



Jewish National Fund Tu BiShvat in the Schools, 2020/5780

Classroom Experiments

Note to Teacher: The goal of this year's activities and program is for your students to learn about the accomplishments that made it possible for Israelis to build up the land of Israel and make the desert bloom. These activities are all designed to begin on or before Tu BiShvat (February 10th), and continue one or two weeks afterwards so students can view the results (If you teach in a religious school that only meets on Sundays, you can begin on Sunday, February 9th and view the results two weeks later on Sunday, February 23rd since President's Day weekend falls in between). This will give you an opportunity to follow up with your students and parents about the program and remind them about purchasing trees to be planted in Israel.

For any of these activities, please remember a few things:

1. Please look through each activity to determine which are best for your students. You can incorporate one or all of them, but please read through all options before buying supplies.
2. Label everything with the names of students and which activity/activities you are doing in case the projects get moved to a different location.
3. Keep everything in sunlight. You may need to move the activity to a different room once you have completed it with students.
4. For those in cold locations you may want to confirm that the heat will be on in the building so the projects do not freeze. You may want to consider moving them to another location if the building will be unheated.

Jewish National Fund: Making the Desert Bloom

Jewish National Fund has enabled many communities in Israel to thrive in desert environments. Since Jewish National Fund's founding in 1901, over 260 million trees have been planted in Israel. These trees were planted in many areas for many reasons. In the central region of the country, trees were planted to help drain the swamps and get rid of all the mosquitoes that carried illnesses. In the desert, Jewish National Fund planted trees to help create new areas for communities to be built. Kibbutzim all over the country were built on Jewish National Fund land and grew with Jewish National Fund trees. Today, technologies that have transformed Israel, such as



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drip irrigation and desalination, are helping ensure that every Israeli home, farm, and business has the water it needs. Today, all the organizations we will learn about are thriving thanks to the work that Jewish National Fund has done in Israel.

- Supplies list**
- Clear plastic cups
 - Toothpicks
 - Avocado pits

Activity To appreciate how important Jewish National Fund's efforts were in creating an environment that could sustain communities and countless farms, the students first need to appreciate that growing plants in areas that seem too harsh is the first step to understanding the idea of making the desert bloom. This simple activity gets the student to understand that plants can grow anywhere if given the opportunity.

- Label each cup with individual student's name.
- Fill each cup halfway with water.
- Stick a toothpick into each side of the avocado pit so that it will not fall into the water when you place it on top of the cup.
- Fill the rest of the cup until the avocado pit is submerged halfway in water.
- Review in two weeks and the students will be able to see that they can grow plants in places close to them, not just on far away farms.

Note to Facilitator: This is a simple activity to get an avocado pit to sprout roots. These roots will not make it possible to grow avocado trees; you need different avocado seeds for that. But this is a simple way for them to watch something grow outside of a garden.

Questions to ask before activity:

- What do you think will happen? What do you expect to observe?

Questions to ask after activity is completed:

- What are some qualitative observations? What are some quantitative observations?

Question to ask when the students return to see the results:

- How does what we see reflect what we learned about growing trees in Israel?
- Do your observations and the data collected support your previous claim/what you thought would happen?



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Yatir Forest— Growing Trees in the Desert

The Yatir Forest is a prime example of Israel overcoming the odds to make the desert bloom. When Jewish National Fund began to plant the forest in 1965, the land was just a desert on the outskirts of the Be'er Sheva region. Since that time, over 4 million trees have been planted and it is the largest man-made forest in Israel. The forest contains a large variety of trees, including Eucalyptus, Jerusalem Pine, Pistachio, Carob, and many others. The Yatir Forest has proven that growing a wide range of trees in the desert is achievable, and is now a living laboratory to help prevent the spread of the desert and teach how to grow trees, plants, and vineyards in arid temperatures.

Supplies list

The quantities of each activity depend on how many students you want to take part in the activity, and if you have each student making one of the options, or all of them.

- Bag of sand
- Bag of potting soil
- "Regular" soil found in the garden of your facility, or any home garden or yard
- Clear plastic cups. You can also use water bottles that you slice in half, or mason jars if you want to have something more permanent.
- Grass seed (If you are not using the packets of sprouts for the Kibbutz Lotan activity, you can use them for this activity.)

Activity:

The trees that grow in the Yatir Forest grow in a far different environment than the trees in our neighborhoods. This activity will help show that plants are able to grow in what appear to be unwelcome environments – like deserts.

1. Before planting, make sure to label each cup with what soil you have used, student's names, and whatever else you need for proper identification.
2. Split the class into thirds so that each group can focus on one of the three types of dirt.
3. Have students fill 1/3 of their cup with one of the three soils.
4. Place 6-8 seeds into the soil of each cup.
5. Add enough water to the cup so the soil is moist and the water has all been absorbed by the soil.
6. Place the cups in a sunny location.
7. Water every few days (You may need to make sure a building admin is aware so that they can water if you are only there once a week).
8. On February 23rd, you will be able to see which of the soils was most helpful in growing the grass seeds. You can then show your students that the ability to grow plants in unwelcome regions is possible.

**If you want to continue this activity after the two weeks, you may want to consider adding fertilizer to the mixtures. Fertilizer is not useful in the first two weeks, but is later on in the growing process.*

Note to Facilitator: This activity is intended to show that plants can grow in different environments. The plants should all show some amount of sprouting, with the potting soil and backyard soil plants bearing more than the seeds planted in sand. This idea, like that of the avocado pit, is that any plant can grow if given water and sunlight.



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Questions to ask before activity:

- What do you think will happen? What do you expect to observe?

Questions to ask after activity is completed:

- What are some qualitative observations? What are some quantitative observations?

Question to ask when the students return to see the results:

- How does what we see reflect what we learned about growing trees in Israel?
- Do your observations and the data collected support your previous claim/what you thought would happen?



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Arava Institute —Watercolor Changes

The Arava Institute has been leading the charge for environmental research and coexistence in Israel since 1996. Supported by Jewish National Fund, the Arava Institute is at the forefront of developing new ways to use the small amounts of water that Israel has access to, helping prevent the Dead Sea from drying up, and researching new and better ways to use reusable energy. The Arava Institute also helped pioneer the idea that brackish water, which is a combination of saltwater and freshwater, can make some fruits and vegetables even more sweet and delicious.

Supplies list

- Clear cups
- Several different colors of food coloring
- Bag of celery
- Salt (optional)

Activity

To understand how different materials in our water can affect the food we grow, we must see how different outside factors can change our food. In this activity, we put celery into water that contains different food coloring. The goal is to see how the celery absorbs the different colors from the different waters.

1. Before performing the activity, make sure to label each cup with what you are putting in, to identify each one.
2. Fill each cup halfway full with water.
3. Place a celery stalk into each cup of water.
4. Place a few drops of food coloring into each cup. Some cups should have one color, some should have no food coloring. You can also mix different colors into a single cup, and/or add salt to some of the cups to see how that may change the celery.
5. Make sure to have at least one cup with plain water to see what happens with no changes.
6. In two weeks you will see some wide differences among the celery stalks.

Note to Facilitator: This activity is intended to show how different environments can affect plants differently. If you are doing this project in conjunction with *Our Tree Named Steve*, you can reference that Steve absorbs some bad things and has to be taken care of. The celery should turn the color of the food coloring. If you choose to add the salt to some, it should make the celery look withered with less food coloring absorbed.

Questions to ask before activity:

- What do you think will happen? What do you expect to observe?

Questions to ask after activity is completed:

- What are some qualitative observations? What are some quantitative observations?

Question to ask when the students return to see the results:

- How does what we see reflect what we learned about growing trees in Israel?
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Kibbutz Lotan —Making the Desert Sprout

Kibbutz Lotan is in the south of Israel. A kibbutz is a community where everyone has a task (like milking the cows or cooking the food) to help take care of the whole community. With the help of Jewish National Fund, Kibbutz Lotan is creating new and amazing ways to reuse everyday materials. They have built ovens that use solar power, buildings that naturally stay cool or warm, and use a bicycle to wash clothing. Most importantly, they are working hard to teach the idea that food does not come from the grocery store. They want to make sure that everyone can plant fruits and vegetables in their homes or backyards.

Supplies:

- Packets of seeds from Tu BiShvat box
- Plastic cups (To make this activity work enough to eat the results, you must keep the sprouts well sealed. You can do this with plastic wrap/rubber bands on plastic cups, or by using mason jars). More suggestions of how to make this activity work are on the Tu BiShvat website.

Activity:

Growing sprouts is the easiest way for students to see growth before their very eyes and eat their own success! This activity takes significant preparation, as the sprouts must be washed every day to help them grow, but provides tremendous satisfaction upon completion. For videos on how to grow indoor sprouts, go to www.jnf.org/tbs2020.

Note to Facilitator: This is a great experiment because children can take it home to complete and can actually eat the results. For best results, please look at the materials on the website. They include write-ups and videos for you to understand how this experiment works.

Questions to ask before activity:

- What do you think will happen? What do you expect to observe?

Questions to ask after activity is completed:

- What are some qualitative observations? What are some quantitative observations?

Question to ask when the students return to see the results:

- How does what we see reflect what we learned about growing trees in Israel?
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Halutza– What Lies Beneath the Soil

Despite all of Israel's successes, communities in Israel are still working hard to make the desert bloom. The community of Halutza has continued the vision of Ben-Gurion. When their community had to find a new home after the 2005 disengagement from Gaza, 30 families looked to barren sand dunes on Israel's southern border. With the help of Jewish National Fund, today their community has over 2,500 families and has just completed a large medical center so that more families will want to move to the area. Greenhouses and farms can be seen all over the region, as the Halutza community works hard to grow food in an area that used to be just sand. In order to access water, the Halutza community must drill deep down into the aquifers that are hundreds of feet below the surface and contain water that the community needs in every home, farm, and business.

- Supplies:**
- Bottles or jars that can be completely sealed
 - "Regular" soil found in the garden of your facility, or any home garden or yard

Activity: Just like the people in Halutza know that they were building the community in a place lacking natural resources, it is important to appreciate what is hidden beneath the ground we walk on every day. With this simple activity, your students can appreciate that the dirt they walk on is much more complex than they thought.

1. Label each student's bottle.
2. Put a few handfuls of dirt into the empty bottle/jar until the bottle is 1/3 full.
3. Fill the bottle with water until it is halfway full.
4. Have the students shake and turn the water (give each student a try or have multiple bottles).
5. When the water settles, the dirt will have separated into different levels of soil based on their makeup.

Note to Facilitator: This activity is a simple one to show that our soil is more complex than what meets the eye. When you shake it, the different materials in the soil should coalesce because in water, materials come together when given the opportunity. So you should see somewhat clearly delineated levels on soil, rocks, etc. It's not important to be able to identify each level, just to get the students to appreciate that there is more than just dirt.

Questions to ask before activity:

- What do you think will happen? What do you expect to observe?

Questions to ask after activity is completed:

- What are some qualitative observations? What are some quantitative observations?

Question to ask when the students return to see the results:

- How does what we see reflect what we learned about growing trees in Israel?
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Wadi Attir—The Next Milestone

The Bedouin people have traditionally been nomadic, which means they travel with their families and possessions from place to place. They live somewhere for a season or year before moving their entire tribe and herds to a new location. This makes it hard to build schools, hospitals, and other community organizations for them. Through Project Wadi Attir, Jewish National Fund helps to create a growth engine for the Bedouin community that is sustainable environmentally, economically, and socially while respecting Bedouin culture. Developed and driven by the Bedouin community, and guided by the US-based Sustainability Laboratory, the project demonstrates a self-reliant approach to social and economic advancement faithful to key aspects of Bedouin tradition. At the core is an organic farming enterprise involving animal husbandry and the production of dairy products; cultivation of medicinal plants and the development of a related line of health products; and the reintroduction of nutritious, indigenous vegetables to common use. The project includes a Visitor, Training and Education Center, with a focus on ecology, sustainability, innovation, and entrepreneurship.

Activity: Just as the Bedouin community uses successes of the kibbutz network to improve their lives, you can improve the environmental focus of your school by creating a composting setup.

Since there are many different ways to start composting, we have listed a number of these options that can be found on our website. You can start out small with a Rubbermaid bin in a classroom or create something for the entire building to use. All those ideas, other resources and how-to videos can be found at www.jnf.org/tbs2020.

Note to Facilitator: This is an opportunity to add composting to your classroom culture. There are some very easy setups that don't involve large building projects. The one we have highlighted can be as small as a large Rubbermaid container, and can live under a desk or in a corner of the classroom. Please take a look at the materials shared on the website to give you a better sense of how to go about creating this.



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