RESEARCH QUESTION:
In the group we would like to study about how different amounts of water could affect plants. We will be creating an artificial drought by giving the plant less than average water so the plants, which are radishes and onions will be dealing with limited water, then giving them a normal amount, and then an extreme amount of water that is over what they need, this will represent a flood. We are experimenting on how different amounts of water affect plants.

EXPERIMENTAL DESIGN:
In our experiment there will be two types of plants that we will be working with to get the best possible results. We will be working with radishes and onions. Each of them needs to have their own specific requirements that will be needed to grow, even though we will be putting them through several conditions to see how they react. These facts about radishes will help us with our experiment about giving radishes droughts, floods, and normal weather. Radishes, on average, need 25 milliliters of water per 4 days, Radishes are also one of the most water rich vegetables meaning they need a lot of water. 40 milliliters every 4 days can cause overwatering. 15 milliliters every 4 days would be a moderate drought. Radishes should be planted about 1 inch apart and there should be 4-6 radish seeds. Radishes prefer fertile, deep, well-drained soils. They need plant seeds 1／2-1 inch deep. Radishes need 6 hours of sunlight per day. Radishes grow best in sandy soil. Radishes grow best in sandy soil. Drought can cause roots to develop bad flavor and tough texture. We need this information to successfully grow radishes. These facts are to help with the germination of our onions. Onions need a lot of care and to start that care you need to first, prepare a planting bed, by adding a fertilizer and amend fertilizer and amend soil as needed with will composted organic matter. Onion bulbs are produced by sowing seeds in a dense pattern in early summer and then being harvested in autumn. Next, when the bulbs are still small. Lastly,onions need an inch of water a week to survive, and 7-14 days before harvesting stop watering the onion. To conclude all we have stated, onions need a lot of care in order for this experiment to work.

PREDICTION:
We have some predictions of what will happen when we “flood” a plant, put a plant into a “drought” and then put a plant through its normal plant experience where it gets what it needs. If we give a plant a normal amount of water it will grow how a normal plant does and it will be healthy and will survive. If we give a plant a small amount of water, like in a drought, it will probably die and wilt. When it is overwatered in a flood, we think the plant will drown and die. A plant will grow a normal amount and be an average plant when it gets a normal amount of water. A plant will grow, probably slightly smaller, and die with a small amount of water if it continues to get a small amount of water for a long period of time such as if a plant would be going through an extreme drought. If a flood happens, we predict it will kill the plants or hurt them. The plants will be growing at

different speeds and in different sizes because of the amount of water we will give them. The ones that are in a “drought” will probably grow slower and not be as big because they are getting a limited amount of water, they could easily die as well but hopefully not. When you get a limited amount of water the plant will become very dry and it does not get enough nutrients that they need so they will start to dry out and die. The ones that are getting a normal amount of water for them will probably grow to the size that most of them are and be very healthy. They will grow to the size they are supposed to be because they are getting a normal amount of water so their systems will be happy and functioning because they will have everything that they should need. The ones that are getting too much water and are in a “flood” we think the plant will drown and die. We think they are going to drown because we will be giving them a lot over what they are supposed to, it will overpower the plant and as that absorbs into the soil then the roots get drowned and suffocate because they can’t absorb the water fast enough until they drown.

CONCLUSION: In our experiment things did not turn out the way that we had expected. When we had originally thought that the droughts were going to do the worst, then the floods, and then the controls. Instead though the droughts were the worst but then the controls did not do the best, so overall the floods did the best out of all of them. We think that this happened because the school had a problem with the facilities and we could not water them for over a week. This caused the droughts to dry out even more and the controls to start to dry out, the floods which had been almost constantly wet had now reached a good amount of water for them and started to recover from their previous almost dying state. The data supports our claim because in our graph it shows that droughts went down the whole time, the control went up and down, and the floods did very well overall. This does not support our old claim, where the controls did the best, then the floods, and lastly the droughts, but it does support our new one where we said that the floods did the best, then the controls, and lastly the droughts. Future experiments that could include redoing this without the interruption of the school problems, another one would be doing this on a larger scale with more data, and doing the project for a longer amount of time until we got lots of data. In conclusion, through things such as the school having problems, having the wrong idea to begin with, and learning new things about plants we have gained knowledge and experience that will be useful later in life.

MARCH 4TH:

We planted our onion and radish seeds after we soaked the soil. We had 6 pots. Onion control, flood, and drought, and radish control, flood, and drought. We labeled them and put them on a tray to drain.

MARCH 5TH: We did the same as yesterday because we forgot to plant two of each.

MARCH 7TH: We watered our floods with 40 milliliters of water. We saw no germination. We did not water the control or the drought pots.
MARCH 11TH: We watered all of our plants and we did see germination which I will record in the table. We measured the heights by measuring the tallest 1. They are all healthy and green that have sprouted and they have some leaves at the end.
MARCH 13TH: All of our plants have sprouted. We did not water them today. They all look healthy and green, even the ones that have barely sprouted. The ones that sprouted on monday have the same color as before and are the same besides the height All the radishes have at least 1 leaf.
MARCH 15TH: One of the floods has gotten smaller and one of the radish controls. They are still all green and healthy and most of the radishes have more than 1 leaf. We watered them all besides the drought and we will water them next week.
MARCH 18TH: Our droughts and some of our floods are droopy. Our controls look good and green. We watered our droughts today and we will water our other plants tomorrow. All the radishes have leaves and the onions do not have any.
MARCH 19TH: Some of our floods and droughts are droopy and dying. They are still green and all the radishes have at least 1 leaf. Our controls look the best and that makes sense. We watered all our plants besides our droughts. Controls got 25 and floods got 40 milliliters.
MARCH 22TH: We watered our floods and controls. The droughts are doing the worst, then the floods, then the controls. 1 of the floods looks good. The droughts are wilting and the others look pretty good, especially the controls. We watered the floods 40 mm, we watered the controls 25 mm.
MARCH 25TH: Today we watered our droughts with 15 mm of water. They are wilting and each day they look worse. The floods look okay and our controls look pretty good.The droughts stems are white on some of them and the ones with leaves have shriveled leaves. The 1 flood, radish flood 1 looks pretty good too.
APRIL 1ST: We watered all our plants today. All of the controls and especially the droughts look like they are wilting but the floods look the best and green.

R=Radish O=Onion C=Control D=Drought F=Flood (days when not here, not recorded) For march 11, we did height instead of average.

	RC1 cm	RC2 cm	RD1 cm	RD2 cm	RF1 cm	RF2 cm	OC1 cm	OC2 cm	OD1 cm	OD2 cm	OF1 cm	OF2 cm
Mar 4	No	No	No	No	No	No	No	No	No	No	No	No
Mar 5	No	No	No	No	No	No	No	No	No	No	No	No

Mar 6	No	No	No	No	No	No	No	No	No	No	No	No
Mar 7	No	No	No	No	No	No	No	No	No	No	No	No
Mar 8	No	No	No	No	No	No	No	No	No	No	No	No
Mar 11	7.9	4.3	6.7	9.1	6.1	1.8	No	No	No	No	No	No
Mar 13	10.64	10.95	11.63	14.15	12.62	10.3	1.6	.8	1	.7	1.57	.2
Mar 15	12.22	10	12	12.28	12.37	13.4	3.8	1.7	2.4	6	2.3	1
Mar 18	14.94	10	13.03	9.38	11.8	7.85	4.7	4.6	4.7	7.8	3.7	3.1
Mar 19	14	11.9	13.7	11.93	13.7	8	7.11	5.4	5.75	3.2	5.9	4.4
Mar 22	14.6	11.2	7.67	9.5	13.71	7.5	7.42	6.6	5.9	5.6	7.25	5.5
Apr 1	8.18	7.6	3.2	7	14.8	14.6	8.22	6.3	1.45	3	9.25	7
	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height