HOW DOES A GREENHOUSE WORK?

1st Grade – Goode

2022

MODEL: GREENHOUSE

- I love to learn about Nature, and I am always asking my parents questions about the natural world. Especially in winter when I miss being outside and exploring Nature. At first, I wanted to do my Science Project on different types of leaves, but I forgot that most trees have no leaves in the winter. After further brainstorming, my Dad and I decided to make our own greenhouse.
- I was curious to know how plants could grow in greenhouses when it was so cold outside. I asked myself, “How does a greenhouse work?”. I will make a model of a greenhouse to figure this out.

SIGNIFICANCE OF MODEL

- Constructing your own greenhouse is the best way to learn how greenhouses works. I quickly learned that the temperature inside my greenhouse was a lot hotter than the temperature outside, because the heat from the sunlight got trapped inside, something my Dad explained was called the greenhouse effect.
- I also observed that the greenhouse could get over 120° Fahrenheit after being in the sunlight for a few hours! Constructing a greenhouse model was important because I was able to think about and learn more about how the Earth works.

RESEARCH

- I asked my Dad lots of questions and we discussed even more while we were constructing the greenhouse and taking daily observations. For the questions my Dad couldn't answer we went to the library to look up books that will help me find answers. A bibliography of the books used to research my greenhouse is included in my logbook.
- I also took a field trip to the Missouri Botanical Gardens and went inside the Climatron, which was a huge greenhouse! This helped me understand more about greenhouses on a much larger scale. There were entire trees growing in the Climatron!
- Some of the important facts and terms I have learned from my research on greenhouses are listed here.

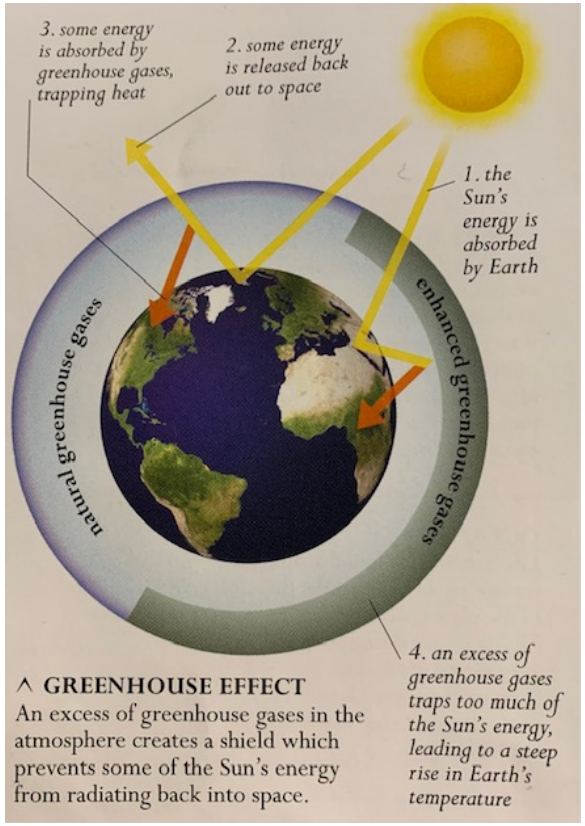
RESEARCH – GREENHOUSE FACTS

- Greenhouses come in many different size; large ones the size of the Climatron to ones as small as a plastic soda bottle.
- Greenhouses need a base to place the plant containers, sides and a cover, clear plastic or glass to let the sunlight enter, and a thermometer to observe the temperature.
- In the winter when it is cold outside, greenhouses need to be placed in certain locations where the sun shines the strongest. Where I live, it is best to place on the south side of the house!
- Greenhouses need to stay extra warm in the winter. Like a blanket on your bed, greenhouse can use insulators to help keep it extra warm inside.
- Occasionally, Greenhouses need to have fresh air inside them for the plants to grow best.
- Greenhouses help demonstrate the relationship between the Earth's atmosphere and the Sun.

RESEARCH – GREENHOUSE TERMS

- Insulator
- Sun positioning
- Sun angles
- Photosynthesis
- Humidity
- Condensation
- Thermometer
- Fahrenheit

- Greenhouse effect
- Natural greenhouse gases (good)
- Enhanced greenhouse gases (bad)
- Atmosphere
- Climate Change



^ GREENHOUSE EFFECT
An excess of greenhouse gases in the atmosphere creates a shield which prevents some of the Sun's energy from radiating back into space.

IMAGINE

- I looked through the books I got from the library to find an idea of a type of greenhouse that my Dad and I could construct.
- I wanted my greenhouse to be big enough so that I could grow plants in it. Big greenhouses need to stay outside, so it would need to be made of a strong material like wood, and would need clear glass or plastic to allow sunlight in.

too small!

too big!

This will work!

PLAN

1. Decide what type of greenhouse to construct. Use your library books!
2. Decide where to place your greenhouse outside (on the southside) and how big you want to make it.
3. Plan out the tools and safety items you will need.
4. Use a chalk outline to determine the length of wood pieces you will need to construct the greenhouse frame.
5. Go with your dad to the hardware store to get supplies. This can take multiple trips! And don't forget [illegible]eter!

Safety!

Tools!

Our greenhouse idea!

Chalk outline on the southside of house.

CREATE & CONSTRUCT

1. Measure out the wood pieces to be used for the greenhouse frame. Let your dad use the saw to cut the pieces of wood.
2. Make sure to let your younger sister help!
3. Attached the wood pieces together with screws, place the wood pieces in halk outlin
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Using a tape measure and pencil.

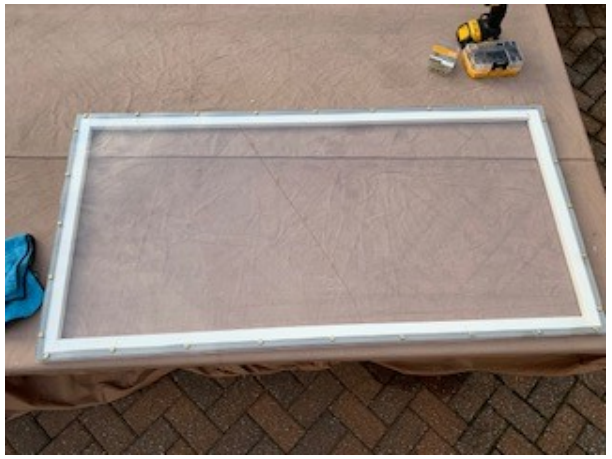
Legs 1st.

Then the lower frame.

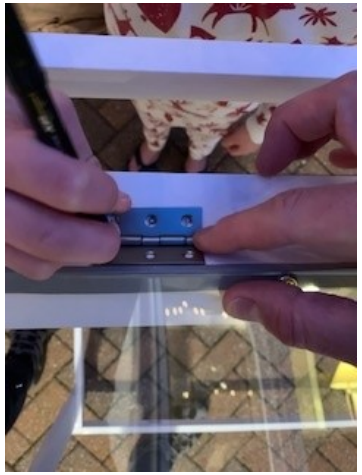
Next the upper frame.

CREATE & CONSTRUCT

4. Make the cover with a wood frame screwed together and a clear plastic material screwed to the frame. Place it on the greenhouse frame using hinges so you can open & close the cover.
5. Keep the heat in: use a squishy, gray material for where the plastic covers attach to the wood frame.



The cover is clear plastic.



Attached the cover with two hinges.

Late night! Open and close the cover to make certain it works.

CREATE & CONSTRUCT

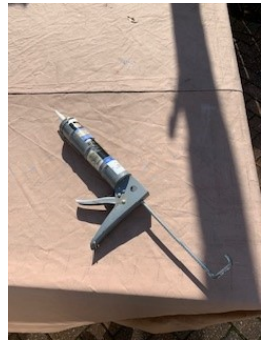
6. Measure and make the greenhouse lower and upper bases from a strong piece of wood. The lower base will be used for stability and can also be used for storage. The upper base will be used to place the plant containers on. The bases are screwed together to the frame.

The upper and lower bases fit in our chalk outline.

And they slide perfectly into the frame!

CREATE & CONSTRUCT

7. Measure and make the greenhouse sides. The back of the greenhouse will be made of the same material as the bases, and the sides will be made from the same plastic material as the cover.
8. Keep the heat in: used a squishy, gray material for where the plastic sides attach to the frame and use caulk to seal the cracks in between the frame pieces.



Caulk! Its kind of like Play-Doh

Measure and cut the sides.

And attached them to the frame.

CREATE AND CONSTRUCT

9. Most important step: Don't forget to put the thermometer inside and now you have finished construction of your greenhouse.

My finished greenhouse looks similar to the idea we started with, but I think it is better.

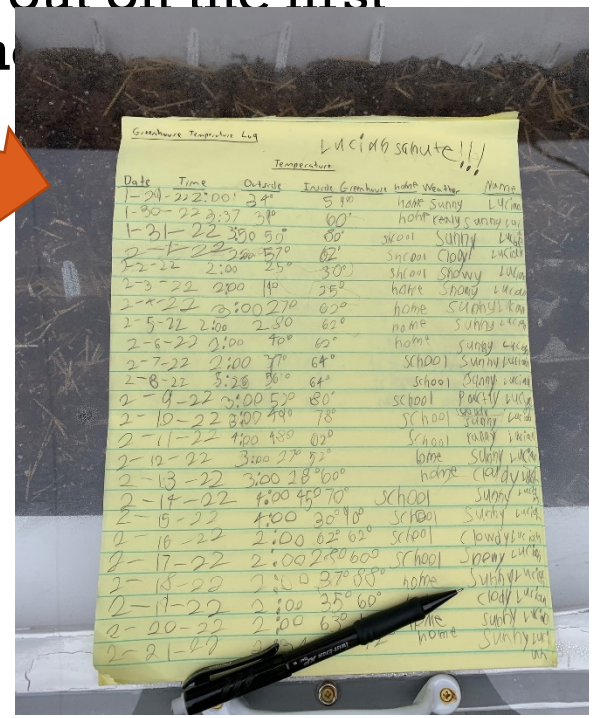
Like the model, my greenhouse has a wood frame and base, and clear plastic sides and a clear plastic top that opens and closes. But, my greenhouse is also taller so that I can easily reach into it and, most importantly, has a thermometer inside so I can determine if it is working!

My Greenhouse!

Our greenhouse idea!

TEST AND EVALUATE

- There were several ways I tested my model greenhouse to determine if it was working. Two ways I thought of myself, and one other way I discovered.
- My dad told me to watch the sun in the afternoon to determine where to place my greenhouse. I positioned my greenhouse on my back patio and faced it south so that it would get sunlight during the day.
- Test #1: When I was doing my daily observation log, I found out on the first day that my greenhouse was workin[illegible] I knew this because th[illegible] was higher inside the greenhouse than outsi[illegible]



TEST AND EVALUATE

- Test #2 (unexpected): When I was doing my daily observation log on the second day, I noticed there was a lot of water on the inside of the plastic cover and I thought it was evaporation. My dad said this was called condensation and explained it was caused by the warmer air inside the greenhouse reacting to the colder air outside the greenhouse. The water in the air inside the greenhouse, or humidity, was sticking to the plastic cover. My dad said the condensation proved the greenhouse was working!

TEST AND EVALUATE

- Test #3: The last test was if plants could grow in my greenhouse. My dad and I bought seeds, potting soil, containers and straw from the store. I also used recycled egg cartons as seed containers. I placed potting soil in each container, placed the seeds in the containers, put more potting soil to cover the seeds, and watered each container. We also put straw inside the greenhouse. My dad told me the straw would help keep the heat inside the greenhouse throughout the night. I thought this must be why barns have straw for the animals to sleep in!

Seeds, soil, containers and straw.

Planting the seeds

Lining the greenhouse with straw

Ready to put the containers in

TEST AND EVALUATE

- Success! About 30 days after I planted the seeds, I noticed the first plants peaking through the soil. I understand that plants need sunlight, soil, water and warmth in order to perform photosynthesis and start growing in the colder weather. Photosynthesis is kind of complicated, so I will need to learn more about that later!

My greenhouse works!

SAFETY GUIDELINES

- The signed safety form is on the first page of my logbook.
- My parents made sure I followed safety guidelines while researching and constructing my greenhouse.

I love greenhouses! I love small ones, big ones, whatever kinds.