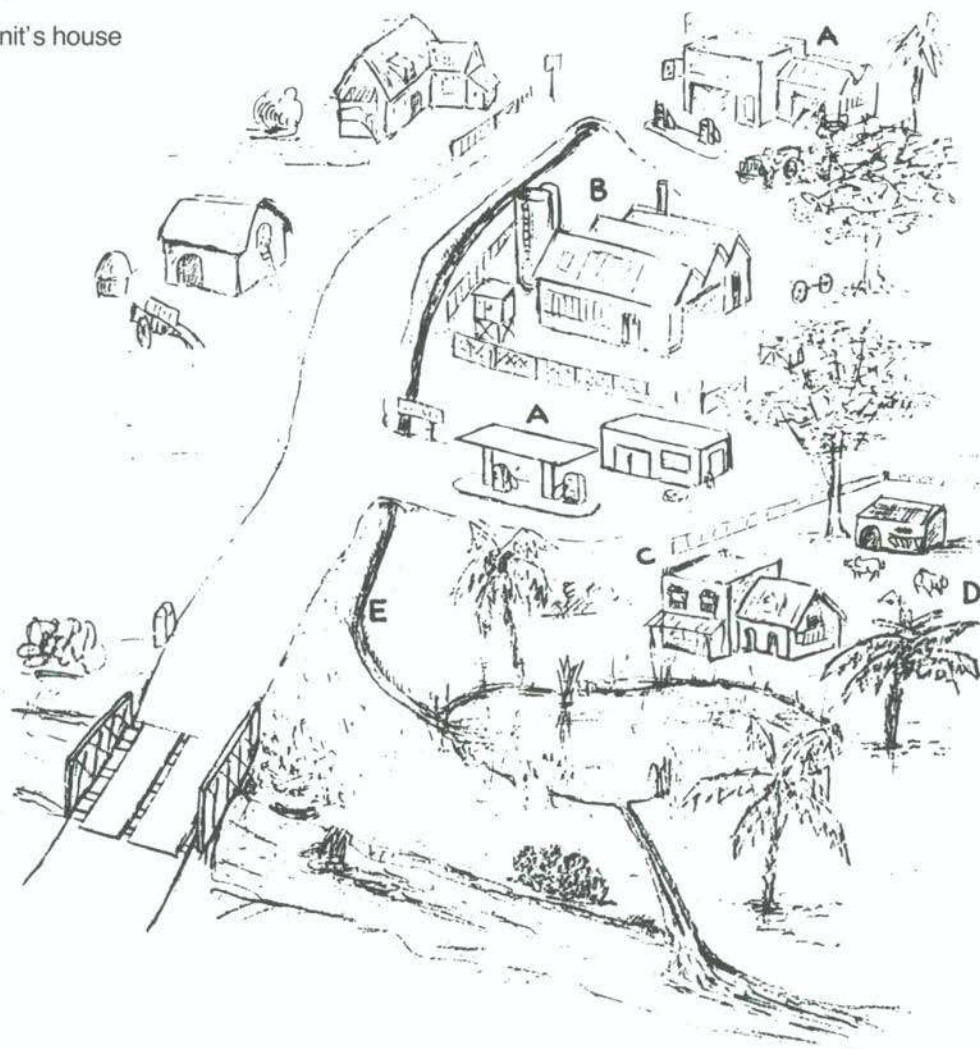
«Uncle Saranit keeps four pigs at his house near the pond. The pigsty drains down towards the pond and some of the refuse reaches it, but we are not sure how this affects water quality in the long run. (Someone in the group remarked that the pigs were a minor problem, but if the pond were cleaned up, the drainage ought to be directed away from the pond.)

«We talked to the owners of the service stations and the repair shop. They all admitted the pond was an eyesore, but nobody considered it a serious problem. They emphasized the fact they were collecting used engine oil for recycling, but did not deny occasional spills. We had the impression that they collected most of it, but were not terribly concerned about dumping some in the pond if the drain happened to be full. On the whole we feel they could be persuaded to be more careful.

«At the Survey Department they told us the pond was within the floodplain zone and that it was legally on public land. This explains why nobody feels responsible for it. We also asked the police if they knew of the problem and if anything had ever been done about it. They noticed the oil on the pond, but since no one had ever complained, they never thought it would require their attention.»

«Uncle Saranit is the only one who regularly used the pond. He has planted the banana palms around it. In the dry season he used to bring water up from the pond to water the vegetable garden and the pigs and a cow. Now, with the oil, the animals refuse to drink it so he has to haul the water up from a well. He noticed the first signs of oil pollution about five years ago, and every year the problem became worse. He is definitely irate about the fact that some of his banana palms are dying. Occasionally his ducks swim into the oil slick. One of them died recently, but because of its oily taste he could not even eat it.

- A Service station
- B Repair shop
- C Uncle Saranit's house
- D Pigs
- E Sewer



«Uncle Saranit took us downstream in his rowboat and showed us the best places to fish in the stream. Passing underneath the bridge we saw the pipe that drains the pond. For about ten metres the shore was thick with oil, but further downstream we did not notice any obvious signs of it. People who lived there told us that they saw oil drift by occasionally, and one woman had ruined some white clothes because she rinsed them in the stream while a patch of oil came drifting by. On the whole we had the impression that, for them, the oil pollution was more of an occasional nuisance than a serious problem.»

Chintana remarked that **one drop of oil can spoil a million drops of water**. Once it seeps into the groundwater even small quantities of oil can contaminate drinking water wells. It may take years for the oil to reach a well, so one cannot be certain about the long-term effects of oil pollution until much later. A perceptive member of the group offered to summarize the information contained in the reports:

«The main problem is, as expected, the oil, but we noticed by chance that pollution by insecticides is also a threat, equally serious but perhaps more difficult to control. Uncle Saranit's pigs pose the least problem, but even they could ruin the pond in the long run.

«In terms of immediate impacts, we noted that species diversity is greatly reduced in the pond, that banana palms are dying because of the oil, and that the pond is no longer of any value as a fishery resource. On top of that it is an eyesore for everyone who passes by, and it is no longer a playground for the neighbourhood children.

«The immediate causes are clear enough, but behind the careless disposal of oil and chemicals is this: No one owns the pond, so nobody feels responsible for it. Not even uncle Saranit fought its pollution. You could not dump oil in the middle of a road as it would cause some spectacular accidents before long. You can, evidently, dump it in a sewer, because when it turns up in someone's well a few years from now, no one will know where it came from. If it turns up in a little pond that nobody owns, who cares? Our actions will need to address those underlying causes of the problem.

«People are inconvenienced by the problem, like Nit's sister who had to scrub her daughter and the woman who was rinsing clothes just as a patch of oil came drifting by. Uncle Saranit is more than inconvenienced. He lost a source of water for his animals, a duckpond, his banana palms, dry season fishing next to his house, and he may also lose his well.»

As Chintana began speaking, her voice took on a serious tone as she concluded the summary by saying:

«The pond with all its living organisms is dying. To what extent can we hold the polluters responsible? Can we blame uncle Saranit and the police for not doing anything about it? How are they and others going to react to suggestions for a clean-up? The clearer we are about their interests and motivations, the more realistic will our actions will be. A problem statement can help us determine **what needs to be done and how we can do it.**»

The problem statement which they wrote was not unlike this summary, and they quickly formulated action objectives as well.

Action objectives:

1. Prevent further pollution of the pond

This objective addresses the immediate causes of the problem. It comes first because without the cooperation of the polluting businesses, it would not make much sense to clean up the pond.

2. Clean up the pond

This objective addresses the condition of the resource. It is the central focus of all action.

3. Increase public concern over water pollution

This objective addresses an underlying cause: widespread ignorance and disregard for the dangers of water pollution. The group's efforts will concentrate on the neighbourhood, but they hope to carry the message to a wider audience through the media.

Third Meeting

The group had a lively discussion about the roles various people might play in their project.

Uncle Saranit was certainly going to be the most reliable ally, as he was quite glad that someone shared his indignation about the condition of the pond. He had a solid interest in it, and after his participation in the clean-up campaign he could be counted on to remain guardian of the pond in the future. The people downstream are not inconvenienced enough to perceive the problem as serious. If they were informed about the possible consequences of water pollution they might eventually support a clean-up of the pond.

The polluters required more thought. As a precondition to a clean-up, they would have to cooperate and agree to prevent further spills. Since the police never pressed charges, the polluters have nothing to gain directly except a reputation as responsible citizens. The girls decided that in discussions with them they would stress the publicity angle of the project, and that the group would like to mention their constructive role of responsible citizens in the clean-up. On the positive side, a decision to stop future pollution of the pond would not cost the polluters very much, and their agreement appeared likely.

Making a decision

Reaching a decision that pleases everyone can be difficult. Make sure everyone in the group has a chance to express themselves. Encourage a full range of options for discussion. As members talk, their preferences will gradually emerge and the advantages and disadvantages of different projects will become clearer.

After this, the group switched tracks and began to discuss the values they held about material possessions and life goals. Chintana read the results of a recent demographic survey among university graduates who were asked to choose items they would most like to have and would work hard to get. One list contained things like «a harmonious family life», «meaningful work», «security», «a healthy environment», etc. The other list contained material items like «a high salary», «a big car», «latest fashion dress», «stereo and colour TV», «travelling abroad», etc. All of the above choices were ranked quite high. Then she pointed out apparent contradictions. If, she said, one worked hard to buy the big car, there might not be much time left for a harmonious family life. Meaningful work is not necessarily the work that offers the highest salary, and it is the production, consumption and use of highly valued material goods that can turn a healthy environment into a polluted one.

They split up to discuss this in small groups. They discussed wants and needs and in doing so realized that lifestyle and consumption of resources are directly linked to the condition of the environment. The oil-polluted pond was only one minor consequence of the global consumption of oil and oil-derived products. Although the girls did not drive cars, their families used the service stations at the top of the hill, so they were in part responsible for the pollution.

Fourth Meeting

For this meeting Chintana prepared three large sheets of newsprint, each headed by one of the group's three action objectives for the project. The group acknowledged that preventing further pollution of the pond had priority, and that cleaning it up only made sense after that first objective was attained. Increasing public concern over water pollution was something they would be doing all along, but activities on that objective would be incorporated with the pond clean-up publicity. They decided to have review sessions to discuss their progress on each action objective and to prepare for what needed to be done next.

The group brainstormed activities for each action objective. Their suggestions ranged from «take pictures of pollution at businesses, the pond and streams» to «hire a front-end loader for the pond clean-up.» The former suggestion was eventually incorporated into the action «take pictures and document the process, before and after the clean-up.» The latter was discarded, as most members were concerned the machine would flatten everything around the pond and that it would look worse afterwards than before. Others remarked that it was not the speed and the ease of the clean-up which counted, but the experience for all those participating and observing.

Each suggestion was thus examined, retained or discarded, and put into the right sequence. Members volunteered for tasks, a time schedule was devised, and before long the action plan took shape. At one stage, the discussion threatened to lose itself in implementation details. Then Chintana cut in to say that the action plan merely helps to assign responsibilities and facilitates organization and implementation. It is not a rigid document that has to be perfect from the start.

Fifth Meeting

At this meeting the girls reported their experiences in tackling the first step of their action plan: getting permission and authorization to implement the project.

Although Chintana and two representatives from the unit carefully explained the project to the Commissioner, she was sceptical but in the end she gave her consent on the condition that Chintana provided a weekly report.

Nobody in the Road Department appeared able either to approve or to disapprove the project. The delegation from the conservation club promised to heed all the regulations pertaining to the right of way and setting up of signs, and the girls left expecting neither opposition nor support from that Department.

They received a similar reception at the town hall, where they talked to a very busy assistant mayor who ushered them out of the office, heaping lavish praise on their commendable work for the good of the community.

ACTION PLAN FOR THE POND PROJECT

x x x = action in progress * = review session							
	Feb.	Mar.	Apr.	May	Jun.	Jul.	Person respons.
OBJECTIVE: PREVENT FURTHER POLLUTION OF THE POND Obtain endorsement from the School Director Persuade owners of service stations and repair shops to cooperate Obtain endorsement from Road Department and City Council Make copies of problem statement and hand it out to people Persuade Uncle Saranit to dig a ditch that drains the pigsty away from the pond	x x x x	 x x x x x *					
OBJECTIVE: CLEAN UP THE POND Persuade Scouts to help with the clean-up Get Road Department to send a truck for transporting oil Obtain snacks and lunch for helpers; solicit donations to cover costs Clean-up: Remove the oil-polluted soil, eliminate all visible signs of oil along the edge of the pond and downstream from the bridge Persuade Uncle Saranit to look after fruit trees and decorative shrubs to be planted later. Obtain and plant trees and shrubs Take pictures and prepare a documentation of the clean-up		x x	 x x x x x x x x x *				
OBJECTIVE: INCREASE PUBLIC CONCERN OVER WATER POLLUTION Try to obtain coverage of the clean-up in TV, radio, press Obtain the necessary endorsements/applications for exhibition at the county fair Design an exhibition booth and prepare exhibits			x x x	x x x x x x x x	 x x x x x x	 x x x *	

Fortunately, their strategy for persuading the polluters proved fully effective. They showed them pictures of the pond, described how they traced the pollution, explained what they were planning to do and that they depended on their cooperation. The service station managers verbally assured their cooperation. The repair shop owner even called all his workers to issue appropriate instructions. The unit hoped that the clean-up would create enough publicity to increase people's vigilance (especially that of Uncle Saranit) so that the polluters would not back out of their promise.

The day uncle Saranit heard of that promise, he promptly took action by digging a ditch to drain his pigsty away from the pond. The response by others in the neighbourhood was disappointing, perhaps because it looked as if the girls were canvassing for an unknown political party when they distributed their mimeographed problem statement. They decided to try again, equipped with photographs of the pond as it was now, a sketch of it after the planned clean-up and a jar of oily pond water.

The girls soon discovered the importance of the review session. Because the tasks were divided among them, it was necessary for each small group to report on their findings each week. They knew that some of the new information or ideas might alter their upcoming plans, so they remained flexible enough to accommodate needed changes. Chintana made sure each girl had the opportunity to speak and that all were in agreement with the changes before moving on.

Sixth Meeting

The second step of their action plan involved enlisting the support of key people and equipment for the clean-up stage. The Scouts were glad to help, but the girls realized they could hardly expect them to do the dirty work without inviting their representative to take part in the project meetings.

The Road Department was considered too uncooperative to be asked for a truck, so two unit members persuaded their fathers to help out with their pick-up trucks one afternoon each. Chintana suggested that the Road Department should at least be notified in writing of the unit's intentions. They never received a reply, but on clean-up day an inspector from the Road Department suddenly appeared to inquire what they were doing. They were relieved to be able to show him a copy of the letter and refer him to a policeman who lent an official air to the undertaking. The policeman, by the way, was there in response to a request from the unit, signed by the Commissioner.

The girls went on to list the equipment they would need for the clean-up, where they could find it, and whom they could ask for assistance. By the end of this session, two girls volunteered to show the final plan to an officer of the fire brigade. That turned out to be a useful contact, as he pointed out that removing the muck would be much easier if the water were first pumped out of the pond. He volunteered to provide a large water pump from the fire station.

Clean-Up Day

Despite their careful plans, the clean-up itself began in utter chaos. Twenty-five people, not counting onlookers, were standing around a pond full of water and a bank lined with shovels, buckets, collecting pans and the water pump. There was no shortage of good advice, but nobody took charge and assigned tasks. At the review session everybody, including Chintana, admitted they should not have relied on the Boy Scouts to direct the clean-up. Someone skilled in mobilizing a group of people to complete a task was needed, preferably someone who was associated with the project; after all, it was their responsibility, from beginning to end.

That someone was no other than uncle Saranit who saved the day by taking charge. He started the water pump and organized the bucket brigade to collect and save the few fish in the pond. When the pond was dry, he set the Girl and the Guides Boy Scouts to work digging out the oil slick and depositing it next to the road. Several girls took turns screening the aquatic insects from the oily muck and placing them in a bucket of water destined to return to the cleaned pond. He sent several Scouts over to clean up the polluted part of the stream. Two days later he organized volunteers to plant the donated trees and shrubs which the unit obtained from the Forestry Department nursery.

In the afternoon of that first day the local radio station sent a reporter to interview the clean-up workers. The story was on the air the next morning and some listeners promptly came to watch and congratulate the young people on their initiative. Although the regional newspaper was notified, they did not send anyone until the story had been on the radio. The newspaper covered the project for their weekend community news section. One of the girls suggested that the unit practice writing news releases to get better coverage on their next project.

The Director of the school came through with some school funds to pay for minor expenses like the cost of lunch and snacks for helpers in the clean-up, which was greatly appreciated. She was pleased now to assist the project, because it was reflecting well on the reputation of the school supporting such a Unit.

A local photo shop was there to take pictures of the clean-up, since they offered to sponsor the documentation. They displayed enlargements of the project in the shop window, and mounted others in photograph albums for use by the unit.

Instead of the anticipated two days, the pond clean-up took three, but by the end of May the pond was cleaned out and its banks were planted with shrubs and fruit trees. The unit was now well known in town.



Seventh Meeting

With the physical event of cleaning the pond behind them, the girls increased their efforts to develop public awareness of local water quality. The upcoming county fair was a perfect opportunity to talk with people.

The successful clean-up had two immediate unexpected benefits. First, it increased the unit's credibility with government offices so that their application for booth space at the fair was quickly approved. Second, the successful action and the publicity attracted new members, anxious to become members of Girl Guiding/Girl Scouting. Since the older members needed more time to study for final examinations, the new members took over some of their responsibilities. This helped them become quickly absorbed in the unit and gave them a feeling of purpose. The older members learned from the chaos on the first clean-up day, and had a team to take care of the technical aspects of setting up the booth.

The day before the opening of the fair was still hectic, but everything was finished on schedule. They documented the pond clean-up with pictures of the people who helped, mentioning the constructive role of the formerly polluting businesses, and more pictures of the people of the pond before, during and after the clean-up. A jar of oil-polluted muck and the news articles were also on display. The other section of the exhibit explained the dangers of water pollution by widely used agrochemicals.

That section also contained a map depicting streams and rivers in the district marked with locations where fishing with poison had been reported. This display attracted much attention, and the unit decided they would continue and expand the documentation of such local issues for future use.

Concluding Meeting

Chintana's unit celebrated the completion of the project with an excursion to the nearby wildlife sanctuary. Chintana declared they all had reason to feel good about their achievement. «We have done no less», she said, «than translate the words of the World Conservation Strategy into practice. and this is in line with our Girl Guide and Girl Scout principles and Lord Baden Powell's belief in the protection of nature and service to the community. We saved the pond and thus made our contribution to the maintenance of a lifesupport system. Genetic diversity will increase as animals and plants return to the pond, and it will once more be a living resource which uncle Saranit and others will use – sustainably, I expect. Perhaps as important as these visible results is the change within all of us who participated. We are all more confident in our ability to reverse past abuse of the environment and all the people who helped us are more aware of the environmental problems in their community».

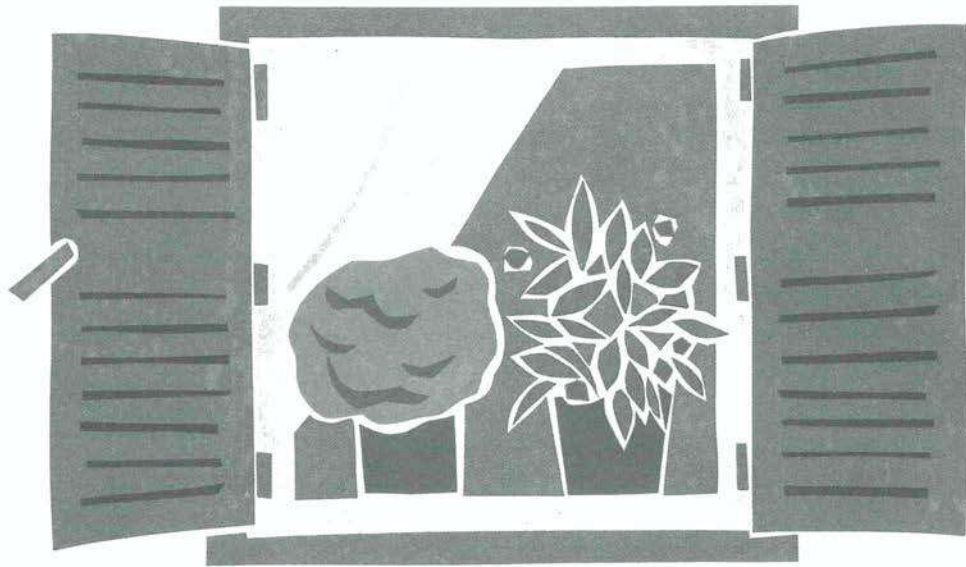


ACTIVITIES BY CHAPTERS

Water can be considered as a biological substratum. It is believed that life started in the oceans. Water is the constituent of all living organisms at a percentage of 70 to 95. On the ground living bodies appeared where water was available to assure life.

In the plants water is absorbed by the roots and circulates in their body in the form of sap in their special veins. The plants transpire through the stomata of their leaves. They have the capacity of adapting to dry climates through a water economy system by reducing their surface, developing thorns and thick leaves like the ones in cactus for storing water.

Water is essential to animals for their nutrition which is based on the circulation of their «fluid system»: blood, lymph, urine, sweat. Reproduction also needs water. All categories of animals can be found around a pond or a lake or along a river: many insects and frogs pass their early life stage in water, reptiles and birds as well as all kinds of animals need water to survive. This water has to be proper and adequate so that it can fulfil its role as the life giving element.



WATER AND HOME AND HEALTH

The «Wise Water User» Checklist

1. Turn the water tap off while brushing your teeth.
2. Place a jug of tap water in the fridge to have cold drinking water later.
3. Wash only full loads of laundry and dishes.
4. Check all water taps for leaks and replace the washers on leaky taps.
5. Avoid watering the garden during the heat of the day. Do not waste water on sidewalks, roads, carparks, etc.
6. Toilet dams or bricks placed in the tank can save 5 litres of water per flush.
7. Flow-restricting shower heads can save 10 litres of water or more per-minute of showering.
8. The use of municipal water meters can help reduce wasteful use of water.

ACTIVITIES

*The second volume is based on three educational points and aims at helping Leaders, young women and children to develop a **conviction** as to the importance of water on Earth, be **creative** while taking action and be able to **involve the community** and gain its support in their efforts to safeguard this precious element.*

1. Keep a daily record for five days in camp or at home to learn how much water is actually being used.
For example: brushing teeth = 3 litres, washing face = 4 litres, a drink = 1 litre, a shower = 75 litres, a bath = 90 litres, flushing a toilet = 23 litres.
Keep a list of all amounts used and add up the figures per day, then compute the five day total.
(conviction, creativity: 1, 2, 3)
2. Proclaim a competition among the family members or the camp participants on proposing ways which may reduce the quantity of water used in the family or the camp. Think of an attractive award for the winner.
(conviction, creativity: 1, 2, 3).
3. On a water conservation day at camp, each member be allocated a limited amount of water for use during the whole day. At the end of the day discuss how this amount was used by each member. Invent devices for more efficient water use.
(conviction, creativity: 1, 2, 3).
4. Make posters to illustrate water conservation.
(creativity, community involvement: 1, 2, 3).
5. Find out the cost of water in your community/country. Study the monthly cost of water in your own home. Think of five ways of water conservation and propose them to your family to reduce quantity and cost and compare monthly bills. Make a report.
(conviction, creativity, community involvement: 1, 2, 3)
6. Find out where your drinking water comes from. Is it groundwater, spring water, river water or does it come from another source? How is it treated? How is the quality determined or tested?
(conviction: 1, 2, 3)
7. Visit a water treatment station at the start of the town distribution net. Then visit the station where the sewage is treated before it goes back to the river. Realize how lack of second treatment can pollute your river.
(conviction: 1, 2, 3).
8. Adopt a river, a lake or a pond for at least a year. Carry out activities demonstrating your environmental awareness and commitment, like keeping the shoreline and adjacent woodland or park free from litter and misuse. Find sponsors to support your effort and provide you with litter baskets.
(conviction, creativity, community involvement: 1, 2, 3).
9. Adopt a stream or a lake front. Do a project that will improve the wildlife habitat such as:
 - Preventing soil erosion (plant trees on a hill side or build waterbars on a nearby trail).
 - Removing litter and garbage.
 - Tracing and labeling city storm drains that empty into the community streams. (After securing permission from the proper authorities, label with stencil that says, «Do not dump toxic materials. This drains into a stream for wildlife»).(conviction, creativity, community involvement: 1, 2, 3)

10. Contact competent persons and learn how to produce «pure» soap. Then produce it and sell it during a campaign against pollution of the river, lake or pond of your area.
(conviction, creativity, community involvement: 2, 3).
11. Talk with people responsible for the storage and distribution of water in town. Learn what steps are necessary for an adequate and safe distribution. Report it to your unit, patrol or family.
(conviction: 1, 2, 3).
12. Identify factors which inhibit adequacy of water supply in your village, town or farm. Find and propose remedy to the authorities through your Guiders.
(conviction, creativity: 2, 3).
13. Find out what the needs of the watershed of your area are and start a project on the choice of the proper trees to protect or improve the water catchment area.
(creativity: 3).
14. Learn about maintenance of water pumps. Then offer service to your village pump.
(creativity, community involvement: 3).
15. Find out what the effects of pesticide spraying are on the surface and groundwater. Discuss the problem with officials. Organize a campaign to inform the community on the side effects of it.
(conviction, creativity, community involvement: 2, 3).
16. Find out what kind of materials come in contact with water transportation, catchment or storage, which are detrimental to safe drinking water.
(conviction: 2, 3).
17. Learn how to make a solar water purifier box. Then use it where needed.
(creativity: 2, 3).
18. Experience the pleasure and strife of water. Express this experience in an interestin and creative way.
(conviction, creativity: 1, 2, 3).
19. Find a method to filter and collect the filthy water in camp.
(creativity: 2, 3)
20. Find out how sewage can be recycled and used for irrigation.
(conviction: 1, 2, 3).
21. Make a solar shower for use in the camp.
(creativity: 2, 3).
22. Make a toilette box a for single person for use in the camp.
(creativity: 2,3)
23. Arrange access to a spring.
(creativity, community involvement: 1, 2, 3)
24. Learn about the water cycle. As you walk around your community, identify elements of the water cycle that you see.
(conviction: 1, 2, 3)
25. Read a book about a developing country or a book about a developed one or interview a person who can

describe the life of a girl in a developing or in a developed country. What things do you share? How is life different? What water problems do your communities share? What problems are different? Is there a way you can make the world a better place for both of you?

(conviction, creativity, community involvement: 2, 3)

26. Find out how families in developed and less developed countries use water in their daily lives. How does it compare with your own family's daily use of water? What are your feelings about this comparison?

(conviction: 1, 2, 3)

27. Find out about different diseases that are carried by water in your country and other parts of the world. List ways to avoid polluting water on a camping trip. Try to purify water in at least two ways when camping or in an emergency situation, such as in a flood, storm or earthquake.

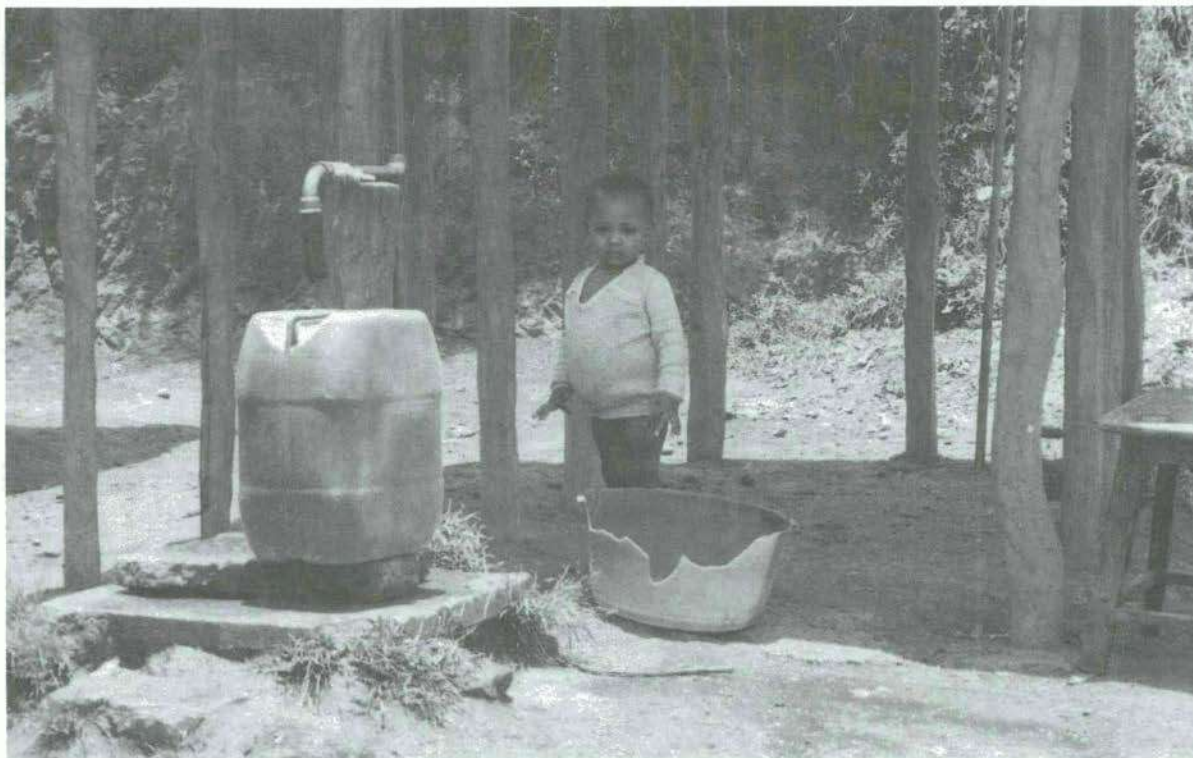
(conviction, creativity, community involvement: 2, 3)

28. Find out the names of organizations that are concerned about the health of the environment. Go to a meeting, help with a water project or follow one of their suggestions for improving the health of the environment by protecting the water sources.

(conviction, creativity, community involvement: 2, 3)

29. Learn about the natural water cycle and how water gets to your tap at home. Explore some of the ways that humans have interrupted or changed the water cycle. Draw a picture of the water cycle and show where you fit in.

(conviction, creativity: 2, 3)



30. Interview a grandparent, great-grandparent or elderly friend to find out what it was like when they were children. What type of home did they have? Did they have a television? running water in their home? electricity? What did they do for entertainment? What did their parents do for a living? How is your life different? How do you think human relationships with the land have changed over the years? You might consider taping the conversation with them or writing down what you learned so that you can save it to share with your grandchildren. Relate your findings with the necessity and use of water now and in the past.

(conviction, creativity, community involvement: 1, 2, 3)

31. Water spills at an open well and collects in puddles around it. Some of it seeps back into the ground and contaminates the groundwater. Undertake a remedial action.

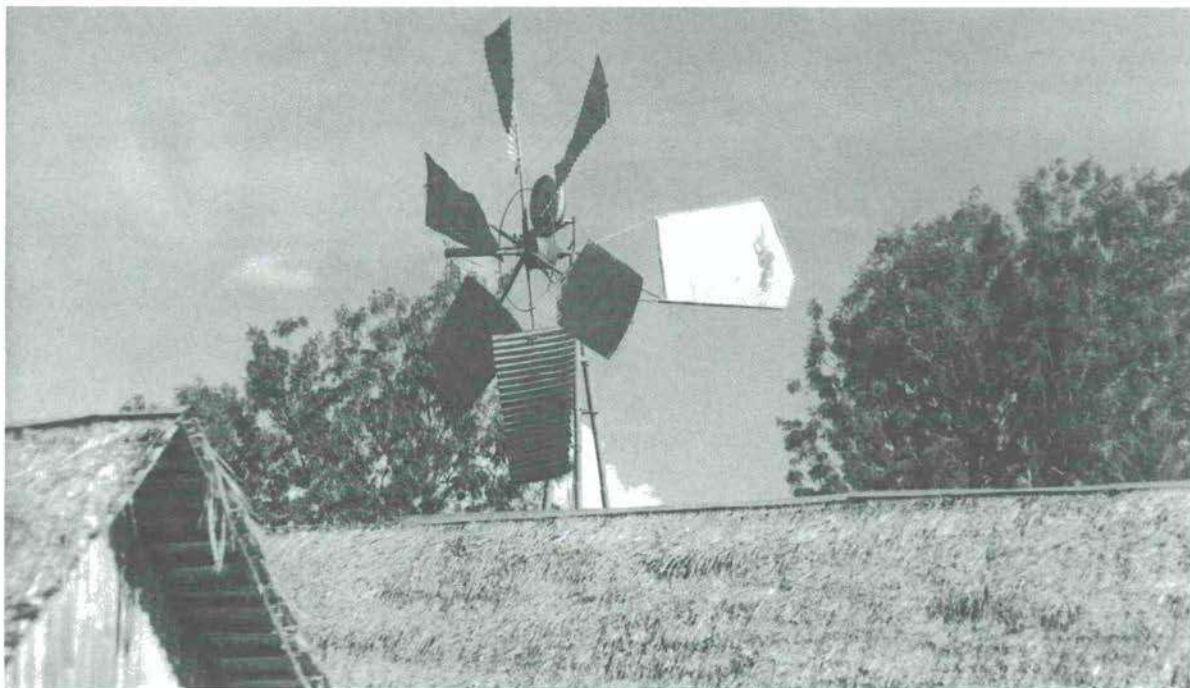
(creativity, community involvement: 2, 3)

32. **Keep the water clear**

- Never pour paints and paint thinners down any drain.
- Do not use the toilets to discard paper towels, facial tissues, or similar items that more properly belong in the garbage.
- List the kinds of household wastes your family disposes through sinks, toilets, bathtubs, and washing machines.

Make a poster to illustrate what you found out; or make a checklist for your family to review and discuss. Conduct a survey at your favourite campsite; or survey your friends and neighbours as a community project with other Girl Guides.

(conviction, creativity, community involvement: 2, 3)





WATER AND AGRICULTURE

Agriculture is the discipline which provides the man with adequate food of good quality. Man has to pay respect to the agricultural workers as they must respect the land by practicing rational fertilizer and pesticide treatments.

1. Investigate your area to find out why trees are needed, e.g.
 - to prevent salinity
 - to provide shelter
 - to attract rainfall
 - to prevent erosion
 - to maintain the watersheds
 - for firewood(conviction: 1, 2, 3).
2. Where does water come from in nature? Invent a game which will permit your unit/patrol to discover the water cycle.
(creativity: 1, 2, 3).
3. Find out what type of trees suit the needs in your area for better water maintenance. Start a nursery of these trees and sell them on an organized WATER-TREE DAY.
(conviction, creativity: 1, 2, 3).

4. Grow plants in pots, preferably vegetables. Give water to these according to the following schedule:

pot no 1	every day
pot no 2	every 3 days
pot no 3	every 5 days
pot no 4	once a week
pot no 5	every 10 days
pot no 6	every 2 weeks

Record the results relating the water quantity with plant growth. Find out the best watering time intervals.
(conviction, creativity: 1, 2, 3).
5. Create a model of an irrigation system to show how water can be directed along channels, including methods of water lifting from one channel to another.
(creativity: 2, 3).
6. Undertake a tree plantation campaign choosing the types of trees best suited to implement adequacy in water quality and quantity, along with your community.
(conviction, creativity, community involvement: 1, 2, 3).
7. Raise funds to assist the community to build appropriate water catchments (tanks, channels etc.)
(creativity, community involvement: 1, 2, 3).
8. Meet farmers using chemical fertilizers and farmers using organic or biological fertilizing methods, and find out about their arguments for their choice.
(conviction, creativity: 1, 2, 3).
9. Find a place or use a pot to grow vegetables and maintain them till maturity. Record their water needs.
(conviction, creativity: 1, 2, 3).
10. Demonstrate how freshwater helps crops grow: water plants in pots with clean water and with water containing a certain quantity of detergent, salt, chlorine water. Compare the results in a report.
(conviction, creativity: 1, 2, 3).
11. Visit an irrigation project near your Company and discuss the irrigation process with the farmer. Find out any negative effects stagnant water has on the environment or on the health of neighbouring people.
(conviction: 2, 3).
12. If you notice that the vegetation near a reservoir in your environment is dying out, can you use the same water for watering livestock or for irrigation? What can Girl Guides and Girl Scouts do to advise the community?
(conviction, community involvement: 2, 3).
13. In an area where irrigation water comes from groundwater, find out if the quantity used permits appropriate replenishment of this water. Learn how to calculate how long it will take for this source to be exhausted.
(conviction, creativity: 2, 3).
14. Find out how much water is needed in your area to irrigate one hectare of cotton. Compare this quantity with the quantity of water used in the village and establish its equivalence.
(conviction, creativity, community involvement: 2, 3).

15. Find out whether the irrigation schemes in your area have any effect on water supply of the nearest town or village.

(conviction: 2, 3).

16. Grow corn (or any other crop) in 5 different pots. Find 5 receptacles and cover them with some solid plastic material forming a screen. Put the pots on top of them. Add to the pots amounts of fertilizers as indicated below:

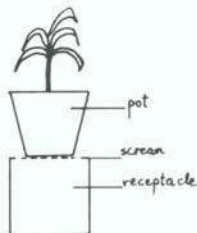
1st pot : 0 teaspoon

2nd pot: 1 teaspoon

3rd pot : 3 teaspoons

4th pot : 5 teaspoons

5th pot : 7 teaspoons



Water the plants accordingly saving the water collected in the receptacles. Consult with experts how you can measure the quantity of fertilizer which has been leached off in the receptacles. Compare the plant state with the quantity of fertilizer added to each pot. Conclude on the correct amount needed.

(conviction, creativity: 2, 3).

17. Gather information about disease development in stagnant water, think or learn about preventive measures and apply them with the community.

(conviction, creativity, community involvement: 2, 3).

18. Help clear irrigation canals so that water does not overflow to waste through flooding wrong areas.

(creativity, community involvement: 2, 3).

19. Do a soil erosion survey. After a heavy rain, walk around your community and look for evidence of soil erosion. Present your findings an attractive way during a farmers meeting.

(conviction, creativity, community involvement: 3)

20. Be able to describe the practices farmers use to prevent soil erosion on their lands. Present your description on a compagn against erosion.

(creativity, community involvement: 2, 3)

21. Create a terrarium (terrarium is a container in which small terrestrial animals or plants are kept). How is your terrarium like the planet Earth? How is it different? What do you think would happen if you introduced a toxic substance into your terrarium through polluted water. (Please do not do this).

(conviction: 1, 2)

22. Interview a farmer to find out about different farming techniques. Visit farms that use various farming techniques such as monocultures, xeriscaping, hydroponics, and organic farming. Learn the advantages and disadvantages of each related to the use of water. Make a report and present it to a parents' meeting.

(conviction, community involvement: 3)

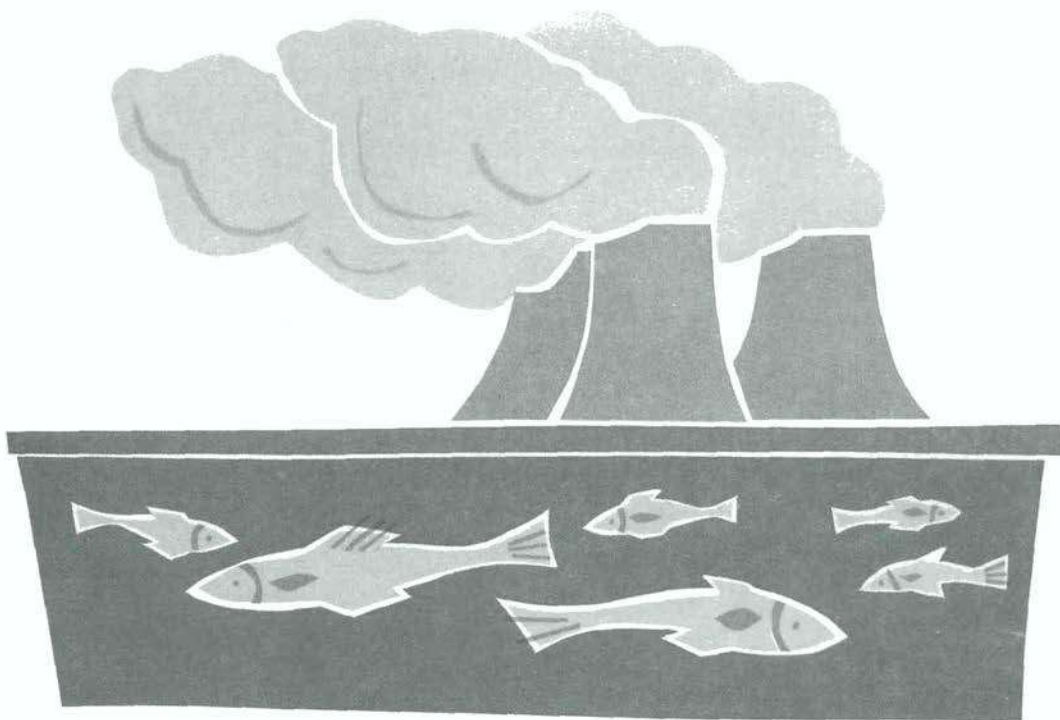


WATER AND INDUSTRY

Industry provides society with goods resulting in a better quality of technological life. If considered as a tool, it provides us with goods which make our life easy so that we economize time for intellectual, spiritual elimination to a minimum of all its negative implications.

1. Carry out a campaign against excess of industrial material used (plastic, leather, paper, tins etc.)
(conviction, community involvement: 1, 2, 3).
2. Contact the appropriate authorities of your area and learn how to monitor water pollution of a river, a lake or a pond through correct techniques. Then monitor the water sources of your region to trace any pollution.
(creativity, community involvement: 1, 2, 3).
3. Contact older people and learn about their lifestyle years ago. Compare it with the actual lifestyle in relation to industrial products.
(conviction, community involvement: 1, 2, 3).
4. Visit a factory after having made previous preparation as to what to look for with particular reference to waste disposal. Follow-up with an evaluation.
(conviction, community involvement: 2, 3)
5. Organize a role-playing game including an industrialist, a government official and an environmentalist. Try to find arguments for each role. Guiders may sum-up and conclude.
(conviction: 2, 3).

6. Organize a photography competition on industrial pollution and set up a photo exhibition.
(creativity: 1, 2, 3).
7. Prepare a questionnaire on the implications of industry on freshwater. Visit two or three of your neighbours and find out what they know on the effect of industry on water supply. Discuss with them what they do not know.
(conviction, creativity, community involvement: 2, 3).
8. Find out how industrial development affects adequacy of water supply.
(conviction: 2, 3).
9. Identify industrial pollution sites and report to your unit.
(conviction: 1, 2, 3).
10. In case of accidental industrial pollution, offer help to the authorities.
(creativity, community involvement: 3).
11. Create a puzzle on industrial pollution for your Brownie Company.
(creativity: 1, 2).
12. Identify pollution points along a river. Find the source of pollution and campaign against it.
(conviction, creativity, community involvement: 1, 2, 3).
13. Organize a campaign for appropriate industrial waste disposal. Enlist environment oriented organizations and cooperate with them during this campaign.
(conviction, community involvement: 2, 3)
14. Draw a series of pictures showing what you think would happen to your region if too many factories were set up and present it to your unit or a parent meeting through a «home made» T.V. set.
(conviction, creativity, community involvement: 1, 2).
15. Imagine life in your region with and without industry. If the existing industry is closed, try to find out how the needs of people and the needs of the environment can cope together.
(conviction: 2, 3).
16. How would you face the lack of facilities at home, at school, in town? What do you think could be a substitute for industrial products which can pollute surface and groundwater?
(conviction, creativity: 1, 2, 3).
17. Learn about the impact of acid rain in your community by talking to a science teacher person who works for a wildlife or public health agency.
(conviction: 1, 2, 3).



WATER AND ENERGY

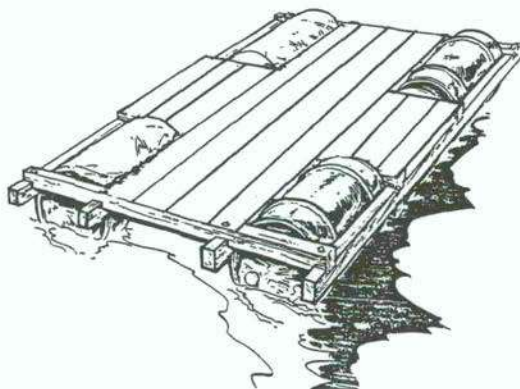
Energy in form of electricity, movement or heat are indispensable for the well being of man. Water is in the origin of its production. Man has to safeguard directly and indirectly this primary substance of our planet.

1. Go to a hydropower station and try to find out how energy can be produced by using water. Then try to set up a model hydropower station in the river near your camp by building a mini-dam to produce power for the camp.
(conviction, creativity: 2, 3).
2. Visit a power station and find out from where it gets the energy required. If it is water energy, identify possible implications on the use of this water for eventual other purposes.
(conviction: 3).
3. Find out the possible uses of a water wheel. Use this discovery to carry out production of power in combination with irrigation of land at a higher level.
(creativity, community involvement: 2, 3).
4. Water is energy and this can be noticed during heavy rainfall. Watch how water has the power to transport things. Describe it to your unit/patrol.
(conviction, creativity: 1, 2).
5. Describe the implications on the landscape of a waterdam in your area.
(conviction, creativity: 2, 3).

6. Measure the water temperature upstream and downstream near a power producing plant. What are the differences in the fauna and flora in these two locations? Why? Write a report.
(conviction, creativity: 2, 3).
7. In a region where a dam has been constructed, contact people and find out what the consequences are on the population (good or bad).
(conviction, community involvement: 2, 3).
8. Compare the need for fuel wood with the necessity of maintaining a forest to preserve the water catchment. Discuss with people.
(conviction, community involvement: 2, 3).
9. Find out how much energy is needed for the water to be piped to your tap. Campaign for the reduction of the water consumption which will result in energy reduction as well.
(conviction, community involvement: 2, 3).
10. Think with your patrol how water consumption can be reduced. Make a list of possible ways and propose it to your family or/and your school class or/and to the public of your community/neighbourhood in a meeting.
(conviction, creativity, community involvement: 1, 2, 3).
11. Try to identify leaking taps and suggest remedy.
(conviction, creativity: 1, 2, 3).
12. Draw with your patrol or unit or yourself a poster on which you will show the water itinerary from its source to your tap. At which points is this water used for energy production and at which points is it using energy? Present it to your unit or in a parent meeting and identify ways to safeguard both water and energy.
(creativity, community involvement: 1, 2, 3).
13. Imagine that you had no electricity in your home. Make a list of all the household «conveniences» that you could no longer use. How would your life be different without electricity? Next, find out how your electricity is generated. Does it come from solar, nuclear, hydroelectric or wind power or from another source of energy? Learn about them and compare the advantages and disadvantages of these energy sources.
(conviction: 2, 3)
14. Construction of a raft for the group
 - 4 metallic barrels 200 lt each (88 cm long and 60 cm in diameter)
 - 4 rafters 8×5 cm, 3.06 m long
 - 4 rafters 8×5 cm, 2.25 m long
 - 16 bolts 160 mm long, 10 mm in diameter
 - 32 flat rings
 - a drill
 - wooden boards
 - rope

Construction

Mount the base of the raft by screwing the intersections.
Nail the boards on the base.
Attach the 4 barrels with the rope on the base.



PROJECTS

PROJECTS FOR ALL AGE GROUPS

WARNING: Safety Rules and Precautions

Each time the Unit decides to make a water research, Leaders must assure all safety precautions: **lifesavers** must be at the ready and **life jackets** must be worn for water above ankle deep. In certain areas no one is allowed to put their hands into water in natural sources unless they have had all of the **relevant injections**. Care must be taken of floating **wastes** or those settled on the bottom. The **hardness** of the pond/river bottom must be tested before starting any operation in water. Sometimes **gloves** and/or special **boots** may be needed and **indoors facilities** for «scrubbing up» with disinfectant in the clean water at the end.

1. River Research

Travel to a place at a pond or along a river where you can easily get to the water. Introduce the area as an ecosystem that is full of a variety of plants and animals unfamiliar to most people. Ask the unit to spread out along the water's edge (individually or in pairs), and to watch for animals in and on the water for ten minutes. Encourage them to make notes or sketches of what they see. Then dredge up some of the bottom material and sort through the rocks, pebbles, mud or sand for other organisms. Check the bottom of rocks in a fast-moving area of the stream for clinging insects. Dip nets can be used to catch animals moving through the water. Collect the organisms in a pail for closer observation. Then take them back to the water.

(conviction, creativity: 1, 2, 3)

2. Our lifestyle

List those things in your life that you think contribute to the overall quality of your life. Check off those things that you feel contribute to your personal well-being; star those that contribute to survival on a day-to-day basis; and double-star those things and places that make life special for you. Underline those things that you literally cannot live without. These should be things that all people everywhere need in order to live. Circle those things that you could do without if necessary. Make a separate list of those things that you know are endangered because of pollution, poor environmental practices, and overuse. Do a project that helps one of those things, or change a lifestyle that will affect the environment in a positive way.

(conviction, creativity: 3)

3. A Page out of History

Collect information in your community to see what activities and life styles were important 25, 50, and 100 years ago, and what social and commercial activities were related to, or dependent upon, water transport and rivers. For example:

1. Talk to senior citizens about past river-related events in their lives.
2. Talk to senior citizens about the effects of past floods and droughts they remember.
3. Visit local government officials to discuss river-related programmes and problems, to ascertain how your community currently deals with concerns about water issues like diking, floodplain development, river pollution, and drinking water supply.

Present your findings as a scrapbook report, a poster of past river activities, a report for your local newspaper, or a drama production played out during a unit meeting.

Invite a pioneer citizen or two from your community to a unit meeting, to share with you their stories and pictures of river activities and explain the past use and availability of water for washing, cooking, bathing, and recreation.

Look up and study why the river is significant in the history of your country. Share your knowledge with the other members of your unit. Above all, enjoy the trip to your countryside.

Visit a national or provincial historic site at or near a river. Take part in a pioneer activity offered there, such as churning butter, spinning, weaving, and grinding flour, or making ice cream. What can such activities teach you about the past and the present?

Participate in a local «River Day Clean-Up», or a «River Valley Beautification Programme». Contact your community or provincial parks department for the dates of such activities, also to obtain suggestions for your useful and enjoyable participation, and to find out what other activities related to rivers are planned or already under way. Join up with your whole unit; or, make a party date with your family or some friends. Take note of how such activities foster goodwill and a high community spirit, while hard work takes place to make your river and its valley look better.

(conviction, creativity, community involvement: 3)

4. Looking into Marsh Water.

The closer you get to something under water, the easier it is to see it clearly. To make a water viewer, you will need a paper cup with the bottom cut out, and a strong, clear plastic wrap. Cover the top of the cup with the plastic wrap and secure it with a rubber band. A larger viewer can be made by cutting the top portion and the bottom out of a milk carton or by opening both sides of a big can. Again use the plastic wrap with a rubber band. Now you are ready to discover and view the fascinating underwater life within a marsh.

Larger viewers could be made by cutting the base out of a plastic bucket and sealing into the whole a circle of clear plastic/perspex instead using a suitable solvent (overseen by adults). A few screws can help to hold the circle in place by taking the weight, if they are screwed below the circle.

(conviction, creativity: 1, 2, 3)



5. Pond Dipping

Discovery has always been popular with children of all ages, and it is very simple to plan water activities that everyone can participate in. Old clothes and old running shoes are a necessity for this activity, as is a pond kit (see below).

Dusk and dawn are the best times of the day to see activity around and in ponds, lakes, and rivers. Late May and June are the best months, but all the year round in the tropics and June/July in the Arctic/Antarctic areas, although autumn is a good time to see migrating waterfowl.

Try shining a light into still water at night. Many fish which are accustomed to feeding at dawn and dusk, will swim to the edge of the dimly illuminated area in search of food.

Fun pond activities for young girls can include using a dip net carefully to catch some of the living creatures of the pond and place them into a jar with pond water. Looking at their «treasures» and imitating the movements of their favourites ought to be fun. The older girls may organize plants and animals in egg carton compartments in the order of a natural foodchain. In every case, return the plants and animals to the pond alive!

Equipment for a Pond Kit:

- One receptacle to hold pond water.
- One small, aquarium - size dip net.
- Larger insect net, made from nylon, wire, and a wooden handle, one to three feet long.
- A magnifying glass or microcube.
- Plastic bottles, or egg cartons, to retain and study the plant or animal specimen.
- A towel.
- A reference book.

(conviction, creativity: 1, 2, 3)

6. Growing Algae

The water plants known as algae grow as many varieties, and are often found as green, slimy blobs or strands in streams and ponds. They can be microscopically small, or grow as large as kelp does along the shores in some countries. Algae provide food for fish turtles, and birds like the osprey and the heron. They can be found all over the world and produce about 75 percent of the oxygen in our air.

Method for growing Algae.

- Fill a clear glass jar with tap or pond water.
- Place the jar in the sun for several days, without a lid.
- After a few days add more water as it evaporates.
- Suddenly a green or brown growth will appear in and on the jar.
- Study this algal growth with a magnifying glass or better still, under a microscope.
- You can test the fragility of this mini - ecosystem, by (a) letting the algae overcrowd their living space, (b) letting the water get too warm or (c) too cold. In all three situations the algal community will collapse and die, leaving you with a jar of very smelly water. Another way to test its fragility is to deliberately «pollute» the water with a few drops of soap detergent. Both tests should clearly teach you something very important, something that we as beings cannot ignore about our environment.

(conviction, creativity: 1, 2, 3)

7. Crystal Clear Water?

Clear water is very important to the health and life of water plants and animals, for it is the clarity of water that allows the sunlight to penetrate to different depths. Polluted or murky, dirty waters prevent sunlight from assisting water plants to produce maximum amounts of oxygen.

Method for Measuring Light Penetration.

- Construct yourself a metal disk of about 25 centimetres in diameter, make sure it weighs a couple of pounds (1 kg). Now mark its upper surface into four pie-like sections, and paint one opposing pair of sections white, the other red. Drill a small hole through the exact centre of the disk, thread a sturdy white, and about 4 metre long string through the hole and make a knot on the bottom of the disk, large enough to prevent the string from slipping through the hole. Now mark the string at 30 centimetre intervals with black paint.
- To make measuring with this disk work, you will have to stand at the end of a wharf or be on a raft, canoe, or boat.
- Slowly let the disk sink into the water, always keeping an eye on the depth - measuring string.

- When the disk disappears from view, mark its measured depth down in your field notebook. Try the same procedure at a number of different places, streams, lakes, and during different times of the year.

Another system for shallow water is to take a stick or rod and mark it off in centimetres. Make a hole at one end and poke a shiny piece of wire through so that it projects for 3-4 centimetres. At the other end of the stick/rod make another hole and bending more wire into the shape of a ring, poke the two ends through the hole. In each case twist the ends of the wires that are not wanted so that the straight piece of wire and the ring do not fall out of the holes. The ring should be above the protruding wire. Looking through the ring at the top of the stick, lower the stick until the protruding wire disappears and read off the water level on the stick. This is the vanishing depth in the water.



(conviction, creativity: 1, 2, 3). (Courtesy of Environment Canada Inland Waters Directorate).

8. Keeping our Water Clear and Fresh

Whether people live and work in cities, towns, ranches or farms, we all add things to our water supplies as we use them for drinking, cleaning or in our industrial pursuits. So when the water leaves our homes, places of business or factories, it is never as clean as it was when it first came out of the taps. So what can we do to help keep it much cleaner than we do now?

Activity:

We can demonstrate that water is a universal solvent for most of the liquids we use with a potential to pollute our drinking water, by:

1. Adding four drops of blue food colouring to one full glass of water. Observe what happens! Our shampoos, cleaning fluids, and soap bubbles, have the same potential to discolour, dirty or pollute clean water.
2. Adding four drops of vegetable oil to another glass full of clean water. Observe what happens now. Pouring oils and greases into your sink at home causes the same type of film to form on the surface of waters and ponds where many oily substances often end up. This kind of oily surface scum prevents certain fish from surface feeding and insects to reach the air for breathing. Would you want to swim in it?
3. Adding four drops of vegetable oil to glass number three, then carefully adding two additional drops of green food colouring to the surface of the oil. Wait a few seconds and observe what happens. Imagine this to be an oil spill on the ocean surface when tanker ships carry oil to coastal refineries.

Equipment required:

- Three glasses full of clean water
- One small vial of vegetable oil
- One small vial of green food colouring
- One small vial of blue food colouring
- One eye dropper
- One glass of «clean» and cold water to drink afterwards!

(conviction, creativity: 1, 2)

9. The quality of our Water

We cannot assume to be able to safely drink water directly from all natural sources, whether they be

springs, streams or lakes, without first considering the presence of quite natural pollutants and biological health threats. For example, rain contains atmospheric dust particles and gases dissolved within it. Streams carry dissolved natural elements, clay and silt particles. Some of the natural impurities give water its pleasant taste. Still other natural impurities are picked up by the «universal solvent» water, when it flows through swamps and similar bodies of water, where it absorbs the «swampy» smell and water soluble brown coloured acids.

Following are some of the physical characteristics of natural water that are easy to observe, are usually measured and often controlled, so that water can be made more suitable for our use.

Colour:

Water often absorbs colour from decaying organic matter when it flows through swamps or soils or it is coloured by minerals and metals in the ground and subsurface bedrock it flows through: i.e. the rusty stain caused by iron.

Water becomes cloudy when it carries very fine soil particles following a storm, when glaciers melt and add «rock flour» or when plant and animal organisms «bloom» during the summer months.

Still other physical characteristics of natural water cannot be seen and must be detected by chemical means or with instruments.

Taste and Odour:

Again, certain natural substances like soil salts, minerals or vegetation, can and do affect the taste and odour of water. Other similar substances, whether natural or man-made, do not have such an effect on our taste and smell preferences.

Hardness:

The degree of hardness of water is caused by the amounts of calcium and magnesium salts dissolved in it. Some salts and minerals so dissolved are necessary for the maintenance of our good health, others have the opposite effect.

When water contains high amounts of these salts, it is said to be «hard» it looks no different from «soft» water, but it is difficult to get soap to foam properly when washing your face or your clothes. Hard water also stains toilet bowls and reacts with soap thus leaving a ring around your bathtub.

pH:

The technical term «pH» refers to the measurable acidity or alkalinity of water. In other words, the pH scale ranges from 0 to 14, with 7 being the neutral point between the two extreme values. For example, normal rain water is slightly acidic (less than 7). Calcium carbonates in the soil give a reading greater than 7. Water too acidic or basic has the potential to corrode pipes and damage house plumbing and fittings.

Activity:

1. Using absolutely clean 1/2 to 1 litre jars, collect a sample each of running water from a small creek, a river, and a lake. Make sure to mark each sample as to its origin.
2. Using the same size of jar, collect a water sample from your house tap. Mark it accordingly.
3. Collect and melt 1/2 to 1 litre sample of snow from a nearby field and a similar sized block of ice from a nearby and shallow pond or swamp. Mark accordingly.
4. Measure the pH of each sample separately. Take notes of your findings.

5. Try to provide an explanation why the measurements are either similar or dissimilar based on the origin of the water samples.
6. Why might the drinking water sample taken in a city differ from the other samples? Also why might the same water sample in the winter and again in the summer differ in its pH?
7. Using soap, wash your hands in the remaining water of each of the two samples with the most opposite pH values. Watch which pH tends to produce the most soap bubbles. (Please note that the results may be totally one-sided, if all your samples either contain only «soft» or only «hard» water).
(conviction, creativity: 1, 2)

10. Measurement of Vegetable Water Content

About 83 percent of our blood is water. It helps us digest our food, takes in oxygen, transports body wastes, and controls our body temperature.

Activity:

Find out how much water the following fruits or vegetables contain. Add some of your own choices to the list: tomato, orange, celery stalk, onion, grapes, pea pods, lettuce, mangoes, bananas, pineapples.

Approach:

First weigh the produce you intend to experiment with. Record the exact weight in metric measure. Now place the fruit or vegetable in a metal or ceramic tray and at a low temperature oven-dry or air-dry in a sunny window or on a floor vent. When the produce is totally dry to look at, weigh its remaining bulk. When you subtract the last weight figure from the former one, you will have established the weight of the water lost. Now you can calculate the percentage of water the fresh produce contained.

The answer might surprise you! Additionally, you might wish to compare the percentages of water contained in different fruits or vegetables and begin to think about why they differ and how the plant goes about storing water in its fruits or stalks.

(conviction, creativity: 1, 2)

11. Precipitation Measurement

The wettest place on Earth is Mount Waialeale, Hawaii, with an annual average rainfall of 11,684 mm, while the driest is Atacama Desert, Chile with a barely measurable rainfall. The highest annual average number of days with rain is 251 and it is found in Balem, Brasil.

Activity:

Collect and record the amounts of rainfall on your community during the spring and summer months. A similar project can be conducted during the winter months, when snow falls are measured (Note: 25 centimetres of snow equal about 2.5 centimetres of water).

Approach:

Make a rain gauge by using a clear plastic container or a canning jar of 1 litre size. Either mark the side of the container in millimetre and centimetre divisions or have a plastic ruler you can dip into the water to take the measurements. Place the container on a small stand just off the ground and in an open area of a yard or campsite. Make sure it does not get blown or knocked over. Take measurements immediately after each period of precipitation and compare your data with that published in local newspapers or shown on television. Annual comparisons can also be made with previously published data you can access at local libraries.

or weather offices. You may also find out if your area received more or less precipitation than last year, and during what periods. You may be able to think about why that was so.
(conviction, creativity: 2, 3)

12. Water Consumption

Many homes lose more water from leaky taps than they need for cooking and drinking purposes.

Activity:

The following illustration shows where the most water is used in a home occupied by a family. Make a similar chart to compare how much water your family uses in one week. Keep accurate records, and invite your family to join your efforts.

Approach:

Design a recording sheet by taking the basic ideas from the sample tabulation shown:

Showers: 5 minutes = 75 litres of water.

My family uses:

Mon: Tues: Wed: Thurs: Fri: Sat: Sun:

Leaky Faucet: 1 day = 25 litres

Our House has: leaky faucets.

We waste: litres of water per day.

(conviction, creativity: 1, 2)

(Information Courtesy of Environment Canada, Inland Waters Directorate.)

13. The Journalists

Prepare, publish and distribute a newspaper to sensitize people of your community on the subject «WATER SOURCE OF LIFE», once a week for the month.

(conviction, creativity, community involvement: 1, 2, 3)

14. Becoming Water Creatures

Prepare and play a puppet show on «HOW IT IS TO LIVE IN THE WATER». Take into consideration how the water creatures feel when water is polluted. Invite people of your community combining fund raising for environment protection projects of the community.

(conviction, creativity, community involvement: 1, 2)

15. Wildlife Protection

Gather information and undertake a survey on the endangered species related to freshwater in your community or in your country. Share with people your findings by organizing an exhibition.

(conviction, creativity, community involvement: 1, 2, 3)

16. Collections

Make a collection of photos or drawings or posters or stamps or of flowers, plants, insects or other animals living and depending on water.

(conviction, creativity: 1, 2, 3)

17. Water Storage

Find out from experts how to carry out water projects and build water tanks or/and roof gutters to accumulate rainwater to increase water supply for your home or your school. Campaign against pollution/contamination of the stored water.

(conviction, creativity, community involvement: 3)

18. Safeguarding Water

Make a survey to identify water pollutants from industrial or town wastes. Find out their effects on groundwater. Organize round table discussions with interested parties and invite your community to attend.

(conviction, community involvement: 3)



GAMES AND SMALL PROJECTS FOR BROWNIES

SENSITIZING BROWNIES

An Example

Full of care, noiselessly so that they could listen to the music of the water, they approached: gushing between two big rocks there was a small spring which formed a tiny brooklet.

- «Good morning, Brownie, I am the spring. If you drink me you will have in your body the murmur of the wind in the trees, the song of the robin and the blackbird, the smell of the jonquil and the perfume of the hyacinth, because I am the life of the Forest and I offer to the whole Forest».
- «I am the water. I am born in the mountains. In the beginning I hide in the ground, nobody can see me but I am there in the forest, I feed the seed which germinates and I can climb up in the big trees. Every thing alive in the forest needs me. I come out from the ground and I become a spring. I give my cool and clear water to the thirsty animals, to the frogs which jump among the reeds, to the silver fishes between the pebbles of the stream.»
«I tumble down into a waterfall. I grow into a river, I turn the wheel of the old mill, I strike the pillars of the bridge. I grow even more and I become a big river. I rive between the banks in the countryside and the quay of the town, I carry heavy boats and I give birth to electricity. I let myself be imprisoned in the tap, I run for every body in the house. I cool, I wash and I boil in the pots and kettles.»
«When I stretch out in the sea, I strike against the rocks, I whip the shores and the ships. The wind turns me into a tempest my vagues look like mountains. When calm, I lick the sand of the beaches and in the summer I am cool for those who swim.»
«I am the water, I purify, I give life ...»

SWIMMING

Water, water, water ...
not only for drinking but
also for swimming, plunging,
jumping, splashing.

In the swimming pool, in the
river, in the sea, you exercise
your body in the water.

Jump, plunge, dive and collect
something from the bottom, do
surfing, swim 25 m (slowly).



Safety rules

- Do not swim for two hours
after a meal.
- Do not stay for long in the
sun before swimming.
- Do not run on the edge of the pool which is usually slippery.

PLAYING IN THE WATER

The duck and her children

Half fill some 12 plastic bottles and stop them well so that they can
float.

One of the players goes into the water with the bottles around her:
she is the duck which protects her ducklings.

The rest of the players form a circle around her
4-5 metres away. They try to touch the
ducklings with a ball. The duck sends the ball
back trying to throw it as far as possible.

The duckling which is hit by the ball retires from
the game.

The player who touches the last duckling is the
next duck.

The duck which protects her ducklings for the
longest time is the winner.

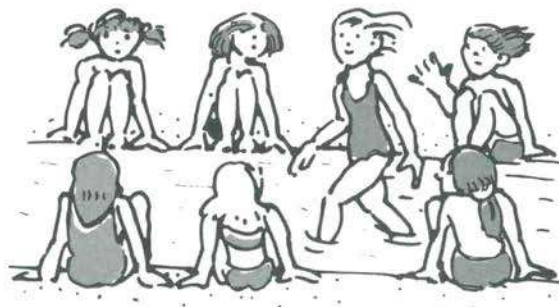


The carp and the frogs

The frogs (the players) form a line, along each «river bank» (real small river or water strip or a strip on the ground).

The carp is in the middle; it goes up and down non-stop, it appoints a frog and this frog a second one: these two frogs try to cross the river without being caught by the carp. The frog which is caught replaces the carp in the «river».

(Give a time limit - one or two minutes - by the end of which the frogs must have crossed)



Water is life. Every body knows that.

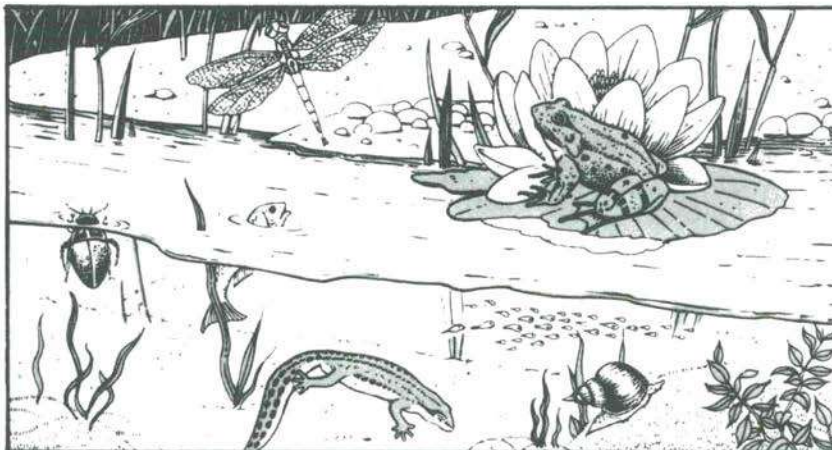
Would you like to find out its role in nature and in the life of people?

PROTECT THE RIVER

Water is life but if certain substances are mixed in the water they inhibit any kind of life. For example, fish do not like soap or detergent at all.

- Never discard filthy or soapy waters into a brook or pool but dig a hole especially for this purpose. The earth will filter them.
- Similarly do not throw in any rubbish.
- Do not wash yourself or your cloths in a brook. Take some water in a bucket or a basin.
- Help people around you to respect water so that it remains clean.

Isn't it better this way?



EXPLORE THE RIVER

Water is life. It runs in the brooks, the small and big rivers. Perhaps some day you will have the chance to discover the source of a big river but you may also either with your family or with your Brownie unit discover the source of a brook quite close to your house out in the country.

- Choose a brook on a detailed map.
- Then choose a point where you will start climbing up towards its source.
- Observe the plants and the animals which live in the brook or along its banks ... You can also talk with the riverside residents.
- Later tell your discoveries through a story or designs or photos.



FIREMEN, GARDENERS ... NEED WATER

Certain people use water constantly in their profession. In your neighbourhood there are certainly firemen, gardeners, services for cleaning the roads and the drains ... But there are also those who live from water: fishermen and marines, people who work on the oil platforms, etc.

Would you like to go and meet these people and learn more about their profession? You could go with your parents or your Guider or your Friend D6 and spend a few hours with them. You can have some questions ready to ask. Do not forget to describe every thing about this visit in the meeting of your Brownie unit or at home.



It is raining

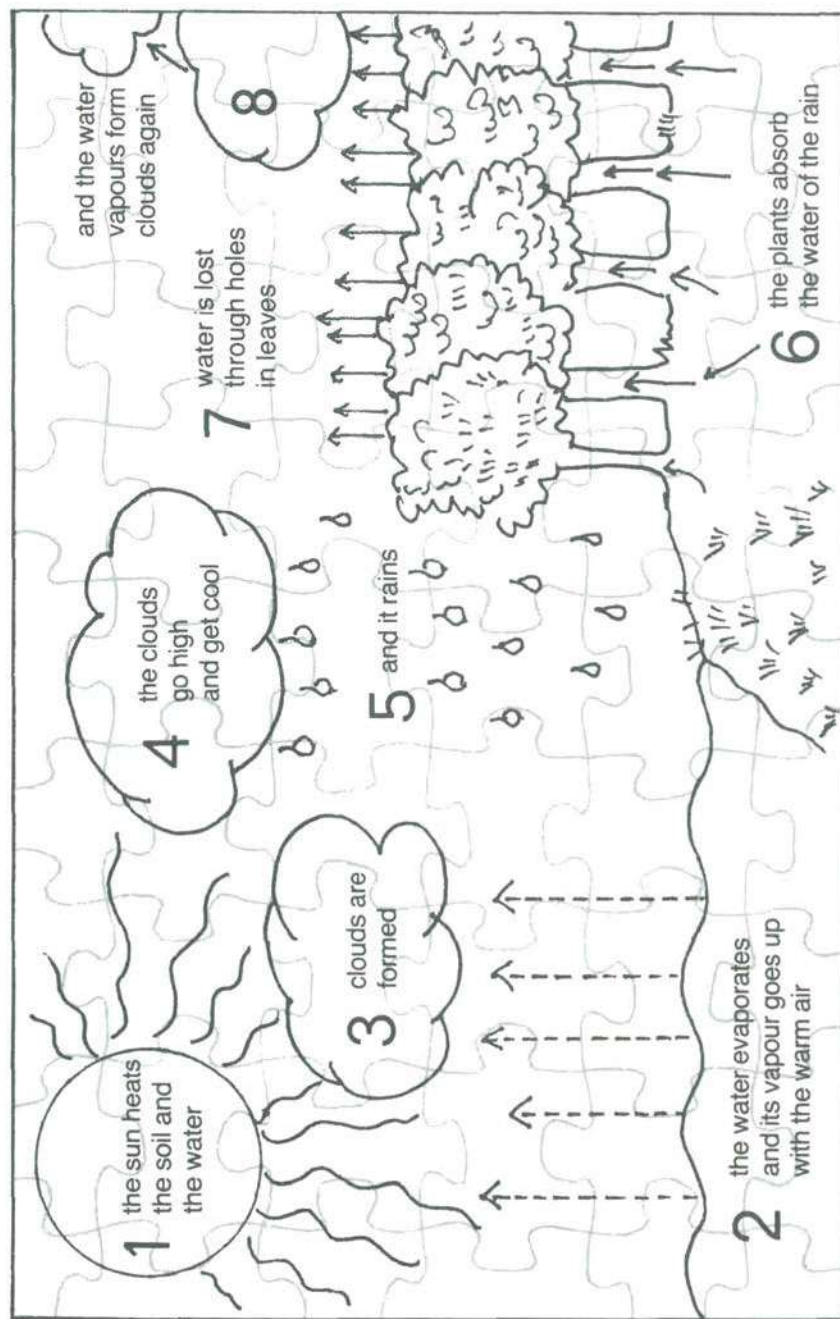
You need a raincoat.

Do not forget to take your own raincoat with you. Even when it rains one can have the pleasure of walking in the rain.

Design one and by tracing of the outline of the Brownie in the picture, dress her in it. Here is a figure of the type you could probably suggest to the Brownies to use.



YOU CAN COPY IT ON A HARD PAPER, COLOUR IT
AND MAKE A PUZZLE FOR YOUR BROWNIE UNIT.



From Apple and its Plantations
by Cristina Björg and Lena Anderson
Designs © by Ab. Raben and Sjørgen
Texte © by Casterman.

GAMES AND PROJECTS FOR GIRL GUIDES GIRL SCOUTS, CADETS AND RANGERS

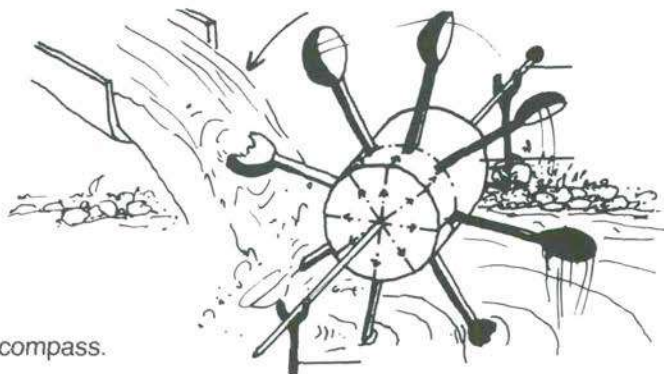
THE WATER MILL

You need:

- 8 plastic spoons
- 1 big cork, 5 cm diameter
- 1 knitting needle
- 2 Y-shaped sticks
- glue

Tools:

1 cutter, 1 knife, 1 ruler, 1 pencil and, if possible, 1 compass.



Construction

Find the centre of the cork when viewed at one end and push the needle down through the cork at that point until it protrudes equally from both ends of the cork. Now, using the ruler, find the central area when looking at the side of the cork and make a mark with the pencil at 8 places round the cork where the handles of the spoons should be inserted. Make a split for each spoon, put some glue on each handle and fix them one by one into each split making sure that all spoons face in the same direction. Place the 2 Y shaped sticks on either side of the water and rest the protruding ends of the needle, one on each stick. The force of the water should move the water wheel round if it falls into the bowls of the spoons in turn.

GAME: THE PRINCE OF LIFE

This is a game for Girl Guides and Girl Scouts (12-15 years old) which has been played successfully in Melan/France. You can use it as a model to make a new one according to your special conditions or use it as it is given.

(conviction, creativity, community development: 1)

Objectives

1. Discoveries related with the water of the region.
 - a. The source
 - b. Utilization of water by plants and animals
 - c. The capture of water by man
 - d. Uses of water
 - e. Water pollution and purification

Let the children discover some evidence of each of these 5 aspects of water in their own area.

The Game

- a. Start (improvised)
- b. Group formation (the children form groups without any assistance by the Guiders).
- c. Unrolling of the game (no need for marking tracks. The children use a map and they are independent).
- d. The messages (they are partially coded)
- e. The end of the game (the answers and the presentations of the children are evaluated)
- f. The party (an opportunity for the children to develop and use their imagination).

The Elements and the Material of the Game

Those responsible for the Girls or the Guiders are called to prepare the necessary material and the set up of the game accordingly. Here are the various messages (as an example):

Message—1 (written on thick paper cut in two pieces and put in two glasses on the table at the end of the lunch).

Invitation

On the occasion of his birthday, the PRINCE OF LIFE has the honor to invite you to his party which will take place in the Linden-Tea Hall on (day) at o'clock.

A special boat for 8 persons will collect you from the «quay» of your preference at (time) o'clock and bring you to the Linden-Tea Hall.

Special garment is requested (use your imagination so that you look especially attractive).

(the choice of the embarkation point needs some coordination among the groups which follow the same itinerary, in different order, however).

Message—2

A map of the area where the game will take place drawn on thick paper, cut in two pieces and put in two different glasses on the table at the same time with the previous message.

Message—3 (placed at the beginning of the paths, written on papers of four different colours with which four folded boats are made)

On behalf of the PRINCE OF LIFE the Captain welcomes you on board (name of the boat: Castle or Source or Principal Tap etc.)

During our trip try to meet the PRINCE who is your host. You will have to prove that you know him well before you are allowed to enter the party Hall. The Linden-Tea Hall will not be open before 5.00 p.m. Thus it is strongly recommended to all guests to take the maximum advantage of every step of their itinerary so that they get to know the PRINCE OF LIFE well. Do not rush. This trip is not a speed run.

The PRINCE likes mystery, so he will often address himself by coded messages. To help you during your trip, the PRINCE provides to you the precious tools placed in the bag. He hopes that you will return them to him in good condition at the entrance of the party Hall. Ready

- On board ...
- Open the bag and have a nice trip
- In every stop-over you get more and more acquainted with the PRINCE
- Give exact answers
- Bring back along with you all messages

Message—4 (placed by the sources of the forest)

I am the WATER
I am the PRINCE OF LIFE

You will discover my ultimate self ... Long ago I was born before the earth, ready to give myself to all who might meet me ... Some think I am cold. What do you think of my temperature?

Message—5 (found at the animal watering place)

I am the WATER
I am the PRINCE OF LIFE
I am the one WITHOUT WHOM LIFE CANNOT EXIST

Draw the place where the sheep come to meet me.

Message—6 (placed by a little old house)

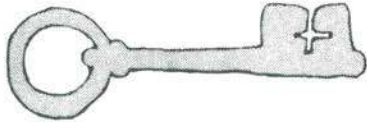
I am the WATER
the PRINCE OF LIFE
the one WHO CLEANS



Measure the water quantity with the graduated can or cylinder

Message-7 (this message is placed at the main community tap)

I am the WATER
The PRINCE OF LIFE
The one WHO IS ALWAYS ACTIVE ... and mysterious ...



= r i v E R = r i v E R r

I accERptER to bER in thER sERrvicER of mERn who without mER can do nothing. ThERy convERy mER through channERis thERrER whERrER thERY nERERd mER.

1. CalculatER on thER map thER diffERERncER in altitudER bERTwERER thER sourcER of thER watERr and thER point whERrER you arER actually.
2. ThERn find all of you thER placERs whERrER thERY usER mER: housERs, community tap ... and tracER on thER map thER track i follow from thER sourcER to thER points of sERrvicER.

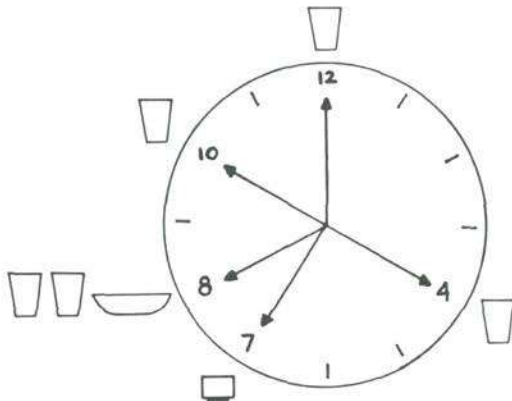
Answer (write your answer here)

Message-8 (found by the spring of the forest)

I am the WATER
The PRINCE OF LIFE
The one WHO REFRESHES

After having used your receptacles, answer the following question:

By the time you go to bed, how much have I given you out of myself?



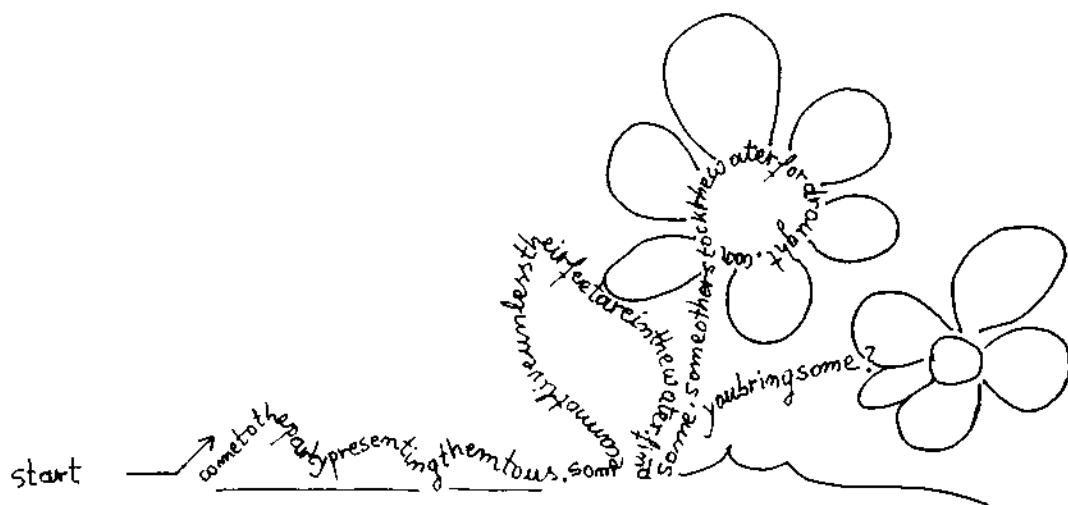
Answer (write your answer here)

Message—9 (placed on a stone pile on the road)

I am the WATER
the PRINCE OF LIFE
the one WHO HELPS GROWTH

In my kingdom you live, you grow up, you multiply and so do along with you all living creatures. These creatures cannot move by themselves. During their whole life they remain the same place where their grain has fallen and emerged. They adapt to the soil and climate where they grow.

Can you find out which these creatures are? Make a design or bring a small sample of them.



Message-10 (placed near the water purification plant)

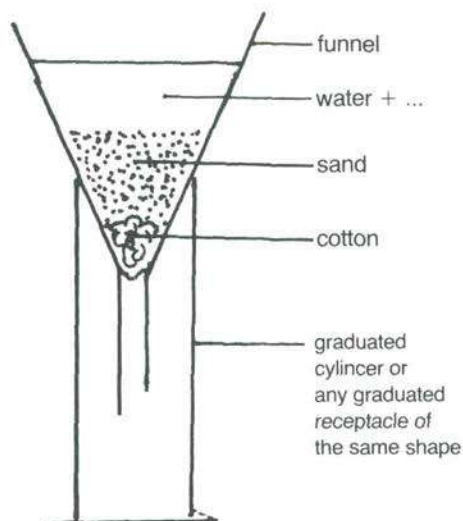
I am the WATER
the PRINCE OF LIFE
the one WHO CANNOT SERVE UNLESS I AM CLEAN

All of you have used me too much ... and you have dirtied me too much. However, you can give me back, my purity.

1. Try to find how you have polluted me.

Answers (write your answers here)

2. Try to understand how I can be clean again by conducting the following experiment.



1. Put the equipment together as in the picture.
2. Prepare the mixture: water + dead leaves found on the ground.
3. Pour the mixture on the funnel.
4. After the mixture is filtered, find out:
 - i. what you see in the jar
 - ii. touch the water. What does it feel like?
 - iii. stir the water with a stick.What do you observe?
5. Empty the jar.
6. Repeat the experiment on new sand and cotton, each time with different mixture:
 - water + watercolor
 - water + detergent
 - water + cooking oil

Solutions

In the jar you see: water + leaves = water without leaves
water + color = colored water
water + detergent = water without foam
water + cooking oil = water without oily spots

If you touch the water in the jar: After any of the above experiments, it does not have an oily touch.

If you stir it: nothing happens or changes.

Explain:

- The role of filtration in the water purification process.
- Why filtration is important in the sewage or waste purification process for the prevention of water pollution.
- The need to avoid pouring certain substances in water which goes untreated into the ground.

Message–11 (at the reception)

(The reception in the Linden-Tea Hall can start by tasting water as a drink. The Grand Chamberlain is reading the message written on a scroll:)

«You have arrived in the Linden-Tea Hall. The PRINCE OF LIFE requests the passengers of the same vessel to present to him everything which they have discovered during their trip so that he recognizes them. He will not appear to you. You have to discover him.

«The Wise Man of the PRINCE will listen to the discoveries of each crew and he will reward you accordingly.

«You have discovered the one without whom there is no life. Can you tell us how he reveals himself and show us the designs you have made?

«THE PRINCE OF LIFE is happy for the way you got to know him and invites you now to the Hall. He will award each crew a special prize to show his satisfaction.»

Notes about the party :

There are many possibilities. Guests may:

- be dressed in blue
- make up their face so that it symbolizes one of their discoveries about water
- write a poem, a sketch or a report on their discoveries
- tell or read a story or a legend about water
- the water celebration may even include a prayer about water
- and anything else the children can imagine

Signs of Rewards : The prizes of the game can be given to each group (crew) or to each guest and they can be:

a small bottle of colored water :

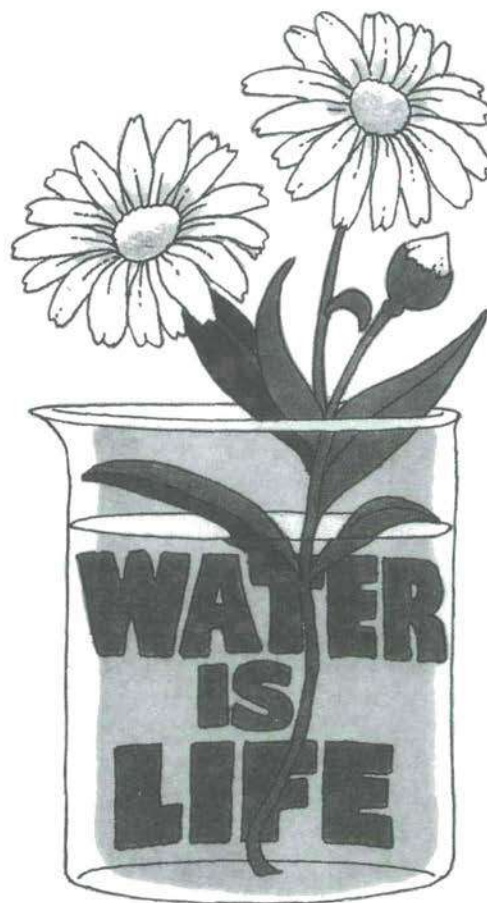
- red: water of Smile, protective during difficulties
- yellow: water of the Sun, for being shining and for sharing with others
- green: water of Spring, for not hesitating to make efforts which help grow up
- blue: water of Time, so that you remember that after a difficult time good days come back again.

WATER QUIZ

(conviction, creativity, community involvement: 2, 3)

To become a clean water advocate in your community, you need a few facts at your fingertips. How much do you know about water in your town area or even in your country? Take this quiz and find out.

1. Can you trace the water that you drink from your tap to its source or origin?
2. Who determines the quality of your drinking water and how often is it tested?
3. Is your environment affected by acid rain?
4. How many centimetres of rainfall does your area receive each year? What is the wettest month and the driest month?
5. Are there any waterways in your country used for navigation?
6. Name any sources of water in your area that have influenced history by giving rise to settlements, land disputes or boundaries.
7. List four species of fish found in the lakes or rivers of your area.
8. List five species of water birds found in your area.
9. How deep is the groundwater in your area?
10. Is the water in your community considered «soft» or «hard»? Do you know the difference?
11. What is the nearest body of salt water to your community?
12. What water conservation practices does your community encourage?



Water... A Life-Giving Cycle

1

Learn about acid rain and how to determine if you have acid rainfall where you live.

2

Find out where your drinking water comes from. Is it groundwater, spring water, river water, or does it come from another source? How is it treated?

3

Get into a good and healthy habit. Drink at least 8 glasses of water a day. Add a slice of lemon or lime for variety.

4

Find ways to measure currents along beaches. What happens when waves continuously pound against the shoreline? Observe how plants and animals hold on to a rocky shoreline.

5

Adopt a stream or a lakefront. Do a project that will help improve a wildlife habitat by preventing soil erosion, such as planting trees on a hillside or building water bars on a trail.

6

Observe the life forms in a lake or a stream. If you turn over rocks, be sure to replace them the way you found them!

7

Think of five ways your family can conserve water. Try them all and share your methods with your troop or a friend.

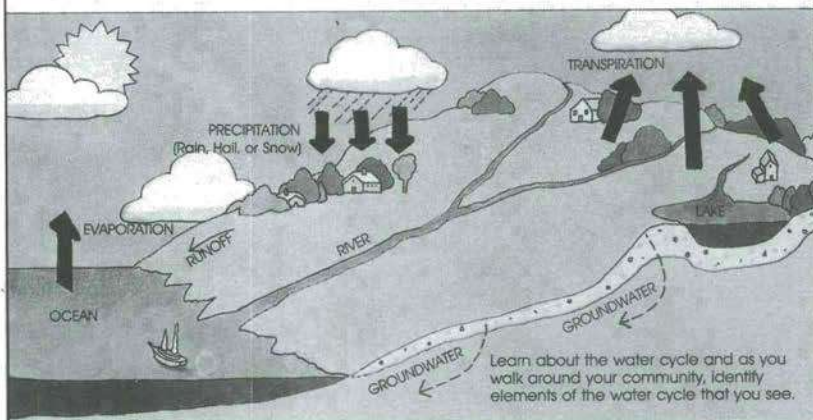
8

Make a solar still and collect the water as it evaporates.

9

Learn about weather. Visit a weather station or set up a simple station with your troop. Keep track of cloud cover, temperature, barometric pressure, and precipitation for a week or for a month.

The water cycle is the constant circulation of the earth's water as it journeys from the oceans to the sky, to the land, and back to the oceans again. Along the way, we study it, we use it, we try to control it, and we pollute it. As we greatly affect the quality of water and life on earth, it is essential that we understand our role in the water cycle. We can do this by focusing on water-related activities.



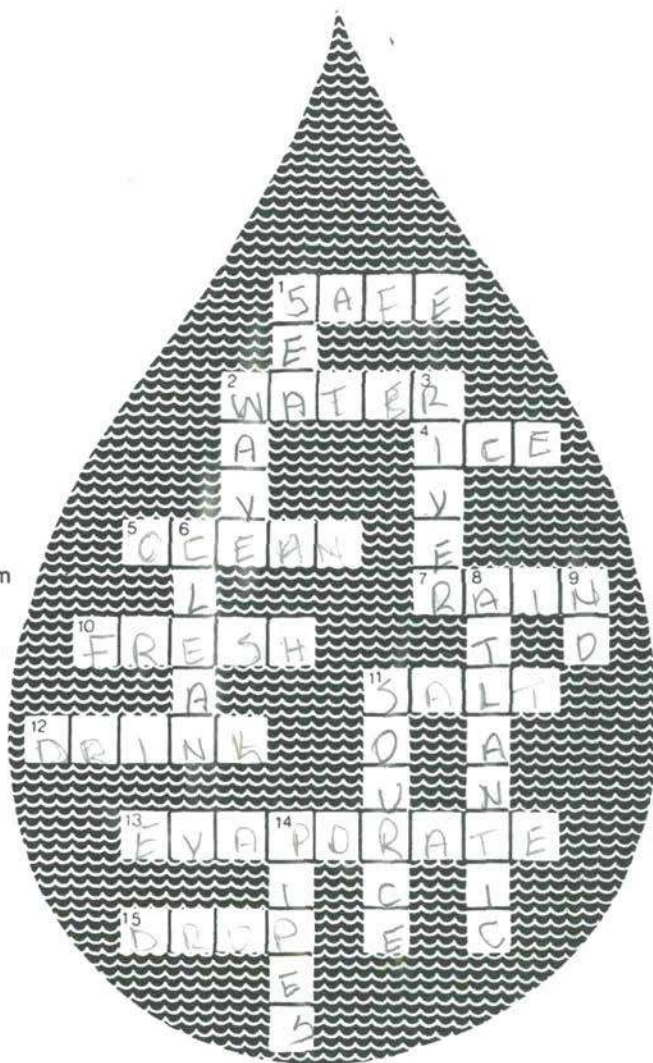
WATER CROSSWORD PUZZLE

ACROSS

1. Free from danger
2. A liquid all living things need to survive
4. Frozen water
5. Large body of salt water
7. Water that falls from the sky
10. Type of water in a lake or pond
11. Goes with pepper on the table
12. To swallow a liquid
13. To change from liquid into vapor
15. A small, round blob of water

DOWN

1. A body of water
2. Movement on the surface of water
3. A large stream
6. Opposite of dirty
8. Name for the large body of water between North America and Europe
9. Opposite of yes
11. Origin, or a place from which information is gotten
14. Large tubes used for carrying water



ANSWERS TO CROSSWORD PUZZLE



- | | |
|-------------|---------------|
| DOWN | ACROSS |
| 1. SEA | 1. SAFE |
| 2. WAVE | 2. WATER |
| 3. RIVER | 4. ICE |
| 6. CLEAN | 5. OCEAN |
| 8. ATLANTIC | 7. RAIN |
| 9. NO | 10. FRESH |
| 11. SOURCE | 11. SALT |
| 14. PIPES | 12. DRINK |
| | 13. EVAPORATE |
| | 15. DROP |

TECHNICAL PAGES

How children are persuaded to wash themselves in Africa.

Old people tell us that when we don't take a bath, the body will smell in a certain way that the snake will notice!

But it is not just snakes that notice! Your friends will notice. You can get 'craw' crawl, sores, itching or ringworm, when you don't take a bath every day.

MAKE SURE TO WASH:

Take a bath with:

Soap and plenty of water. Look for something to scrub your body.

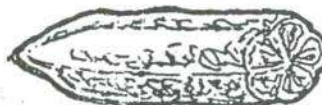
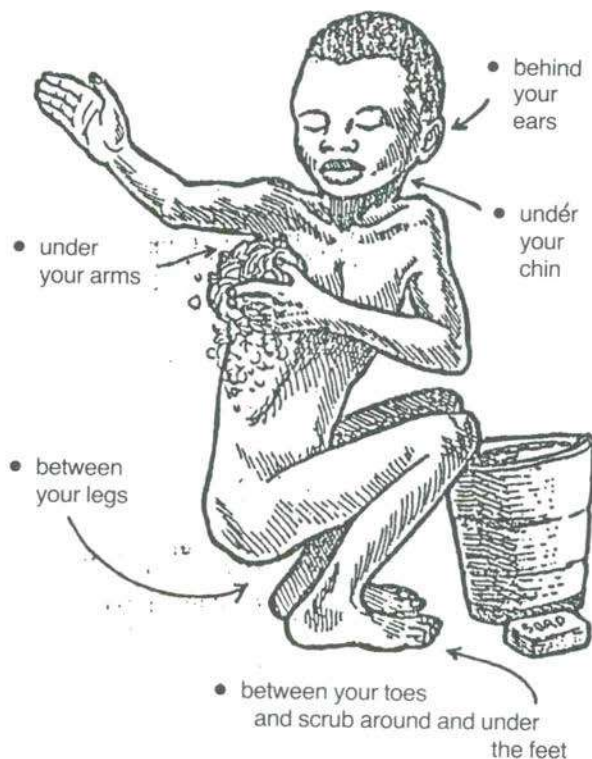
Use a sponge or a piece of cloth or the thing that grows on a vine like a cucumber. When it is dry, you peel off the outside and take out the seeds.

The rope that grows in the bush that you cut and beat until it is soft. Split it into little strings to scrub with. This is called loofah.

There are many kinds of soap. Can you think of some?

How is soap made in your home? When your body smells even after taking a bath: rub under the arms with mixed lime and soda (not caustic!).

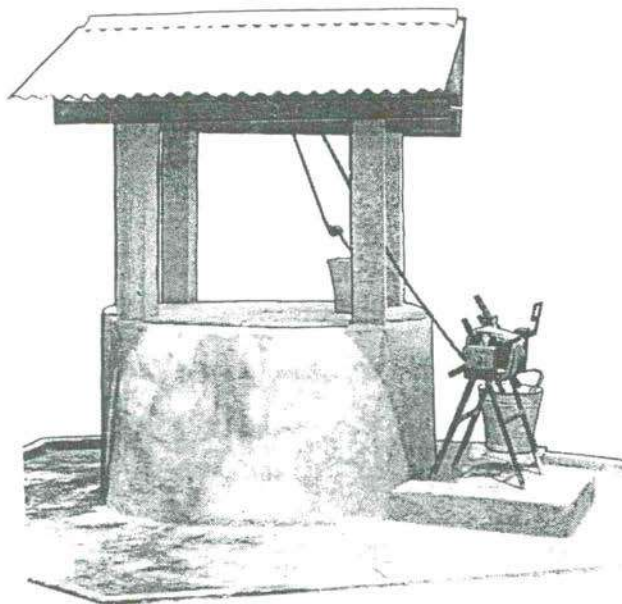
There are leaves and saps of trees in the bush that can make you smell fine. Do you know these trees?



VILLAGE WATER

Many villages have good, clean water from dug wells. But when people go to get the water sometimes the way they do it makes the water filthy.

This well has a pulley over it to help pull up the full bucket of water. Each well should have a special bucket used only for taking water out of the well. The special well bucket must not be put on the ground. There should be a shelf on the wall to put the bucket on when it is not being used as you see on this well. Then the bottom of the bucket will not get dirty. And the water in the well will not get dirty when you put the bucket in the well.



STORING WATER

Many people store clean water in or near their house so they don't have to get water many times during the day. You can store water in a large cement pot like the one in this picture, or a regular bucket. Whatever you store the water in, try to keep a cover on it. If possible keep the container off the ground. Sometimes animals wander around the compound. If there is not a good cover on the water pot, or if it is too small, these animals may drink out of your water pot. This will make the water dirty and may give you or your children diarrhoea or other diseases. Even chickens and ducks have very dirty mouths.

Keep a clean cup near the water container to use only for dipping water out of the pot.

Whenever your water pot gets close to empty, wash it with soap and rinse it with the rest of the clean water and put it in the sun to dry. Be sure to put it where the animals can not get into it.

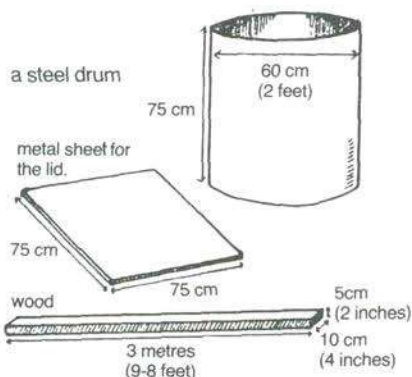


How to make a filter

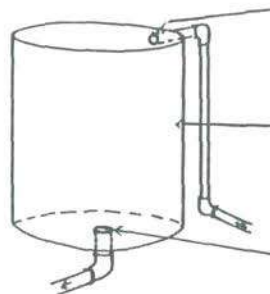
Let's make a
gravity sand filter
for our family's
water supply.



O.K. Here's what we need for a filter
that will deliver 1 litre of
clear water every minute



1. Prepare the drum.



Make a hole in the side of the drum
at the top. This hole is for an over -
flow pipe (if too much water enters
the filter it can flow into the over
flow pipe and drain away).

The drum can be coated with
asphalt material to make it last
longer.

Make a hole 2mm. wide in the bot-
tom of the drum. This is where the
clear water flows out of the filter.
This hole controls the flow of water.
So it must not be made larger.

2. Prepare the lid.

Fix a wooden frame around the metal sheet. (The drawing below
is what the lid would look like if the end of the lid, cut away were.



Make a hole in the centre of the lid
for the pipe that brings water to the
filter.

The wooden frame hangs
over the edge of the drum
to stop rain and dust get-
ting into the filter.

Nails fixed into the wooden frame
rest on the top of the drum. This
lets air pass, under the lid and over
the sand filter.

3. Find a site for the filter

Choose a site near the stream or pond where your family gets its
drinking water.



Water can be channelled into a settling
basin. There leaves or mud may settle so
they need not be removed
from the water by the filter.

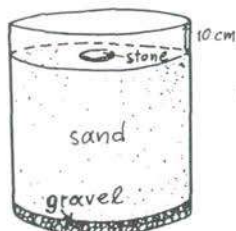
A screen can be added
at the entrance to the pipe
that leads to the filter. This can stop the pipe being plugged up
with debris.

4. Set the drum in place.



Rest the drum on 3 or 4 blocks. Make sure it is high enough to allow pipes or water containers underneath.

5. Fill the drum.



First put in a layer of gravel at least 3 cm (1.2 inches) deep. Next, put in the sand. This layer should be at least 60 cm. deep it is best if it is 75 cm or more. Fill the drum with sand, but leave at least 10 cm. of space between the top of the sand and the top of the drum.

Put a flat stone on top of the sand. This stops the water that flows into the filter from digging a crater in the sand.

6. Place the lid firmly on top of the drum. Weigh it down with stones to stop it blowing away. Make sure all the pipes are in place: a pipe from the water source to the filter: an over flow pipe: an outlet pipe for clear water.

DEHYDRATION

For preventing dehydration, an equally effective oral rehydration solution can be made using ingredients found in almost every household:

Some traditional remedies such as rice soup, also make highly effective oral rehydration solutions.

THE DO-IT-YOURSELF VERSION

8 TEASPOONS
OF SUGAR

1 TEASPOON
OF SALT

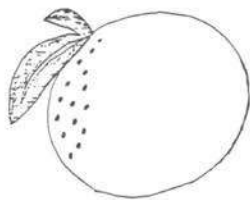
1 LITRE
OF WATER

38 NATIONS BEGIN MASS PRODUCTION

The following nations have now begun mass production of oral rehydration salts:

Afghanistan	Iran
Argentina	Kenya
Bangladesh	Lesotho
Brazil	Malaysia
Burkina-Faso	Mexico
Burma	Mongolia
Burundi	Morocco
China	Mozambique
Colombia	Nepal
Costa Rica	Pakistan
Kampuchea	Paraguay
Dominican Rep	Peru
Egypt	Philippines
El Salvador	Rep Korea
Ethiopia	Syria
Haiti	Thailand
Honduras	Tunisia
India	Venezuela
Indonesia	Zaire

HOMEMADE ORANGE SOAP



Produce your own soap instead of using detergents which pollute the environment especially the freshwater resources. In Japan Girl Scouts try to produce an orange soap which can be used to wash socks, shoes, collars, oil stains, cooking ovens, fans, plastic ware and various other things.

Material

1. an empty 18 lt oil can
2. thermometer in C°
3. a flat wooden stick 80 cm long
4. a pair of thick cotton gloves, and even better
5. plastic or rubber gloves
6. a stove or fire

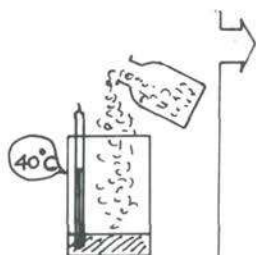
Ingredients

- | | |
|---------------------------|--------|
| 1. used salad oil | 2.7 lt |
| 2. caustic soda in flakes | 450 g |
| 3. orange rind | 400 g |
| 4. steamed rice | 400 g |
| 5. boiling hot water | 2.0 lt |

$$F = C^{\circ} \times (9/5) + 32$$

$$C^{\circ} = (F^{\circ} - 32) \times (5/9)$$

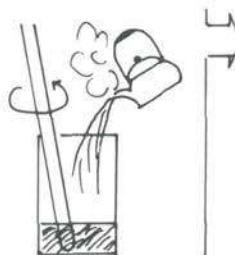
Making process



1. In an oil can, heat 2.7 lt of used salad oil up to 40° C
2. Add caustic soda; mix well

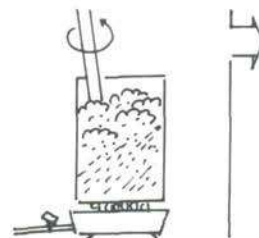


3. Mix orange and rice in the blender; add it into the can; mix it so as to be laid to the bottom



4. Pour 4 lt hot water into the can, mixing well while heating the mixture until fluffed out.

Remove it from the range and keep mixing well until it becomes thick.



5. Pour the remaining water and simmer while mixing for 20-30 min (the more you mix the smoot and more efficient it becomes)



6. Remove from heat and leave it until it turns into a brown jelly-like substance.

Scoop it into glass bottles and store it (do not use aluminium wares as caustic soda will dissolve it and aluminium will get into the soap. It being the most toxic of all metals this is undesirable.

Warning:

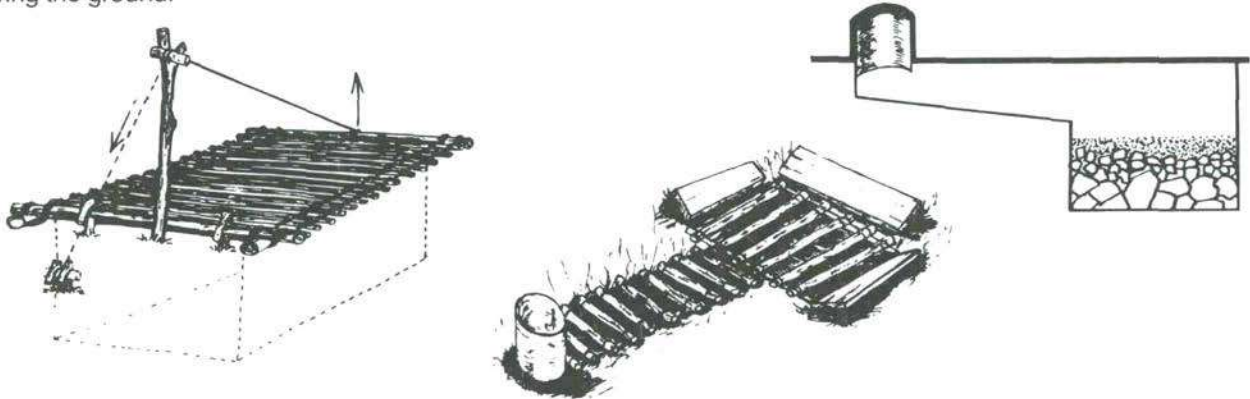
Good care must be taken of caustic soda which is a drastic chemical. Gloves must be used to handle it to prevent skin troubles. Never touch your eyes during the process or it is easy to become blind.

This small project is suitable only for Girl Guides or Girl Scouts above 15 years old.

PIT CONSTRUCTION

The greasy waters of the kitchen should not be poured on the ground or behind the bushes; they release a very unpleasant smell and attract the flies. A pit for these greasy waters is indispensable. We dig it a little farther from the kitchen: it all depends on the type of the soil.

For a big camp, it must be constructed with care. The hole of the drain (or point of discharge) of the waters must be near the cooking spot, a canal dug in slope will direct the waters in a rectangular pit 50×70×40 cm (40 cm deep) approximately. The bottom must have a layer of rather big stones and, be filled progressively with smaller stones and gravel at the top. The stones act as a filter, keep the grease which would inhibit the water from entering the ground.



SOLAR SHOWER

Camping does not necessarily mean to live without any comfort. After a game, a long hike or a hot sunny day, what is more agreeable than taking a shower? ... especially if it is hot ...

Material

- A 50 lt container (you can find it in a petrol station)
- Two palettes (you may ask some carrier to provide you with these)
- A rope or a belt 4 m long
- A black flexible water pipe 20 m long, 50 mm diameter and a second one 1.50 m long
- A junction (fitting) to attach the pipe on the tap
- A rigid plastic pipe used for electric installation (or PVC pipe) slightly larger than the outer diameter of the water pipe
- A cork stopper suitable for the rigid tube
- A transparent plastic sheet, and a black plastic sheet, both a little bigger than the size of the palette
- A lining material of any kind
- A roll of teflon

Tools

- A stapler gun
- A nail
- A sharp cutter
- Pliers
- A drill
- A shovel

Installation

1. The water heater:

Turn the palette up-side down. Cover this side with the lining material and put the black plastic sheet on top of it. Place the tube on it. Stretch the transparent plastic sheet on top and staple them all together.

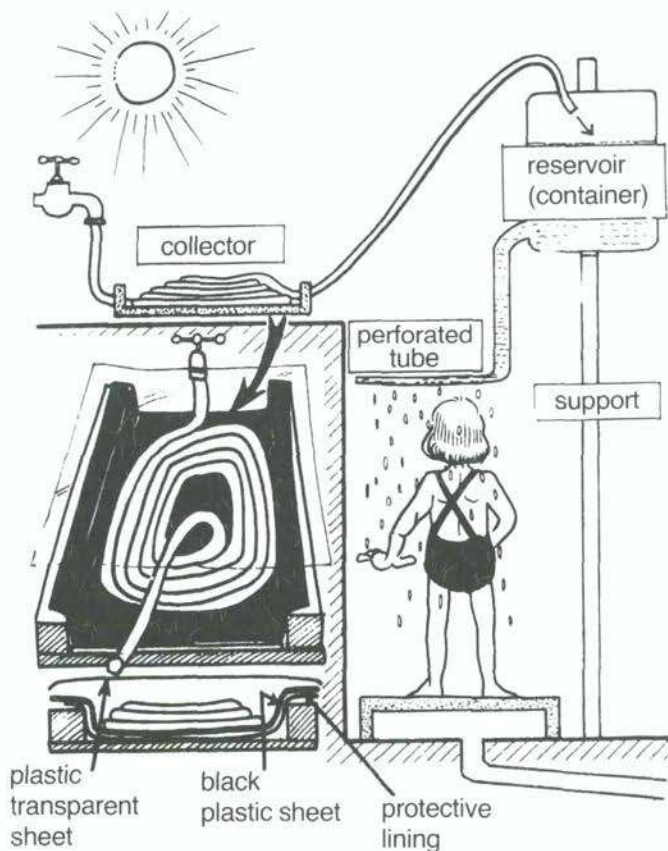
2. The reservoir:

Pierce a hole near the bottom of the container slightly smaller than the diameter of the tube. Cover the ends of the small tube (1.50 m) with teflon so that there is no leakage, and place one of the ends on the container.

3. The shower - rose

Make holes on the rigid tube (or PVC) with the nail after heating it on a flame, and plug one end with the stopper. Fix the small tube on this rigid short one. Fill both the water heater and the reservoir with water. It takes two hours for the water to be hot on a sunny day.

(Warning: Take care while **heating** the nail as the whole nail can heat up quickly and children can burn their fingers. Thick gloves could be useful. **Knocking holes** with a nail in a rounded object like a pipe is a bit hazardous and they might knock their own fingers).



CONSTRUCTION OF A TOILET OR SHOWER CABIN

Advantage: rapid mounting

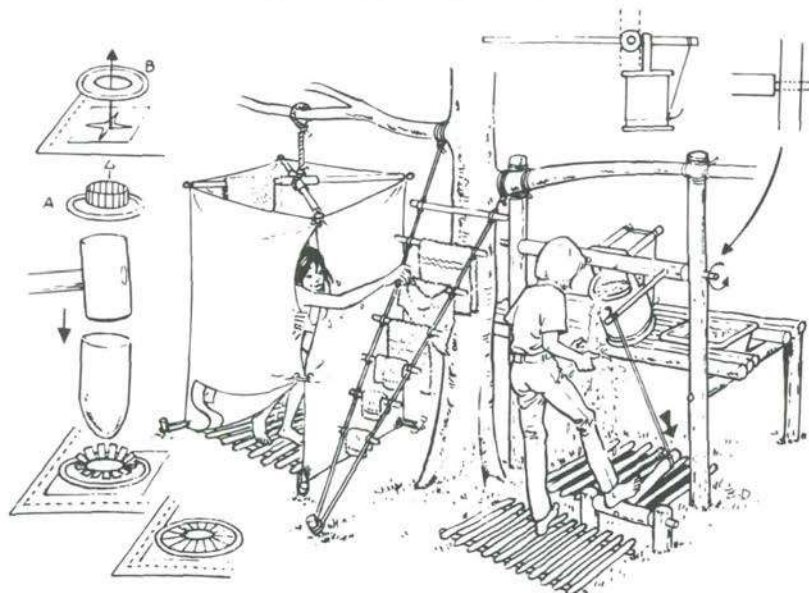
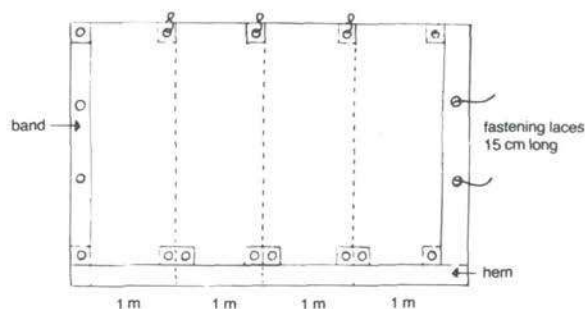
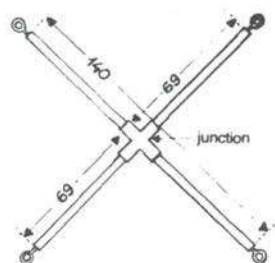
Disadvantages: It is inconvenient for children with special needs because a wheel chair cannot enter the cabin and they cannot be assisted in the cabin because of its narrowness.

Material

- light washable material non transparent: 4.20 m by 1.60 m. or even better 1.80 m. Do not use jute because it is very heavy. Each side of the cabin needs 1.00 m, the remaining 20 cm in each side is for the bands (2×5 cm) for fastening.
- 60 cm lace or velcro for the fastening
- 15 grommets
- stretcher
- 7 stakes
- 1 piece of stake 20 mm in diameter 140 cm long
- 2 pieces of stake 20 mm in diameter 69 cm long
- 1 cross fitting with the 4 inlets 20 mm in interior diameter
- 4 screw - rings

You can place the grommets with special pliers

Follow the scheme for the construction

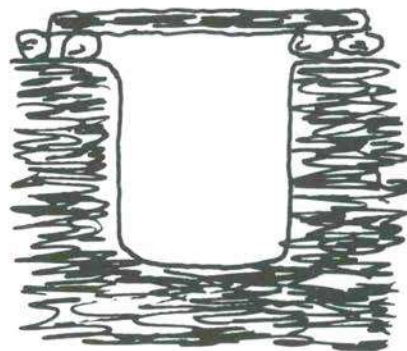


LATRINES

It is important that proper latrines be established, even for a short camp time. Even if you have it, do NOT use disinfectant in a latrine. Lime or disinfectants would kill the useful bacteria that break waste down and then it WILL start smelling. Add small amounts of water which will promote the bacteria.

Deep trench latrine

Dig a trench about 1.25m deep and 45cm wide. Build up the sides with logs or rocks and earth to make a comfortable sitting height, sealing the gaps between them. Lay logs across to leave only a hole for use (or several if you are a large group and making a communal latrine). Empty wood ash on the logs to make a seal – it will also deter flies.



Make a lid of smaller wood to cover the opening or use a large flat rock or a large leaf weighted down with stones. Always remember to replace it.



Urinal

Dig a pit about 60cm deep. Three-quarters fill it with large stones and then top up with earth, with a cone made from bark set into it as a funnel. Site it close enough to the camp to ensure that people bother to use it.



WATER AND AGRICULTURE

Water lifting devices

In the different countries of the world various water lifting and conveyance systems have been developed to carry the water directly to the field in a controlled manner according to the water requirements of the crop.

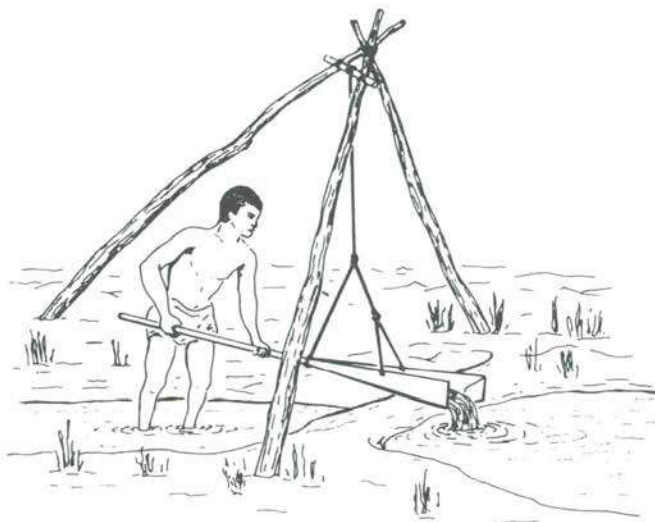
The figure below indicates the key components of any irrigation and distribution system.

Man started with very simple devices such as cans, buckets, scoops, bailers and swing baskets. These devices are still in use in many countries under development. They are based on simple principles which can be applied in any circumstances especially during camp where the children can develop a conviction about the need and use of water.

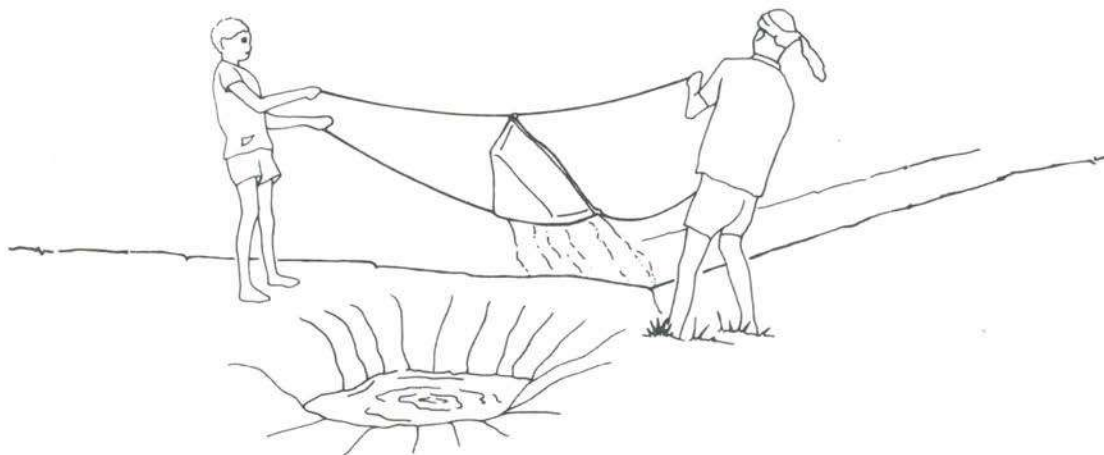
The figures below show such simple devices in use.



The scoop used as a simple hand tool



Scoop with a rope support



The swingbasket in use (after T. Schioler)

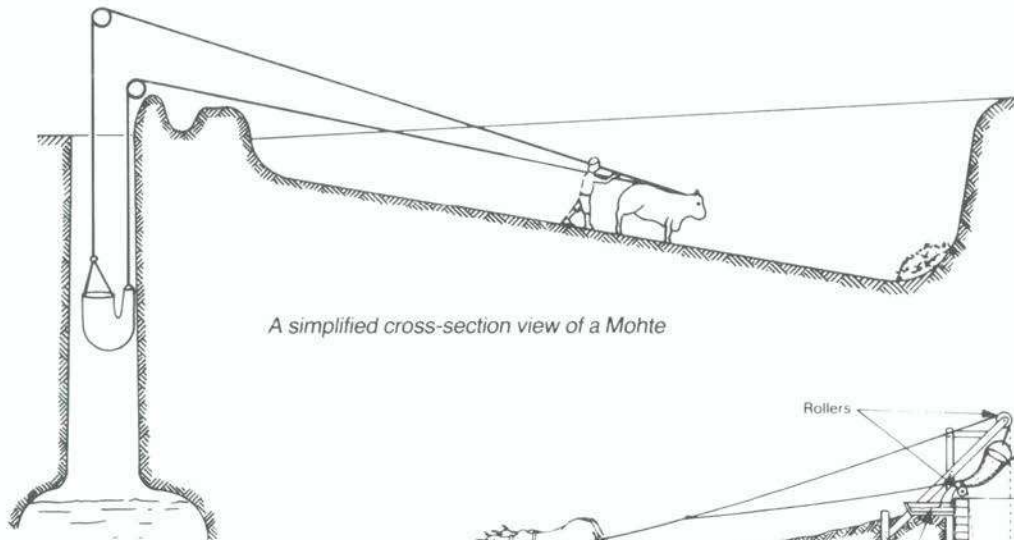
Besides these simple devices which operate with man power, certain more complicated ones have been invented based on the principle of the lever, i.e. the multiplication of power.

The next picture shows a **mohte** used in India. The same system is used in the mountainous area of the Aïr in northwestern Niger on the plateaux to grow vegetables.

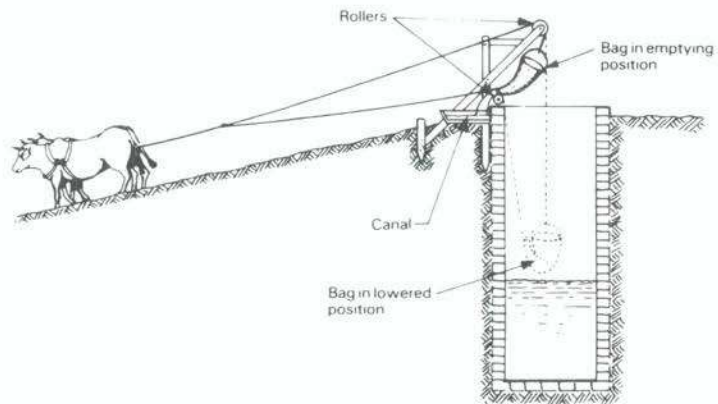
This device can operate by hand but the output is very low. In its simplest form it has a rope and bucket giving a winch to increase the leverage and hence the size of bucket that can be lifted.

The output of such systems is generally too small for irrigation but by powering the device with animals, usually oxen, sufficient water can be lifted to irrigate even through heads of 5-10 m. This encouraged the evolution of the «self-emptying bucket», the above mentioned **mohte**.

The figures below show two mohtes, one in its primitive form (a) and a second more complicated (b).



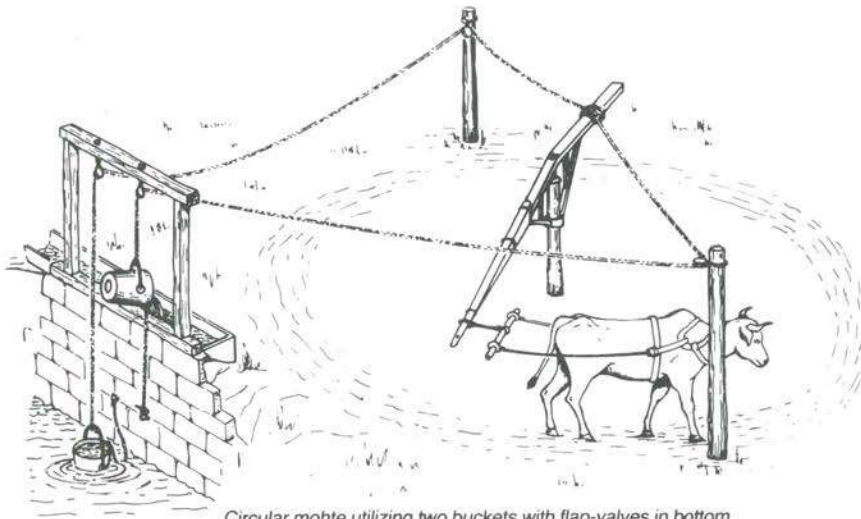
A simplified cross-section view of a Mohte



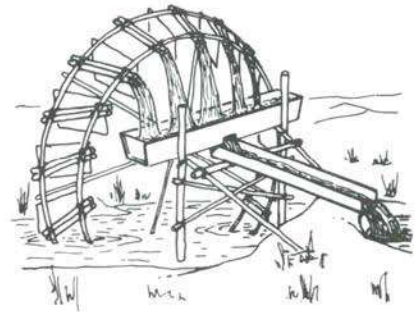
Self-emptying Mohte with inclined tow path

The **rotary direct lift** devices improve both efficiency and productivity if the water lifting element can move on a steady circular rather than being reciprocated as above. The reason for this is that energy input to any water lifting device is usually continuous, so that if the output is intermittent, unless energy can be stored during the parts of the cycle when no water is lifted, it is lost.

The original version of the devices in the following figures which are ancient but still used, was known as the **Persian wheel**. The earliest forms consisted of earthenware pots roped in a chain which was hung over a drive wheel.



Circular mohte utilizing two buckets with flap-valves in bottom



Noria

The water powered **noria**, a water wheel with pots, buckets or hollow containers set around its rim, is similar in principle except that the containers which are physically attached to the drive wheel circumference rather than to an endless belt suspended from it.

The flow of any of these devices is a function of the volume of each bucket and the speed at which the buckets pass the top of the wheel and tip their containers into a through set inside the wheel to catch the output from the buckets.

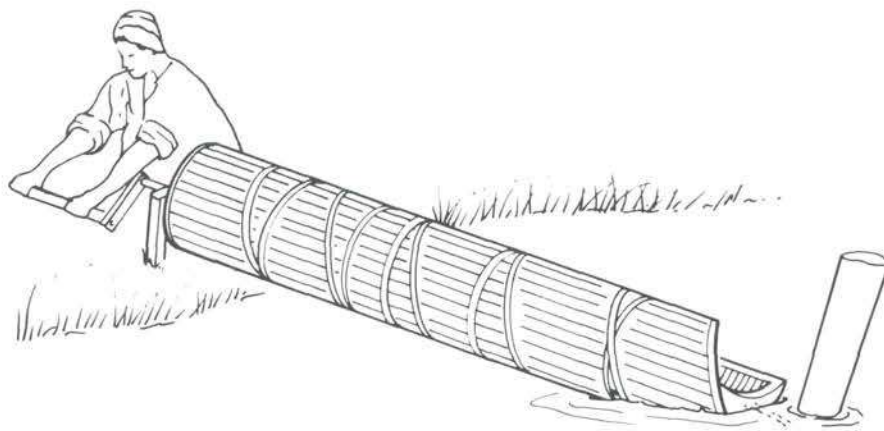
The Persian wheel has been, and still is, widely used particularly in the north of the Indian sub-continent while the **noria** was widely used in China, S.E. Asia and to some extent in the Middle East, being normally water powered.



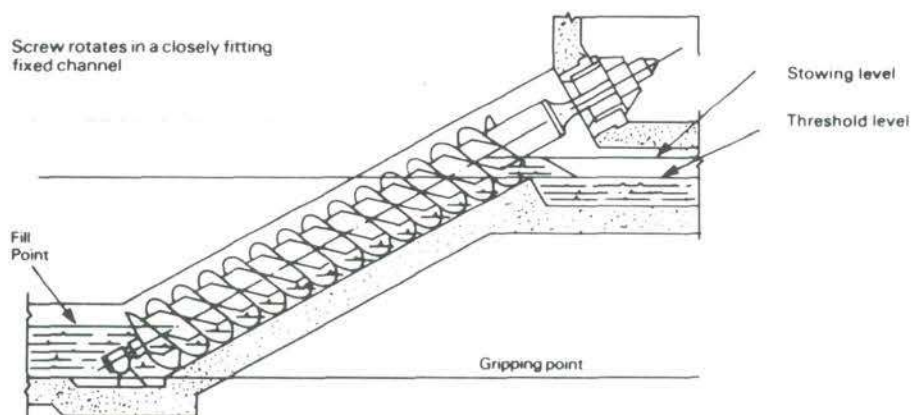
Persian wheel

Children working on the activities of their choice can construct models of such devices and experience the lifting of water in the camp or in their community.

The **Archimedean** screw, the invention of the ancient Greek philosopher Archimedes, is still used to lift water. The pictures below show two Archimedean screws: the first in its primitive form, and the modern version of the same principle, the screw pump.



An Archimedean screw. Two men are needed if the water head is more than 0.6 metres.



The modern version of the Archimedean screw: cross-section through an open screw pump.

Various needs forced man to invent various devices to satisfy these needs. The paddle-wheel is a clever device functioning with man power. It is a rotary version of the simple scoop. It is only useful, however, for very low lift pumping.

After the children have studied the various water lifting devices with the assistance of their Guiders, they can be encouraged to make models of the various kinds of the water lifting devices for small scale application. In fact Guiders can help children decide to have their own vegetable garden in a place where water lifting is needed. Children can also give ideas to their village and help in the construction of water lifting devices.

ENERGY AND INDUSTRY

Power from the Water Power

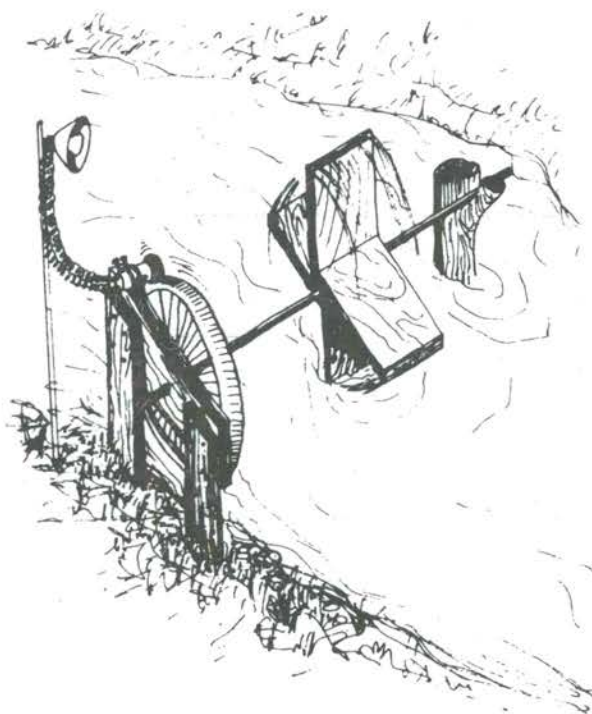
(conviction, creativity: 2, 3)

It is possible to construct a small hydroelectric station in camp if you are camping next to a rather rapid river. You can have power in various essential points in the camp, i.e. in the kitchen, the gate, the guard point, toilets etc.

You will need:

- 1 dynamo from a bicycle
- 1 bicycle wheel (complete with tyre and air tube)
- 1 straight wooden axis 2 m long, 4-5 cm in diameter
- 4 pieces of plywood 20 × 50 cm, 1 cm thick
- electric wire
- 1 or more bulbs and the same number of sockets
- nails, hammer, string
- Y-shaped strong sticks to support the system

First you choose the point of the river where the water current is quite fast. You may have to arrange the ground at the riverside.



Then prepare the axis by fixing the boards of the plywood on it. They must be arranged so that an angle of 90° is formed between them. Ask in a garage to remove the wheel from a bicycle for you. Then fix rigidly the axis on the wheel.

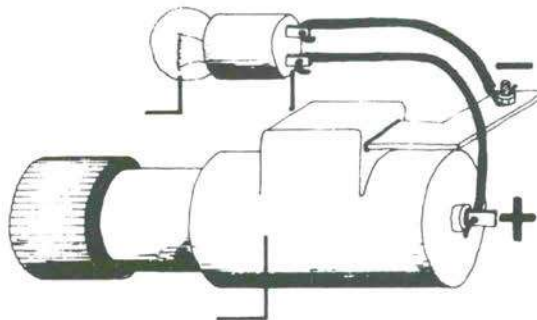
Put the Y-shaped stick quite deep in the river and stabilize it with stones. When the axis is in place:

- the paddle - boards should plunge into the water 5-10 cm deep.
- the tyre of the wheel must not get wet because:
 - a. the movement will slow down
 - b. it might cause a short circuit

After a number of tests assuring the stability of the system, fix the dynamo on the stake next to the wheel so that when turning it makes the dynamo turn as well. The stake can be planted either on the ground or in the water according to the kind of riverbank.

The electric connection

Strip insulation off on both ends of the electric wire. Connect one end of the wire on the dynamo (see scheme) and the other end on the two screws of the socket. Take into consideration the distance from the station to the point you need to have the bulb. Be sure your bulb corresponds to the voltage of the dynamo. Around the bulb you can put conical reflectors made of carton covered with aluminium foil.



If you need more light connect more bulbs on the same dynamo or even better put many dynamos on the same wheel.

- This is quite a difficult construction and needs time and precision. It is suggested that it be undertaken by groups of 3-5 persons.
- Before undertaking this project train yourselves in assembling simple electric devices: pocket torch etc.
- Be careful with the choice of the river, and be sure about your security (depth of the river, force of the current, fallen debris etc.)

Source Arrangement

What you see in this figure is a waste of precious water. To avoid it you can arrange the spring so that the water is conveyed to effective uses. Be sure, however, that this arrangement will not interfere with animal watering or other uses by neighbouring people.



As soon as water springs from the ground it forms a tiny catchment. You can arrange this little reservoir with bricks leaving an opening for the water to escape to the correct direction. Make a tube from a can and attach it at the opening to direct the water to the ditch.



If you do not have bricks, arrange the source using logs cut, if possible, along their axis and fixed with big stones.



In case you do not have any material, use the castor system: prepare some stakes and fix them on the ground quite close to one another. Then weave some flexible twigs or small branches from trees. Use small stones or pebbles to inhibit the water from running through the stakes.



WATER AND INDUSTRY

(conviction, creativity: 2, 3)

GAME: WORD SEARCH PUZZLE

An Eight Direction Reading

Can you find the listed words which are hidden?

ACID
BIODEGRADABLE
CHEMICALS
CHLORINE
ENVIRONMENT
HYDROLYSIS
INDUSTRY
INORGANIC
MERCURY
MICROELECTRONICS
POLLUTE
SEWAGE
TOXIC
VEGETATION
WASTE

M S C I N O R T C E L E O R C I M
L A H O S I S Y L O R D Y H C I M
A C I N A G R O N I E B I J G J E
C I N O R T V E G C G K O Q R N R
H E S E S E T S A W H O P T O S C
E W Q U B M H C M N M E R I C L U
O U D P K R I R I D O X T P O A R
N N B I O D E G R A D A B L E C Y
I L H Y B L O N E X T F L U T I T
R E D R E X L T V A G D J L U M W
O G M O O R O U T V E R H Y L E M
L A T O X I C E T E N I R O L H C
H W I N N D G O N E E C E F O C V
C E E V X E U B I O G A Z X P P U
X S E N V I R O N M E N T W A S T

Enjoy yourself ...

GENERAL

CAMPAIGNS

During your campaigns you will use various means for the presentation of your convictions and for passing certain important messages concerning water protection to the public.

Organization of exhibitions, radio or TV programmes and interviews are some of them. You can find some technical elements which may help you to undertake any of these means.

Domain: Communication

Number: One team for one programme or three teams for a series of programmes.

Description:

The local radios are animated by volunteers and very often accept with pleasure groups or individuals so that they have a new voice.

You can accomplish a radio programme from a radio station addressing adolescents of 15-16 years old with subjects in which they are interested: sports, poetry, music or tales about their town, region etc.

To realize such a programme the unit has to be well prepared especially on two points:

1. To fully understand what message they want to pass to the listeners.
2. To learn the technical language necessary for an efficient radio programme.

The experience which the children will gain is really fascinating.

Objectives

- Technique:**
- a. be able to say who you are
 - b. learn how to give a clear and precise message
 - c. talk on a microphone without stammering
 - d. make a plan of interventions
 - e. find documents
 - f. know the public you are aiming at
 - g. make an interview

The Individual: Dare to go deeply into the research, discussions, arguments, share your beliefs, opinions and interests for which you are impassioned.

Develop your curiosity to enrich the project with your findings.

Team – Unit: Enter into the project all together and make it successful through your interest and personal participation according to your abilities.

Take into consideration each one's capabilities.

Duration: Three meetings if you want to present the Girl Guiding or Girl Scouting of your country or the life of your unit.

One and a half months if you want to present a selected subject which needs a certain amount of research.

Three months if you want to prepare a radio or TV programme in which the whole unit will participate.

Organization:

- select the subjects taking into account what the radio station proposes
- visit the radio station officials and ask for approval
- prepare the selected subject for the programme
- carry out the programme

Division of Responsibilities:

- listen to the radio and be able to form a programme for one day or one week or propose titles for discussion
- get in touch with the animator of the radio
- undertake a research on a certain subject, find the maximum number of documents so that you know what to choose
- according to the length of the programme, be able to adjust its speed (time of speaking, of music etc.)
- choose the music
- write the schedule of the programme
- learn how to record voices on a cassette tape

Budget

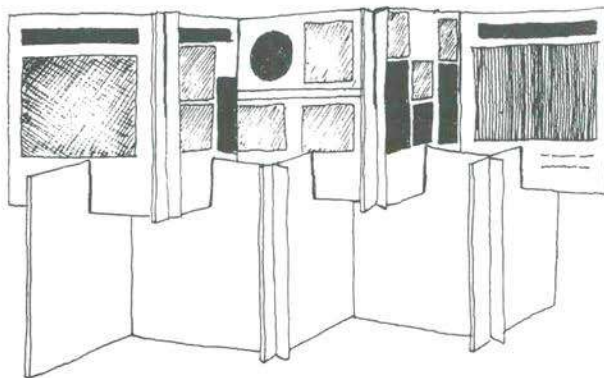
- one cassette to use for exercise of speech
- transport means (from the unit to the radio station)

Benefit - Meeting People

This project may help the unit discover various interests related to the mass media (newspapers, posters, television etc.)

- for the speech contact an orthoepist, a chorus director, a theatre actor etc.
- for the text meet a journalist, a language professor, a radio or TV animator ...

The findings of a research on the history of the region can be presented in the form of a musical, a light and sound performance etc.

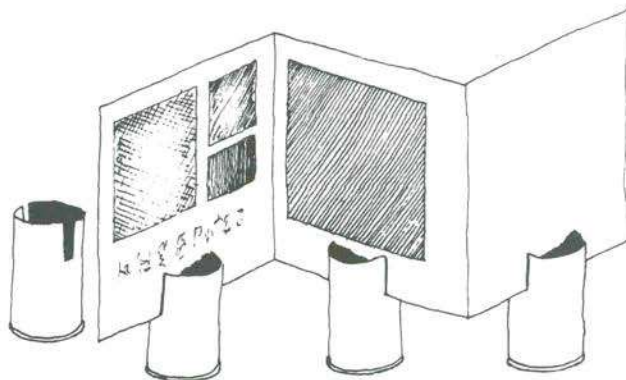
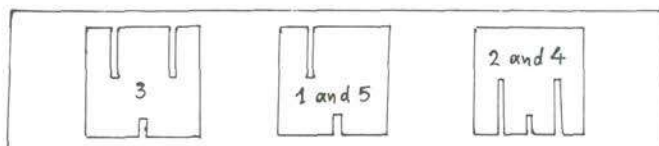


you can use plywood, hard carton or expanded polystyrene, according to the budget of the unit.

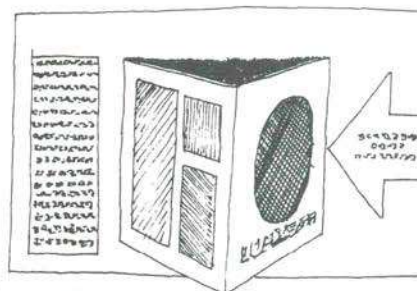
Dimensions: at least 80×80 cm, but depending on the size of the documents you want to present, you can increase these dimensions.

Warning:

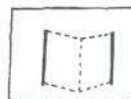
- the carton must be quite thick so that it does not bend.
- the polystyrene can easily be taken by the wind when exposed out of doors.



On detergent barrels or paint boxes you can cut off oval or round pieces and fix photos in the interior.



- Cut two notches on a carton.



- From another carton cut a rectangular of the same height as the notches. For the length you must calculate $1/3$ more without taking into account the sticking margins.



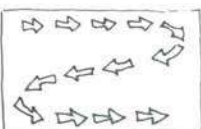
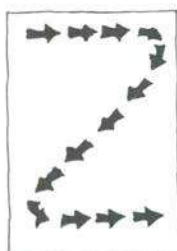
- Make traces with your knife carefully so that the carton is not cut off, so that you can fold it easily.

CONSTRUCTION OF BOARDS

THE SET-UP OF AN

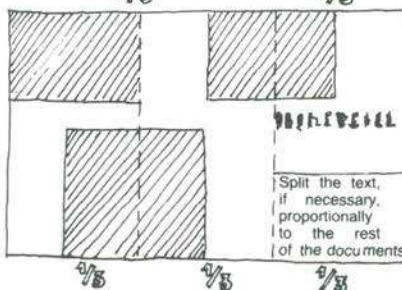
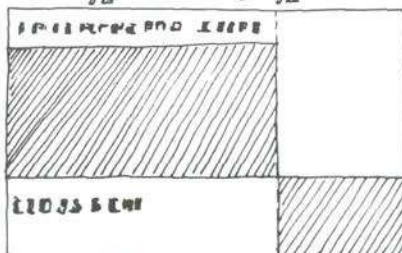
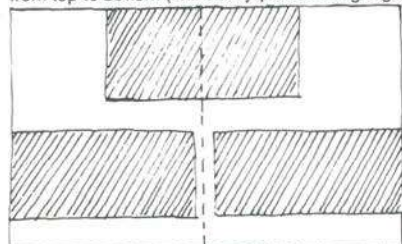
EXPO

PLACE AND IMPORTANCE OF DOCUMENTS



When placing texts on the boards, take into consideration that we read from left to right (latin and indoeuropean languages), from right to left (arab languages) and

from top to bottom (chinese/japanese languages).



Split the text, if necessary, proportionally to the rest of the documents.

THE PROPORTIONS

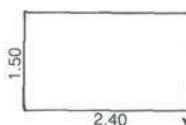
If you want to calculate the proportions of each part of your format to give a harmonious whole then:



Suppose a map 1.50 x 1.50 m i.e. square

To enlarge this and make it rectangular in shape

multiply 1.50 with 1.618



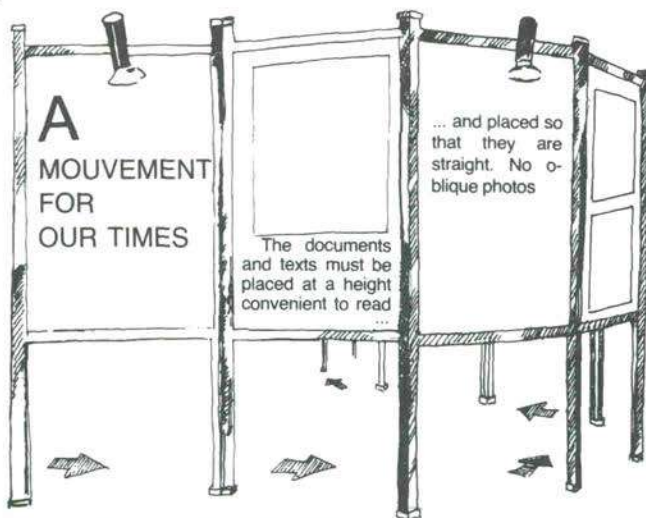
1.50

2.40

= 2.42 or 2.40

To decrease the size multiply 1.50 by 0.618m

THE CHOICE OF THE STANDS MUST BE MADE ACCORDING TO THE PROPORTIONS OF THE HALLS



A
MOUVEMENT
FOR
OUR TIMES

The documents and texts must be placed at a height convenient to read ...

... and placed so that they are straight. No oblique photos

THE CHOICE OF THE STANDS MUST BE MADE ACCORDING TO THE PROPORTIONS OF THE HALLS

WATER AND SURVIVAL

WATER AND SURVIVAL

Water is essential to life. A person can survive for three weeks without food but only for three days without water. Water is the number one priority to survival.

1. Water loss

A person usually loses 2-3 lt of water each day. Even when resting in the shade it may lose 1 lt. Water loss occurs through breathing, respiration and perspiration. Vomiting and diarrhoea increases further loss.

Water loss must be replaced so that the critical water balance in the body be maintained.

HOW TO MAINTAIN WATER BALANCE IN THE BODY

- Keep calm. Rest.
- Stay in the shade and keep cool.
- Do not lie on hot ground or heated surfaces.
- If there is no water available, do not eat or eat as little as possible.
- Do not talk and breathe through the nose, not the mouth.

2. Discovering water

Water usually drains in the bottoms of the valleys and can be found just below the surface of green vegetation.

Especially where there are sanddunes near the coast, one has a good chance to produce about 5 cm of fresh water by digging above the high water line.

The small river outlets can provide fresh water while large rivers usually are not clear or they are polluted by human activities upriver.

Whether you find water on the coast or not,
NEVER drink sea water without distilling it.

WARNING

Pools or lakes without any green vegetation around or animal bones present, are suspicious of pollution by chemicals. Check the surrounding soil for strong alkaline reaction due to poisonous minerals. Do not forget to BOIL ANY STAGNANT WATER before drinking or using it.

3. Dew and rain collection

Despite the acid rain produced by industries in the developed countries, rainwater is drinkable everywhere: it only needs collecting.

The catchment area has to be as big as possible and water has only to be collected into containers of any kind. Dig a hole in the ground and line it with clay. It will hold water efficiently. In some cases even this water has to be boiled.

In climates where it is very hot during day and cold at nights, heavy dew can be expected. When it condenses on metal objects it can be sponged or licked off.

In winter when there is no rain melt ice or snow. AVOID eating crushed ice or your mouth and lips can be injured. Further dehydration can also be caused.

NEVER eat snow. It will chill your body.

4. Freshwater swamps

Swamps are located in low-lying inland areas. Because of their mass of thorny underbush, reeds, grass or short palms going is difficult and visibility is reduced to only few meters. However, wildlife abounds and survival is easy. In a swamp you have a water source and the means to reduce body temperature in hot climates. Healthy animals and vegetation assure the safe quality of the water.

5. Water, source of food

Rivers, streams, lakes and ponds are a valuable source of food not only in cases of real need for survival but at any time the unit wants to experience an adventure and is ready to look for food in the wilderness.

Fish are a valuable food source, containing proteins, vitamins and fats. All freshwater fish are edible but one must be careful with certain ones which are dangerous, like the electric eels, freshwater stingrays and the piranha of South American rivers.

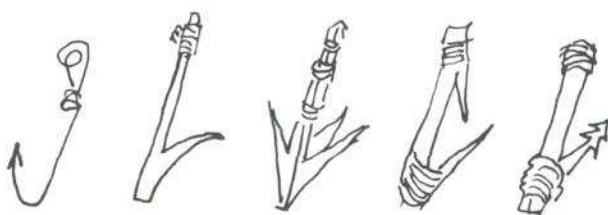
When fishing remember that fish choose comfortable places in the water where they can easily find their pray.

- If it is hot and the water is low, fish in shaded water and where there are deep pools.
- In cold weather choose a shallow place where the sun warms the water.
- If the river is flooded fish where the water is slack, on the outside of a bend, for example.
- Fish like to shelter under banks and below rocks and submerged logs.

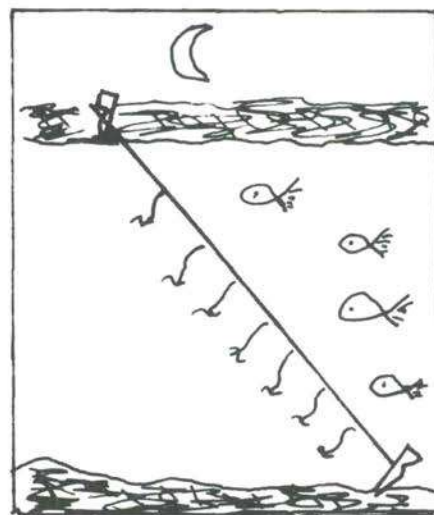
Fish can see more on the bank than you think. Keep back from the edge when fishing. Always try to keep your shadow off the water you are fishing.



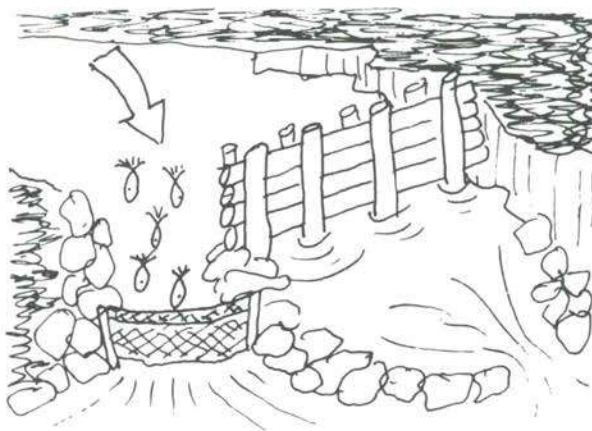
The most common way of fishing is by using a hook and line, although there are other more efficient methods. Hooks can be made from wire, pins, bones, wood, thorns and all kinds of materials. In the illustration below you can see (from left to right) a pin, a thorn, a bush of thorns, bone and wood.



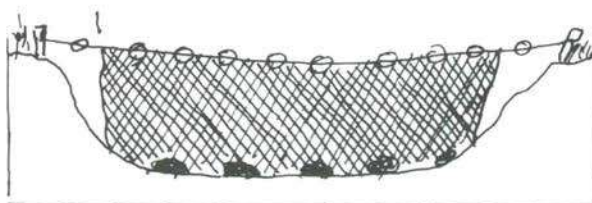
At night you can weight one end of line and attach hooks at intervals along it. Bait them with worms. Lower into the water. This gives you the chance of catching surface-, mid-, and bottom-feeders.



Another technique to catch fish is damming. Divert the flow of the stream to one side by building a dam, and with rocks create a small shallow pool downstream where fish can be trapped. Then fix a net below the race at the side of the dam to catch any fish coming from upstream.



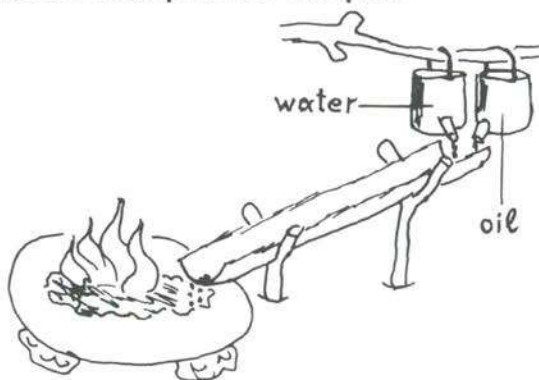
The use of a net is quite common. You can make a net with mesh size of 4cm between knots. Set floats at the top and weight the bottom. Then stretch it across a river. Fish swimming into it get caught by the gills.



6. Water produces ... fire

THE STRANGE MIXTURE

Mixing oil and water makes one of the hottest fires. Pierce a small hole in the base of each of two cans and fit a tapered stick into it to control the flow. The oil and water run down a trough on to a metal plate. Adjust the sticks so that the flow is 2-3 drops water: 1 drop oil.



7. Crossing rivers

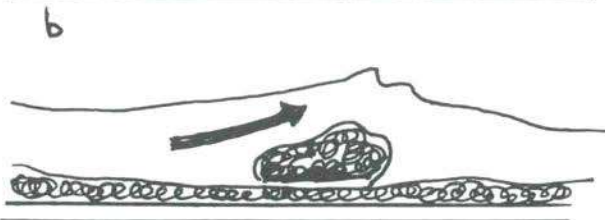
Guiders must be careful when they decide to adventure crossing a river with their unit. Although banks may be steep and rocky it will usually be possible to find a place to cross. Where water is shallow you may be able to wade, but test ahead with a pole for hidden depths. You may find rocks to provide stepping stones to be able to place them in small streams.

BE CAUTIONS: STUDY THE WATER BEFORE CROSSING

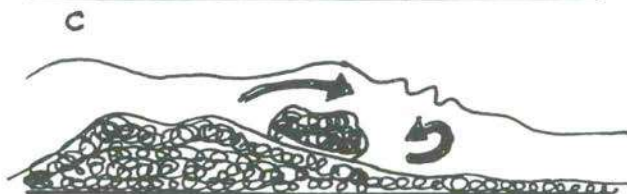
The way the water moves on the surface can tell you a great deal about what is beneath. A V is formed around a rock or any other projection (a) which is widened downstream.



A boulder on the bottom is reflected on the surface water by waves which appear to stay in the same position.



If the surface water seems to run back against the main flow, you know that there is an obstruction closer to the surface. Sometimes the created eddies produce a powerful backward pull downstream and they are very dangerous.

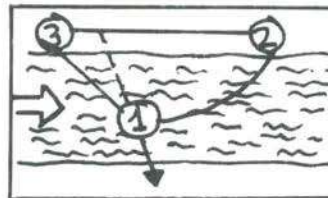


BE WISE: ICE-COLD WATER CAN KILL YOU

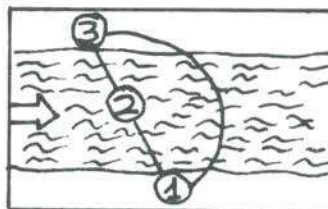
Do not swim or wade across a stream when the water is very cold: it can be fatal. In this case make a raft. If it is necessary to wade do it without wetting more than your feet. Be sure to dry them vigorously as soon as you reach the bank across.

Make wading safer by using a rope. You need a rope three times the width of the stream and at least a group of three people. The Guider and one of her assistants must be the two of the group helping one girl at a time. They must control the rope to keep the girl out of the water as much as possible and draw her to the bank if difficulties are encountered.

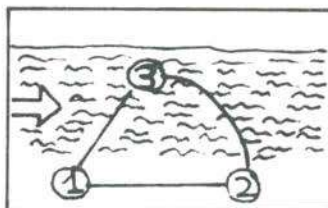
Secure the crossing person to the loop around the chest. The strongest Guide/Scout crosses first. The two Guiders are not tied on and they control the rope so that the crosser is not washed away.



When the girl (1) reaches the bank, she unties herself and (2) ties on and crosses controlled by the others. Any number of girls can be sent across in this way.



When 2 has reached the bank, 3 ties on and crosses. 1 then takes most of the effort while 2 is ready to help if something goes wrong.



DO NOT TRUST RIVERS

It is dangerous to enter the water. Enter it only if there is no other way of getting across. Choose the crossing point carefully.

- Do not climb out on high banks.
- Avoid obstructions in the water.
- Do not try to land by climbing steep banks found at the outside of bends. There may be undercut making landing impossible.
- Find an even section of the river for crossing: a shingly surface is the best for wading.

8. Waterborne diseases

Facts on the waterborne diseases have been discussed in the first volume of the book, like the pathogens which cause each disease and the preventive strategy. Symptoms, however, are important for people to know as well as certain treatments before it is possible to consult with a Doctor.

EXCREMENTAL DISEASES

Prevent catching these diseases by **boiling all water**. Do not clean your teeth or rinse your mouth with water which could be impure. In case it is necessary to enter such a water, cover cuts or wounds and avoid standing in it for long. Follow rigid hygiene procedures, especially with regard to food preparation and cooking and eating utensils.

Bilharzia (schistosomiasis)

A disease of the bowel or the bladder due to a parasite which at a certain stage of its life cycle develops in freshwater as a snail. It is endemic in Africa, Asia and South America.

Main symptom: an irritation of the urinary track.

Can be treated: With a special drug.

Hookworms

Parasites that can enter the body either by penetrating the skin or by drinking infected water. Its larvae travel through the bloodstream and locate in the lungs. When coughed up and swallowed they develop into worms in the intestine. Do not enter the water bare feet.

Symptoms: anaemia and general lethargy.

Can be treated: With certain drugs in the recommended doses. A decoction of bracken, where available, is a de-wormer as well.

Amoebic dysentery

Amoebae can be transmitted through contaminated water and uncooked food. They are located in the intestine. Largely found in the tropics and subtropics, they can be encountered sometimes in the Mediterranean.

Symptoms: fatigue and restlessness. Faeces carry blood and mucus looking like red jelly.

Treatment: Administer fluids. Maximum rest and consult with the doctor for the correct drug.

Measures to avoid diseases should include all suitable immunization before travelling for these outside areas where water-borne diseases are common. The Leaders of units within these areas should endeavour to find out what immunization programmes are available and encourage the girls and their families to participate. In addition, meticulous attention to the following precautionary rules can be of great help:

- Purify drinking water
- Clean hands when preparing or eating food
- Wash and peel fruit
- Sterilize eating utensils
- Wash cloths and hold over smoke if louse-ridden
- Wash body but avoid swallowing possibly contaminated water when washing or swimming
- Bury excreta far from any water source

9. Dehydration

Increased excretions of any kind may easily lead to dehydration, especially in hot climates.

The more body fluids are lost through excretions the more dehydration becomes obvious. The body contains about 50 litres of water of 75% of its weight. **If the body loses one fifth of this amount survival is impossible.**

Water loss 1-5%: Thirst, lack of appetite, vague discomfort, sleepiness, nausea.

Water loss 6-10%: No salivation, dizziness, headache difficult breathing, ambiguous speech, impossible to walk.

Water loss 11-20%: Dim vision, swollen tongue, unable to swallow, insensitive and shrivelled skin.

In advanced stages: Unsound mental capacity and great muscular weakness.

One of the causes of dehydration may be diarrhoea. Besides the various drugs available against diarrhoea there are certain herbs, fruits or plants in general which can be used against diarrhoea:

Bilberry: Decoction of fruit

Bistort: Infusion of whole plant except roots

Bramble: Infusion of leaves or decoction of fruit

Cowberry: Decoction of fruit

Elm: Infusion of bark

Great burnet: Infusion of leaves and shoots

Hasel: Infusion of leaves

Marsh mallow: Infusion of leaves and flowers, decoction of roots

Mint: Infusion of the whole plant except roots

Mountain avens: Infusion of the whole plant except roots

Dak: Decoction of bark

Plantain: Infusion of leaves and stems

Rice water: wash an ounce (5gms) of rice in cold water and put it into a jug with 2 litres of water which is warm but not boiling. Keep at a low heat for 3 hours. Afterwards put it into a clean pan and boil slowly for 1 hour adding more water as the liquid boils away. Strain and sweeten to taste if sugar is allowed. Lemon peel or cloves may be used to give flavouring.

10. Water Problems at Sea

Four-fifths of the earth's surface is open water – probably the most frightening of all environments, and the most difficult in which to survive.

Girl Guides and Girl Scouts who go to sea should know how to face up to the problem of keeping a fresh-water supply in situations of survival at sea.

Although a minimum 1 litre a day is necessary to keep fit, it is possible to survive on 55-220cc. So have an idea of what these volumes look like.

Even if you have a good water supply, ration it at once, keeping to these minimum needs until you can replenish your supply. Do not relax the ration until final rescue, for you have no idea how long you will have to last out.

How to reduce your water needs is mentioned above. At sea one should avoid sea-sickness for vomiting will cause the loss of valuable fluids.

WATER CONTROL

In case of water shortage it is important to control the daily consumption:

- 1st day: No water. The body has a store.
- 2nd day: 400 ml, if available.
- 5th day onwards: 60-225 ml daily, depending on the climate and the water availability.

Whether or not you have enough water to apply the above suggested rations be sure to remember the following rules:

- Do no** drink sea water
- Do not** drink urine
- Do not** eat unless water is available
- Do not** smoke

Sleep and rest are essential for enduring days of reduced water and food. Be sure to have adequate shade when resting or napping during the day. And ...
RELAX.

11. Disasters and water

Drought

In certain regions of our planet rainfall is extremely rare or it is missing at all creating the deserts. Elsewhere drought can be predictable being a regular seasonal feature. In such regions water can be stored during the raining season to last through the dry months. In various countries around Mediterranean people use the underground stone-cut or the concrete-built cisterns to store water for the long dry seasons.

In these cases store as much water as possible and use it wisely.

A cistern must be built in a shady spot avoiding tree roots. Line it with a polythene sheet or with cement or with clay if available.

Do not waste water. Apply recycling as much as feasible. Water used for cooking can later be used for washing.

Boil all drinking water.

If a well gets depleted dig deeper for more water but do not forget that the deeper you dig the further you deplete the ground water.

Flood

Heavy rains may cause overflowing of rivers, lakes or reservoirs and lead to flooding. Sometimes flooding may be caused by the built-up of sea or lake water due to submarine earthquake, hurricanes or the collapse of dams and dykes.

Be prepared against flood:

- Find out how high you are above normal water levels.
- Learn the easiest route to high ground.

Even a few centimetres of floodwater can do a lot of damage and it is worth laying sandbags or plastic shopping bags filled with earth along the bottom of the doorways and windows to keep out as much water as possible.

The central heating flue, ventilation bricks and other spaces must all be sealed.

When walking or driving to a safe location: remember that a small drop in the level of the roadway down a hill can make a considerable difference to the water depth.

Do NOT attempt to drive across a pool or a stream unless you are **CERTAIN** that the water will not be higher than the middle of the wheels or higher than your knees.

If you must cross: use the river-crossing technique mentioned above.

If crossing bridges which are underwater: take especial care: you may not be able to see that the flood has already swept part of the bridge away.

In times of sudden heavy rainfall a flash flood is likely to develop. Keep out of the valley bottoms and streams both during and after the rainfall. Remember water rushing downhill often carries mud and dangerous deadly debris of broken trees and rocks.

As the waters recede they leave a littered area of debris and bodies of victims. Their decay may cause severe water pollution. In any case **thoroughly boil all water before using it.**

12. Water comes from the sky: Learn about clouds

Clouds are formed from masses of water vapour which becomes visible as it condenses with cooling. If cooling continues the droplets increase in size until, being too heavy to remain airborne, they fall as rain. When their temperature rises sufficiently they evaporate and the cloud disperses.

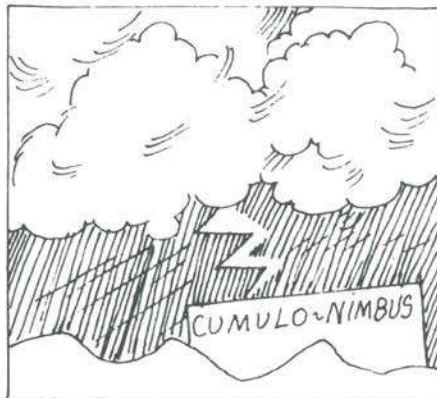
Following are cited certain common kinds of clouds. Meteorologists use special signs to denote the various kinds of clouds.



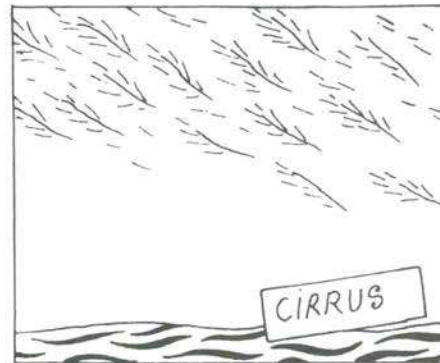
Cirrocumulus clouds are small rounded masses, looking like rippled sand: normally an omen of fair weather (5-8km).



Altocumulus clouds are fair weather clouds, similar to cirrocumulus but on a larger scale, thicker, not so white and with shadows in them. They usually appear after a storm (1.5-6cm).



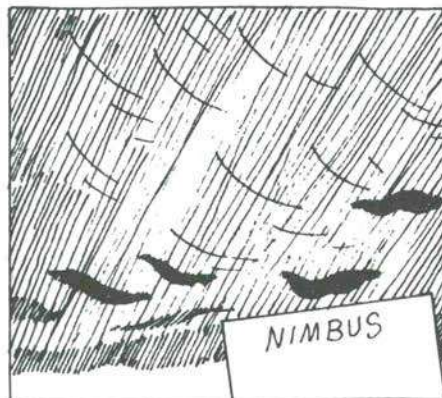
Cumulonimbus clouds are low thunder clouds, dark and angry looking. They may tower to 6,000m with the top flattening out in what is often called an anvil top. This cloud will bring hail, a strong wind, thunder and lightning (1.5-10km).



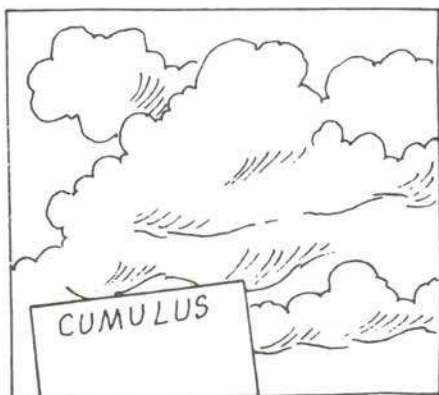
Cirrus clouds are high, wispy clouds formed from crystals which give them a white appearance. They are seen in fine weather (5-9km).



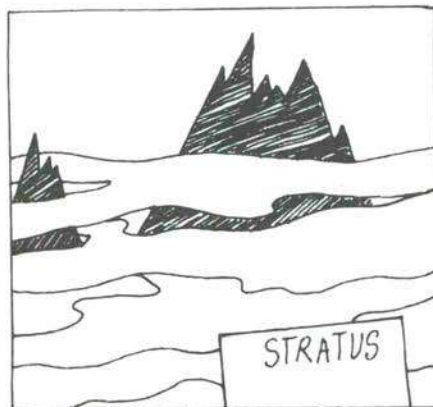
Cirrostratus clouds are clouds made up of ice particles and look like white veins. These are the only clouds which produce a halo around the sun or the moon. If the halo gets bigger it means fine weather, smaller, it is a sign of rain (5-9km).



Nimbostratus clouds form low dark blankets of clouds and spread gloom. They mean rain or snow within four or five hours and usually the rain continues for hours (1.5-5km).



Cumulus clouds are fluffy white clouds like cauliflowers. Usually they are an indication of fair weather when widely separated but, if they become large, they may produce sudden heavy showers (2.5 km and less).



Stratus clouds are the lowest of clouds and form a uniform layer like fog in the air. They are often described as hill fog when they occur. They produce a drizzle. When they form thickly overnight and cover the morning sky, they will usually be followed by a fine day (less than 2.5km).

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