



# STEAM

TERRA Environmental Research Institute

*Environmental Science*

Ms. Abreu



# Science

## Environmental CTE Curriculum Framework

02.06 - Identify conservation practices related to natural resources.

## Science Standards

SC.9.L.17.In.2

- Identify that living things in an ecosystem are affected by changes in the environment, such as changes to the food supply, climate change, or the introduction of predators.

SC.9.L.17.In.8

- Describe ways the lifestyles of individuals and groups can help or hurt the environment.

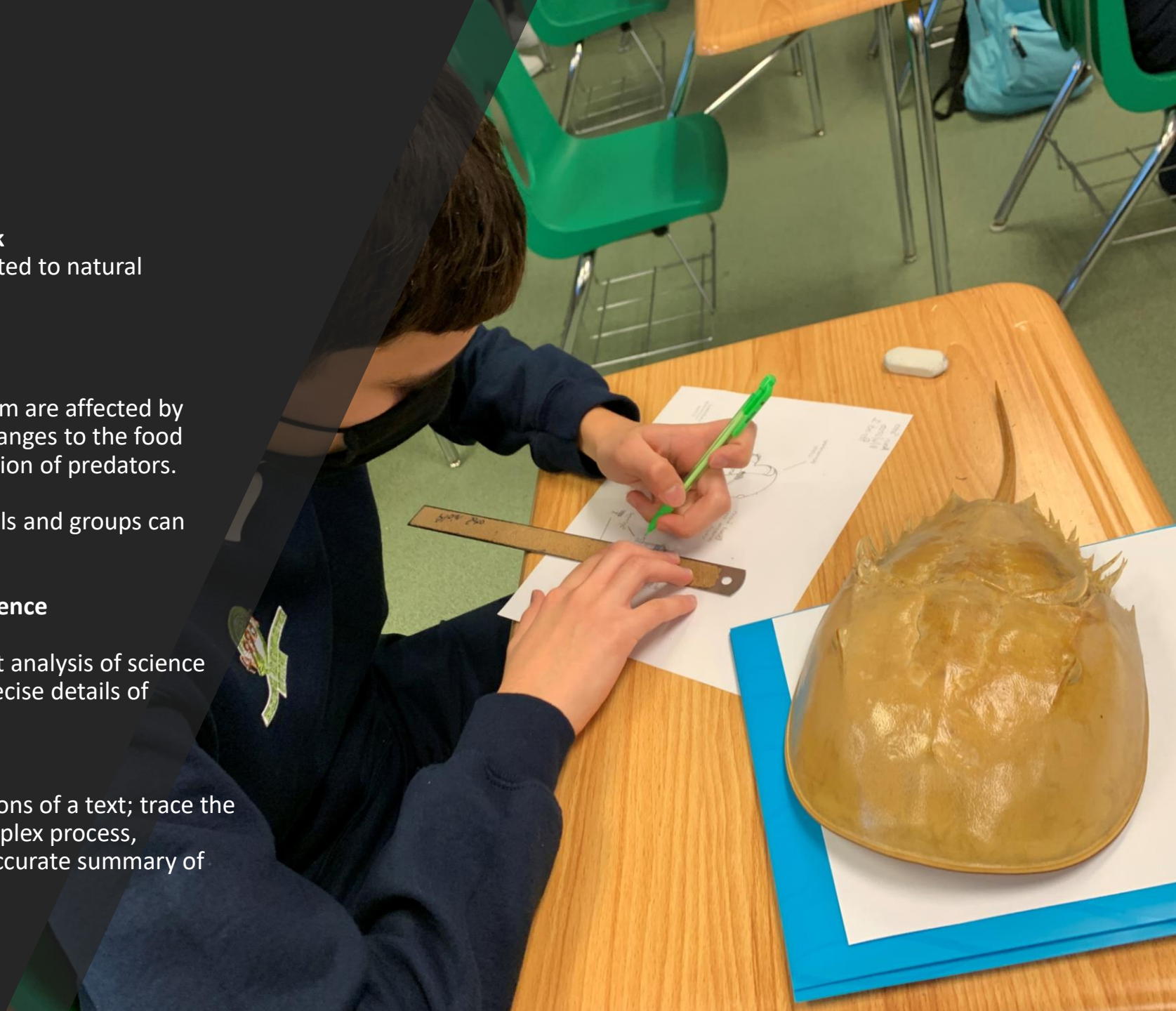
## Language Arts Standards that Apply to Science

LAFS.910.RST.1.1

- Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LAFS.910.RST.1.2

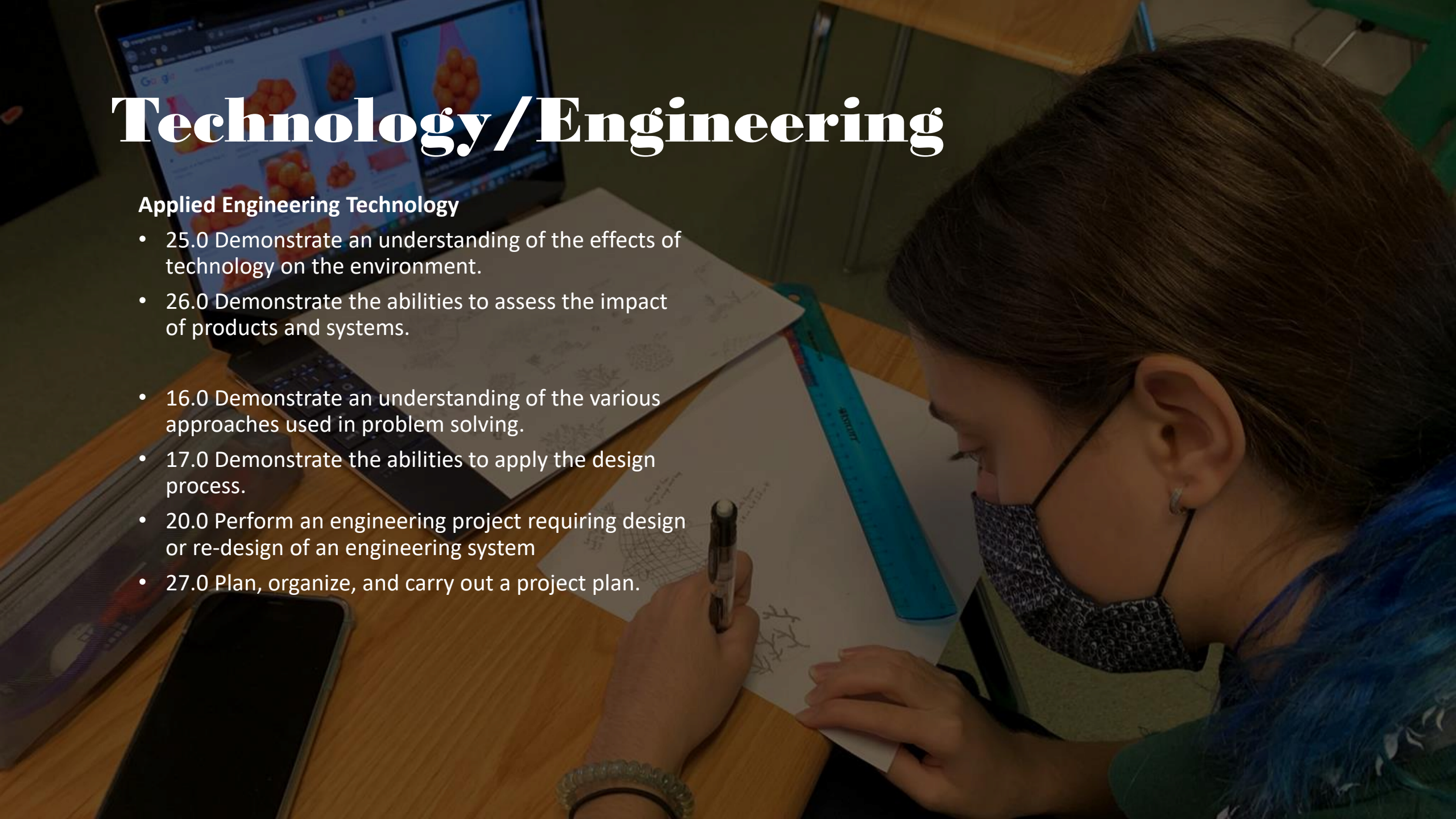
- Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.



# Technology/Engineering

## Applied Engineering Technology

- 25.0 Demonstrate an understanding of the effects of technology on the environment.
- 26.0 Demonstrate the abilities to assess the impact of products and systems.
- 16.0 Demonstrate an understanding of the various approaches used in problem solving.
- 17.0 Demonstrate the abilities to apply the design process.
- 20.0 Perform an engineering project requiring design or re-design of an engineering system
- 27.0 Plan, organize, and carry out a project plan.



# Art

VA.9.C.1.2

- Use critical-thinking skills for various contexts to develop, refine, and reflect on an artistic theme.

VA.9.F.1.2

- Manipulate or synthesize established techniques as a foundation for individual style initiatives in two-, three-, and/or four dimensional applications.



# Mathematics

MAFS.K12.MP.1.1

- Make sense of problems and persevere in solving them.

MAFS.K12.MP.5.1

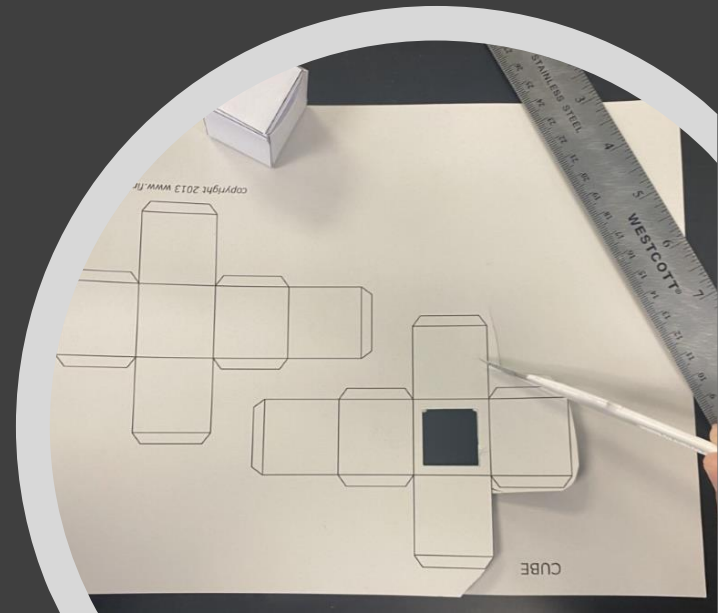
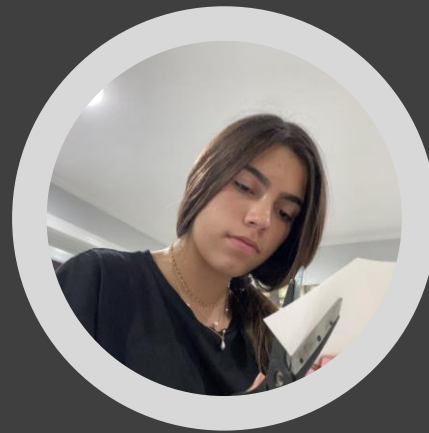
- Use appropriate tools strategically.

MAFS.K12.MP.6.1

- Attend to precision.

MAFS.K12.MP.7.1

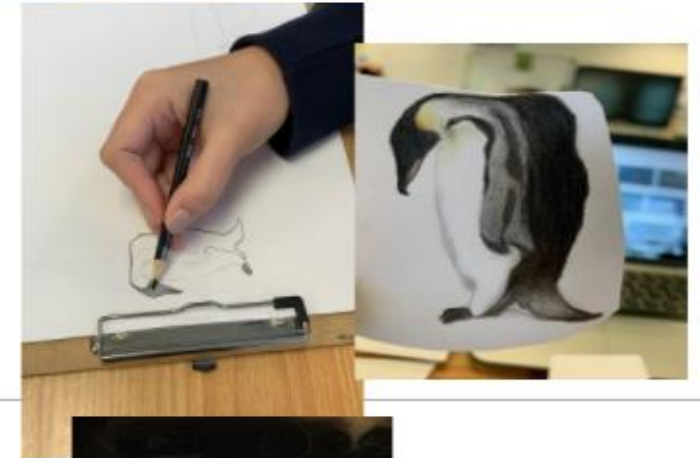
- Look for and make use of structure.



# The Process

(one student's example)

1. Scientific Research
2. Rough and Final Draft illustration of what the topic will look like
3. Documentation of steps in the creation of the topic.
4. Final Photograph of Creation



# 1. Scientific Research

## The Amazon Deforestation and The Iquitos Gnatcatcher

The Amazon Rainforest is a diverse rainforest with several species of plants and animals inhabiting it. There is massive deforestation going on in the Amazon rain forest. Due to logging, agricultural farming, urbanization, and the building of roads the amazon rainforest is being deforested and is losing much of its biodiversity. 17%-20% of the Amazon rainforest has been lost and that's only due to deforestation. This is a problem because approximately 137 species of animals, plants, and insects are lost every day. Every animal in a food chain is important and if one is taken away a disruption in the food chain and ecosystem occurs. One species that is being negatively impacted by the deforestation is the Iquitos Gnatcatcher. It is a little grey and white native bird to the amazon rainforest, and it has become critically endangered mainly due to deforestation. There are predicted to be less than 50 pairs left and they are considered critically endangered by the IUCN (International Union for the Conservation of Nature) -World Conservation Union criteria. They are endangered because of the limited amount of habitat space that has been created by the deforestation leading to the decline of their population. They have approximately only 8 square feet of space.

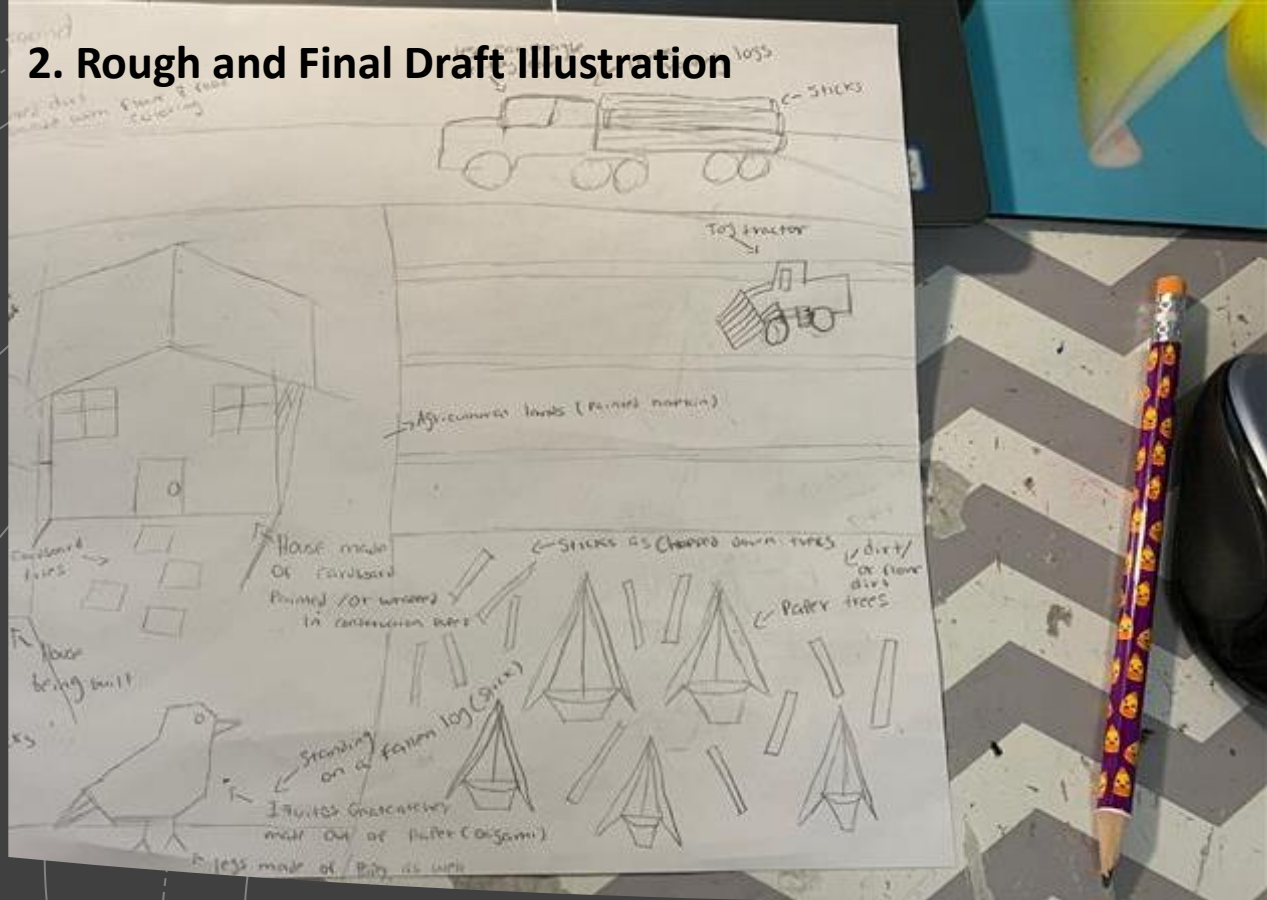
This all started back around the 1920's due to population growth. When the population of the world grew by 1 billion the amazon rainforest became targeted. It became targeted due to its resources of timber and ability to be used for agricultural means like farming crops and raising cattle. All the reasons that lead to the deforestation in the amazon rainforest become interconnected in a way. The cutting down of the logs account for about 3% of the deforestation in the Amazon. One dilemma with the logging is that less valuable trees are being chopped down to create more availability to find the more valuable trees (mahogany and timber) to sell to other companies in different countries. The less valuable trees are used for fuelwood, pulp or charcoal. So many trees have to be chopped down for this type of logging and it is done in a manner called clear felling where they chop down vast forests all at once. Another problem is the use of land for agricultural means. Much of the land for agricultural use is constantly being expanded because it can only sustain crops for a certain period of time (which leads to more and more deforestation). Due to the log driving and the need for more access to receive more resources from the rainforest, roads are being created (clearing even more land) to give more access to take more resources out of the forest and in addition, these roads also attract people to settle nearby and this leads to urbanization and need for more resources to provide for the growing population. All this deforestation is affecting many animals such as the Iquitos Gnatcatcher. The more deforestation goes on the more habitat is being taken away from the Iquitos Gnatcatcher and they cannot survive. The two main forms of deforestation affecting this little bird are the ones mentioned earlier: agricultural farming and the cutting down of logs for the purpose of using or selling them. However, there are ways people can help save the Iquitos Gnatcatcher and the amazon rainforest.

There are many solutions to help avoid/minimize the deforestation in the Amazon Rainforest. One includes Donating to non-profit organizations that are trying to help the amazon. Two examples of non-profit organizations are The Amazon Conservation Association that has planted 275,000 trees to or the Rainforest Action Network that is fighting to preserve the forest. Another way to help is by not buying furniture or paper products from the amazon. Also, People can sign petitions or make sure the food they are purchasing is from farmers who are using sustainable agricultural methods. An example of a petition is the "Save the amazon Greenpeace Petition" that is telling the government of brazil to save the amazon rainforest and protect indigenous people's lands. Countries can make International agreements can so that they don't receive wood that is unsustainably practiced. Also, Companies working in the Amazon rainforest can use selective logging so that only the logs that are needed are chopped down instead of clear-felling to help save the excessive chopping down of trees for no reason. Last but not least, satellite technology can be used to monitor and make sure no illegal procedures are being done in the rainforest, and so much more can be done to save the amazon rainforest and its unique biodiversity. Coming together and working together to make a difference can prevent further deforestation and loss of biodiversity in the amazon rainforest. By saving the Amazon rainforest we are not only saving the forest but those animals and plants who inhabit it. The Iquitos Gnatcatcher needs help just like many other animals in the rainforest and there are things people can do to help. It just takes one step to make a difference. So, sign that petition or support that organization.

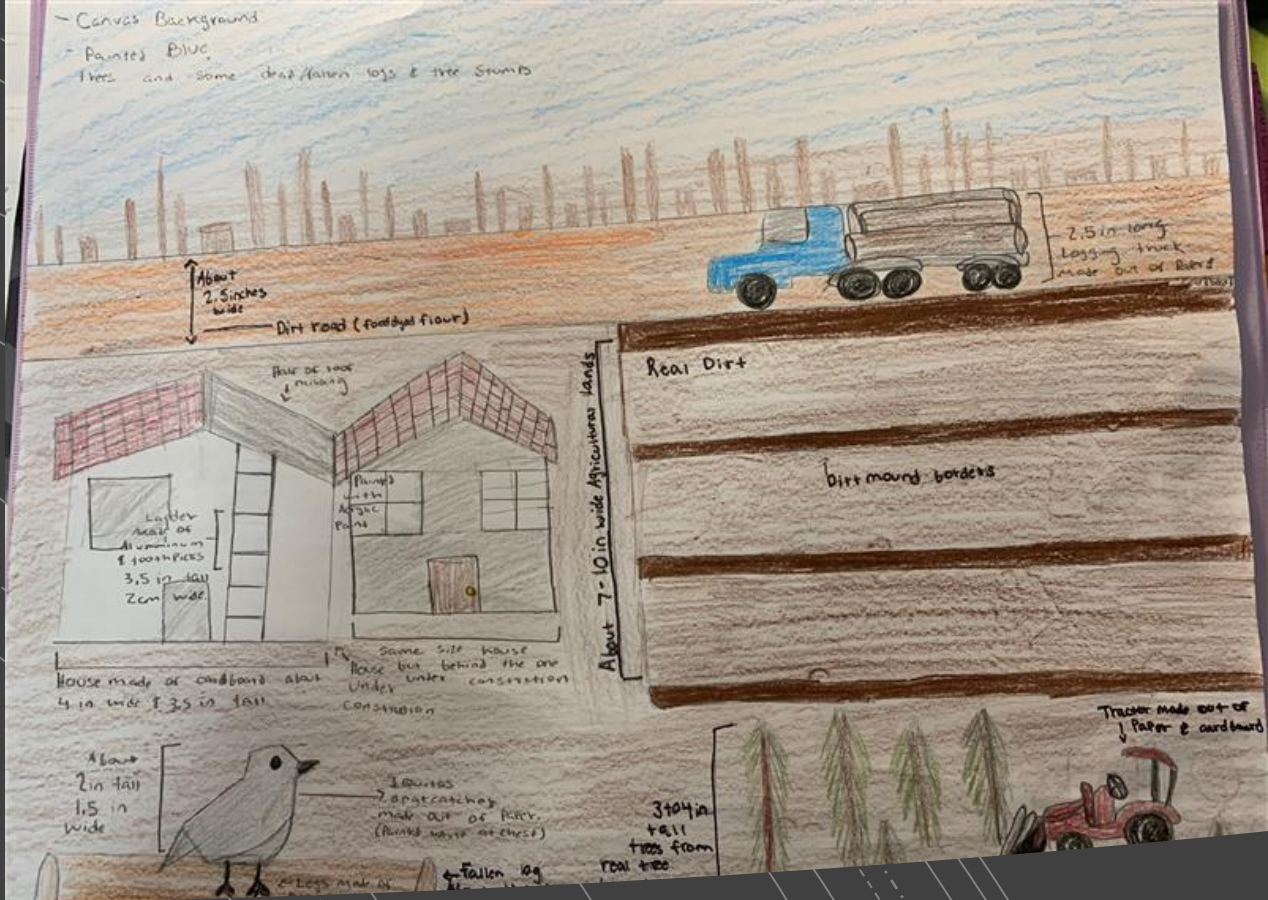
Sources Used:

1. <https://www.internetgeography.net/what-arethecauseofdeforestationintheamazon/#:~:text=Ranching%20is%20the%20leading%20cause%20of%20deforestation%20in,period%20because%20the%20quality%20of%20pasture%20quickly%20declines.>
2. <https://www.plantyourfuture.org.uk/6-species-threatened-by-deforestation-in-theamazonrainforest/>
3. <http://www.earthtimes.org/conservation/saving-iquitos-gnatcatcher/150/>
4. <https://www.internetgeography.net/topics/what-are-the-effects-of-deforestation-in-the-amazon/>
5. <https://www.internetgeography.net/topics/sustainable-development-in-the-tropical-rainforest/>
6. <http://www.greenify-me.com/2019/08/10-deforestationssavetheamazon.html#:~:text=10%20Deforestation%20Solutions%20to%20Save%20The%20Amazon%201,Save%20the%20Amazon%20Greenpeace%20petition.%20More%20items...%20>
7. <https://www.worldatlas.com/articles/how-much-of-the-amazon-rainforest-is-left.html#:~:text=The%20Amazon%20Rainforest%20is%20often%20considered%2022The%20Lungs,is%20done%20to%20provide%20land%20for%20cattle%20ranching.>
8. <https://www.arcgis.com/apps/MapJournal/index.html?appid=a8f327aff3414bcd4e4ab4694f909722>
9. <https://www.globalcitizen.org/en/content/organizations-donate-amazon-rainforest/#:~:text=Amazon%20Conservation%20Association%20has%20trained%20hundreds%20of%20conservationists,%E2%80%94%20and%20Offers%20a%20Way%20to%20Help%204.>

## 2. Rough and Final Draft Illustration



Before



After



### 3. Documentation of steps

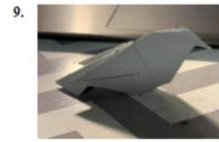


7. Final Product of both my tractor and Logging truck. Following the same steps for the truck I made the tractor.

#### Making the (bird) Iquitos Gnatcatcher



8. I watched a video on how to make an origami bird and this is a few steps into the process



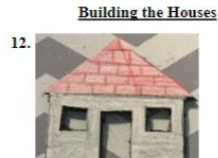
9. Final product of the origami bird



10. I got a stick from my back yard to use as the base for the bird to make it seem as if it were on a fallen log or tree branch. Using a black pen I added one eye to each side of the bird and I hot glued the origami bird to the stick



11. The building of the houses is similar to that of the vehicles. I traced the house and cut it out on paper and foam (this house is the one that supposed to look like its under construction)



12. I colored my outline and mounted it onto the foam piece I cut out

#### Building the Houses



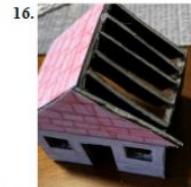
13. I measured and cut-out sides for the house and half the roof ( there is only half a roof since the house is meant to look under construction). I also cut out a small piece of paper the same size as the roof to color it and mount it on top to make it look like brick roof.



14. I repeated the same process but this time for the house that wasn't under construction



15. Using hot glue, I glued the houses together



16. To make the house look more under construction using hot glue, I glued small foam pieces to the side of the roof that is under construction

#### Making the ladder



17. To make the ladder for the house under construction I used toothpicks and a piece of aluminum foil. I rolled the toothpicks into the aluminum.



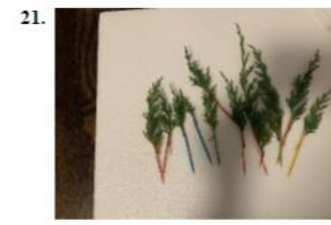
18. I used smaller pieces of aluminum to make the steps of the ladder and then I taped them on



19. I hot glued the ladder onto the house



20. To make the trees I hot glued toothpicks to the backs of the trees (the mini trees are from a tree that I plucked little pieces off of)

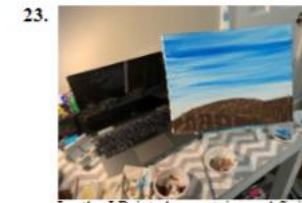


21. I made a couple of trees.

#### The Background/Painting



22. First, I painted the sky



23. Lastly, I Painted mountains and finished it with painting chopped down trees and fallen logs

#### Starting the Setup



24. For the base of the foam board which is the dirt I used ground coffee beans. I applied a layer of glue to the foam board and started to layer and spread the ground coffee on top



25. I spread the coffee grounds and piled up some of it in three sections to make it look like agricultural lands and then I started to set up the props. I put in the trees, the tractor, and the houses. However, this is not the final arrangement of the props.

#### Creating the clayish dirt road



26. For the clay colored/ orangish dirt road, in a Ziploc bag I mixed baking soda and food coloring until I got the desired color



27. Using the same method as the grounded coffee, I spread a layer of glue on the foam and then started to spread the "dirt" for the road



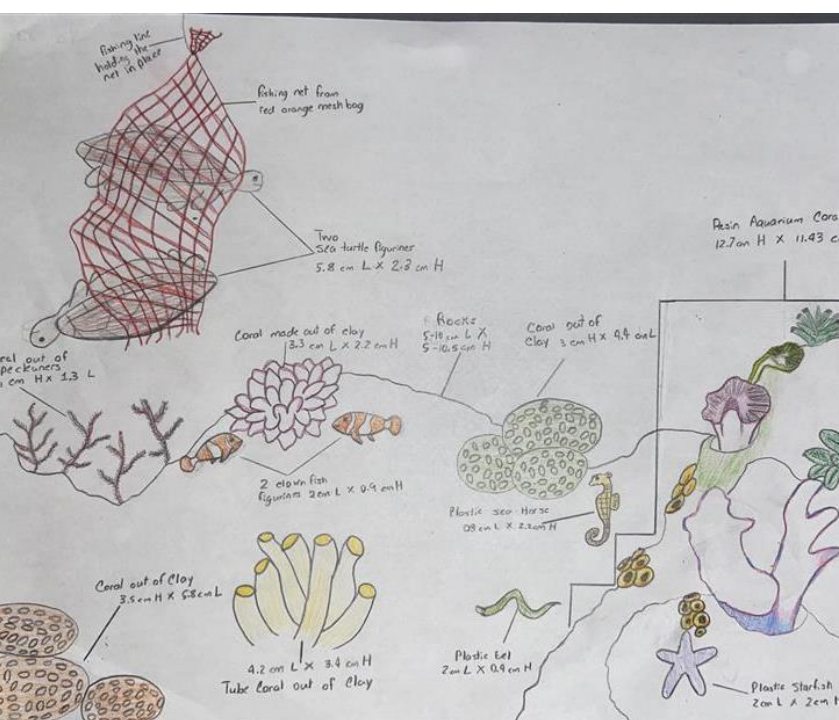
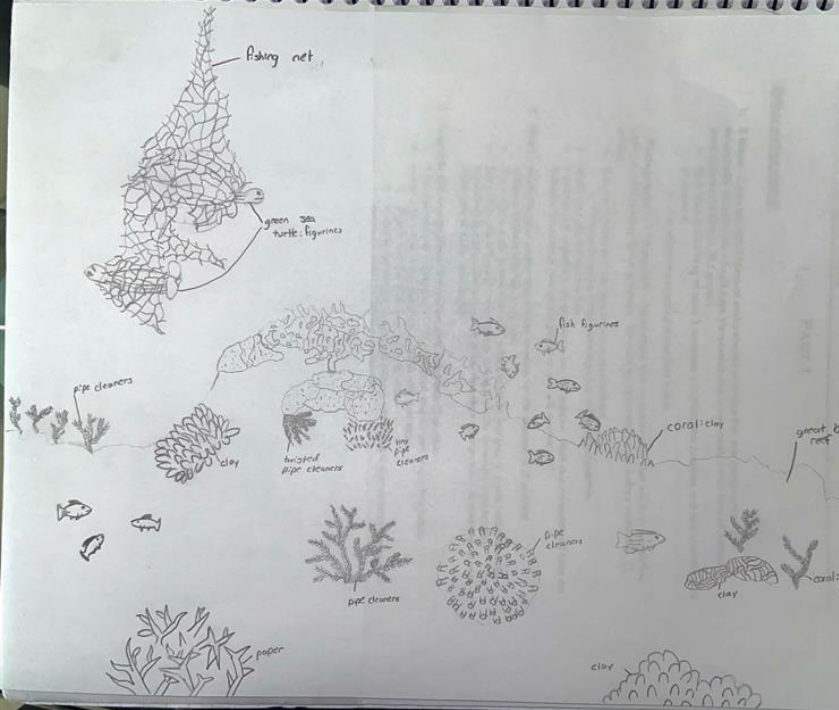
28. This is the final set up! While taking pictures I moved everything around to where I thought it looked best. So, the set-up changes in the pictures

4. Final Photograph of Creation

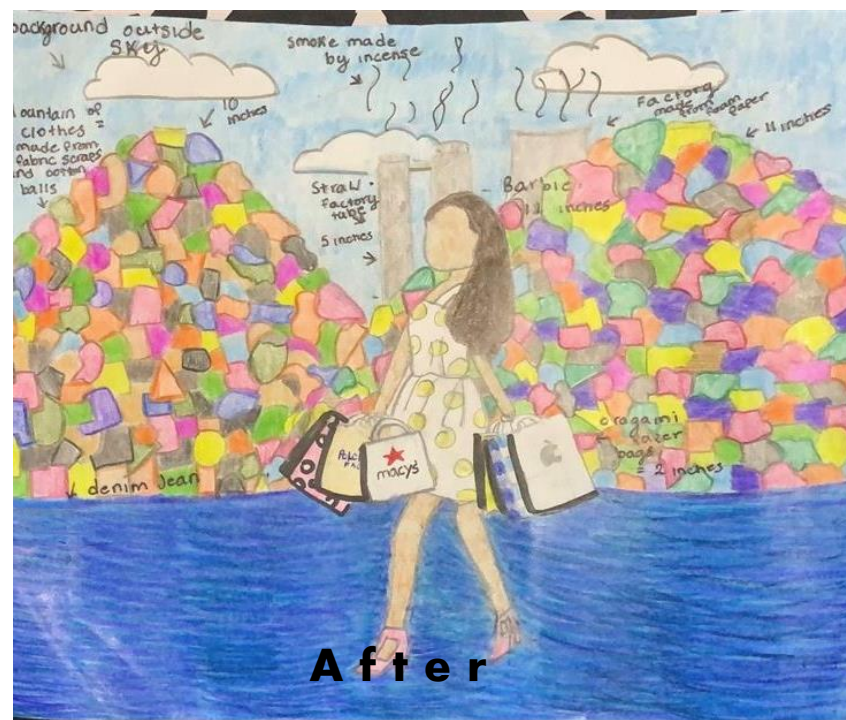


Other Final Product Examples





# Before



# After



