

TITLE OF PROJECT:

Bird Buffet: Discovering Birds' Favorite Seeds

QUESTION: Which bird seed do birds prefer to eat the best?

VARIABLES:

INDEPENDENT: The different seeds in the bird feeders

DEPENDENT :The amount of bird seed that is most eaten

CONSTANTS : The type of bird feeder,the weather conditions,how high the bird feeder is,and where the bird feeder is the 579 rule.A feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

HYPOTHESIS: If I test what bird seed birds like to eat the most, then I think the birds will like the black oil sunflower seeds the most because according to my research the sunflower seed is most favored of all the birds including the Cardinal, House Finches, and the Grosbeaks.

RESEARCH:

Source 1

Title:Best seeds for feeding wild birds in tucson

•**Website:**<https://localyardandgarden.com/best-seeds-feeding-wild-birds-tucson>

• **Citation:** *Friedman, J. (2020, July 5). Best seeds for feeding wild birds in Tucson. Local Yard & Garden Resources.*

<https://localyardandgarden.com/best-seeds-feeding-wild-birds-tucson>

• **Information found:**

1.Common seed-eating birds that may come to your seed feeder include:

- Red finches
- Goldfinches
- Cardinals
- Quail

- Pyrrhuloxia
- Grosbeaks
- Sparrows
- Mourning doves and white-winged doves

2. White proso millet is usually considered the highest quality for nutritional reasons and, in bird seed mixes, is usually the second most important ingredient after sunflower seeds.

3. A common local bird, the goldfinch, prefers Nyjer thistle seed as the overwhelming favorite. The seed is small and thin-shelled but has a very nutritious nutmeat at the center and the seed is easily opened by the goldfinch's delicate yet sharp bill.

4. Cardinals and Pyrrhuloxia, have much larger and stouter beaks relative to size, and can therefore consume harder, thicker-shelled seeds that are bypassed by most other birds. While they cannot swallow these seeds whole, they use their heavy, strong bills to crack the shells, discard them, and swallow the smaller and nutritious nutmeats contained within.

5. The most common seeds used in backyards across the country are the sunflower and millet seeds. They are the basic ingredients for most mixes. Even within these two seed groups, there are distinctions and choices to be made.

6. The shell of the seed has a cleavage and birds can manipulate each seed in their bill correctly so that when pressure is applied the outer shell breaks into two halves which the birds let drop. They retain the softer, oiler nutmeat within the seed.

7. The overwhelming majority of sunflowers were traditionally and historically grown to be used as bird seed. However, the demand by humans for healthier cooking oils has contributed to the increased cost of these seeds in recent years.

8. Birds visit our feeders to supplement their natural diets. By providing high-quality and highly nutritious supplemental foods for them, such as seeds, we can help them thrive.

9.The millet family of seeds is used by humans and birds throughout the world. For example, in Ethiopia, white proso millet is a staple of the human diet and used creatively in many ways. In the West, millet is gaining popularity; it can easily be found in health food stores and is used as an ingredient in cereal mixes and breads.

10.Not to be overlooked in the sunflower market are the large striped sunflowers and sunflower hearts. The large gray-striped sunflower seed was long considered to be the ultimate sunflower for both the bird and human markets. This very large seed was favored by the cardinals, grosbeaks, and other stout-billed birds, as well as for the large pet market trade.

What can I learn from this information to help me formulate a hypothesis?

This information can help me formulate a hypothesis because I will be able to determine which three seeds are best for this experiment, and which seeds I will use.

Source 2:

- **Title:** Identify 25 bird species Visiting Backyard bird feeders in Arizona
- **Website:**<https://avianreport.com/identify-backyard-feeder-birds-arizona/>
- **Citation:***Begazo, A. (2025, April 24). Identify 25 bird species visiting backyard feeders in Arizona. Avian Report.*
<https://avianreport.com/identify-backyard-feeder-birds-arizona/>

• Information found:

1.Sparrows, finches, and their allies are the most common visitors, with 9 species in this group alone. This suggests that feeders might be particularly attractive to these types of birds, possibly due to the availability of seeds and other food sources they favor.

2. Verdins and Quails are unique to the region, indicating that Arizona's bird feeders support both common and region-specific species.

3. Other groups are represented by fewer species. For instance, woodpeckers and doves include three species each.

4. Migratory species move from region to region in search of food, better breeding opportunities, or to avoid harsh weather conditions. This can explain why some birds visit your feeders for a few months or even weeks, and then disappear, while the resident species keep coming back year-round.

5. Birds in this group have heavy, conical, seed-crushing bills. Backyard feeders generally offer seeds and grains that sparrows, finches, grosbeaks, and buntings like. Some birds in this group take more insects and other invertebrates during the breeding season and switch to a seed and grain diet during the rest of the year.

6. Birds that visit bird feeders are a small subset of the birds in the region. One would expect that insect-eating birds would make the largest group of birds visiting bird feeders. However, grain and seed-eating birds compose the largest group.

7. These birds have not only learned to live near humans but also to take advantage of the food provided by them.

8. Cassin Finch- They are primarily seed-eaters, providing a variety of seeds, such as s black oil sunflower seeds, hulled sunflower seeds, nyjer, and millet. It favors platform feeders but can use large and small tube feeders. Other examples of birds in Arizona.

- House Finch- Attract house finches with black oil sunflower seed, hulled sunflower seeds, safflower, and nyjer. It favors large tube feed, small and large hopper, and platform feeders.

- White crowned-sparrow- Attract white-crowned sparrows with black oil and hulled sunflower seeds, cracked corn, millet, and milo. White-crowned sparrows feed mainly on the ground but take platform feeders.
- Abert's Towhee- Attract Abert's towhees with black oil sunflower seeds, hulled sunflower seeds, safflower, cracked corn, peanut hearts, millet, and milo. The Abert's towhee is largely a ground feeder that takes seeds spilled below elevated feeders.

9. The type of bird feeder to get in the State of Arizona is a platform feeder or hopper feeder,

10. According to the data most 92.5% birds use platform feeders, followed by large hopper feeders 64.8%. Many birds (32%) are comfortable feeding on the ground.

The table below shows the bird feeder types most frequently used by backyard birds in the State of Arizona.

Feeder Type	Number of Species that use it	Percentage
Platform	50	92.5
Large Hopper	35	64.8
Ground	32	59.2

Large Tube	20	37.0
Suet Cage	20	37.0
Small Tube	15	27.7
Small Hopper	9	16.6

What can I learn from this information to help me formulate a hypothesis?
This information can help me formulate a hypothesis because it helps me determine which is the best bird feeder to use for my trials. It also helps me because it gives me resources on what bird like what seed.

Source 3

- **Title:**Promoting Bird Health In The Backyard
- **Website:**<https://tucson.wbu.com/sick-birds-tucson-bird-feeders>
- **Citation:** *Wild Birds Unlimited - Nature Shop. (n.d.).*
<https://tucson.wbu.com/sick-birds-tucson-bird-feeders>
- **Information found:**

1.When sick birds show up at feeders, other birds can get sick as a consequence so it's very important that we are feeding the birds in such a way that we aren't exposing them to the dangers of disease and predators.

2.Consider replacing wooden feeders with ones made of plastic or recycled materials for easier cleaning.Do not reinstall feeders that allow contact between fecal material and food such as platform or tray feeders

3.Clean bird feeders regularly. Scrub them with water and a brush. Rinse and let them dry.Clean the ground under feeders using a rake.

4.Store bird food in a clean, dry, animal-proof container such as a metal garbage can.Only fresh, clean seed to the birds. No wet or moldy food.

5. Nyjer is a very high oil seed, providing lots of fat and protein for your finches. This is the reason the goldfinches are so attracted to nyjer seed. When stored in a hot environment, the natural oil dissipates quickly, sometimes becoming not good. If this happens, the goldfinches no longer have a reason to feed at your feeder and begin finding better options elsewhere. Always store nyjer seed at room temperature.

6.Rain and condensation can cause the nyjer at the bottom of the feeder to quickly mold, making the seed very unappetizing to your birds. This happens frequently during monsoon season and during winter rains.

7.You should use any bag of birdseed within 4 to 6 weeks after purchase. This is when the seed is freshest and contains the most fat, protein and other nutrients that are so good to your birds.

8.Avian Flu is a viral infection naturally occurring in wild birds - mainly waterfowl and shorebirds. It can occasionally spread to humans. People who work with poultry, waterfowl and dairy cows are most at risk.

9.Avian Pox are irregular bumps on birds' legs, feet, and faces. The virus that causes it can be spread by close contact among birds.

10. Disease is one of the many natural processes affecting wild species. As birds age, they become more susceptible to a number of diseases that are common in the avian community.

What can I learn from this information to help me formulate a hypothesis?
This can help me formulate my hypothesis because I can know how to properly clean the bird feeders and the different diseases birds can get.

Source 4

- **Title:**How to choose the right kind of bird feeder

Website:<https://www.allaboutbirds.org/news/how-to-choose-the-right-kind-of-bird-feeder/>

- **Citation:***Powell, H. (2025, February 24). How to choose the right kind of bird feeder. All About Birds.*

<https://www.allaboutbirds.org/news/how-to-choose-the-right-kind-of-bird-feeder/>

- **Information found:**

1.It's best to start out with black-oil sunflower seed; it's the most widely used seed, and it attracts the largest range of species.

2.The bird feeder needs to be sturdy enough to withstand winter weather and squirrels, tight enough to keep seeds dry, easy to assemble and, most important of all, easy to keep clean.

3.Platform feeders attract the widest variety of seed-eating feeder birds, although they are the most susceptible to raids by squirrels and other possibly unwanted guests.

4.Hopper feeders look nice, hold lots of seed, and provide a roof to keep the seed dry and fresh. But they can be hard to clean, and they usually offer easy access to squirrels.

5. These versatile feeders are easy to hang from a line or a shepherd's crook. Different types allow you to target different species, sizes, and numbers of birds.

6. A busy window feeder offers breathtaking, up-close views of birds and helps keep birds safe from window collisions.

7. Nyjer (also called thistle) feeders attract species such as goldfinches, Pine Siskins, Redpolls, Indigo Buntings, giving these small songbirds their own spot away from larger species that may dominate sunflower feeders.

8. Suet feeders are a great way to offer high energy food to birds, especially woodpeckers, nuthatches, chickadees, titmice, starlings, jays, and sometimes Carolina Wrens and Pine Warblers. They are most often used during the cooler temperatures of winter.

9. Nectar feeders are a great way to attract birds. You can hang a feeder almost anywhere; and they're great even if you don't have a yard.

10. Most seed feeders are variations on just a few basic designs: trays, hoppers, tubes, window mounts, and suet feeders.

What can I learn from this information to help me formulate a hypothesis? This can help me with my hypothesis because I can help me determine what type of bird feeder to use and what I'm testing.

MATERIALS AND PROCEDURES

Materials:

1. 3 Platform bird feeders
2. Black oil Sunflower seeds
3. Nyjer (Thistle) seeds
4. Safflower seeds
5. Measuring stick
6. Lab Notebook

7.Optional:

- Binoculars

Procedures:

1. Load up the Platform bird feeders with the three bird seeds. Record the height of each bird feeder with the seeds. Make sure each platform has the same amount of seeds. Record the time that the bird feeder was placed outside in your front or backyard.
2. Flatten out the bird seeds to get a better height.
3. Place the bird feeder in a convenient location, so birds can access it and you can view and monitor it.
4. Place the Platform feeder in different locations following the 5 7 9 rule and at least 10-15 feet apart. A feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.
5. Try to monitor the bird feeders regularly to see which they visit the most. In the lab notebook, try to record which birds are coming to the bird feeder and at what time.
6. After 1 week, record the height of the seeds and see which had the most and less amount of seeds. Then repeat this process for the next two trials.

SF EXPERIMENT DOCUMENTATION (3 TRIALS)

TRIAL 1:

DATE: 11/7-11/9

Time: 4:55

Beginning: 5:20pm

Ending: 5:20pm

Variables:

- Independent – The different seeds in the bird feeder
- Dependent – The amount of bird seed that is most eaten
- Constants – The type of bird feeder, the weather conditions, how high the bird feeder is, and where the bird feeder is the 579 rule, a feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

Results of Trial 1 experiment were:

The results of Trail 1 of this experiment was that the safflower and black oil sunflower seeds were both at the same height 0.5 inches. The Thistle seeds were at the same height 0.5. Yet I think as I was bringing the seeds outside in the front yard some might have fallen because the Thistle seeds are very small.

Observations/ thoughts from my experiment:

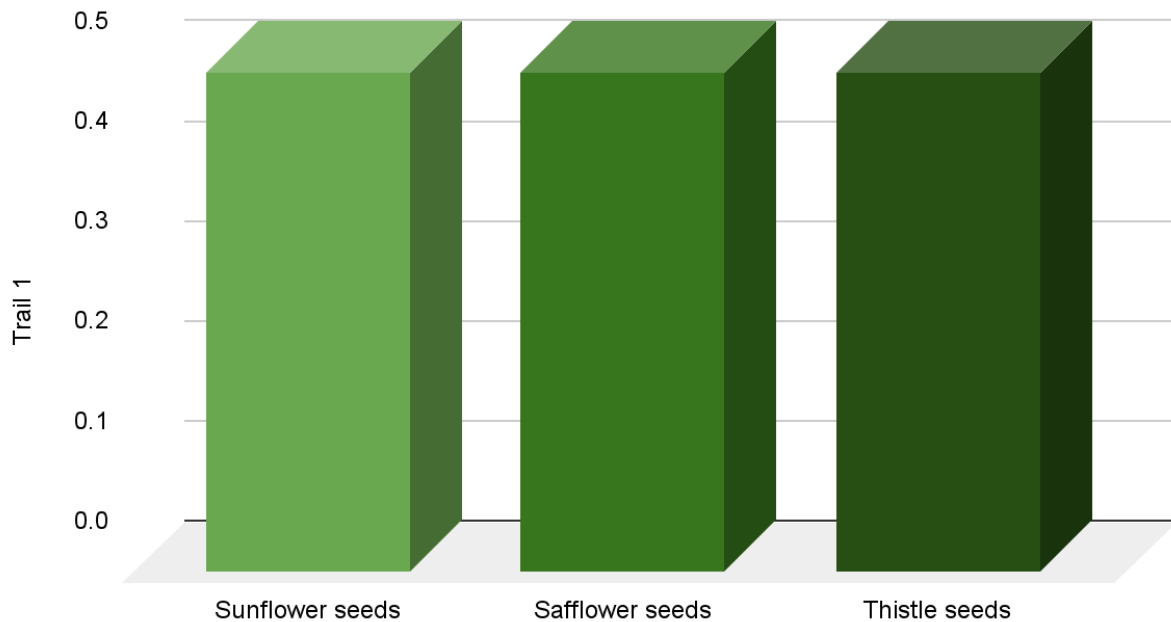
My thoughts and observations from this experiment is I think since the bird seeds weren't eaten out of or touched, I think the Platform feeders should be out for a longer time. I also think that hopefully in the next two trails the seeds would get at least some birds since they will be in the same spot and a longer time.

My expectation was that

My expectations from this experiment was that I thought since I left the bird feeder out for 2 days the birds would recognize the bird feeders and come to them. I didn't see any birds come and go on the feeders and none of the bird feeders got any birds.

Sunflower seeds	Safflower seeds	Thistle seeds
0.5 in	0.5 in	0.5 in

Trail 1



TRIAL 2:

DATE:11/10-11/12

Time: 5:20

Beginning: 5:20pm

Ending:5:20pm

Variables:

- Independent – The different seeds in the bird feeder
- Dependent – The amount of bird seed that is most eaten
- Controls – The type of bird feeder, the weather conditions, how high the bird feeder is, and where the bird feeder is the 579 rule, a feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

Results of Trial 2 experiment were:

My results for trail 2 is that once again the seeds got left untouched. The safflower, Sunflower, and Thistle seeds all stayed at the same height of 0.5 inches on the bird feeder.

Observations/ thoughts from my experiment :

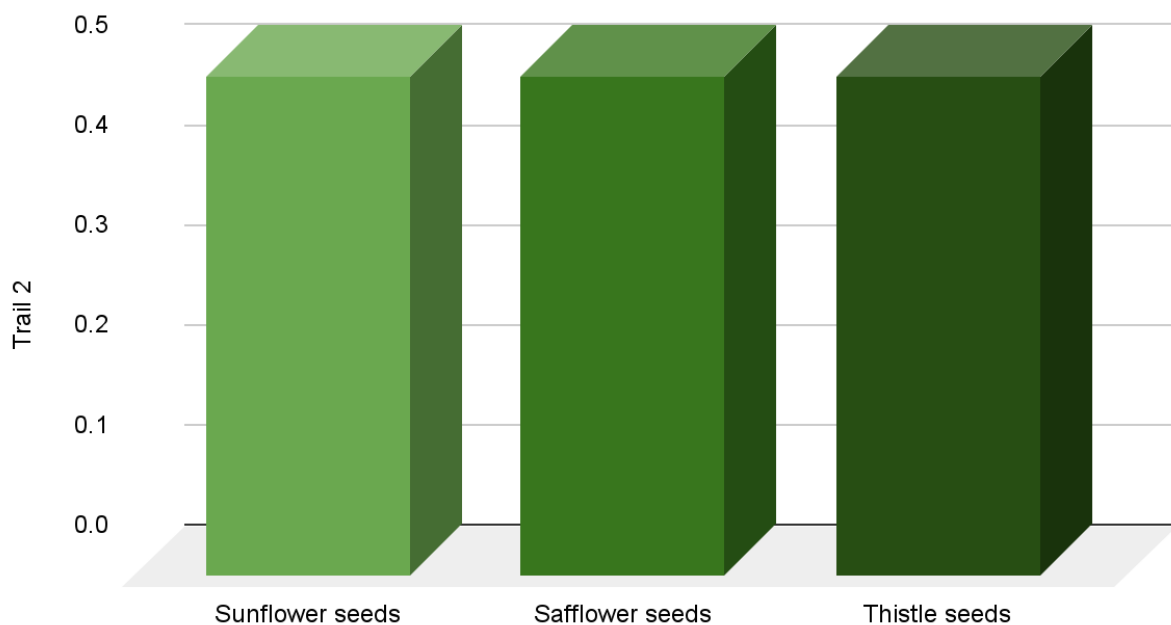
My thoughts and observations are I think they just needed more time so the birds could recognize the feeders and actually come to them. I think they always need to stay out for a week and somewhere calm and peaceful so the birds can eat.

My expectation was that

My expectations were that since the bird feeders were out for two days last trial the birds would at least recognize them a little more. Rather than what really happened they all got left un-touched, at the same height of 0.5 inches.

Sunflower seeds	Safflower seeds	Thistle seeds
0.5 in	0.5 in	0.5 in

Trail 2



TRIAL 3:

DATE:11/16-11/18

Time: 5:18

Beginning:5:20pm

Ending:5:20pm

Variables:

- Independent–The different seeds in the bird feeder
- Dependent – The amount of bird seed that is most eaten
- Controls – The type of bird feeder,the weather conditions,how high the bird feeder is,and where the bird feeder is, the 579 rule, a feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

Results of Trial 3 experiment were:

The results of trial 3 was a full 0.5. No birds came to the bird feeders this trial.All of the trials stayed the same at the same height of 0.5.I think this happened because birds in Tucson, AZ travel south starting early fall to late fall, about the time I did this experiment.

Observations/ thoughts from my experiment :

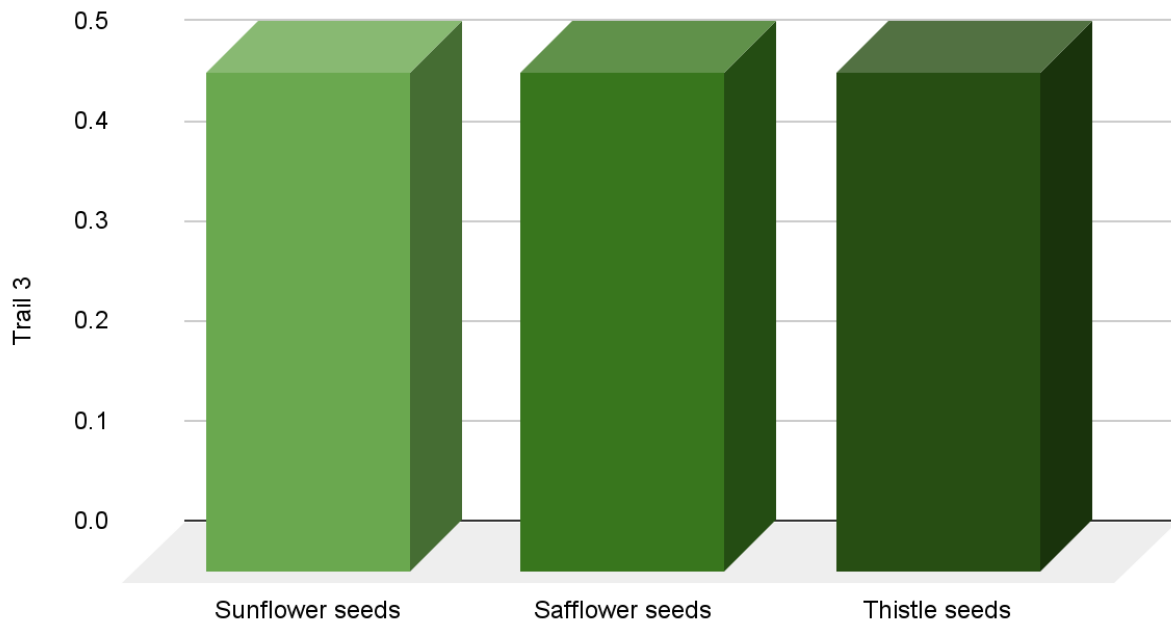
Some of my observations were that since it was really cold outside and it was gonna start raining my assumption was that the birds would have stayed at their nests or migrated.Some birds are leaving and some birds are coming to Tucson Arizona so they are not really noticing the bird feeders.

My expectation was that

My expectation was that since it was the third and last trail the birds would have a stronger recognition of the seeds and the feeders.

Sunflower seeds	Safflower seeds	Thistle seeds
0.5 in	0.5 in	0.5 in

Trail 3



Trail 4

Date 12/20–12/27

Time: 5:00

Beginning: 5:20pm

End: 5:20pm

Variables

- Independent – The different seeds in the bird feeder
 - Dependent – The amount of bird seed that is most eaten
 - Controls – The type of bird feeder, the weather conditions, how high the bird feeder is, and where the bird feeder is, the 579 rule, a feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

Results of Trail 4 experiment were:

The Safflower seeds were all gone. There were only the safflower seeds shells all over the place and there was a glob of poop in the feeder so it came out as 0 inches. The thistle seeds had a tiny spot of poop in it and its height was a total of 0.25. For the sunflower seeds there were shells covering the top of the feeder but the bottom still had sunflower seeds not including the shells. It was 0.25 inches. So the favorite seeds in this trail was the safflower seeds

Observations/thoughts from my experiment:

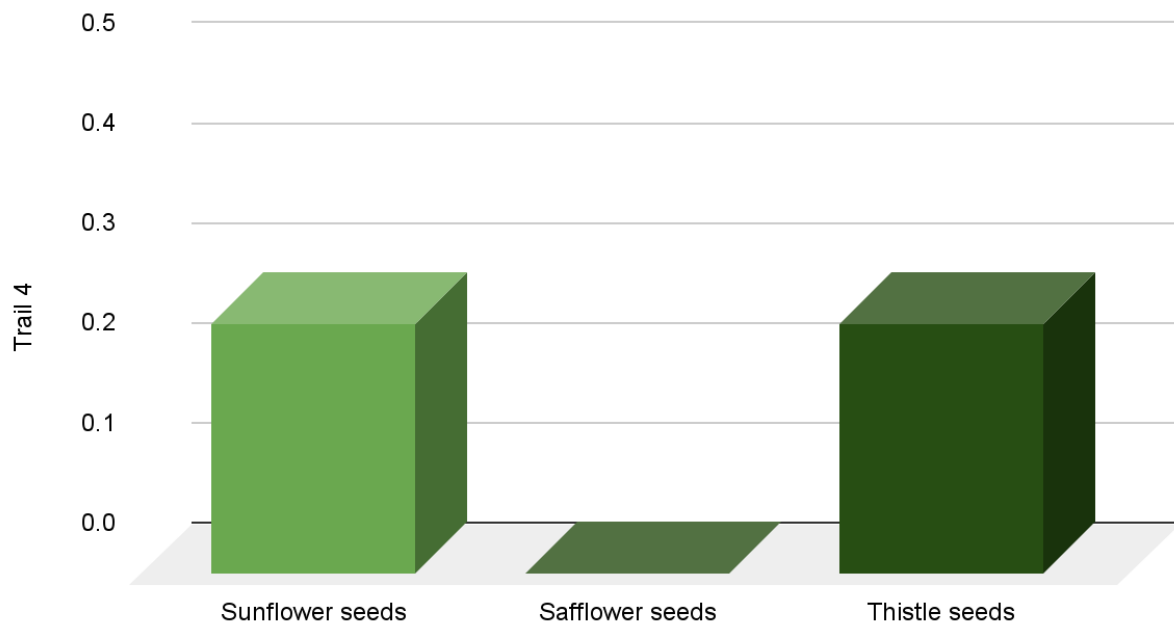
My thoughts on this experiment was that it went very well because birds were always coming to the feeder no matter if it even rained. The birds mostly came to the safflower seeds. I think they might have come to this one because they had a bush nearby so if they saw someone as a threat they could just hide in the bush.

My Expectation was that...

My expectation was that since it was out for a longer time the birds finally realized that there was food out for them.

Sunflower seeds	Safflower seeds	Thistle seeds
0.25	0	0.25

Trail 4



Trail 5

Date 12/28-1/3

Time: 5:00

Beginning: 5:20pm

End: 5:20

Variables

- Independent–The different seeds in the bird feeder
 - Dependent – The amount of bird seed that is most eaten
 - Controls – The type of bird feeder,the weather conditions,how high the bird feeder is,and where the bird feeder is, the 579 rule, a feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

Results of Trial 5 experiment were: The results of trial five were the sunflower seeds were all gone by about a quarter of the seeds on the floor.Due to the rain and wind during this experiment some of the seeds fell. The safflower seeds were all gone with about 0.125 inches on the floor. The safflowers seeds also had some poop from the birds in the feeder. The thistle seeds had about 0.125 inches left in the feeder with some poop and some fell on the floor.

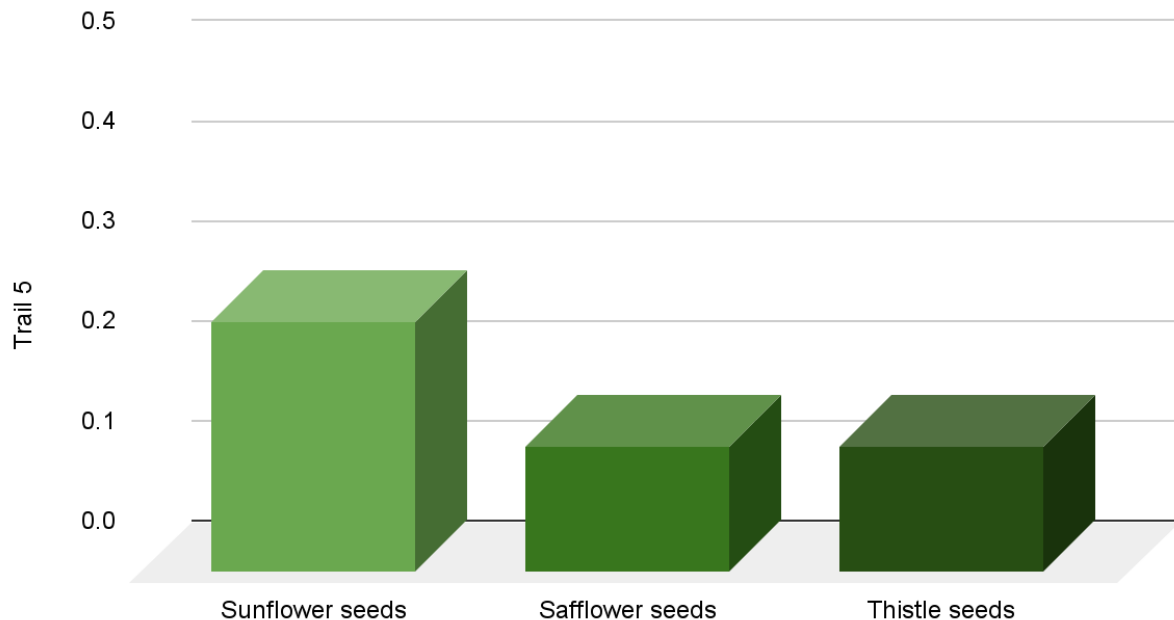
Observations/thoughts from my experiment: My observations on this experiment were the Pine siskin, House finch, and the Mourning dove were the only ones that I saw come to all three feeders.

My Expectation was that...

My expectation was pretty similar to what happened, I thought that since in the first trail a lot of birds came and the feeder was practically empty, I thought more birds would come again and there would be different species then just the three that have been coming.

Sunflower seeds	Safflower seeds	Thistle seeds
0.25	0.125	0.125

Trail 5



Trail 6

Date 1/4-1/10

Time: 5:00

Begininning:5:20pm

End:5:20pm

Variables

- Independent–The different seeds in the bird feeder
 - Dependent – The amount of bird seed that is most eaten
 - Controls – The type of bird feeder,the weather conditions,how high the bird feeder is,and where the bird feeder is, the 579 rule, a feeder should be at least 5 feet off the ground, 7 feet away from any structures like fences or trees, and 9 feet below any overhanging branches.

Results of Trail 6 experiment were:

The results of this experiment was that all of the bird seeds had none left in them. However there were a lot of seeds on the floor due to the rain and wind that caused the seeds to fall. So I would say that about 0.125 inches had fallen on the ground. Nevertheless this trial was very successful having the most birds come to this trial. So the amount of seeds left in all three feeders would be about 0.125 inches.

Observations/thoughts from my experiment:

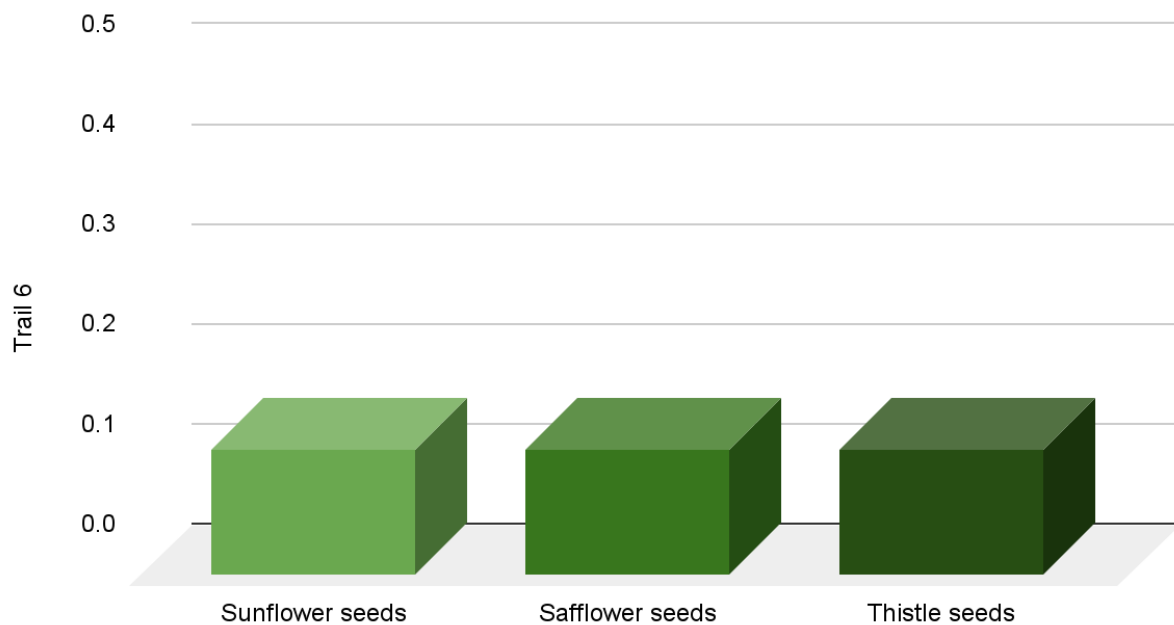
Throughout this trial I've noted that even though there was some rain, birds still came after the rain. I also saw that a lot of seeds fell out of the feeders and it would be better if the bird feeders had a more stable branch that it could hang on.

My Expectation was that...

My expectation was that the birds would like the sunflower seeds the most but the bird still ate the sunflower. They just favored the safflower and thistle seeds.

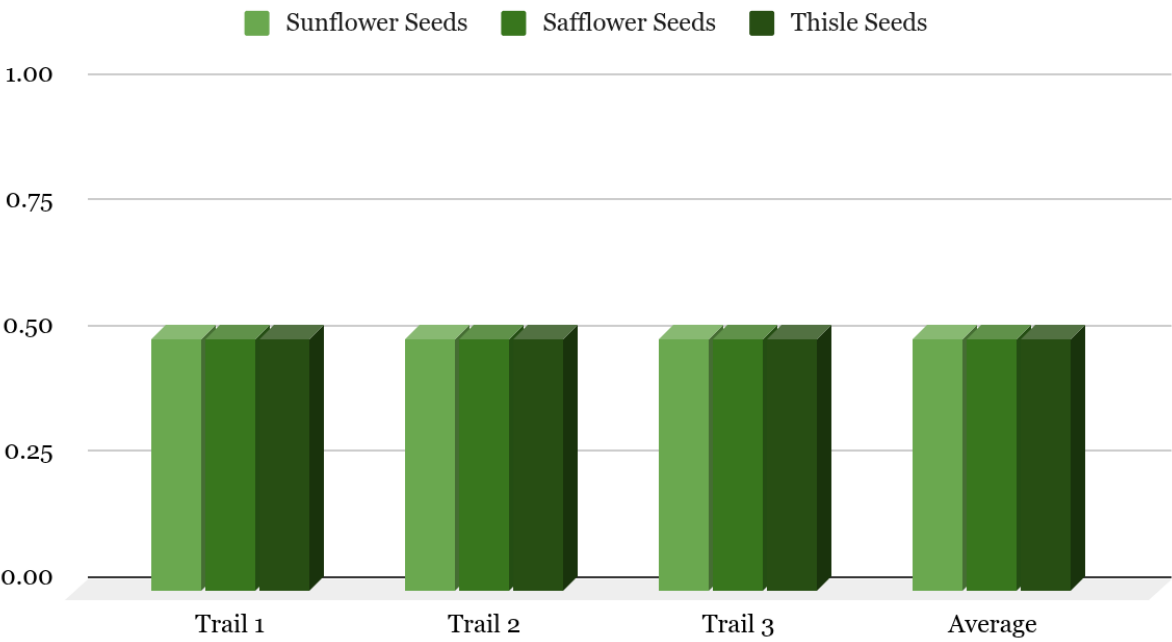
Sunflower seeds	Safflower seeds	Thistle seeds
0.125	0.125	0.125

Trail 6

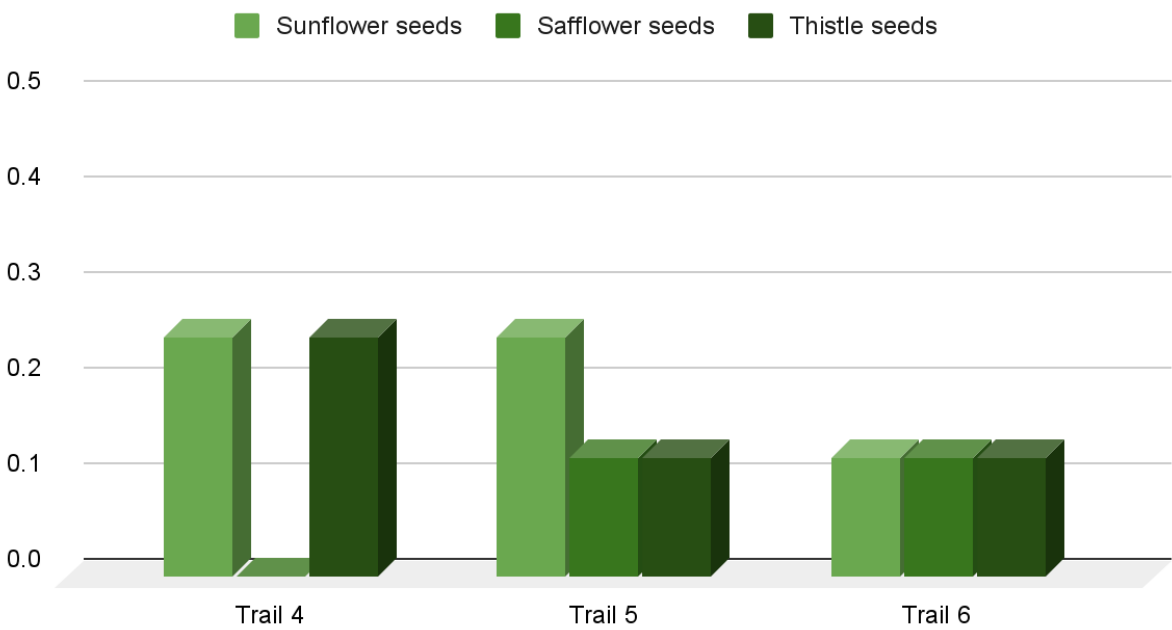


Data Chart and Graphs

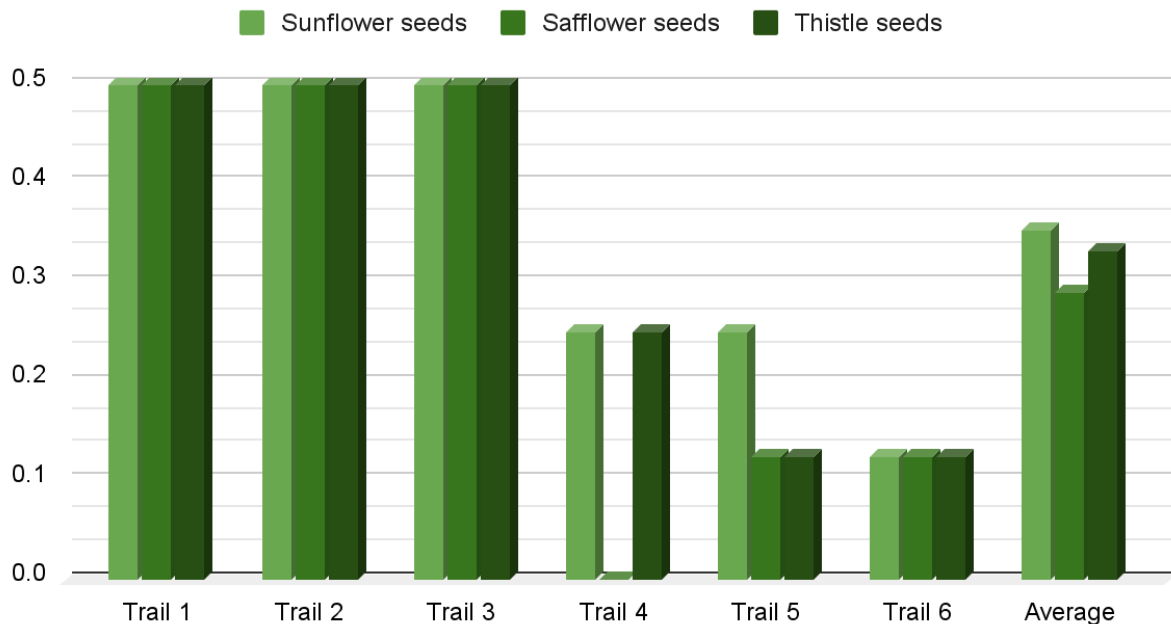
Bird Seed Preferences Trails 1-3



Bird Seed Preferences Trails 4-6



Three Different Bird Seeds



(Inches)	Trail 1	Trail 2	Trail 3	Trail 4	Trail 5	Trail 6	Average
Sunflower seeds	0.5	0.5	0.5	0.25	0.25	0.125	0.3541666667
Safflower seeds	0.5	0.5	0.5	0	0.125	0.125	0.2916666667
Thistle seeds	0.5	0.5	0.5	0.25	0.125	0.125	0.3333333333

Closing:

In closing, this experiment went very well, with 5 different species of birds coming to my bird feeders including the Pine Siskin, House Finch, Mourning Dove, American Woodpecker, and the Lesser

Goldfinch. In my first three trials no birds came but when I did three more trials about 4 weeks later I got 5 species of birds. During the fourth trial I got the Pine siskin, House finch, and Mourning dove going to all three of the bird seeds and the favorite seed this trial was the safflower seeds with all the seeds gone. In the fifth trial I got the same three coming to the bird feeder with the favorite of this trial being the safflower and thistle seeds. In the sixth I got a Lesser Goldfinch and the Arizona woodpecker plus the first three birds with the most eaten being the . Overall the most favorite bird seed of the whole experiment was the Safflower seeds. My hypothesis was: If I test what bird seed birds like to eat the most, then I think the birds will like the black oil sunflower seeds the most because according to my research the sunflower seed is most favored of all the birds including the Cardinal, House Finches, and the Grosbeaks. This hypothesis was invalid because I said that the birds would like the black oil sunflower seeds the most but the birds ate the safflower seeds the most.

From this project I learned that birds here in Tucson, Arizona like the safflower and thistle seeds the most and like the platform feeder because they have more space and allow them to lay and rest in them as the Mourning dove did. I also learned that you have to be patient and wait for the birds to come because of the calm environment they like. The questions I have for this experiment are: Why didn't the birds like the sunflower seeds? Why did no birds come the first three trials but they came the last three? Why did birds prefer the safflower seeds over the rest? Changes I would make to this experiment if I were to do it again are the time and day of when I put the bird feeder out and I would make the time I leave the bird feeder outside longer.

Reflections:

After thinking about it, I think my experiment was successful because of how many birds came. I was very excited to see 5 different species come to my feeders throughout the trials. Although my first three trials didn't turn out as well, I still think that there might have been

some complications like how they only had 2 days outside compared to how I changed it. If I were to do this experiment again I would change the time and how long I let the bird feeders outside. I would change the time of day to the early mornings because this is when birds in Arizona are more active during the winter. I would let the bird feeders outside for a long period, like one to two weeks. Next time I test this experiment I would also try getting more information on my sources because I would want to get more research on birds migratory patterns and when birds are most active.

My experiment benefits the world because some birds need high quality nutrition to pollinate plants. The data and information I have collected will help you decide which bird seeds to use to nurture birds in Arizona. This experiment can also be beneficial to birds because it will help birds survive in harsh environments and if this experiment goes to the right birdseed manufacturer they can change their food mixes based on real data. This project can also help bird lovers because they can choose bird seeds birds will actually eat, keep them well nutritious, and reduce waste, which is all the bird seed shells that fall on the floor. The purpose of this experiment is to know which seeds birds like best. I would hope they like the black oil sunflower seed because they have more nutrients. This would help the birds so that the birds can eat them and get more energy they need to pollinate. This experiment could be helpful for other bird watchers or photographers so the seeds would attract the most birds.