Time for our experiment!

Gather the following materials before you begin:

- ✓ **Two small paper or styrofoam cups** - pick something that you can punch a hole in the bottom of easily.
- ✓ **Two pieces of filter paper –** a cut coffee filter will work well
- ✓ **¼ cup sand –** make sure it is dried out. Do this by leaving it out in the sun, or baking in the oven with parent permission.
- ✓ **¼ cup soil –** same note as above for the sand.
- ✓ **Two larger cups/containers** - pick something wide enough that you can easily hold the small cup over it, and something that holds at least ½ cup of water
- ✓ **Measuring cups** - you will need to be able to measure ¼ cup and ½ cup

Step #1 – Set up your filters

1. Flip over the small cups and poke a few holes on the bottom using a pencil or pen. The holes should be about as wide as a hole punch.
2. Flip the cups right side up and put the coffee filters inside the bottom of each cup. Fold and tear them as needed so it sits on the bottom and completely covers it.
3. Pour ¼ cup of sand into the first small cup with the filter.
4. Pour ¼ cup of soil into the other small cup with the filter.

Don't worry if your holes don't punch through cleanly. I recommend you do more & bigger holes than I did.

Filling up my first cup with the filter in place!

Step #2 – Pour water through your filters

1. Measure out ½ cup of water. For this experiment, you should try to get this measurement really accurate.
2. Hold the small cup with the sand over your larger cup/container. Slowly pour the ½ cup of water into the small cup and let the water run out the holes on the bottom, collecting in the larger cup/container below. *Note - you will have to pour a little water at a time, so that the small cup with the sand doesn't overflow from the top.*
3. When the measuring cup is empty, and all your water has filtered through the sand into the larger cup/container, set it aside.

Soil and sand filters ready to be used for testing!

Step #2, continued – Pour water through your filters

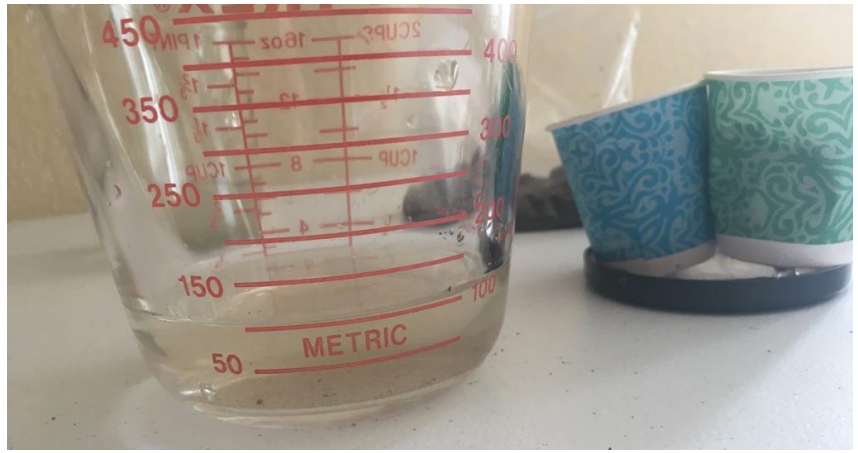
1. Measure out another ½ cup of water.
2. Hold the other small cup with the soil over your other larger cup/container in order to collect the water. Slowly pour the ½ cup of water into the small cup and let the water run out the holes on the bottom. You will have to pour a little water at a time, so that the small cup with the soil doesn't overflow from the top.
3. Keep pouring until the measuring cup is empty, and all your water has filtered through the soil into the larger cup/container.
4. Be sure to keep the two containers with the filtered water separate, so you can identify which came from the soil and which came from the sand (label them if needed).

https://www.youtube.com/watch?v=qnCzyLuPBjo

Need a brain break? Play this game with your family!

Step #3 – Results

1. Take your container that collected the water filtered through the sand and pour it into something to measure it. If you have one, use a measuring cup that has a few different markings so you won't have to round or estimate the exact amount of water. However, if you don't have this, pour the filtered water back into your ½ cup measurer and mark the water line with a dry erase marker, pencil, or piece of tape. Record this amount.
2. Now, dump out this water and repeat this process for the water that filtered through the soil.
3. Compare the two amounts. Which filter let less water through? Why do you think that might be?



Measuring cup I used to figure out how much water came through the soil and sand filters.

Sand v. Soil

- You should have seen that we collected less water from the soil filter than the sand filter, and both should have less water coming out than we poured in.
- As it turns out, sand is not very good soil for holding water. The large grains of sand have a lot of space in between them, so water flows out easily and doesn't get stuck in all the tiny spaces.
- However, soil types like clay, silt and loam are made up of smaller particles that don't have as much space in between them. This means that water gets trapped in the soil, where the plant roots can pick it up, therefore supporting plant growth.
- So now we know – sandy soil is *not* superior soil!