

KINDERGARTEN

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How does the amount of water affect plant growth?

Hypothesis

Plants need a just right amount of water to grow.

Materials

- *13 Plastic Cups
- *13 cups of soil
- *Strawberry Seeds
- *Water
- *Measuring cups (small, medium, large)

Procedure

- 1.Fill the cups with soil.
- 2.Plant the strawberry seeds.
- 3.Place them by a sunny window.
- 4.Divide into three groups for watering: small, medium, and large cups.
- 5.Observed over time.

NEW YORK STATE SCIENCE LEARNING STANDARDS

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

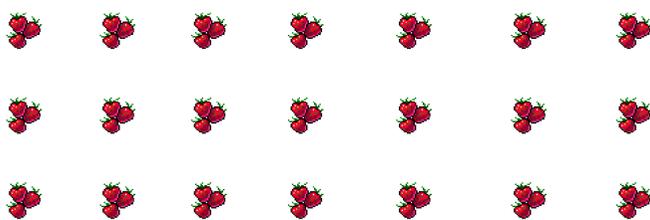
NEW YORK STATE SOCIAL STUDIES FRAMEWORK

K.1a. A sense of self is developed through physical and cultural characteristics and through the development of personal likes, dislikes, talents, and skills.

GARDEN RECIPE: MY FAVORITE STRAWBERRY

- * Strawberries
- * Whipped Cream
- * Melted Chocolate or Chocolate Sauce

Wash, dry, and hull the strawberries. Decide your favorite way to eat them. You can eat them plain, with swirl of whipped cream, with a spoonful of chocolate, or with both whipped cream and chocolate!



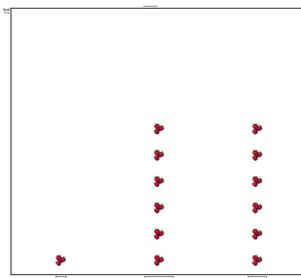
Results

Nothing grew! We think that all of the plants dried out during a long weekend. We tried again and then there were a lot of snow days and the plants dried out again. Oh no! We will persevere and keep trying!



We made a class tally chart about how we like our garden strawberries.

Ways to Eat Strawberries	Tallies
Plain	1
Chocolate Covered	6
Strawberry Shortcake	6



Conclusion

Don't let seedlings dry out! Our chart showed us that different people have different likes and dislikes.

1ST GRADE

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How does time affect how tomatoes grow?

Hypothesis

The plants will get taller over time & change.

Materials

- * 24 Plastic Cups
- * 24 Cups of Soil
- * Heirloom Tomato Seeds
- * Hybrid Tomato Seeds
- * Water
- * Nonstandard Units of Measurement

Procedure

1. Fill the cups with soil.
2. Plant the tomato seeds.
3. Water regularly and keep by a sunny window.
4. Measure how tall the plants grow using math blocks. Observe how the heirloom and hybrid seeds change over time.

NEW YORK STATE SCIENCE LEARNING STANDARDS

1-LS3-1. Make observations to construct an evidence-based account that some young plants and animals are similar to, but not exactly like, their parents.

NEW YORK STATE SOCIAL STUDIES FRAMEWORK

1.7c Families of long ago have similarities and differences with families today.

GARDEN RECIPE: TOMATO TASTE TEST

- * Different Kinds of Tomatoes, such as hybrid and heirlooms.
- * Optional: Salt, Olive Oil, Crackers

Wash and dry the tomatoes. Have an adult help to cut them into bite-sized pieces. Try them either plain or with salt and olive oil on crackers. Do the different varieties taste different?

Taste test tomatoes at different times of year, too! You can easily grow them in pots at home or find them at the local Farmers' Market in the summer.

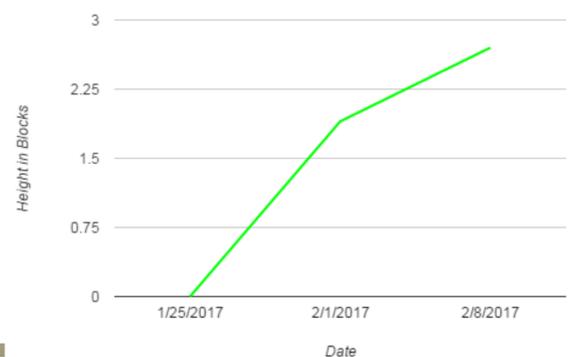


Results

The plants grew taller over time. They changed from seeds to seedlings and started to grow more leaves.

Date	Average Height in Blocks
1/25/2017	0
2/1/2017	2
2/8/2017	3

How do plants change over time?

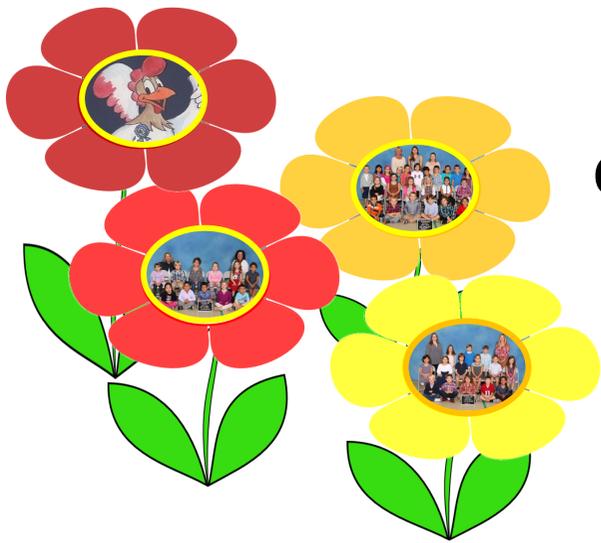


Conclusion

The data support the hypothesis. The seeds turned into seedlings and then started growing more leaves.

2ND GRADE

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How does light affect plant growth?

Hypothesis

The plants by the sunny windows will grow the tallest.

Materials

- * 17 Plastic Cups
- * 17 Cups of Soil
- * Seeds from plants that we eat the tops (cilantro), middles (tomatoes), or bottoms (carrots)
- * Water
- * Metric Rulers
- * Classroom Map

Procedure

1. Fill the cups with soil.
2. Plant the seeds.
3. Make a map of where the plants are located around the room.
4. Water regularly and observe.
5. Measure growth.

NEW YORK STATE SCIENCE LEARNING STANDARDS

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

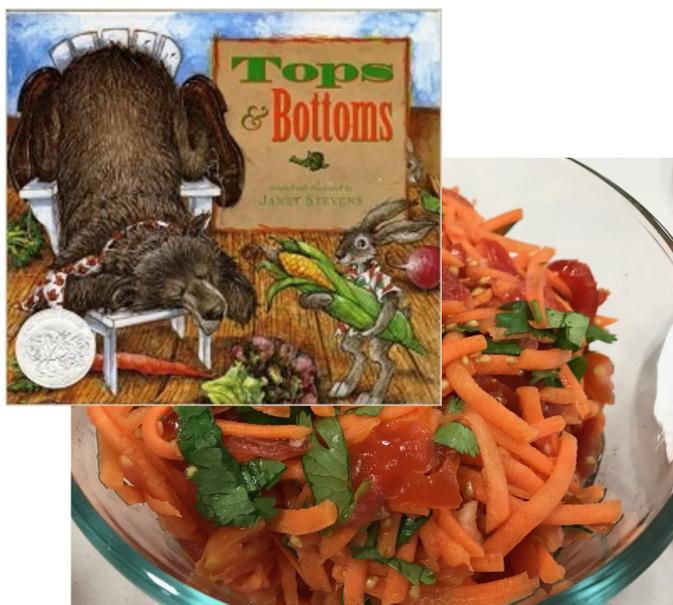
NEW YORK STATE SOCIAL STUDIES FRAMEWORK

2.5a Urban, suburban, and rural communities can be located on maps, and the geographic characteristics of these communities can be described by using symbols, map legends, and geographic vocabulary. Students will create maps including maps that represent their classroom, school, or community, and maps that illustrate places in stories.

GARDEN RECIPE: TOPS, MIDDLES, & BOTTOMS SALSA

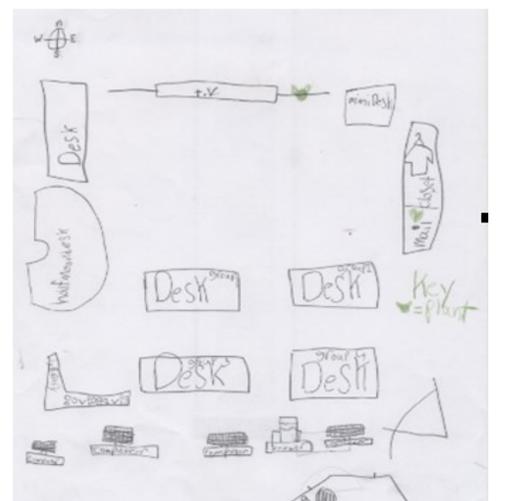
- * Tops of the plant: 1/2 bunch Cilantro
- * Middle of the plant: 1 bunch Tomatoes
- * Bottoms of the plant: 1 large Carrot
- * 1 clove garlic, smashed
- * Juice of 1 lime

Wash and dry the vegetables. Pinch off the tops of the cilantro leaves. Have an adult help chop the tomatoes and grate the carrot. Mix together with the garlic and lime. Serve with tortilla chips.



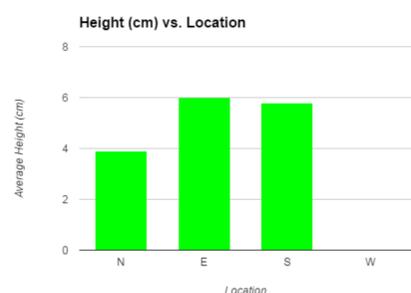
Results

Most of the plants grew around the room.



The plants by the sunny window and heater dried out over the long weekend and did not sprout. The plants furthest from the windows were longer, thinner, and lighter green.

Location	Height (cm)
N	3.9
E	6
S	5.8
W	0

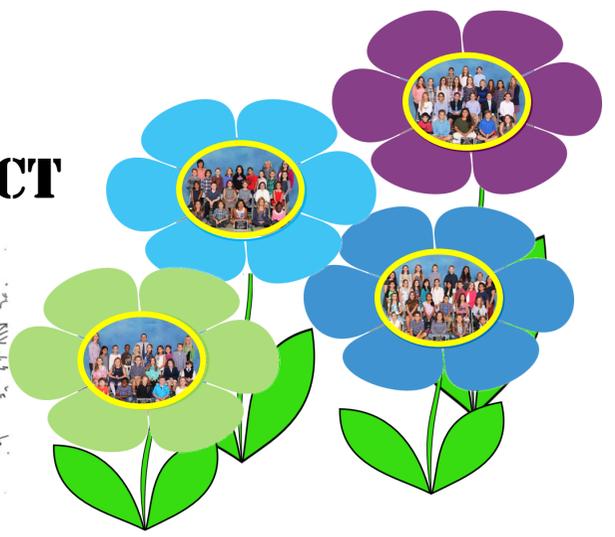


Conclusion

The data do not support the hypothesis. We could try again, making sure that all the plants get the water they need.

3RD GRADE

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How do biome conditions affect a desert plant, a temperate forest plant, and a rainforest plant?

Hypothesis

Plants will grow best in the biome where they are adapted to live.

Materials

- *9 Plastic Cups
- *9 Cups of Soil
- *3 Desert Cacti
- *3 Temperate plant seeds, such as nasturtium
- *3 Rainforest Aralia
- *Water

Procedure

1. Fill the cups with soil.
2. Plant a seed or plant in each cup.
3. Keep one set desert dry, one set with a medium amount of water, and one set rainforest wet.

NEW YORK STATE SCIENCE LEARNING STANDARDS

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

NEW YORK STATE SOCIAL STUDIES FRAMEWORK

3.1 Geographic regions have unifying characteristics and can be studied using a variety of tools.

GARDEN RECIPE: BIOME TASTE TEST

- * Desert Plant: Pear Cactus
- * Temperate Plant: Cranberry Sauce
- * Rainforest Plant: Chocolate

Wash and dry the cactus. Ask an adult to help peel and slice it. You can make your own cranberry sauce using the recipe on the package or buy it in a can. When buying chocolate, try to look for shade grown chocolate that doesn't hurt the rainforest ecosystem when it is grown.



Results

The rainforest plant grew the best in the wet cup and died in the dry cup. The temperate seedlings didn't sprout so we tried replanting them. Then they only sprouted in the medium cup. The cactus grew best in the dry cup and started to rot in the wet cup.

	Biome Condition		
	Desert Dry	Temperate Medium	Rainforest Wet
Plant	NO	SPROUTS	+
	Desert Plant	Temperate Plant	Rainforest Plant
	healthy	OK	rot
	Desert Cactus	Temperate Cactus	Rainforest Cactus



Conclusion

The data support the hypothesis.

4TH GRADE

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How does soil type affect plant growth?

Hypothesis

Out of the different types of soils found in New York, the seeds planted in a mix will grow the tallest.

Materials

- *21 Plastic Cups
- *21 Cups of Soil
(Sand, Clay, Potting Soil, Mix)
- *Three Sisters Seeds
(Corn, Beans, Squash)
- *Water
- *Ruler

Procedure

- 1.Fill the cups with the different types of soil.
- 2.Plant the seeds.
- 3.Place in a sunny window and water regularly.
- 4.Measure growth and observe.

NEW YORK STATE SCIENCE LEARNING STANDARDS

4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.

NEW YORK STATE SOCIAL STUDIES FRAMEWORK

4.1 GEOGRAPHY OF NEW YORK STATE: New York State has a diverse geography.

4.2 NATIVE AMERICAN GROUPS AND THE ENVIRONMENT: Native American groups, chiefly the Haudenosaunee (Iroquois) and Algonquian-speaking groups, inhabited the region that became New York State. These people interacted with the environment and developed unique cultures.

GARDEN RECIPE: THREE SISTERS SALAD

- * 1 container frozen corn, thawed
- * 1 can beans
- * 1 container frozen squash, thawed
- * 1/2 bunch cilantro
- * 1 Tbsp Apple Cider Vinegar
- * 1 clove garlic, smashed
- * Salt to taste

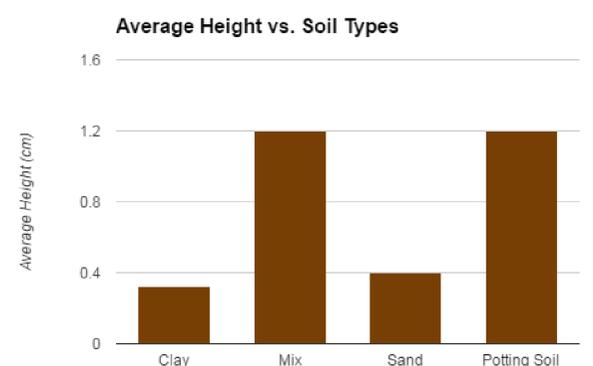
Wash and dry the cilantro. Pinch the leaves off and discard the stems. Mix all of the ingredients together.



Results

The seedlings in the potting soil and mix grew the tallest. The sand grew the next tallest and the clay were the smallest.

Soil Type	#1	#2	#3	#4	#5	AVERAGE
Clay	0.1	0	0	1	0.5	0.32
Potting Soil	2	1	0	2	1	1.2
Sand	1.5	0.5	0	0	0	0.4
Mix	3	2	0.5	0.5	0	1.2

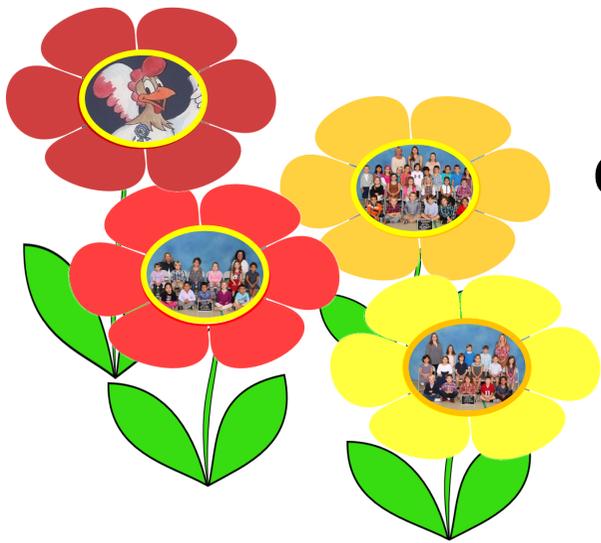


Conclusion

The data partially support the hypothesis because both the mix and the potting soil grew the tallest.

5TH GRADE

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

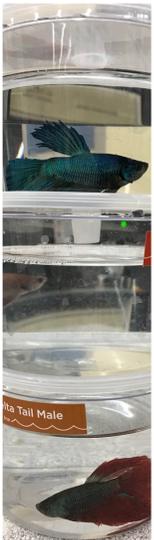
How do the amount of consumers affect pollutants in a fishbowl ecosystem?

Hypothesis

The more consumers, the more pollutants.

Materials

- *3 Fish Tanks
- *Water
- *3 Producers (Water Plants)
- *3 Consumers (Fish)
- *3 Primary Decomposers (Snails)
- *Fish Food
- *Nitrate & Ammonia Test Kits



Procedure

1. Set up the fish tanks with an equal amount of water, producers, and primary decomposers.
2. Make tanks with 0, 1, and 2 consumers.
3. Measure the pollution over time with the kits.

NEW YORK STATE SCIENCE LEARNING STANDARDS

5-LS2-1. Develop a model to describe the movement of matter among plants (producers), animals (consumers), decomposers, and the environment.

NEW YORK STATE SOCIAL STUDIES FRAMEWORK

5.4 GEOGRAPHY IN THE WESTERN HEMISPHERE: The diverse geography of the Western Hemisphere has influenced human culture and settlement in distinct ways. Human communities in the Western Hemisphere have modified the physical environment.

GARDEN RECIPE: AQUAPONIC FISH CAKES

- * 1 lb cooked fish, like aquaponically grown tilapia, flaked
- * 1 lb. mashed potatoes
- * 1/2 bunch parsley
- * 1 egg, slightly beaten
- * Salt to taste

Wash and dry the parsley. Pinch off the leaves and discard the stems. Gently mix together the ingredients. Form the dough into cakes. Either pan fry in olive or bake in the oven at 350F until cooked through and browned.

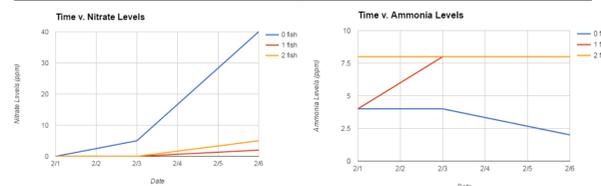


Results

The nitrates increased for all of the tanks over time, but the one with no consumers increased the most. The ammonia levels decreased with no consumers, increased with 1 consumer, and stayed the same with 2 consumers. All of our fish died within a few days and we were sad.



Nitrate		Date		
# of Consumers	2/1	2/3	2/6	
0 fish	0	5	40	
1 fish	0	0	2	
2 fish	0	0	5	
Ammonia		Date		
# of Consumers	2/1	2/3	2/6	
0 fish	4	4	2	
1 fish	4	8	8	
2 fish	8	8	8	



Conclusion

The results did not support the hypothesis. We are planning to investigate how just producers affect the nitrate and ammonia levels over time.

6TH GRADE

CLASS SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How do recycled solar panels affect temperature?

Hypothesis

The opaque solar panel will raise the temperature the most.

Materials

- *2 Recycled Wood Pallets
- *Recycled water bottles
- *Hot Glue
- *Spray Paint
- *Clear Plastic Tarp
- *Laser Thermometer

Procedure

1. Build 2 solar panels with the pallets, water bottles, and hot glue. Keep one clear and spray-paint one black. Cover with clear plastic.
2. Place one solar panel in each garden bed plus leave one bed empty.
3. Collect temperature data.

NEW YORK STATE SCIENCE LEARNING STANDARDS

MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

NEW YORK STATE SOCIAL STUDIES FRAMEWORK

6.3 EARLY RIVER VALLEY CIVILIZATIONS IN THE EASTERN HEMISPHERE (ca. 3500 B.C.E. – ca. 500 B.C.E.): Complex societies and civilizations developed in the Eastern Hemisphere. Although these complex societies and civilizations have certain defining characteristics in common, each is also known for unique cultural achievements and contributions.

GARDEN RECIPE: CLASSICAL CIVILIZATIONS BROAD BEAN HUMMUS & KALE CHIPS

- * 1 can Broad Beans (also called Fava)
- * 1/3 cup Tahini
- * 1/3 cup olive oil
- * 2 cloves of garlic
- * Extra olive oil to drizzle
- * Juice of one lemon
- * Salt to taste

For the Hummus: Drain & rinse the beans. In a food processor or with a masher, pulse the beans, tahini, olive oil, and garlic until a paste forms.

For the Kale Chips: Wash and dry the Kale. Cut into chip-sized pieces. Toss with salt, olive oil, and lemon juice. Bake at 350F for 10-15 minutes or until browned.



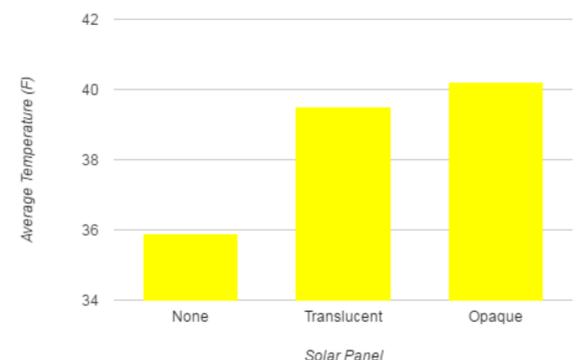
Results

The average temperature for the translucent solar panel was 3.6°F more than the baseline temperature. The average temperature for the opaque solar panel was 4.3°F more than the baseline temperature.



Solar Panel	Average Temperature (°F)
None	35.9
Translucent	39.5
Opaque	40.2

Average Temperature (F) vs. Solar Panel

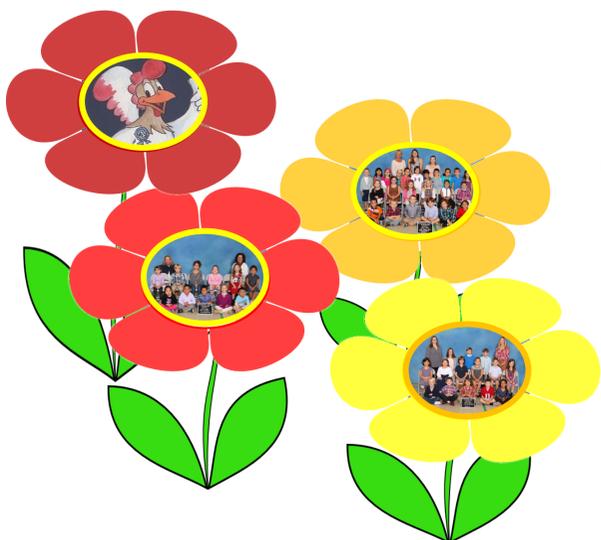


Conclusion

The data support the hypothesis. More tests will need to be done to determine whether it increased the temperature enough to grow plants.

CODE CLUB

TEAM SCIENCE FAIR PROJECT



NEW GENERATION SCIENCE STANDARDS STARTS SPRING

Testable Question

How does robotics brand affect speed & engineering designs to do garden work?

Hypothesis

The Sprk+ will be the fastest and Cosmo the slowest. All robots can be engineered to work in the garden.

Materials

- *Different Robots (Cosmo, Dash, Sprk+)
- *Ruler
- *Stopwatch
- *MakerSpace Supplies (Different types of tape, glue, cups, straws, paper, rubber bands, etc.)

Procedure

1. Create a 5m race track with the ruler and tape.
2. Use the stopwatch to time the different robots as they race down the track.
3. Separately, test engineering designs to do work in the garden.

NEW YORK STATE SCIENCE LEARNING STANDARDS

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

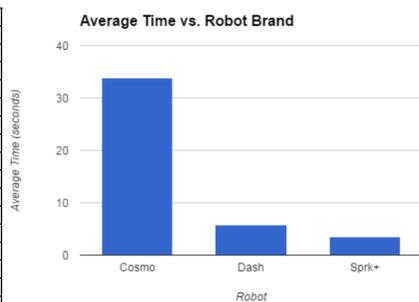
ENGINEERING DESIGNS



Results

Sprk+ was the fastest, followed by Dash. Cosmo was the slowest.

Robot Brand	Time
Cosmo Trial 1	33.07
Cosmo Trial 2	30.86
Cosmo Trial 3	35.32
Cosmo Trial 4	36
Dash Trial 1	5.39
Dash Trial 2	6.08
Dash Trial 3	5.32
Dash Trial 4	5.18
Dash Trial 5	6.7
Dash Trial 6	5.72
Dash Trial 7	6.6
Dash Trial 8	5.97
Sprk+ Trial 1	4.2
Sprk+ Trial 2	3.25
Sprk+ Trial 3	3
Sprk+ Trial 4	3.76



Robot Brand	Average Time (seconds)
Cosmo	33.8
Dash	5.8
Sprk+	3.6

All of the robots could be engineered to do work in the garden, such as transporting soil, spreading seeds, etc.



Conclusion

The data support the hypotheses.