



ASK HERZL

Program Title: Israel's Water Conservation

Program Tagline: Created by JNF Australia, students will become familiar with the water shortage situation in Israel and the JNF activities that deal with water issues in the country.

Target Audience: Lower K-5, Middle School

Grade: 3rd - 7th

Length of Program: 90 minutes

Goals:

- Familiarize participants with the water situation in both Israel and around the world
- Familiarize participants with water sources around school
- Introduction to basic concepts in the field of water: water reservoirs, river restoration, biofilters, runoff harvesting
- Familiarization with JNF's areas of activity related to water issues

1. Materials needed:

- Shovels
- Garbage bags
- Ropes
- Disposable cups, empty jugs
- Map of Israel kit
- Computer, speakers, and projector
- Pens and paper
- Clipboards
- Copies of water audit questionnaires
- Buckets and smaller containers like empty yogurt containers

Implementation

Part 1: Water Treasure Hunt (20 min)

Initiate a "treasure hunt" where two teams compete to find the special and secret treasure: a bottle of water and cups. The path on the way to the treasure goes between different stations that relate to issues of water and their applications. Examples of stations can include: water pipes in the school, outdoor taps, water fountains, garden or greenhouse irrigation, etc. Once the water treasure has been found, have the



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students drink the water in the jug. As they are drinking ask:

- Why is water a treasure?
- What do all the stations we passed during the hunt have in common?

Note: it is not necessary to prepare a complex game that requires a lot of prep time in advance. It is also possible to hide the treasure and hint the location using questions or as a "hot/cold" game. If there is prep time available, the teachers or even the students can divide into two groups and each group can hide the treasure for the other group. In this case it is important that the students not know what the treasure is; the staff members should ensure that the treasure is wrapped up thoroughly so it will still be a surprise.

Part 2: Water Conservation (25-30 min)

- Ask the students to list different uses of water.
- Do you personally conserve water? Why?
- Have you ever experienced a shortage of water?
- Explain, that even though we are not always aware of it, the whole world is in short supply of fresh drinking water, and the situation is getting worse. What is the situation in our school?

Water Audit: In order to find that out we are going to assess where we use water at school and where we might be able to use less. Break into 3 groups. Handout clipboards, questionnaires (appendix 1), and materials to teams to assess school's water use in each of the following areas. Break into teams and head up to your areas to do tests. It will work well to work in pairs or groups of three within each team to have one hold the clipboard and the other(s) to run the assessment. It is also a good idea to have multiple small groups of 2 or 3 students measuring the same thing to ensure greater accuracy of results.

1. Bathrooms - measure amount of water used in one minute of a faucet running. Materials needed: water collecting containers-- buckets and smaller containers like empty yogurt containers, clipboards, questionnaires, pencils or pens.
2. Outside (hand washing stations) and inside the dining room - measure amount of water used in 1 minute at outside washing station, one minute of inside faucet running, and in one full hand washing jug. Materials needed: water collecting containers-- buckets and smaller containers like empty yogurt containers, clipboards, questionnaires, pencils or pens.
3. Kitchen and outside kitchen areas- measure amount of water used in 1 minute of running the dishwasher (is this is even possible to measure), one minute of running kitchen sink inside and out. Materials needed: water collecting containers-- buckets and smaller containers like empty yogurt containers, clipboards, questionnaires, pencils or pens. Be sure to be respectful of kitchen staff.

After 10-15 minutes have each team return and report their findings to the rest of the group.





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Part 3: Water Sources in Israel (20 min)

Spread a large map of Israel on the ground and ask students to identify the country's water sources. Expand and explain the various water sources visible on the map.

Talk about other water sources that are hidden, such as aquifers. You can demonstrate how aquifers contain water and explain about the landscape structure and watershed line.

- Explain that one of the most important water sources is the Sea of Galilee (the Kinneret).
- Ask students: How do you get water from the Kinneret to the rest of the country? (National carrier)
- Take a rope and show the (approximate) path that the national carrier follows and ask: Which regions does the national carrier traverse? (Lower Galilee, the Negev).
- Ask what problems might arise when you have to move water from one place to another over such great distances? (Evaporation, seepage, water pollution, energy shortages on inclines)
- Ask to suggest how to move water from one place to another.
- Explain how the water carrier operates.
- **Water Tag team:** Get two volunteers with bottles of water on two sides of the map on the line of the Sea of Galilee and two bowls / cups on the line of Mitzpe Ramon. Divide the group into two teams and give each team a plastic tarp. The task - have the students hold the tarp and stretch it tautly. The facilitator gives the sign and each team simultaneously pours the water onto the tarp and each team has to move the water without spilling it (through cooperation and team effort) to fill the first container. The team that manages to move all the water safely to the first container wins the competition.
- **Note:** you do not have to use a tarp. You can place a bucket of water on one side and bowl on the other side of the competition and think of creative ways to transfer the water. You can also add rules that make it more challenging according to the circumstances and the age of the campers: i.e. using straws, not allowing the use of artificial containers, transferring water only with the body, etc.
- Summarize - who thought that transferring water from one place to another could be so complicated?
- Introduce the idea of harvesting runoff - an ancient agricultural technique to collect rainwater that JNF uses to take advantage of every drop for irrigation efficiently in the desert.
- Cite the Yatir Forest as an example, the largest planted forest in the Middle East, that is located on the edge of the desert.

Part 4: How to Deal with Water Shortage in Israel? (25-30 min)

Up until recently it seemed as if Israel was about to drain out its major source of fresh water, the Kinneret, which provided Israel with 70% of its drinking water. Sea level was almost down to the dangerous black line of -215 meters, when pumping water would be impossible and severe damage would be caused to the lake's eco-system. Ask: How to deal with water shortage in Israel? What would you do?

Offer two main strategies: (with older groups ask participants to suggest their own strategies, use an explanatory approach to the younger groups)



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1. Find other potential sources of water that can be used. Ask the participants to offer examples of potential water sources and add the following sources if they are not raised by the students: reservoirs of treated wastewater and recycled water, desalinization plants that turn salty water into sweet water, biofilters, harvesting runoff, brackish water use.

2. Conserve existing fresh water where possible: ask the participants to offer potential ways to conserve water, and add the following sources if they are not raised: water saving devices, dual flush toilets, drip irrigation, reuse of recycled water and treated wastewater, runoff water utilization, biofilters.

But today the situation is different. Show the following movie clip which presents new innovations developed in Israel to face that challenge and conserve water. As you play the movie, hand out pens and paper, and ask students to list all of the innovations presented in the clip and choose one that they think is the most cool and most effective solution.

View clip: <http://www.youtube.com/watch?v=x7G9v6JdYwc>

- Tell them that JNF provides more than 300 million cubic meters of water for various uses by means of over 250 reservoirs it has constructed.
- Explain the different types of reservoirs and their construction process.

Reservoir Construction Game

Divide the group into teams and present a challenge - every team gets a shovel, plastic bag filled with water and a jug full of water. Each team must build a reservoir that is able to hold the maximum amount of water for five consecutive minutes. Allocate time for dig and construction and then have a competition. Sum up with the different types of reservoirs and related data.

Research & Development (10 min):

In the previous activity we discussed another important source of water: recycled water. JNF is constantly reducing the consumption of water in agriculture through agricultural research and development centers.

Brackish water use can be used as an example:

Brackish water is water where the level of salts (chloride, potassium and other salts) is higher than that of fresh water (drinking water) and lower than that of seawater (which is salt water).

In Israel, in the southern Negev and the Arava, the underground water reserves consist of brackish water. In the north part of the country brackish water is found in springs, such as the Beit Shean Springs or the Nachal Tananim Springs.



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Brackish water is undrinkable; however, it can be used for various purposes in industry and agriculture: for industrial purposes, brackish water is used for cooling machinery and other industrial processes. In agriculture, brackish water is used to irrigate crops, including palms, tomatoes and grapes. In recent years, developments have been made in the growth of brackish water fish.

Brackish water usage has many benefits: irrigation with brackish water encourages the creation of sugars in fruit and creates fruits that are sweeter than those irrigated with freshwater; brackish water usage saves fresh water and improves the condition of the water economy in Israel.

JNF Research and Development centers are constantly working on the development of agricultural varieties suitable for irrigation with brackish water for the agricultural and environmental future of Israel.

- Desalination can be demonstrated as an additional way to increase available fresh-water resources. In order to explain desalination to the students, conduct the following experiment: Dissolve salt in a pot of water and boil the salt water until steaming. Cover the pot with a cold cover. Collect the droplets that condensed on the cover and taste them. The sweet water will have evaporated leaving the salt water in the pot.

Summary (5 min):

In today's activity we've learned that water shortage is a global problem that affects all of us, even here at school. Israel, which is mostly desert, suffered from this problem severely, but innovation, creativity, and investment in Research & Development has led us to find potential solutions to this problem, and today Israel not only has solved its water shortage, but it also exports these innovative solutions and helps other countries solve their own water problems.



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Appendix 1: Water Audit Form

LOCATION OF ASSESSMENT:

WHAT ARE YOU MEASURING:

AMOUNT OF WATER USED IN 1 MINUTE:

WHAT ARE YOU MEASURING:

AMOUNT OF WATER USED IN 1 MINUTE (OR IN TOTAL):

OTHER OBSERVATIONS:

LOCATION OF ASSESSMENT:

WHAT ARE YOU MEASURING:

AMOUNT OF WATER USED IN 1 MINUTE:

WHAT ARE YOU MEASURING:

AMOUNT OF WATER USED IN 1 MINUTE (OR IN TOTAL):



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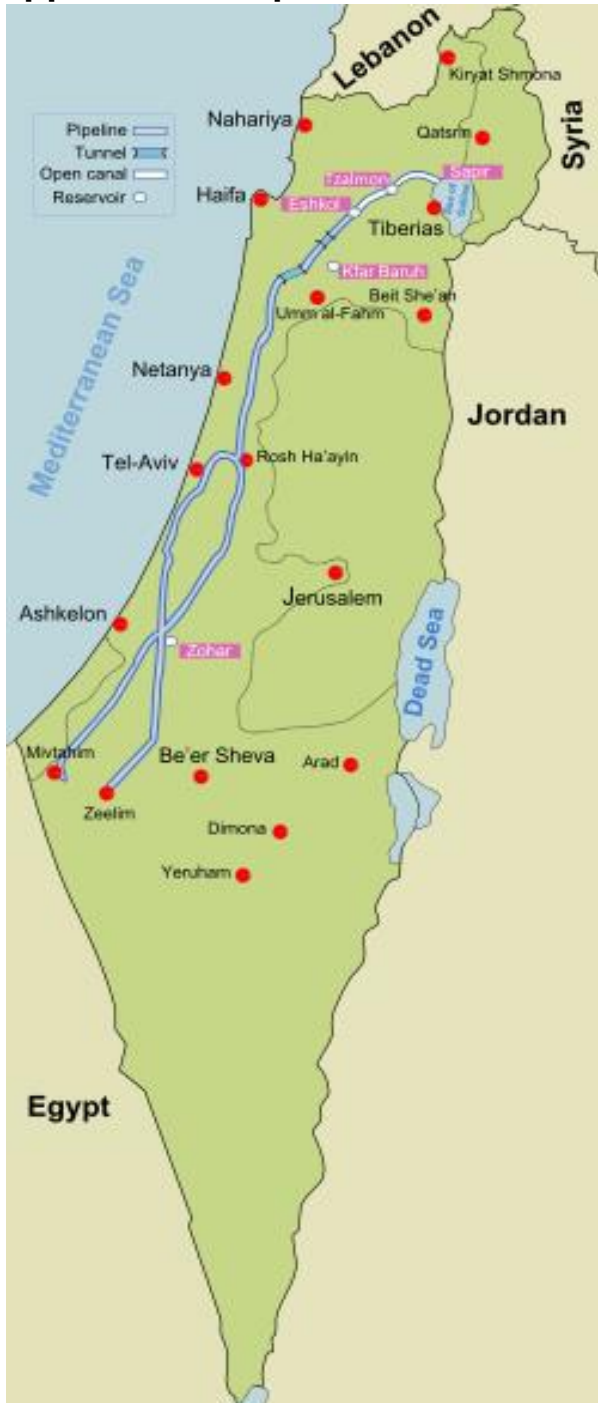
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Appendix 2: Map of the National Water Carrier



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