

Area of Concern

Do you like chocolate? If so, thank pollinators like bees. Can you imagine a world without chocolate? It could soon be real because pollinator populations are on a decline. Pollinators like bees are important to the ecosystem because many plant and crop varieties depend on bees. Crops like apples, tomatoes, cocoa, and almonds could get wiped out and the lack of variety could affect human nutrition. Bees also help in pollinating feedstock that livestock feed on, such as hay, clover, alfalfa, and corn. Less feedstock could drive up the price of grocery and produce. Less bees, also means less honey production, which could result in job reduction for farmers and beekeepers and they might not have enough money for the things they need.

Because these problems are global, they also affect our community, such as our school and the neighborhoods around. If we can solve this problem at our community level, others can learn from our example and create a bigger impact on the city and area in general.

In conclusion, bees are very important to our community and environment. If bees go extinct, we will have to face the impact on the community and take action for those effects. Most people are either scared of bees or don't want to take care of them, but if bees were extinct, the food that we rely on for survival would be gone.

Challenges

Once we began doing research about pollinators it became clear that the issue was more complicated than expected for the reasons that follow:

1. Since modern farming practices use pesticides that are neurotoxins for pollinators to eliminate insects that threaten their crops, this could result in a lower population of pollinators. Since $\frac{1}{3}$ of our food comes from pollinated crops this could lead to global food shortages.
2. Because diseases carried by mosquitoes like West Nile Virus and Zika have become an increasing problem for many people, many homeowners spray their yards with pesticides which can lead to pollinator decline.
3. Because diseases carried by mosquitoes like Malaria and Dengue can lead to death, many governments have overused pesticides that are neurotoxins to pollinations, leading to a decline in pollinator populations in their country.

4. Because yard design trends have been changing to greener and shorter grasses, there are less wild plants like clover and dandelions for pollinators so they can't pollinate properly. For this reason pollination rates have decreased resulting in less variety of plants in our ecosystem.
5. Since people prefer flowers with big blooms, there has been a decrease in the number and variety of wild flowers being planted, leading to lower pollination rates.
6. Because of negative media attention regarding some dangerous bee species, many people have developed a negative feeling toward bees in general leading to execution of many bees.
7. Because of misinformed information in movies and on YouTube videos about bee stings, people have complained to their cities or towns about beekeepers living next to them. As a result some cities or towns restrict beekeeping.
8. Since global media practices drive up numbers with click bait, stories of people dying of insect stings are seen by many people. For this reason, people have a negative perception of insects and do not take actions to protect them.
9. Because public schools have reduced funding, hornet and bees nests are often not taken down from the school property quickly. The teachers have to warn the kids to stay away from the nests which creates anxiety in kids, leading to negative feelings for bees and hornets.
10. Because the world's population continues to grow, many pollinator habitats are being destroyed leading to unsustainable competition for resources for pollinators.
11. Because acid rain decreases flower numbers, there are fewer flowers for pollinators to spread pollen too. Fewer flowers to spread pollen means less wild pollination for fruits that bears and deer feed off of.
12. Due to reduced pollinator populations, some countries have started importing pollinators to help pollinate their crops. Because the native pollinators have to compete for resources with often stronger imported pollinators, there could be negative impacts to the native pollinators.
13. Because countries have imported non-native bee species who bring different diseases, native bee populations have become sicker, leading to bees who don't pollinate wild plants efficiently.

14. Because the kind of bees farmers import are designed to be really good at pollinating one crop, they use a lot of resources for a small benefit, resulting in native bees having fewer resources to survive.

Underlying Problem:

Because $\frac{1}{3}$ of all our food supply is directly related/produced by pollinators, how might we decrease the misinformation in our Selwyn school community so that we have a positive impact on pollinator populations.

Solutions:

After further research we came up with a list of potential solutions, such as:

- Develop a flyer that goes to the principal of every school in the district with instructions for planting a pollinator garden.
- Ask neighbors in our community to use all their open lots to plant wildflowers.
- Develop a Positive Pollinators campaign and then tell 3 people about positive pollinators and spread the word about what we have learned
- Plant a native plant pollinator garden at our school because if kids see pollinators every day they may change the way they think about pollinators.
- Create a competition for each class to plant a part of the garden. Class with the most pollinator-friendly flowers and plants planted in their garden receives a reward, pizza party, movie day, etc.
- Expert comes to each grade one day during lunch to teach and do Q and A or presentation about the importance of pollinators and correcting some misinformation.
- Create a protest where we camp out on lots where they are building new developments and warn people about pollinator habitat loss
- Pollinator packets with seeds, instructions, QR codes to online resources, etc. found in rotunda for our school families to pick up.
- Distribute pollinator packets throughout the whole county.
- Talk on WSEL, our school announcements about things learned, about things families can do about pollinator decline, etc.

Determination of Action Plan:

To determine our action plan, we put our solution ideas through the Realistic Modification. The Realistic Modification is a system for deciding whether our team has the influence, money and time to implement a solution effectively. We started by taking our solution idea and asking if we have the influence to impact it. We asked ourselves if we need to change laws, do we have access

to decision makers and can we make big changes in the way people think? For example, we thought about asking each principal to have their school plant a pollinator garden but we realized that some principals might be scared to do that if they have kids with bee allergies in their school. Also, the school district might need to give us approval. Next we decided if we had the money to implement the solutions. Some solutions are very expensive so you get the point. To distribute pollinator packets to every school or across the county would cost too much money. Lastly, we asked if we have the timeline to implement the solution. For example, if each class planted part of our pollinator garden, it might take months for them to get around to it. If we decided to protest developments in our community our whole family would have to do that every weekend and we would miss all our sports games and other competitions. Also, we thought about how the Realistic Modification wants you to do the most effective solution. If some classes planted things that weren't pollinator friendly we would waste garden space, money and time.

Action Plan:

After we put all our solutions through our Realistic Modification, the ones that required the least influence, were low cost and could be implemented in the timeline were: 1) Going on WSEL to educate our school about pollinator decline. 2) Plant a native plant pollinator garden at our school to use as a teaching tool and visual reminder of pollinator decline. 3) Create a Pollinators are Positive campaign in our neighborhoods with the goal of letting the neighbors know about why pollinator decline is bad for everyone.

Our expectation is to go on WSEL, our school morning announcement broadcast and tell the whole school our plan to plant wildflowers around the school so pollinators can have more flowers that they prefer instead of the ones they dislike. In order to achieve our goal we will ask permission to speak on WSEL from the teacher sponsor. We plan to get three slots on WSEL. During our three slots we will talk about what flowers people should plant to help pollinators, bust common myths with humor by telling bee jokes, and educate Selwyn students on the risks of losing pollinators. Our timeline for the first slot on WSEL is Jan, the second in Feb and the third is March.

Next we will plant our pollinator garden. Because the timing of planting and weather determines when we can do this we will first do research. We will contact the local beekeepers association and ask them to come explain what native plants we should consider and where to buy them. One of our parents will make the first contact with the beekeeper but then we will tell them our meeting schedule and how to get in touch with us. We will also see if they can feature us in any newsletters they have.

Last, we will take our Pollinators are Positive campaign to the streets! We will develop a flyer with tips on keeping your yard pollinator friendly like resisting mowing until late May

when the pollinators have had a chance to do most of their pollination or letting your yard look more natural. We will also give people effective alternatives to DEET that we learned about from Professor Anand Ray at the University of California Riverside, who is an expert on insect olfaction. We will include a pollinator packet with the flyer that includes seeds of the same flowers we planted in our school garden. We will each be required to distribute the flyers around our neighborhood and personally talk to 3 neighbors by mid-March. This way neighbors can have the pollinator packets ready for warmer weather and planting time.