I Wonder


Raccoon
Osprey
Great Blue Heron
whistling Swan
Water Boatman
Largemouth Bass
Carp
Yellow Perch
Pumpkin seed

I Wonder

The Gerbils

by Danny North and Shanna White, Hawthorne Elementary

Introduction

Hi. Our names are Danny and Shanna. We are 5th graders at Hawthorne Elementary. Our project is to see if a gerbil likes black or white environments. Our project came from Phil and Brandon from seeing them do a project to see if rats can see color. Our hypothesis is that the gerbil will like black environments more because the gerbil is albino and albino creatures are supposed to like dark more than light. Albino animals have deficient coloration.

Procedure and Results

First, we went to the art room to get some black construction paper to tape it around the bottom of the cage. Then we observed the gerbil to see if he would go to the top of the cage where the light was or to the bottom where the dark is. The gerbil stayed in the dark part of the cage for one week. The second week we changed the black construction paper to the top half of the cage. The gerbil went to the top of the cage where the black paper was. The third week we took the construction paper off the top half of the cage and then the gerbil went to the darkest spot of the cage under his bedding.

Interpreting Results

We were right. The gerbil does like the dark environment.

Acknowledgments

We would like to thank Katie, the art teacher, for getting us construction paper. Thank you a lot.

Acids, Bases and the Brother of Cement

by Lisco Bunch, Sunny Kanneganti, Leonel Moreno and Jacob Wagner, John Muir School

Introduction

At first we wanted to make a volcano that would erupt when we mixed vinegar and baking soda. But Mr. Wiesner, our teacher, wouldn't let us. The reason he wouldn't let us make a volcano was because somebody was already making a volcano. So we started testing acidity and basidity and pressure in acids and bases because it's just like using baking soda and vinegar for the volcano. We like to discover the results when an acid mixes with a base.

We thought if we mixed acids and bases we would record the result if there was a result, then test the acidity and basidity with pH paper. Our prediction was that when we mix an acid and a base that it will make some kind of chemical reaction. Our question is, "What happens when an acid mixes with a base?"

Procedure

To do our project we used lemon juice, orange juice, sugar cubes, baking soda, cherry juice, vinegar and Tums. Then we mixed a variation of acids and bases together. Before we did that, we measured the amount of acid and the base we have to mix, the pH of both ingredients separately, then we put them together and saw how high it went in the tube we used. Then we tested the pH of both ingredients together. We recorded our data on this chart. We agreed we could use any acid that pH was higher than 3 and any base pH of under 10. We also agreed to always use one acid and one base and use the same container. We mixed acids and bases together. We checked pH of acids and bases before and after mixing. We measured the amounts of acids and bases before and after mixing. Then we put all the

results on the graph. We did all this the way we did because Mr. Wiesner told us to make a chart so we made a graph and you know why we mixed acids and bases (it's in the introduction).

Results

All of our data is on the following chart.

Ingredient 1	Vinegar	Orange Juice	Lemon Juice	Cherry Juice	Apple Juice
Ingredient 2	Baking Soda	Baking Soda	Tums	Baking Soda	Baking Soda
pH of ingredient 1	5	3	3	3	3
pH of ingredient 2	8	8	8	8	8
Reaction yes/no	yes	yes	yes	yes	yes
How many ml high	Overflow	overflow	20 ml	100 ml	77 ml
pH of both ingredients	7	7	6	8	7
How much of ingredient 1	20 ml	15 ml	12 ml	27 ml	31 ml
How much of ingredient 2	20 ml	20 ml	2 Tums	10 ml	25 ml
Ingredient 1	Orange Juice	Lemon Juice	Cherry Juice	Cherry Juice	Orange Juice
Ingredient 2	Baking Soda	Baking Soda	Sugar Cube	Tums	Baking Soda
pH of ingredient 1	3	3	3	3	3
pH of ingredient 2	8	8	7	8	8
Reaction yes/no	yes	yes	no	Yes	yes
How many ml high	63 ml	60 ml	50 ml	63 ml	overflow
pH of both ingredients	8	8	4	3	3
How much of ingredient 1	19 1/2	16 ml	5 ml	15 ml	25 ml
How much of ingredient 2	24 ml	13 ml	1 ml	1	10 ml

We didn't have many things that were unexpected like the brother of cement. When we mixed cherry juice and baking soda it froze at 100 ml. It was hard and didn't come out of the bottom of the graduated cylinder, so we called it the brother of cement. We also made some gloopy stuff. The stuff that was expected was a lot of reactions, and some overflowed. We saw lots of patterns like stuff that looked like wine, the brother of cement, and the gloopy stuff over and over.

Interpretation

Our data tells us the pH of certain ingredients, the ingredients we put together, the pH of both ingredients, how high the reaction went, and how much of the ingredient we put in. The good thing is our prediction was correct. Another good thing is we had a lot of data so our question was well answered. We could have improved our data by doing more tests.

New Directions

We could do more tests and further research the brother of cement. To improve the results we would catch the overflow items and compare that with the other stuff and get an exact amount.

Acknowledgments

We thank Mr.Wiesner for helping us and letting us use the vinegar. We also thank Jacob and Jacob's mom for bringing all of the juices, Tums, and baking soda.

Rat Maze Project

by Emily Luck, Lincoln Elementary

Introduction

I chose two questions about rats. The questions were: Can hungry and not hungry rats find their way though a maze? Which goes through faster? The reason I chose this project is because I love animals. They are nice to talk to even though they can't understand you.

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Procedure

I built the rat maze with my dad with wood. First we found wood for the sides of the maze and then we cut them so they were 2 feet and 3/4 inches. So when we finished it, it would be 2 feet square. Then we cut groves every 4 inches. Then we got a piece of wood for the posts and cut it into rectangular prisms and made a grove in each side. We made skinny squares out of boards that look like the boards that would slide into the posts. I sanded the edges of everything and we found a back and put it onto the square.

I did not test which food they like best. I started by using carrots, pickles and food pellets. Then I changed to using Cheetos, popcorn and chips because they liked them better. I used them because we had them and I knew they liked them.

I don't know if hungry and not hungry rats can find their way though a maze because I never tried it before and these rats had never tried it before. The rats were not in my classroom. They were in someone else's classroom. One problem was that the classroom might have fed them before we tried the maze. After about a week I told the K-1 class not to feed the rats early in the morning.

Results

Date	Daisy/minutes	Rose/minutes
4/23	1.33 minutes	4.6 minutes
4/24	19 seconds	6.15 minutes
4/25	41 seconds	3.38 minutes
4/27	49 seconds	59 seconds
4/30	52 seconds	59 seconds
5/1	4.14 minutes	34 seconds
5/2	46 seconds	1.35 minutes
5/5	5.50 minutes	4.6 minutes

The first time I tried the experiment it took Daisy 22 minutes, 6.27 seconds to make it through the maze. The second time I tried the experiment, it took 7 minutes, 34.29 seconds. The third time it took 1.33 minutes, the fourth 19 seconds, fifth 49 seconds, sixth 52 seconds, seventh 4.14 minutes, eighth 46 seconds, and ninth 1.33 minutes. When I tried the experiment, Daisy kept going to one spot of the maze so that is why it took so long.

The first time I tried Rose it took her 4.6 minutes, second 6.15 minutes, third 3.38 minutes, fourth 59 second, fifth 59 seconds, sixth 34 seconds, seventh 1.35 minutes and the eighth time 4.6 minutes

Interpreting Results

One thing I learned was that the rat does go quicker the second time in the same maze.

New Directions

If I were to do this project again I would make the walls sturdier because the walls fell down sometimes when the rats were in it and sometimes when the rat is not.

I hope you liked my project. I sure did.

Plants and Alcohol

by Maureen Pauly-Hubbard and Meaghan Tuohy, Randall School

Introduction

Hi! Our names are Meaghan and Maureen. We go to Randall School. We are both 5th graders in Mr. Wagler 's class. Our "I Wonder" project is to see if alcohol affects Tradescantia, a plant commonly known as "Wandering Jew." And if it did affect it, to what extent would it affect it.

Procedure

We used water, vodka, plants, a grow light, the millimeter counter, and lots of our time. Mr. Wagler suggested that we also use daphnia in

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our experiment. (But, we decided not to.) We also used a high school chemistry book for research. Here's some data we collected: Methanol is poisonous when swallowed. Ethanol is not poisonous, it tastes like Methanol. Methanol is sometimes mistaken for Ethanol. Methanol attacks the nervous system, mostly the optic nerves. Methanol can cause blindness and death. Examples of alcohols that contain Ethanol are beer, wine, and liquor.

When we measured the alcohol we measured it like this. The first plant got 3 ml, the second got 6 ml, the third got 12 ml, and the last got 24 ml. They all got 24 ml of water in addition. On our second data chart we used the same method only we used two constants while the other time we only used one. We're not sure if it mattered either way.

Results

We planted our plants and they seemed to be doing fine, then they died over spring break! So, we got new clippings from the plant in our classroom. Then Mr. Wagler said we should put them under the grow lights to grow. Then they started growing. We made a chart and everyday we went up there and we wrote down the size of the plants, how many leaves they had, and what kind of condition they were in. The first chart we used to collect our data is on the next page. (See Table I.)

Then they started growing so we gave them the same amount of water and we labeled them so we could recognize each of them. But then Mr. Wagler accidentally threw out our alcohol that was in a Coke bottle. But we got more alcohol. We had to replant our plants twice, and it seems sorta silly that we were trying so hard for so long and then finally they got healthy and then we put alcohol in and made them "unhealthy" again. Does that make sense? We didn't think so. Our second data chart is on the next page. (See Table II.)

Only one of our plants had flowers and we can't figure out why the others didn't. The plants that had alcohol in them got red spots on their leaves, and got really, really dehydrated.

Difficulties

Meaghan and I had to replant new plants twice. I think I'm speaking for both of us when I say, "We did not like planting plants one bit!" When we first started out, our problems were that the plants either wouldn't grow, kept dying, not enough data from the plants, etc. One problem that we had was that the plants weren't getting enough light. So, we started using the grow light that Ms. Gundermann let us borrow and keep outside her classroom. Now Mr. Wagler has a grow light in our classroom which we use for our plants.

Conclusion

Our hypothesis was that the plants that had alcohol would be affected and they were.

We decided on that question 'cause we were interested in how alcohol affected people and we knew that we couldn't test people, so we tested plants. We didn't use big machines or "high-tech" tests, but what we used did the job and we definitely learned a thing or two. We think it's safe to say, "If you want to get all shriveled up, and get spots on your leaves, go get alcohol! It'll definitely do the job." We swear that we're going to steer clear of alcohol for the rest of our lives!!! (and hopefully that'll be a long time!).

Acknowledgments

We would like to thank Mr. Wagler for the cups, soil, plants, and everything else. We would also like to thank our two student teachers, Thipp Kommavang and Rebecca Sherry, for their encouragement and great ideas.

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Table I:

A2	Height: 6 1/2 cm. number of leaves: 5 condition: one leaf isn't healthy!	Height:7cm. number of leaves: 5 condition: growing strait up, Healthy!!!!!!!!!!	13 1/4 in. 15 leaves condition: healthy and has another plant growing off of it.	D2	3 1/4 tall. 6 leaves. condition: Healthy ,but short!		
B1	Height:6 cm. number of leaves: 5 condition: one leaf is torn , but the rest is healthy!!!!!!!!!!!!!!	Height: 7cm. number of leaves: 6 condition: exact same as A2!	Height: 8in. 11 leaves condition: healthy but some took a bite out of a leaf.	E1	1 foot , 3 in. 21 leaves. 2 white flower buds , Really Healthy!!!!!!!!!!!!!!!!!		
B2	Height:2 1/2 number of leaves: 5 condition: it's pinched in the middle of the stem	Height:6in. 10 leaves condition: Healthy and has another plant growing off of it!		F2	10 in. 13 leaves, condition: two dead leaves brown tips on leaves.		
C1	2 in.1 leaf, **A** condition: BAD! "sad plant"			G1	Height: 10 1/2 in. 10 leaves condition: red dots on the tips of each leaf, but otherwise healthy!!		
D1	**A** 7 1/2 in. 6 leaves condition: red spots on leaves.			H1	10 1/2 in. number of leaves:9 condition:tallest of all our plants. Very Healthy!!!	6 in. 12 leaves. **A** condition: Very dry on steam, dried out! WEAK!	

Table II:

D2 No Alcohol	6 1/2 6 leaves condition: Very "floppy" and it will not stay in the soil.	1A Constant	5 in. 7 leaves, condition:stable. growing PERFECT No Alcohol!	I1 24ml alcohol	4 in. 7 leaves, condiyion: soil smells like alcohol! Yuck!!!
1B Constant & No Alcohol	5 3/4 in. 8 leaves 2 leaves have grown flipped over.	F2 No alcohol	4 3/4 in. 7 leaves,there are burnt tips on the leaves, the grow light is frying the plants alive!!!	I2 24ml alcohol	6 in. tall ,8 leaves, condition: really healthy. Brown tips where leaves were burnt.
C1 3ml alcohol	4 3/4 in. 7 leaves condition: alcohol probobly hasn't taken affect yet!	C2 3ml alcohol	4 1/2 in. 8 leaves condition: redish stuff under the leaves!		
H2 6ml alcohol	7 in. tallcondition:brownish-oarngeish on all the leaves,it's alittle pale.	H3 6ml alcohol	3 1/2 in.6 leaves condition: look'n Drunk! a little droopy, white lines on the leaves.		
K1 12ml alcohol	6 in. 8 leaves, condition: greenish pale color, 2 red dots on a leaf!	K2 12ml alcohol	4 1/2 in. tall, 5 leaves, condition: very pale , the leaves are a greenish - redish color. Ewwwww!!!		

Bridges

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by Andy Krogstad, John Muir School

My project is about bridges. I got the idea of testing bridges from a book called How Things Work. My hypothesis was that the bridge with the strings would be the strongest. I wanted to do this project because I like to make and invent things with tools.

Procedure

I made three different kinds of bridges: one without any supports, one with an arch underneath the bridge, and one with a tower on each end of the bridge. Each tower has two strings on the top of them. The strings go down to the bridge and support it. I made the bridges out of blocks of wood, nails, cardboard, and string. After I made all three bridges, I decided to put dictionaries on the bridges until they fell. Each dictionary weighs 250g. To be declared a failer, either the bridge broke or the trestle bent inward.

Results

The bridge with the arch underneath held 10,250g. The bridge with no supports held 14,350g. The bridge with the strings held 14,484g.

Interpretation

I think that I had some false results because I wasn't paying attention when the bridge failed. I tried to fix the bridge with no supports because I thought it was a failure, but it was about to break, so I left it be. The one that I thought was going to be the strongest would have been the strongest, but the way I attached the cardboard to the towers was not very strong. The nails were too close to the edge of the cardboard.

New Directions

If I could build them again, I would make the designs and shapes different. I think different ways than the way I built them could be stronger. I could attach the cardboard differently.

Acknowledgments

Thank you Mr. Wiesner for providing the materials and the tools that I used. And thank you to David MaCaulay, the author of How Things Work.

Does How Fast a Gyroscope Spins Make Any Difference to How Long It Can Balance?

by Anna Ficken, Lincoln Elementary

Introduction

It started when I got a gyroscope as a Christmas present from my parents. I wasn't really interested in playing with it, because it didn't seem like something that was cool. However, because other people were bringing in electronic gadgets I wanted to show it to my class. I thought it would be fun if I brought in the gyroscope and showed it. Then my teacher, Mr. Jeff, started talking about inquiry projects and I thought it would be interesting to study gyroscopes.

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I did this project because I was fascinated by the way gyroscopes worked. When I held the gyroscope in my hand by its top and bottom axis and tried to tip it, I felt a force resisting my movement. It made me curious about what did that.

At the beginning I predicted that if you pulled the gyroscope really fast it would balance longer than if you pulled really slowly.

Procedure

For materials, I used a gyroscope, a string to spin it, a digital stop watch, and a flat surface to spin it on.

To answer my question I did many trials. For each trial I wound the string on the gyroscope and pulled it out at different speeds. I counted out loud to measure how fast I pulled it out. When it started spinning I started the stop watch, and when the gyroscope tipped over I stopped the stop watch. I entered the data (how long I pulled it and how long it spun) on a piece of paper.

To make observations and collect data I did a total of 46 trials pulling the gyroscope at different speeds and timing when it tipped over. I recorded the data in my notebook. When I finished the trials I got an average of the times the gyroscope stayed up for each of the different speeds I pulled it at.

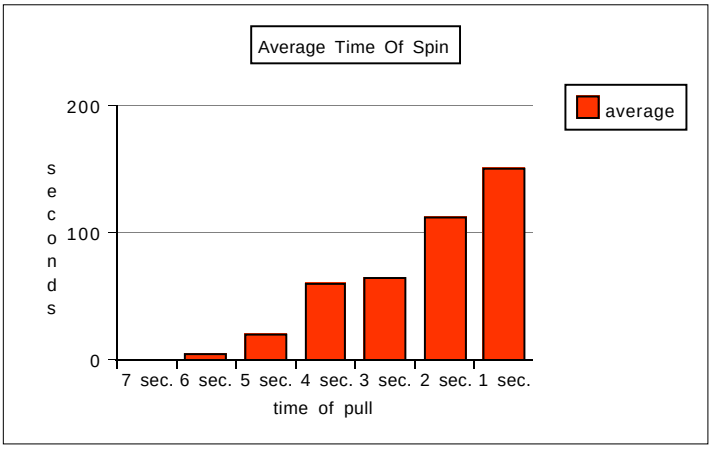
Results

I did have a problem doing my experiment. Sometimes when I was pulling the string out of the gyroscope it got stuck. Then I didn't get the pulling time that I was aiming for and had to start over. One thing that did work was displaying the data in a bar graph to help interpret it .

I found out that that faster you pulled the gyroscope, the longer it balanced. I put my results into a spreadsheet document. The table you see below shows the averages of 1, 2, 3, 4, 5, 6 and 7 seconds.

time of pull	7 sec.	6 sec.	5 sec.	4 sec.	3 sec.	2 sec.	1 sec.
time of balance	0	2	24	50	105	161	240
	0	12	30	48	70	113	127
		1	14	76	71	146	105
			14	69	62	148	127
			15	107	61	76	155
			19	36	35	98	
				31	53	92	
						87	
						86	
sum	0	15	116	417	457	1007	754
number of pulls	2	3	6	7	7	9	5
time of pull	7 sec.	6 sec.	5 sec.	4 sec.	3 sec.	2 sec.	1 sec.
average	0	5	19	60	65	112	151

Then I made the graph you see below showing the relationship between the speed of the pull and how long the gyroscope stayed up:



Interpreting Results

I found out that my original hypothesis was right! My original hypothesis was if you pulled the gyroscope really fast it would stay up longer than if you pulled really slowly. I really didn't find any surprises along the way.

If I were to do my project over I would like to do all my experiments at the same place, because I was switching around from school to home. My gyroscope got a little damaged from being transported and didn't spin as well later as it did at

first. It also would have been good to have a machine that would pull the gyroscope at consistent and exact speeds.

To learn more about the basics of gyroscopes, I checked a video out of the public library and printed out an article from Grolier's Encyclopedia on the computer. My Dad and I also looked for physics books for kids in the library, but didn't really find anything helpful. I also searched the web, but I didn't find anything there either.

By doing my inquiry, I learned that gyroscopes are used for much more than toy tops. In fact, the earth is the biggest and best gyroscope around. From the video and the encyclopedia I learned that the reason the gyroscope balances is something called "angular momentum." It means that when something is spinning around and around it tends to stay in the same position.

New Directions

A new inquiry that could be done on gyroscopes would be to try to build a navigational device using a gyroscope. By that I mean you could build some kind of motor propelled plane and if you get that far you could try to insert a gyroscope and see if it works.

Acknowledgments

My dad and my teacher helped and encouraged me along the way.

Robins

by Ashley Davis, John Muir School

Introduction

I got my idea about robins when I said I wanted to do a project on birds. I picked robins because it was the first name that came in my mind. The first thing I did was go outside and go look for robins so I could observe them. My questions were: What tree do robins like best? What do they eat most? And do they eat bird seeds? Because when I did research on them I read books and they didn't say anything about bird seeds. So that's why I asked, do they eat bird seeds? My guess is that they do eat bird seeds but I want to find out for sure.

I am going to work on the hill at school and I watch and listen for robins. When I go home sometimes I am going to watch for robins too. I am going to watch for robins at my house on my porch and by my aunt's house in the field to see if robins eat bird seeds. I am going to put bird seed out by trees and on the grass and where I think robins like the best.

Procedure

When I was observing robins, they always ran away. I put a lot of sunflower seeds out on the grass and on my porch. I usually put bird seeds out in the morning so birds could eat them. When they run away, they always go to the tree in front of my house. It looks like an oak tree.

I think I saw a rufous-backed robin and a clay colored robin because it has a light orange color and that's the color I saw on the robins.

Results

What I did find out was they do eat bird seeds and that they eat fruits. Some results I noticed were they kept flying away, what they ate, and where they live. But I don't think they live in the oak tree because there is not a nest.

The pattern I found was that robins always run away and when I am gone they eat bird seeds again. Something that was unexpected is that everytime I tried to observe them they always ran away.

Interpretation

My data tells me that robins eat bird seeds and that they like the tree in front of my house that I think is an oak tree. My hypothesis is proved that robins eat bird seeds. I think I gathered enough

data to answer my questions. To improve my data I could have watched for robins almost every day.

New Directions

A new question that came up was do robins like people? I found out that they don't like people because they always run away.

Acknowledgments

When I was stuck, Mr. Wiesner or Tamara would help me. When I didn't know what to write, they gave me ideas and helped me along the way.

Biocolumn

By Emma McKeith, Lincoln Elementary

Introduction

Me and my friend Shequalah tried to make a biocolumn. I think our question was: Can we make it work and how?

We used 4 bottles. We wanted to try having 4 or 5 things running at the same time. For that we had to make it sturdy. We also had to make sure the snail got air and food.

We had a problem with keeping our bottles because people were taking parts of our bottles. Now we don't have to worry about ours getting taken unless someone takes it apart.

We thought we would have problems with it working. We thought it probably would work but we would have to work very hard.

Procedure

We tried to build by using 4 bottles. We also had to figure out how to do it. The materials we used were 4 bottles, dirt, seeds, and tape. We needed to get a spider and a snail and we also needed to start a compost pile. The resource we used is called Bottle Biology.

We only did one experiment. It was to try to build a biocolumn. We wanted to build it because our teacher, Mr. Wirth, said not many kids in his class had been able to make it work. This is what it looked like from top to bottom: a spider was at the top while a plant grew in the same level; next there was a compost pile and fruit flies; and at the bottom, there was a snail.

Results

Me and Shequalah had a lot of problems along the way, but we also had some successes.

The problems we had were:

We started out not able to connect the bottles together the right way.

We planted lettuce and it was too heavy to stand without falling every once in awhile. When the lettuce finally started to grow we started watering it. Some water seeped through the soil and then leaked through cracks, so we put tape around it. It still leaked so we put a quarter of an inch of duck tape and it finally stopped leaking.

We had a hard time starting a compost pile.

We had a hard time getting a snail.

We had a hard time trying to catch a spider.

Now I have our successes to talk about:

We played around with the bottles until they didn't leak as much.

We sat the bottles on a flatter surface and they stayed up. We also turned the bottle and the plants started to grow a lot faster.

It stopped leaking.

Our compost started to work after we put the pumpkin skin in it.

Mr. Wirth found a big snail in the class living machine.

What I have observed is you have to be ready for accidents to happen. I also observed the algae that grew is what the snail ate.

Interpreting Results

Our hypothesis was we would probably be able to do it.

The surprise we had was the snail laid eggs but they never hatched so we knew the eggs weren't fertilized. Then the snail died. So, when 2 kids from a different class came in and asked for algae we gave some of the water the snail was in to them. We gave it to them because the water had a lot of algae in it. It was bright green!

We learned that you have to give a biocolumn a lot of attention, so the plants do not die, and the spiders don't escape. We also learned that the lettuce did very well. Since my partner moved to another part of town and goes to a different school I told my teacher he could transplant the lettuce into our living machine.

What we would do differently is cut the bottles very carefully so they would fit together easily and also we would use better tape to seal cracks. Another thing we would do is make sure the top is sealed tightly so the spider wouldn't get out.

New Directions

We would try to figure out how the fruit flies would get from the compost to the lettuce where the spiders could eat them. That is basically what our new direction is.

Acknowledgments

We would like to thank everybody who gave us stuff to use.

Gradual and Steep Inclined Planes

By Reginald Caldwell, Dan Rosinski, Irving Castro, Aldo Leopold Elementary School

Question: Is it more work to move something up a gradual inclined plane or a steep inclined plane?

Hypothesis: We think it will be harder work to move something up a steep inclined plane.

Materials: spring scale, plastic bag, inclined plane, 8 Webster's Dictionaries.

Procedure: Stack books to make stairs. Put the board on top of the steps. Put the dictionary in the plastic bag. Hook the spring scale on the handles of the plastic bag. Drag the bag up the inclined plane and record the weight. Add to books to make the inclined plane steeper. Drag the bag up the new inclined plane and record the weight. Compare your results.

What did we learn? We learned that on a steeper inclined plane, the bag and book weighs more. The steeper inclined plane requires more work.

Rough and Smooth Inclined Planes I

By Kayla Hillerns, Matt Finn, Ryan Germann, Aldo Leopold Elementary School

Question: Would it be more work to move something up a rough inclined plane or a smooth inclined plane?

Hypothesis: It would be easier to move something up a smooth inclined plane.

Procedure: Stack 5 books up. Lean board up against the books. Rub grease onto the board. Hook spring scale on wheelchair. Slowly pull object up the inclined plane. Write down the

weight. Flip the board over onto the ungreased side. Slowly pull the object up the inclined plane. Write down the weight. Compare the weights.

We learned: that it was easier to pull an object up a smooth greased inclined plane.

Rough and Smooth Inclined Planes II

By Seth Kunin-Goldsmith, Hailey Reich, Jake Mann, Zataiya Gober, Aldo Leopold Elementary School

Question: Which is more work to use: a rough inclined plane or a smooth inclined plane?

Hypothesis: We think it will be more work to use a rough inclined plane.

Materials: 1 bumpy board, 6 Dictionaries, 1 spring scale, 1 medium sized bag

Procedure: Put the dictionaries on top of each other. Put the board on top of the dictionaries. Put 2 dictionaries in the bag. Hook spring scale to bag by handles. Hook spring scale to bag by handles. Drag the bag up the bumpy ramp. See how much the bag weighs. Do the experiment a second time but use a smooth board.

What did we learn? We learned that a rough inclined plane is harder to pull something up than a smooth one. We learned that you use more work to go up a rough inclined plane than a smooth inclined plane.

Do You Really Need To Use the Same Measuring Tool ? I

By Arpita Bhattacharrya, Montien Winters, Lisa Heiar, Aldo Leopold Elementary School

Question: What will happen if you use two different spring scales on the same experiment?

Hypothesis: We will get different results.

Procedure: First stack the four dictionaries up. Then put the board on top so that one end of the board is on the ground and the other is on the dictionaries. Attach one scale to recycling bin. Drag recycling bin up the board. See how much the recycling bin weighs. Now do the same thing but use a different spring scale. See how much the recycling bin weighs now.

We learned: It did not matter which spring scale we used. We got the same results.

Do You Really Need To Use the Same Measuring Tool? II

By Brian Kim, Julietta Johnson, Connor McKenzie, Aldo Leopold Elementary School

Question: Would you get the same results when you used 2 different spring scales on the same experiment?

Hypothesis: No, you will get the same results.

Materials: 9 dictionaries, 1 big board, 2 spring scales, 1 aluminum container, 1 plastic bag.

Procedure: Set up the inclined plane by stacking the 9 dictionaries: 4 stacked on each side and 1 on the top, and setting the tip of the big board on the top dictionary. Put the aluminum container in the plastic bag. Hook the bag to the spring scale. Drag the spring scale with the bag upward on the inclined plane, and record the weight. Have someone that is exactly four feet 7 inches hold an arm up for the rest of the experiment. (Note: Be sure to thank them afterwards, because this will hurt!) Lift the bag up to the arm. Record the weight. Repeat with the same spring scale. Now, repeat steps 4, 5,6, and 7 with the different spring scale.

What we learned: The weight changed when we used a different spring scale. We did not get the same results.

I Wonder

Shorter Versus Longer Inclined Planes

By Emilie Pinkovitz, Oriana Amakobe, Amanda Rule, Frank James, Aldo Leopold Elementary School

Question: Which one uses less work: a shorter inclined plane or a longer inclined plane.

Hypothesis: We think it will be easier to drag a clipboard up a shorter inclined plane.

Materials: 2 Dictionaries, 2 foot ramp, 1 foot ramp, clipboard, spring scale.

Procedure: Stack 2 books up. Lay the 2 foot ramp on the 2 books. Hook the spring scale on the clipboard. Drag the clipboard up the 2 foot ramp. Measure how much it weighs. Lay the 1 foot ramp on the 2 books. Drag the clipboard up the ramp. Measure how much it weighs.

We learned: It is easier to drag something up a 2 foot ramp than a 1 foot ramp. You use less work with a longer inclined plane.

Candles

by Elissa Notbohm and Shameka Fladger, Lincoln Elementary

We are doing an I Wonder project on candles. After much thought we came up with this question:

I Wonder what kind of wick burns brighter, cotton wick or wick with wire inside?

On Monday, Sept. 2 Elissa found a book that tells how to make candles. We found a smiley face candle in the book and decided to make two of those instead of just normal candles. Here are the materials and tools we used:

chopped white wax

yellow crayons

cotton wick

wire wick

black paint

paint brush

mold

single burner

You will find out how we got this question in the following paragraphs.

How We Got Our Question

On August 31 we decided to do something with candles for our I Wonder but we didn't know what. And so we went down to our REACH teacher, Ms. Seguin and we brainstormed with her. Then finally Ms. Seguin thought we could do something with wicks. We kept thinking about wicks and we came up with our question. We decided we would get wire wick and cotton wick and see which burns brighter.

We really didn't know how we would measure the brightness of the candles but Ms. Seguin thought there was something called a candle foot meter that would measure the light. But before we did any research on light meters we decided to make the candles.

The Process

From Our Journals:

Tuesday, Sept. 3, Ms. Seguin gave us some wax and crayons and we started to chop them up.

Wednesday, Sept. 4, we chopped more wax and crayons and Elissa took the wax and crayons home and chopped the rest of it up.

Thursday, Sept. 5, Ms.Seguin gave us some paint to paint the faces.

Friday, Sept. 6, today Ms. Seguin took us to a craft store and bought the wick and a mold.

Tuesday, Sept. 10, today Ms. Seguin helped us

make the candles. Here's how:

The first candle we made was really exiting to make because we had never made a candle before. We used the wire wick for the first candle and the cotton wick for the second candle. We dumped the chopped wax and crayons into a small pan which was in another pan that had water in it. The pans were on the single burner and we waited until the wax and crayons melted. When they were melted we put the wick in the mold and then poured the melted substance into the mold.

It was kind of tricky to get the wick in the mold the second time because it didn't have any wire in it. We ended up taping the wick in the mold.

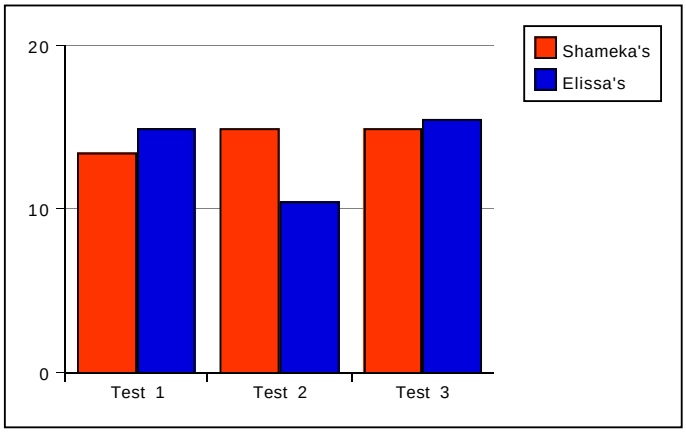
On Wednesday September 11, we took the second candle out of the mold in the morning. We started painting the candle at lunch recess and we finished painting it at afternoon recess. That's all we did that day.

On Thursday Sept. 12 we finished painting the first candle and we called some electric places to see if they rented light meters. We did reach someone who knew about them but they didn't have any to rent to us.

Elissa's dad actually ended up getting a light meter from his work and we did the first test.

The Tests

We did three tests for each. We measured the light of the candles by foot candles. That is what the numbers on the side of the graph are. Here are our results for the tests:



The Closing

We hope you enjoyed our project!

Thanks to:

Dave Wirth

Claire Seguin

Lincoln Custodians

Lincoln LMC

Tom Notbohm

Tornado Thrill

by Tricia Powell and Carmen Verdecia, Hawthorne Elementary

Introduction

We got our question when we went to the movie Twister. Carmen kept asking her mom about the movie and I,Tricia, said it's mostly based on tornadoes. Carmen's mom said that we should do a project on tornadoes to learn more about them. Carmen and I thought our project was very meaningful because it has got to do with life. We expected to learn more. We discovered we did learn a lot.

Procedure

Carmen brought in a poster that had lot of good info. We looked in lots of books and posters that helped us also. We did a vortex by using 2 empty pop bottles, water, food coloring (green), and a tornado connecting tube.

Results

Our vortex started to leak so we had to put tape on it. We did not plan to put food-coloring in it. It was hard to get the connecting tube for the vortex because Carmen kept forgetting to bring it in.

Interpreting Results

The tornado leaked. We needed to be more careful and tape it better.

New Directions

We were planing on making a sand tornado but the Great Blue came too fast.

Acknowledgments

We would like to thank our art teacher, Katie, for the food coloring, and I, Tricia, would like to thank Carmen for bringing in the connecting tube.

Tornadoes: A Research Paper

by Carmen Verdecia, Hawthorne Elementary

A tornado is a powerful storm. The word comes from the Spanish word tronado which means thunderstorm. Some are not very powerful. In fact, there's about 800 tornadoes in the USA and over 3/4 of them are weak. Tornadoes are not as large as hurricanes and they don't travel as far.

A tornado makes the sound of a whistle on a tea kettle and the winds can go up to 300 miles an hour, but most travel about 20 miles and go 25 miles per hour up to 150 miles an hour. Violent tornadoes are not very common. Only about 1 in 50 are called violent. A violent tornado can pick up buildings and set them down in other places. Many tornadoes only last 3 minutes. They can measure as much as 300 yards across. When they go over water they are called water spouts.

People living in North America are most likely to see tornadoes in the spring and summer. Most tornadoes are in the south-central part of the nation. So many tornadoes go through a strip of land in Missouri, Kansas, Oklahoma, and Texas that it is called "Tornado Alley".

Books we used in our report:

Branley, Franklyn M., Tornado Alert, New York: Thomas Y. Crowell, 1988

Simon, Seymour, Storms, New York: Morrow Junior Books, 1989

Acids and Bases

By Casey Hansen, Hawthorne Elementary

Introduction

I got my project from an earlier I Wonder. It was called Acids and Bases, just like the title of my article. Here is what I did first.

Procedure and Results

Materials: Baking soda, Lemon juice, Cabbage juice, Pink liquid soap, Glycerin, 4 cups.

I put the 4 cups in front of me and I put 1 tsp. of Cabbage juice in each cup.

Then I put 1 tsp. of Lemon juice in one of the cups and it turned a magenta color. I put 1 tsp. of Baking soda in another cup and it stayed the color of the cabbage juice.

Then Miranda came over and asked me what I was doing and I said "Just doing my project ." I then put 1 tsp. of Pink liquid soap in another cup and it turned blue but it didn't fizz to the top like last year's person had. Finally, I did the the Glycerin. It turned a greenish color.

Interpreting Results

After I did the Glycerin everyone was complaining about the cabbage juice and the smell. I was complaining myself. Since I got my project from an earlier I Wonder, I didn't really have a hypothesis. I was just doing what that other person did. When it was over, it kind of felt like I did all that work for nothing but it was fun.

New Directions

When I'm in middle school, I would do some new things. I would get some new materials like orange juice, water, hot sauce, and my first

materials. I would use purple cabbage juice and green cabbage juice and see what would happen with the green cabbage juice and again with the purple cabbage juice. I think that would be cool.

Acknowledgments

I would like to thank my teacher, Nancy Lanyon, for letting me use the science lab instead of the sink.

The Aquarium Project

by Chale Gaytan & Estevan Natera, Lincoln Elementary

Introduction

Hi. Our names are Chale and Estevan. Our question is, “Can we make a self-feeding aquarium, so that it will be a food chain?”

The first day of school, we saw a fish tank in the room. So we asked Mr. Jeff if we could make an aquarium. He said, “Sure.” So we started a committee, but slowly people dropped out and now it is just us. We started with nine people. Those people were Joe, Scott, Anthony, Brian, Malini, Eric, Jamil, Estevan and Chale. But it’s kind of good that people dropped out because there is more space in our project area and not as many arguments. The first week we mostly planned and got information. We got our information from the Internet and books. We read about 18 books altogether. We also called pet stores for information. Some things we learned are how to save a sick fish, what some fish eat, what fish habitats are and how to make an aquarium.

Procedure

The day before we started the tank Chale got some pebbles, but there were not enough. We had to buy more. Chale brought some pebbles to school, but a problem happened. We had put the first batch of pebbles in the tank already. We were supposed to wash them, but we put them in the tank without washing them. We had to take them out because there is a white powder on the pebbles that can kill the fish. We put the old pebbles with the new pebbles and washed them all in a bucket and a strainer. We then put the pebbles in the aquarium. After we spread the pebbles around the way we wanted them, we laid a newspaper on top of them so when we poured the water in the fish tank, the pebbles stayed put. After we put the water in the tank, about a week later, some water from the tank evaporated. Then we put 24 more cups of water in the tank. After that, we got some snails from our science teacher, Ms. Seguin. When we did this, we put the snails in the big tank instead of the little tank. Soon after that, the older snails died. Luckily though, they had baby snails to take over for the other ones.

New Directions

We have not made a food chain yet, but that is our goal for our future aquarium. We added an air tube with filter and heater which came in a package with directions. We hooked up the system and connected it to a power source. We still need to add daphnia, which are microscopic bugs that live in ponds. We think we can get daphnia from the pothole which we are studying. We plan to buy live underwater plants and fish from an aquarium store and also an artificial lily pad. Our science teacher, Ms. Sequin, will give us tadpoles. We will add large rocks and a small log for landscaping.

Memory and the Sense of Smell in Rats

By David Blanchard and Wesley Matthews, John Muir School

Introduction

Hi! Our names are David and Wesley. Our teacher is Mrs. Bostrom and we are in a 3/4 Multi-age class at John Muir Elementary School. Our questions were: Do rats have a good memory and do rats have a good sense of smell?

David has a pet rat named Einstein and we wanted to learn more about him so we thought these would be good questions to ask.

Procedure

We took some wooden blocks and made four different mazes with them. We ran the rat through each maze three times. With the first maze we offered no encouragement for the rat to get from the beginning to the end. The second maze had food at the end. The third maze had food lightly rubbed into the carpet to mark the path out. The fourth maze had both food at the end and food rubbed into the carpet.

Results

The first maze had the slowest times: 1 minute 5 seconds, 20 seconds and 18 seconds. The second maze was much faster: 25 seconds, 5 seconds and 3 seconds. The third maze was not as fast as maze #2, but was still faster than maze #1: 45 seconds, 11 seconds and 8 seconds. The fourth maze had fast times that averaged faster than maze #2: 13 seconds, 10 seconds, and 6 seconds.

Conclusion

By looking at the times we concluded that rats have a good memory. The rat improved his time each time he went through the maze. We also found that the food made a difference in how fast the rat found his way out. This shows that he has a good sense of smell.

What Kind of Environment Do fFish Like?

by Emma Laedlein, Lincoln Elementary

Introduction

Hi. My name is Emma Laedlein. I did an “I Wonder” project and my question was: Do fish prefer an environment with a sand bottom or a rock bottom? My question came from curiosity. My hypothesis was that they wouldn’t care that much.

Procedure

To answer my question I took two 2-liter Pepsi bottles and I connected them at the mouths with duct tape to act as a fish tank with a tunnel. I cut a hole in the side of each bottle so that I would be able to put the fish in, feed them, and change the water. Then, I filled the bottles with tap water. I set the bottles down to sit for a few hours so that the water would get to room temperature and so that it would dechlorinate. When I set them down I found out after a few days that no matter how much duct tape I used, the water still leaked.

So then my teacher, Mr. Wirth, got the idea of using a bottle connector to connect the bottles. He went out and got one and it worked. That is, when we screwed it on tight enough. Then I put gravel in the bottom of one bottle and sand in the bottom of the other bottle (making sure to let the dirt settle), a water plant in each bottle, and a large rock in each bottle. Then I made a chart to write down what the fish were doing in 15-30 minutes of each day.

I Wonder

Results

This is the chart:

	Sand Fish 1	Rocks Fish 2
11/5/96	Fish is hiding behind rocks.	Fish is hiding behind plants and suddenly swims to sand side.
11/6/96	Fish is being wild at times. Fish ate it's food. Fish went to rock	Fish swam back to sand side. Fish didn't eat it's food.
11/7/96	Fish is hiding between bottles inside of the bottle connector.	Fish is hiding like usual.
LATER	Fish went to rock side.	Fish went to sand side.
LATER	Fish's favorite spot is in the corner behind the rocks.	Fish's favorite spot is inside of the plants. Both fish wont eat.
LATER		Fish goes to sand side.
11/11/96	Fish won't eat.	Fish won't eat.
11/12/96	I've tried a few kinds of foods and both fish still won't eat.	
11/18/96	Both fish are in sand side, then after a while fish #2 went to rocks.	
11/20/96	Both fish are in sand side.	
11/21/96	Both fish are in sand side.	

Then, it was Thanksgiving break, a 5 day week-end. I would have to take my fish home, or they would die. I put them in a jar with rocks, water, and plants, and I took them home. Apparently, the fish didn't exactly enjoy the bus ride, and after spending one night at my house, they died (well my room is messy). But I didn't have time to get my experiment started again, so I just went with the notes I had.

Interpreting Results

The results of my experiment are that the fish prefer the sand side because the fish seemed to spend more time in the sand side than in the rock side.

Well, my original hypothesis wasn't right. If I had to repeat my project I would get advice from a pet store on what food to use, not play around with my fish as much, and not take them on the bus.

New Directions

A new question would be: Do all fish prefer an environment with a sand bottom? To answer that question somebody could do the experiment over with a different kind of fish.

A Lot of Interesting Information About Stars

by Evelyn Perez, John Muir School

Introduction

I wanted to do a project of stars because stars are so interesting. I think they're interesting because you can learn a lot about stars. I wanted to learn how far away are the stars? Why do they shine? I went outside one night and I was going to see if the stars make a constellation. On another night, I might see it in the same place. I'm going to do four constellations. My guess is that I'm going to see them in the same place. I think my project is important to learn because maybe other people are watching stars and maybe they're thinking what are stars made of or other things. Maybe there are other reasons why they're important to other people.

Procedure

I went outside at night and sat on my porch. I used only my eyes to look at the constellations of stars. I thought of some questions about stars. How far away from earth are the stars? Why do stars shine? I looked for the answer in an ency-clopedia and a book called Stars, by Seymour Simon. I thought I could get better answers from the books than from asking people.

The other thing that I did was to look at stars and look for constellations and then I was going to draw them in my notebook. Those would be ones that I made up myself, not from other people. Then, the next night, I would do the same thing and I would check to see if the constellations are there again.

Results

I found out that the closest star to earth is the sun. Even if I traveled on the fastest spaceship it would take three and a half months to reach the sun. The next closest star to earth is called Alpha Centauri. It is 25,000,000,000 miles away.

Stars shine because they are really hot burning balls of gases that give off light.

One time I did look for a constellation I made, but I couldn't find it again. I did another constellation, but I was so busy that I forgot to do my other look for that constellation.

Interpretation

I expected to find out that the stars were very far away. I did not know stars were made up of burning gas.

Even if I looked at the stars through a telescope they would still look very small and far away.

If I wanted to know for sure if the stars change, I would have to look at least three nights in a row. I didn't do that, so I don't have a for sure answer yet.

New Directions

To get a for sure answer, I would have to do my constellations again and check for sure for three nights. I would have to look at the same time and the same place. I would also write down or draw the different sizes and different colors of the stars. That would also help tell me if the stars are the same every night.

Acknowledgments

Thank you to Mr. Wiesner and Maria McHugh for helping me to type and to understand a lot of things I didn't really understand.

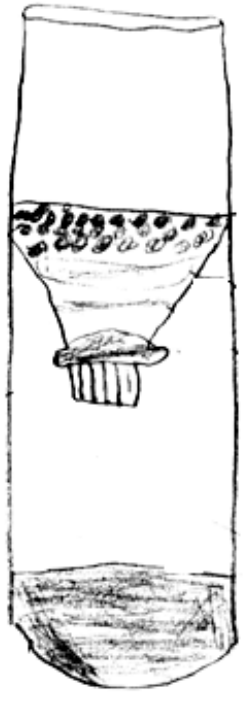
The Return of the Filter

by Donta Collins, Lincoln Elementary

I once had a filter. I created it six months ago. That's why I call it the return of the filter. See, what the filter does is, when you put in nasty water, it comes out clean. What's cool about the filter is the water comes out clean.

This is how I made the filter. I took two bottles. I cut one at about half of the bottle so that was the top of my filter. I did almost the same thing with the other. That's how I made the bottle.

Look for how you make it below:



I Wonder

The Fish Group

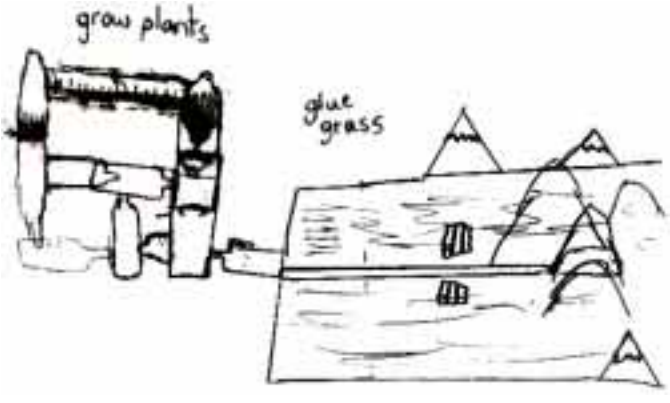
by Nate Whitehead, Jeff Lowe, Patrick Bauch, and Michael McKinley, Lincoln Elementary

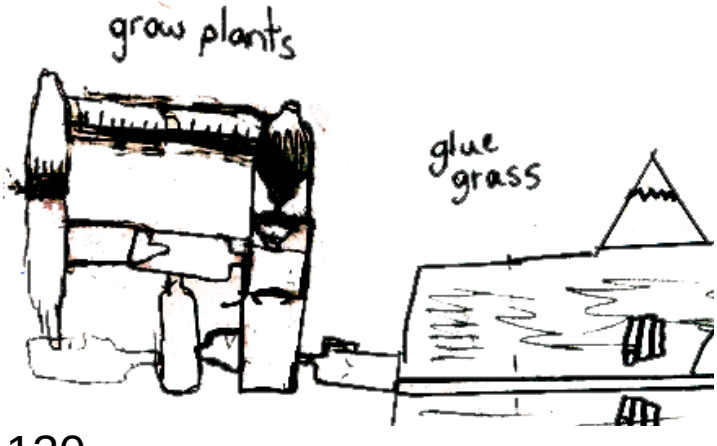
Nate did an experiment on fish and Helgrammites. We thought it would be a fun and hard experiment. It was an experiment because we wanted to see if they can live in bottles and jars.

Procedure

We put two Helgrammites in a bottle with two fish in a jar. Later we found out that the big helgrammite killed the fish and ate the little helgrammite. During this project we built some different bottle biology designs. We then designed a junior living machine. We used four bottles. We connected the bottle but we need sealant to make sure the did not leak.

Here is a picture of our early design and the final project:





We started with betta fish and three or four minnows. We found out that the betta can live with the minnows. We put the betta fish in the three bottle that were connected. The betta lived for several months and seemed very happy. One day we saw bubbles on top of the betta fishes jar. We looked up bettas in a fish book and learned that a male betta will build a nest of bubbles to put eggs in. When we learned this we decided to try to breed betta fish.

How Betta fish mate

We wanted to get a female betta. We called some fish stores to learn how to do this. We learned we had to put the female in a separate tank from the male and the two fish have to be able to see each other. The female watches the male make a nest. Then she starts to make eggs. When the female is done making eggs she has three stripes on her side. Then you put the female in the males cage. The male takes the eggs out of the female's mouth and puts them in the nest. Then when the male is done taking the eggs to the nest you have to take the female out because the male will try to take more eggs out and if there is none the male will kill the female.

Results

Our question was can we keep a fish alive in bottles? So far the answer is yes, but over winter break Jeff took it home and forgot to leave air in the bottle and the fish died but at least we learned a lesson. We have a new betta and it is living great.

Our breeding did not go well. We wanted to mate the bettas but Jeff's was a grouch and Pat's was so nice that all they did was play and watch each other.

Patrick and Mike joined the fish group. Patrick brought in 2-3 gold fish for the pond. We also had minnows living in the pond thing. The minnows and the goldfish lived great together. Then they died. Our new betta fish is still living. Our mini-living machine has been destroyed.

I Wonder

Salt and Daphnia

by Timmy Harris and Governor House, Randall School

Introduction

We're in Mr. Wagler's 4th and 5th grade class. We're here to tell you about our project with salt and daphnia. The way we got this question is that we were talking about daphnia in my class. We heard that daphnia could not live in bad water. We used the salt to see how many drops of salt it takes before all the daphnia begin to die, so that we would know that daphnia can't live with this much salt.

Procedure

The materials we used were 5 containers, a jar, salt, 25 daphnia, eye dropper, spoon, and a small kind of measuring cup to measure the drops of salt we put in each of the 5 containers. Every day we counted the daphnia in each container and added the following numbers of drops of saturated salt solution: 0 in T.A.G.1, 2 in T.A.G.2, 4 in T.A.G.3, 8 in T.A.G.4, and 16 in T.A.G.5. We collected all of the data we needed and then we put more drops of salt in the containers. For example, by the fourth day we had 0 drops in T.A.G.1, 8 drops in T.A.G.2, 16 drops in T.A.G.3, 32 drops in T.A.G.4, and 64 drops in T.A.G.5. (T.A.G. stands for Timmy And Gov, so that our containers wouldn't get mixed up with other research.)

Results

At first, when we just started with our project, we had trouble counting. You have to have good eyes to get the exact number of daphnia. That's why both of us would count them to make sure we both got the same number of daphnia. The graph is here for you to see how we tested them. S is for salt. D is for daphnia.

	D	S	D	S	D	S	D	S	D
Tag 1	5	0	5 / 4	0	2 / 2	0	1 / 2	0	0 / 0
Tag 2	5	2	5 / 5	4	3 / 1	6	1 / 0	8	0 / 0
Tag 3	5	4	3 / 4	8	2 / 1	12	1 / 1	16	0 / 0
Tag 4	5	8	5 / 4	16	1 / 2	32	2 / 1	48	0 / 0
Tag 5	5	16	3 / 4	32	3 / 2	48	0 / 0	64	0 / 0

Interpreting Results

The reason the daphnia were not living a long time is because they could not live in dirty water. we guess that we tested them too much. It took 0 drops to kill the daphnia in T.A.G.1, 8 drops to kill the daphnia in T.A.G. 2, 16 drops to kill the daphnia in T.A.G. 3, 32 drops to kill the daphnia in T.A.G. 4, and 64 drops to kill the daphnia in T.A.G.5.

New Directions

We could do it over but with dirt.

Acknowledgments

We would like to thank our teacher, Mr.Wagler, for getting most of our supplies for our project, our student teacher Thipp Kommavang, and Robert Bohanan.

Crayfish Story

by Heather Reed, Hawthorne Elementary

Hi. My name is Heather Nicole. Last semester Timmy and I did a project on crayfish. I got the crayfish from a pond by my house. My friends and I go down every summer.

Timmy and I were trying to make a crayfish home. At first we made the water in the aquarium very high and then we put sand in. It took about half an hour to get all the sand to settle down. After the sand went down, we put fake plastic trees, sticks, and rocks in the aquarium. We gave the crayfish ground up shrimp to eat. It seemed to me that it really liked the shrimp. We had made a home for the crayfish.

The crayfish that Timmy and I had made the home for was the longest living crayfish I ever had. In December I gave the crayfish to Timmy. I can't believe the crayfish is still alive.

I Wonder

Molding Nutty Bars and Other Bread Products

By Joe Ghilardi, Lincoln Elementary

Introduction

I was first interested in molds when last year my teacher told us about a project some teenagers were doing about testing the durability of Twinkies. I found that very interesting. So I did a project on if Twinkies mold. I chose two other variables, Wonder Bread and Baguette bread. I compared their mold to the Twinkie. I put one of each bread type in Pepsi and one of each kind in water.

This year I'm doing the same thing except I'm changing the Twinkies to Nutty Bars and the Baguette to rye bread. I'm keeping the Wonder Bread. I had also used pie tins last year and this year I am using baby food jars. This year I'm guessing the rye bread will grow black mold because I found out the main kind of mold that grows on bread. I'm expecting the Wonder Bread to mold like last year and I don't know for the Nutty Bar.

Procedure

First I got my materials, Wonder Bread, Nutty Bars, and wheat bread, then I bought some Pepsi and filled 3 baby food jars with the Pepsi, 3 with water. I put them in a cupboard and waited for them to mold. Molly Allison helped me by looking up some info on mold from the encyclopedia for me. Each day I would grab my notebook, walk over to the cupboard, and I would write about what new mold had grown or if none had grown I would write: No visible changes.

I used the following system to name the categories that the materials were in:

P-1 was a Nutty Bar in Pepsi

P-2 was Wonder Bread in Pepsi

P-3 was rye bread in Pepsi

W-1 was a Nutty Bar in water

W-2 was Wonder Bread in water

W-3 was rye bread in water

Here is a reflection from the beginning of the molding process:

P-1 is looking all cracked like dried mud in the desert

P-2 has not yet grown any mold

P-3 is growing black-gray mold

W-1 is growing tan mold on its top. The rest is submerged

W-2 has not yet grown any mold

W-3 has not yet grown any mold

Here is a reflection from later in the molding process:

P-1 is looking the same as earlier

P-2 has all disintegrated except for the crust

P-3 is all covered in black-gray mold

W-1 is the same as earlier

W-2 has disintegrated all but the crust

W-3 is growing black-gray mold

Results

P-1 ended up with a white mold at water level and the actual Nutty Bar sunk to the bottom of the jar. P-2 has grown a huge lump of white mold. P-3 grew some gray mold on its top. W-1 has sunk and the water is turning brown. W-2 has molded at water level and the rest is disintegrated. W-3 is the same as W-2 except it has disintegrated into a finer "dust."

One of the problems we encountered was trying to decide whether to use baby food jars or pie tins. We decided on baby food jars because they contained the smell better and they were smaller. We ended up wasting some Wonder Bread because we bought a whole loaf and used about two thirds of one piece. We didn't waste any other materials because my family usually eats rye bread and I could take a piece and we also eat Nutty bars.

Interpreting Results

My guess was right when I thought the rye bread would grow gray-black mold. I thought the Wonder Bread would mold the same as it did last year but I was wrong. The Wonder Bread molded differently because it was almost totally submerged in water. It did not get as much air and disintegrated from the water. The crust was left floating and it was the part that grew the gray-white mold. There was some gray-white mold last year. I learned that "black" mold is just a metaphor because the mold on the bread was gray. I also learned that mold "molds" differently when it is soaked in water as opposed to sitting on the bottom of a flat surface with water soaking the bottom half but not directly touching the top. As for the Nutty Bar, what happened to it was written in the "RESULTS" section. I also learned a lot about how molds reproduce and how they live on foods.

New Directions

If I did this project again I would not put the mold in baby food jars because then the materials are soaked and submerged in water and I would put them in pie tins because my goal was to not change my means of molding the materials, but simply to change the items I molded. I used pie tins last year and my goal was to compare Nutty Bars and Twinkies so I had to use the same protocol or none of my data would've been accurate. I don't think any of my data was accurate because I used baby food jars, but I still found out that mold molds less when it is submerged in water.

You could do a project on molding certain things and trying to transfer them to other food products, or maybe the same kind of project, but with different variables like Sprite instead of a cola or other kinds of food in the liquid.

Acknowledgments

I would first like to thank my parents for buying me some of the necessary materials, my teacher, Mr. Jeff, for helping me along the way and a special thanks to Fiona Cahill for supplying me with the baby food jars to put the mold in.

Seasons in my Backyard

Josh Bergst, Randall School

Introduction

First I wanted to do a paper airplane project, but I wasn't interested and I wasn't doing anything, so when Mr. Wagler said there would be a group for people who didn't have a project, I got in. About a month later, I got a new project. My project was, "Will plants grow down to get to light?" I had just got it ready when Mr. Wagler said that we had to get a project for Great Blue. He said I wouldn't get enough data in time so I picked this project instead.

Fall, Winter, and Spring

I'm standing right under a big mulberry tree in my backyard. A little to the right of me is a wilting magic lily that looks like it's getting seeds. A big spider caught an ant.

The next day, the mulberry tree is pretty much the same. There is a big feather right in front of the tree. It is black and about a foot long. The ant is gone. The flower has five lumps on it. It is about three feet tall. There is a big fern about two feet tall.

I Wonder

A few days later, the feather is still there. The flower is bent down and dead. A walnut just fell near me. The ferns are all brown and crispy. It looks as if there is a lot more brown than before.

A week later, the feather is still there. I can't find the flower. The ferns are dead. A squirrel is eating a nut. The spider web is gone. A prickly plant is growing. A maple tree is trying to grow. I pulled it out. I just found a cicada shell. There's another one!

Ten days later, the feather is still there. The tree is the same. There is a piece of wood a little to the left of the tree. It is a cylinder. Black walnuts are falling everywhere. A big crow just flew past.

Three weeks later, the feather is still there but it is hard to see it under all the leaves. Leaves are everywhere. I feel cold from a gust of wind.

Two weeks later, the temperature is 32 degrees. There is a big pile of leaves right in front of the tree. The tree is losing a lot of its leaves but there are still a lot of brown leaves. There are lots of crows cawing.

Two weeks later, there is a lot of snow on the ground. A few sticks are visible. There is a little patch of leaves and sticks that has some stuff sticking out. The snow is about two inches thick. The tree has some snow on it.

Six weeks later, there is a big lump of snow that has turned into ice right in front of the tree. The tree still has a few stubborn leaves clinging to the branches. I can see a lot of the leaves sticking out of the snow around me.

Two months later, it looks as if there are little buds just under the ground. The ground is moist and warmer than the air. There is a dead bat that looks as if it has been dead for a week. My mom said she found it in the attic and it was dead so she threw it outside.

A week later, the tree seems more alive for some reason. There are buds all over the ground around the tree. Some look like they will be white flowers.

Three days later, the tree is getting new leaves. Near the tree are some white buds. Right by my feet I see some little buds that look like they are the little blue flowers that we get all over the lawn in the spring. Oh yeah. It is spring. There are some buds that I think are bleeding hearts because that is where they usually are. They are already about 2-3 inches tall.

Two weeks later, I can't get to the place because there are all of these blue flowers all over my backyard. It looks as if there are some white flowers near the trees. Behind me there are some white-green plants that are about 4-5 inches tall. There are not as many blue flowers in back of me.

Lettuce In A Bottle

by Martellious Ward and Brian Donaldson, Lincoln Elementary

Introduction

Hi my name is Martellious. And my question is which lettuce would grow faster, the one with sand and soil or the one with soil? Brian and I did this project because we wanted to do a project on plants.

Procedure

Our first project was when we were doing "bottle biology". Our question was can a baby guppie live with a baby tadpole? We did not get to answer that question because when winter break came Brian took the guppie home and it died. That is when we started the second project.

Materials

The materials we used were two small bottles, lettuce, soil, sand, water and a chart to keep track of growth. I did not use other resources but I don't know why.

Here's what we did:

We connected the bottles with a bottle connecter. Then we cut holes in the bottles and then we put some sand and soil in one bottle and only soil in the other bottle. Then we planted seeds in the bottles. Well we started to water them a half cup every day and kept track of when they grew. Then over Winter Break we saw a huge plant growing. I still think that sand and soil grew the best When we first started we couldn't wait until they grew. Well, I think the project was meaningful when we like first started it.

Results

Our results were that lettuce in sand and soil grows faster. I think that sand and soil grew better is because the sand helps things grow.

Living Machine

by Michael McKinley and Room 74, Lincoln Elementary

Introduction

Hi my name is Michael I am helping Mr. Wirth on a science project called the Living Machine. I bet you're wondering what a Living Machine is, so I'll tell you. It is a living cycle of water that repeats itself over and over again through different stages and the goal is to try to keep all the water critters, snails, fish, plants and microorganisms living. Here's how it works. It is divided into three parts, a 30 gallon fish tank, a garden stage, and a wetland stage. The tank pumps water into the garden stage. The garden stage then cleans the water and the water also waters the plants we have growing in there. The water drains to the wetland stage then it goes up to the tank once again. The Living Machine could probably go forever if nothing goes wrong.

The class is working in Living Machine groups. There are four different groups and each group studies a different thing. The four group names are Pani, Sharks, Dolphins and the Jammin Fish.

Below are the questions and initial write-ups groups had about the Living Machine.

SHARKS

HI, my name is Ayshia. I'm in a group called the sharks. Here are the names of other people in my group: Denita, Donta, Shameka, Shaun, Eliezer, and Me.

We are doing a project on the living machine. Here are the first bunch of questions we want to answer:

(1) How long are the fish going to live?

(2) How much nutrients do the plants get each day?

(3) How much sun does the wetland plant get?

(4) What's the thing at the bottom of the tank and is it breathing?

(5) How do plants help the fish?

(6) How fast will the plants grow?

(7) How much water does the pumper pump per day?

(8) How much oxygen is in the living machine?

(9) Why do we use minnows instead of fish?

(10) Will the leeches kill the fish?

(11) Why do the living machine?

(12) How many little bugs are in the tank that we can't see?

(13) How much algae is in the tank?

I Wonder

(14) How do the snails grow?

(15) How do snails reproduce?

The three questions that we will try to answer are...

(1) How long will the fish live?

(2) Why do a living machine?

(3) Will the leeches kill the fish?

This is how we will answer question #(1) How long will the fish live?

We will research these things:

Fat Head minnows, what they eat and how long can they live.

We will observe these things:

Changes in how healthy they look and act, and what they are eating in the tank.

This is what we will do to answer question #(2) Why do a living machine?

We will find out what can we learn?

We will find out what we enjoy about the machine and what we do not like about the machine. We will think about what would we do differently.

This is what we will do to answer question #(3) Will the leeches kill the fish?

Research we can do on our question: what is a leech?, where do they live?, what do they eat?

Observation we can make: need to know how many fish and leeches we have?,where do they live in the tank?

Experiment: We can set up different bottles with different variable of fish and leeches. Here's how it might look

The F = fish The L= leech

bottle1(F,L) bottle2 (F) bottle3 (L) bottle4 (F,F,L,L)

Variables= number of fish and leeches in each jar

Constants=types of fish and leeches. Size = size of fish and leeches. Amount of water.

Bottom. Plants. Size of bottle. Amount of food given.

DOLPHINS

Hi, we are the dolphins and our names are Barbara, Emma, Shequalah, Elissa, Ernesto and Brian. We thought of 14 questions about our Living machine. Here they are :

1. How much pressure is in the "machine"?

2. How fast do snails reproduce?

3. How fast do fish reproduce?

4. How many gallons of water are in the "machine"?

5. What is growing on the sides of the tank; sides other?

6. Why do we have snails in the tank?

7. What plants can grow in the different stages of the living machine?

8. How does the siphon work?

9. What is the water temperature?

10. What is happening to the snail eggs?

11. Why are the fish on one side most of the time?

12. What would happen if we adjusted the time on/off of the grow light on the tank.

13. Could we draw background for the tank?

14. Why only 3 fish?

I Wonder

We had to choose 3 questions to answer. We did that by voting on which ones we like best. Here they are:

1. How many gallons of water are in the machine?

2. How does the siphon work?

3. What would happen if we adjusted the time on/off of the grow light?

Here's how we might answer them:

Q. 1.

-Empty the machine and measure the water using containers—-Get another tank and put the same amount of water into it fill up 5 gallon buckets with the water from the tank—-Research cubic inches

Q. 2—Watch the siphon—-Research siphons—-Try different siphons; maybe build them

Q. 3.—-Put a timer on the grow light

Things that might change if we do put a timer on it include:-More or less fish, snails, plants, and the temperature.

We will need to:-Take pictures-Take the temperature-Count the plants -Make other other observations

PANI GROUP

Hi. We are in a science group that we call Pani. Pani is Nepali and it means water. We have a girl in our group who is from Nepal and her name is Asmita. The other kids in our group are Emma L., Elsa, Sophanna, and Martellious.

We have five questions about the living machine that we have in our classroom. Here they are:

How fast does algae grow?

How fast does the machine clean water?

What is growing on the snails?

What is the smallest critter in the machine?

How long do leeches live?

We sat down with Mr. Wirth and took a vote to choose our main three questions. We picked:

How fast does algae grow?

What is growing on the snails?

What is the smallest critter in the machine?.

To solve question 1, we will remove all of the algae from the fish tank and see how long it takes to grow back. To solve question 2, we will look at a snail under the microscope and research what we see. To solve question 3, we will take a sample of water and look at it under the microscope to compare the size of the critters and hopefully to identify them. Then we will do more research on those critters.

All of the groups have collected some data and kept some journals, but this was a year to get to know the living machine. We hope to start right away next year setting up these experiment again or thinking of new questions.

Groups have written some journal entries. Here's what they have so far:

Dolphins

February 21, 1997

What we have done so far is...

observations, research and set up two experiments.

Observations on...

-Plants

-Snails (counted)

Research

I Wonder

-Siphons (Found out how to operate one)

-Cubic inches (Found out what they are)

Experiments

-Put a timer on the light on the tank (It's on now from 6 AM to 6 PM)

-Connected another siphon

-Used the information we found when we went

to the Library

2-27-97

Research

-We got this plant in the living machine the name of plant is potamogeton praelorgus

Today we added 3 of Ayshia's tomatoes plants and 1 of Shequalah's and Emma M.'s. We also added more rocks and it got the water stirred up so you can't see into the tank as well.

Jammin' Fish

2/19/97

Today we started our snail experiment:

Basically we are making observations on how snails live in a small environment.

Today we our snails set in our jars with a little bit of algae, a layer of rocks and 250 ML. of water.

2/20/97

Today Nate dumped all of the snails into one jar. Then we put them back in there place. We filled the cups up again to the 250 mark then put in the same amount of rocks in the jars.

Mike: I feel like we had to start over because we had everything done and then one of my group members put everything in a peanut butter jar. So I thought that might have hurt the experiment and we would have to everything all over.

Jeff: I thought it wasn't nice to dump all of the snails in a peanut butter jar. Now we have to start all over. Now the snails are back where they were. I think all of the group members are upset. P.S. PEACE!!!!!!!!!!!!!

2/20/97

Hi it's me Nate. The one everybody is mad at. Jeff lied. The members are not mad at me. I put the snails into one jar but who cares what I did. But today I found a bug in the tank.

Pani

Feb 20

Today we put two snails into a jar. And also put in rocks and water. We will observe to see what is on the snails.

Feb 27

Today we observed what was on the snails. On one snail there was some white stringy stuff that we think is probably some kind of algae or plant.

Mar 4

Today we learned that one of the snails in our jar died. We also put some algae in the tank to see if having plants in the jar will make any difference in how long the snails live. We also found out that there are ten more snails than before in the living machine, for a total of 26 snails.

On Friday, Feb 28, we got a grow light for the plants in the living machine. We found out that one of the plants in the tank of our living machine is one in the pondweed family. It's scientific name is *Potomogeton Richardsonii*. It has submersed leaves with wavy edges. The base of the leaves clasp around the stem. This plant and its leaves do not float.

I Wonder

Wooly-Bear Caterpillars

By Margaret and Jacob Wagner, John Muir School

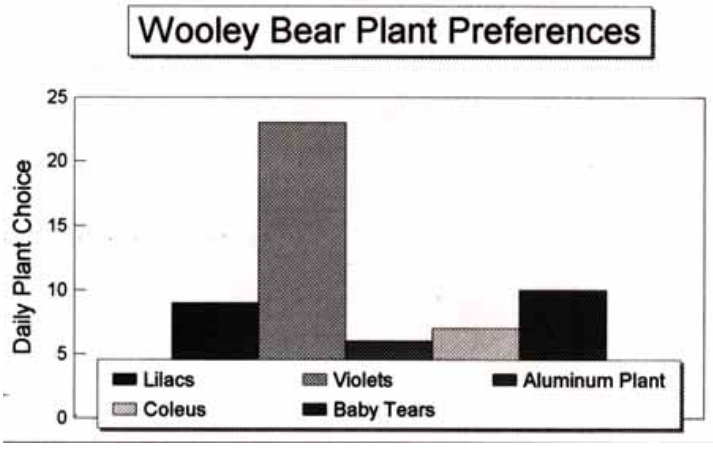
Introduction

Hi, we're Margaret and Jacob Wagner and we are in Mr. Wiesner's and Mrs. Bostrom's classes at John Muir School. We did a project on wooly-bear caterpillars. Our question was: Which plants do wooly-bear caterpillars like best? We got this idea when we found four wooly-bear caterpillars last summer and our mom suggested we put them in a terrarium. We named the wooly-bears Moby, Fuzzball, Cornelius and LCD. We wondered which plant in the terrarium the caterpillars would spend the most time on.

Procedure

We kept the terrarium at school and every day, right after school ended, we looked to see which plant the caterpillars were on. We recorded our data on a chart. We observed the caterpillars for three weeks. We had five different kinds of plants in the terrarium. They were: lilac, violet, aluminum plant, coleus and baby tears.

Results



On fifteen different days, we observed the caterpillars. Out of the 60 observations, 9 times they were on the lilac, 23 times they were on the violet, 6 times they were on the aluminum plant, 7 times on the coleus and 10 times on the baby tears plant. They were on the ground 5 times. We concluded that they liked the violet the best.

Acknowledgments

We would like to thank our mom for helping us to come up with our idea and getting us the supplies and our teachers for letting us keep the terrarium in the room.

My Plant Project

by Marcy Woehrle, John Muir School

I planted marigolds, zinnias, and sunflower seeds. First I got a cup and I put soil in the cup. Then I planted the seeds. I watered them and put them on a blue tray. I put it under the light.

The plant needs light inside and outside. The light outside is the sun. Plants also need rain. Inside they get water from me and Pat.

Some seeds I planted died because nobody watered them over Spring break. Without water they shrank.

I planted more seeds. Now they look nice.

Why are Lamborghinis the Fastest?

by Mario Launder, John Muir School

Introduction

I got the idea of testing aerodynamics from a book called Lamborghini the Fastest. I think that this project is important because I like Lamborghinis. I like Lamborghinis because of their designs, looks, and speed. I thought of my project when I was reading a book on Lamborghinis. I thought that my project would be easy and fun but it wasn't as fun as I planned or as easy as I thought. My question was: "Does aerodynamics have anything to do with the speed of a Lamborghini or is it mostly the engine

that makes it fast?" The way I'm going to figure it out is to make a car out of wood and k'nex. I can change the aerodynamics on the car and call up a mechanic. My hypothesis is that the speed of a Lamborghini is partly the engine and partly the aerodynamics.

Procedure

To do my project I needed wood, k'nex, pencils, ruler, drill, saw, marker, nails, tape and tag board. I made a car out of k'nex, and I made a ramp out of wood. To change the aerodynamics, I changed the shape of the k'nex. The angle of the paper was 23 degrees on the first car and the angle of the second car was 40 degrees. The paper was used to put in the middle of the big gaps so that the car caught the wind better. The only variables I had were the paper's angle and shape, and the k'nex shape. The constants were the ramp's angle, the car's base, the car's wheels, length of the ramp and the place to run it. I made a chart and wrote down the angle of the car and how far it went. I kept measurements of the distances and the shape of the car. I did this because I wanted to know which went fastest and farthest.

Results

For the first car I tested, the angle of the paper and k'nex was at a 23 degree angle and the second car angle was 40 degrees. There was only one thing that was unexpected and that was that the car kept crashing after I let it go. There were a lot of things I expected. One of them was that the k'nex kept falling out of their holes in the wood. One of the things I noticed was that, as soon as it hit the ground, it crashed. The other thing I noticed was that, on the second shape, it kept going three feet every time except for six times.

Interpretation

I found out that the 23 degree angle car went faster than the 40 degree angle car. My hypothesis wasn't proved right or wrong because the car kept turning to the right every single time. I didn't gather the kind of data I wanted to get because the car kept turning to the right and bumping into the wall and if it didn't bump into the wall it would have gone further. To improve my data I would have measured where the k'nex went in better.

New Directions

A few questions came up while I was doing my project. One of them was how to change the aerodynamics on the car. To make my car better I would change the wheels and the holes so that wheels went in straight. I would change the wheels to make it go straighter because the wheels I have now are at an angle.

Acknowledgments

I'd like to thank my teacher Mr. Wiesner and my mom, Betsy.

Comparing Plants

by Meredith Bourne, Lincoln Elementary

Introduction

My inquiry question came from my "I Wonder?" experiment last year and from going to the Great Blue convention and learning about other people's inquiry projects. I wanted to do this inquiry project because I am interested in plants and I did a project on grass seed last year that I abandoned because a lot of problems kept coming up and I didn't know how to solve them. This year I decided to do a project on plants strength and speed of growth. By doing this project I hoped to learn more about these plants (how they grow, what they look like, what makes them more healthy, etc.).

Procedure

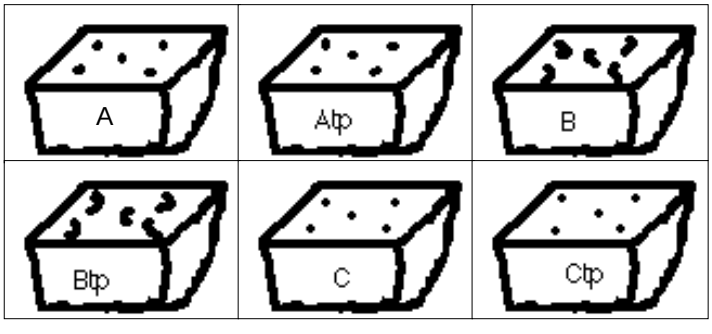
2-5-97 These are the materials that I will need: six planting pots, bean, carrot, and radish seeds, a spray bottle, a grow light, planting soil, measur-

ing cups, a ruler, tissue paper, tape, water, aluminum foil, and a notebook and pencil for documentation.

2-7-97 Today I put up a “needed” sign on the Sixer kiosk in our room, for the vegetable seeds, pots, and soil. I already have the other materials.

2-12-97 Today, after school, I went to Johansen’s garden store and got six plastic pots and two small bags of indoor planting soil. The pots are 4x4 in. at the top and 3x3 in. at the bottom. I found the bean, carrot, and radish seeds in a box that we keep seeds in at home. All of the seeds were from 1994.

2-25-97 I brought in all of the materials for my project to school today, except for the grow light, because I need my teacher to set up the classroom one. I also planted the vegetable seeds. I first cut out squares of aluminum foil and taped them to the bottom of the pots, because there were holes in them. Then I measured 1 and a half cups of soil into each pot and labeled them A and Atp for the radish plants, B and Btp for the bean plants, and C and Ctp for the carrot plants. The tp on three of the pots stands for tissue paper. I am going to put tissue paper on half of the plants to see if they can grow through it. After I had labeled the containers I planted five seeds in each pot in the shape of the five side on a dice. In two of the pots were radish seeds, two were carrot, and two bean. I planted the carrot and radish seeds a half inch deep and the beans one inch deep, according to the package instructions.

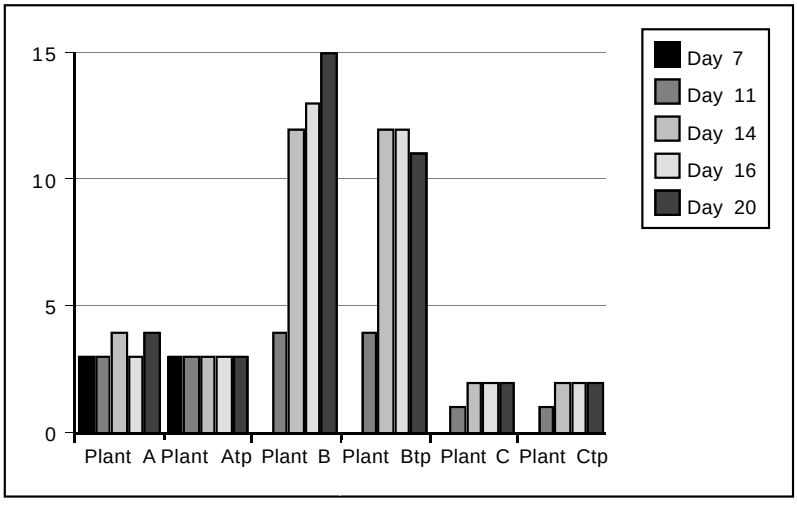


2-26-97 Today the single 20 watt grow light was put up. In the morning I watered each of my plants with two tablespoons of water from the spray bottle (36 sprays). Each day I will water them the same amount. I used water from a drinking fountain in our school. Then I put the pots under the grow light. There is 10 and a half inches from the top of the pots, to the grow light. The grow light is on from 7a.m. to 5p.m.

2-27-97 Today, after watering my plants, I cut out squares of cream colored tissue paper and taped it right on top of the plants soil, that I had labeled tp. I put the tape on the sides of the pots. I collected data on my plants and keep it in my inquiry notebook.

Results

I measured my plants while they were growing. The results are shown here:



For my first question (“Which is the quickest growing plant?”) the radish plants were the ones that came out of the soil first, but the beans grew faster. On March 8, I took the tissue paper off of the plants, because it was causing problems, so for my question, “Which is the strongest plant?”, I didn’t find out. I think that if I had left the tissue paper on, the bean plants would have grown through it, the radishes might have, but probably

not, and the carrots wouldn't have. Some of the problems that I had were trying to keep the tissue paper on, being very careful with the carrot and radish plants, because they were so delicate, and keeping the variables the same.

Interpreting results

Something that I discovered was that the soil that the bean plants were in was a lot lighter colored and a lot more dried out than the soil in the carrot and radish plants. I think it was because the bean plants were a lot bigger and needed more water. By doing my inquiry project I learned about how much water different plants need, what they look like, how fast they grow, and what kind of environment they need to grow in. If I had to do my inquiry project again I would make a few little holes in the bottom of the pots to drain out a little water, I would water the bean plants more, and I would write more about the observations that I made.

New Directions

Some other inquiries that could be done as a follow-up to this one are, trying cross pollination, giving the same plants different amounts of water or light, or trying to grow the strongest or healthiest plant in different environments.

Acknowledgments

I would like to thank my teacher, Jeff Maas, for helping me with my inquiry project, and making it possible to do.

Dolphins

by Mia Forslund, John Muir School

Introduction

My project is to do research on dolphins and their form. I was interested in them ever since I saw them at Bush Gardens and Sea World in Tampa Bay, Florida. I wanted to study an underwater animal that was endangered. I thought that I would get good answers to the questions I had. I thought that I would feel better knowing that my questions were getting answers. I also knew that I was already going to run into problems that I would have to solve. I made a sculpture so that I could tell people and also show people about dolphins.

Procedure

First I went to the LMC to gather information about dolphins. Then I brought the materials for the sculpture in. After a few tries, with some help, I got a form that worked. The materials I used are 2 pop bottles, hot glue, cardboard, 3 paints; black, white and dark blue, masking tape and flour and water to make paper mache. First I put the bottles together and taped it together and then I cut out the fins and hot glued them on. I had to hot glue and tape the tail fluke on. Then I made the paper mache and I put two layers on and then it was stable. I put the dolphin in a vice but the fins kept falling off so I had to hot glue and Elmers glue them on.

Results

I found out new things about dolphins that I didn't know. There are 31 species of dolphins. There are 5 species of river dolphins. The dolphins have eyes, ears and over 100 sharp teeth. The Ganges and Indusand river dolphins are nearly blind. Some dolphins are killed for food. They eat fish and sometimes plants. They are very good swimmers. Without their fins they would not be good swimmers. They also help them glide through the water.

Interpretation

My data tells me a lot about the body parts so it helps me a lot. I would have had trouble if I didn't gather data. It tells me they have ears and where they are located on the body and other things. I was very pleased because all my questions got answers and very sensible ones too. It seems

like I didn't have to worry about problems because I worked hard and got help and good answers. I could have maybe glued my fins on extra so that they would not fall off as easily. Please check The Gallery for a picture of my dolphin form.

New Directions

I could try to answer some new questions that came up. They are: How many babies do they mostly have at a time? What do they do all the time?

Acknowledgments

Thanks to Mr. Wiesner for the encouragement and helping me when I got stuck. And to Maria and Tamara for helping me write this article.

Test Your Memory

by Nikki Weismer and Nicole Schumann, Randall School

Introduction

Hi! My name is Nikki, my partner's name is Nicole. Our question is: can people remember twelve objects? We got this question from two other kids who were doing a similar project. They stopped doing it so we started the project, but we changed it a little.

The first time we tried the project it was with numbers but it wasn't that interesting to us, but then we tried it with objects and it was more interesting so we continued the project. We expected to discover that a lot of people would remember all the objects.

Procedure

What we did was we gave each person fifteen seconds to look at our twelve objects. When their fifteen seconds were up we would close the box and they would have two minutes to write down as many of the twelve objects as they could. We tested each person twice. The materials we used were the objects in our box: 1) glue, 2) gram, 3) pencil, 4) colored pencil, 5) pen, 6) pen cap, 7) book mark, 8) chalk, 9) playing card, 10) crayon, 11) chess piece, and 12) tissue. We hadn't planed to write everybody's name and score on a big piece of tag board; that was Nicole's idea I think. One of our problems was writing this article together. Also we couldn't test everybody, and that was a problem.

Results

Names	# right	Change
Alex	10	+ 3
Josh B.	9	+ 2
Kevin Gl.		
Kevin Ga.		
Jane	11	+ 4
Charlotte		
Gov	10	+ 3
Billy	10	+ 3
Karen	11	+ 3
Caitlin L.	10	+ 1
Caitlin J.	12	+ 2
Colin	11	+ 1
Will	10	no change
Meaghan	9	- 1
Josh F.	11	no change
Timmy	8	+ 3
Fang-Xin	10	+ 2
Maureen	10	+ 2
Willam		
Fue		

Only one person got them all correct the second time we tested her. A lot of people improved the second time we tested them. Only one person didn't improve the second time we tested her. I guess that people did better the second time.

Interpreting Results

The graph above shows the results of the second time we tested the kids in our class. The second column that says “# right” means how many problems they got right on the second test. The next column that says “change” means how many more, or less, problems they got right on the second test than on the first test.

All together on average people did better the second time we tested them. The average score improved by 23%. Still our original hypothesis was wrong since not a lot of people got them all right.

New Directions

If I had to repeat my project I would give them more time to look at the objects and maybe have a few less objects. If you wanted to do a similar project, you could have a certain number of objects, then show them to somebody, cover the objects up, take a few away, then show them to the person again and see if they could figure out which ones were gone.

Acknowledgments

We would like to thank Mr. Wagler for helping us with our problems.

Rats and Color Preference

by Phil Jagielo and Brandon Weidemann, Hawthorne Elementary

Introduction

Hi. This is Phil and Brandon and we go to Hawthorne Elementary. Our project is what color rats like. Pat DiBiase knew a friend that works at the University and she said rats can see a little bit of color. So our hypothesis is that rats will like the color green. The reason we picked green was because we like the color green.

Procedure

Materials: scissors, masking tape, Munchems for the food, colored paper, the rats, and cardboard. We got the rats from Lynn at the science materials center (we had them all year). The way we answered our question is we set up a maze with 4 different colors at the end and the same piece food at the end. The colors we used were red, green, blue, and yellow.

Results

Blue=7 Red=2 Green=5 Yellow=4

The rats liked the blue the best.

Interpreting Results

Our original hypothesis was wrong because we chose green and they liked blue. However, the blue is just two more than the green. So maybe the rats would like green if we did more tests. We don’t really know how many more tests we could do, but our teacher says it is a lot.

New Directions

The thing we would do different would be that we would make a more complex maze and maybe use a different animal such as a gerbil or a hamster. We would do more tests.

Acknowledgments

We would like to thank: Nancy Lanyon for encouraging us, Danny North, Shanna White, Ryan Borland, Richard Nanthasane for helping us construct the maze, Sean Ott for helping me (Phil) handle the rats while Brandon was away from the room, the rats, and Jim and Oscar for the cardboard.

I Wonder

Will a Volcano Erupt With Alka Seltzer and Vinegar and Water?

by Richard Nanthasane and Shaun Manley, Hawthorne Elementary

Introduction

Richard had experience with volcanoes at the Union because they did a project there. I had experience at my friend's house because they were doing it when I got there. So we just thought it would be sort of fun. We expected the volcano would blow.

Procedure

Materials: Alka seltzer, vinegar, water, film container, and a graduated cylinder.

We tried to make a volcano like Jessica. First we took an empty Snapple bottle and put it in a bag and folded the bag around it.

We took Alka seltzer, vinegar and water and put it in the bottle and it didn't work. We took a film container and used half an Alka Seltzer, 10ml of water and 10ml of vinegar.

Results

We didn't use the volcano. We just used the film container. We put a tight cap on the film can and it blew off. Sometimes it blew off, and every once in a while it didn't.

Interpreting Results

The bottle didn't work because it didn't have a tight cap. We learned that Alka Seltzer has a lot of gas when you put water into a film can and put a top on it.

New Directions

We will problably do it next year, but we will try to find a new cap that will fit the Snapple bottle.

Acknowledgments

Shaun Manley, Jessica, Jeff Beutel, Brandon, Richard

Watering Plants With Polluted Water

by Rickel Fedrick, Hawthorne Elementary

Introduction

Hello. My name is Rickel. My project is on plants. I got my project from Boa Yang. He was doing plants too, but we are doing our plants differently. He just did his on sugar water. I numbered the plants 1, 2, 3. #1 has pollution water, #2 has marsh water, and #3 has clean water. My question was "Would a pollution plant grow?". I did three different plants. I did not plan for two of my pollution plants to grow. I think my project is meaningful because people have to know how plants work because they are going to be with you for the rest of your lifetime.

Procedure

Materials: I used dirt, water from the marsh, water that I got from a dirty lake, 3 plastic soda bottle, and seeds.

I began planting in December. I had to cut a 2 liter bottle in half and I used the bottom part. I put dirt and 2 seeds in each bottle. On my project, I had to observe the plants, and what I was looking for was how tall they would grow and how long it would take. I picked this experiment because I thought that I was going to do a lot of science.

Results

The marsh plant and the dirty water plant died in January.

The surprise that I discovered was that when my clean water plant grew it had pinkish-purple leaves. My plant grew 48 cm tall, and it died on 2/25/97. Before it died, it grew a bean pod 5cm long.

I Wonder

Interpreting Results

I think that the dirty water and the marsh water were not good for the plants. So people should clean up that dirty water more so that we can have more living things.

New Directions

If I do this again, I would water them all with clean water until they are bigger. Then I would water them with marsh water and dirty lake water.

Acknowledgments

I would like to thank Jessica for helping me with my project.

Bird Feeder

By Briana Dinkins and Ryan Borland, Hawthorne Elementary

Introduction

Our names are Ryan and Briana. We got our question and idea from our teacher, Nancy Lanyon. She told Ryan about the project, but Ryan never did anything with it. So about 4 weeks after, I asked if I could help with the project and he said "Yes." Once I came in, we started collecting our data. We think our bird feeder project is meaningful because we give the birds a free meal. We thought that we wouldn't get our bird feeder up in the tree before spring break, but we did.

Procedure

Last year on a field trip, Ryan and I made a bird feeder at Mackenzie. We have two bird feeders. One of our bird feeders is taped on the window. The other bird feeder is hanging on a tree. The tree is about 11 meters from our classroom windows.

The materials we used are: water bottle, scissors, bird seeds, hanger, paint, a little silver plate, ladder, and a tree. We collected our data by going outside for 20 minutes and just watching the bird feeder until a bird would come around it. Then we would write down in our journals what kind of bird it was. (The male bird is more colorful.)

Results

We saw the birds at school and at the marsh. The birds that we saw at school were: a cardinal, robin, black bird, seagull, dove, 2 sparrows and a blue jay. The birds that we saw at the marsh were: 8 robins, 2 sparrows, 2 redwing blackbirds, 2 blue jays, a woodpecker, and a hawk.

The bird feeder on the window is never empty. We need to keep putting food in the bird feeder that is on the tree.

Interpreting Results

We saw robins and redwing blackbirds. They are birds that come in the spring so spring is here.

When we went to our marsh on the 3rd of April, Nancy said we can collect data there and the data we collected there we can also use for our project Before we left the marsh, I looked at our paper and I had a page just full of the data. I thought we would never go to the marsh, and if we did we would never count that data. We actually didn't have any problems.

At the marsh there was a lot of different birds that we saw there. The surprise was that we got a lot of data. We also got more done working so cooperatively.

New Directions

If I or another person does this project again, I would write down the time I see the birds. Then the next day, we would go outside and we would look back on our data and see what time the most birds that we saw came out.

Acknowledgments

Ryan and I would like to think our teacher, Nancy, and our student teacher, Jeff, and all of our classmates.

Plants and Music

(First Half)

By Sama Shannag, Hawthorne Elementary

Introduction

My question is “Can music help plant growth?”. I got my question from a book (I forgot which one) where a girl entered it in her school science fair. Our project was to take 3 plants of the same kind and play classical to #1, country to #2, and Z104 to #3. My hypothesis was that classical would grow first because it is relaxing.

Procedure

Materials: 3 plastic cups, seeds, and dirt, music from a radio (classical at 88.7, country at Q106 and Z.104 at 104.1).

First I planted 3 plants and watered them. Then I played the music, and for about 5 weeks everything was fine. I was in a partnership with Miranda and then everything happened at once. The lima beans didn’t grow, someone took the labels off the cups and it was all ruined. Miranda and I switched partners because we had a disagreement and Sarah and her partner had a disagreement.

(Second Half)

By Sama & Sarah Hoffmaster

We replanted. We had 2 radish seeds in each cup and we were to water and music them every other day for 5 minutes. We also added holes in the bottom for water to seep out. Our materials were the same as the ones used before.

Results

We weren’t very good at watering and keeping track, but in the end only classical grew. The worst problem was musicing them all the time. It was taking a lot of our time.

Interpreting Results

Our hypothesis was right, classical grew first. We discovered that if you don’t put holes in the bottom of the cup you drown the plant.

New Directions

Maybe next time we could try different kinds of music, not classical, country and Z104. We also would be more careful at watching the plants.

Will Seed Shrimp Live Longer in Dark or Light?

by Sean Ott, Hawthorne Elementary

Introduction

I got my question from Mom. She got it from a science book for kids.

I did it because it was kind of cool. My hypothesis was that the ones in the dark will die and the ones in the light will live.

Procedure

Materials: I used two bottles and the shrimp. They ate cooking yeast. I put filtered water in the bottles. I put the dark ones in my back room and I put the light ones on the dinner table. I observed the shrimp every other day for about a month. I fed them twice a week.

Results

The ones in the dark died first. Well, all of the shrimp died at the end because my dog spilled all of the light shrimp a week later. The shrimp in the light lived longer, though.

Interpreting Results

I was right about my hypothesis. Shrimp like light more than dark.

New Directions

I would put in water lilies to see if they like to attach their babies to plants. I would use an aerator next year and try more or less air.

Acknowledgments

I would like to thank my Mom.

I Wonder

Bacteria Growth by Age and Gender

by Shaina Stewart, Lincoln Elementary

Introduction

I got the idea of sampling bacteria from REACH. I wanted to know if I sampled kids' hands for bacteria, would age or gender make a difference in the amount of bacteria they grew? I did this inquiry because after I got involved in it, I got interested in what the results would be. Would age or gender make a difference?

My inquiry project was meaningful because if I had found out, according to my data, that all kids grew a lot of bacteria, maybe kids should learn about washing their hands at a young age. Then throughout their lives, washing their hands could become a habit. I expected to discover k-1 kids to grow the most amount of bacteria. I expected this because I thought they wouldn't know as much about washing their hands as older kids would. I expected 5th graders to grow the least amount of bacteria because they would probably have been taught about washing their hands and be doing a better job of washing their hands.

Procedure

On February 12 I met with our REACH teacher, Ms. Seguin, to make agar. Agar is a yellowish, off-whitish colored substance that is kind of see-through that will grow bacteria. In order to grow bacteria in agar you rub a q-tip on whatever you are sampling bacteria from, and then you rub the q-tip all over the agar. Then the agar grows the bacteria.

First, I poured agar powder on a scale until it got to exactly 23 grams of agar powder . Then I poured it into a pot with one liter of water and boiled it. While it boiled we stirred it about every minute. It got all foamy and boiled over! A few minutes later it almost boiled over again! And in a minute it did it again! We found a way to stop this by stirring and pushing the water down with the spoon. After 10 minutes of boiling the agar we let it cool. After it cooled I poured it into the petri dishes so it was about 1/4 inch thick.

I did the sampling for my experiment on February 18, at 1:30 pm. Ms. Seguin pointed out that I should sample everyone at the same time or it would throw off my experiment. For example, if I sampled some kids before recess and some after, the ones who had just come in from recess might have all sorts of stuff on their hands from their mittens.

Here's how I took the samples: I got a boy and a girl volunteer from every grade, kindergarten through fifth, plus some extras from my class. I asked each volunteer to put his or her name and grade on a piece of masking tape and stick it on a petri dish. Then I used a separate q-tip for each volunteer. I rubbed the q-tip on the kid's palm and all fingers seven times, rotating the q-tip as I rubbed. Then I rubbed the q-tip in the petri dish with that kid's name. I rubbed back and forth, and then up and down while I rotated the q-tip, like this diagram shows.

Ms. Seguin told me to keep the agar in a warm, dark place before and after taking the samples. So I gathered up the petri dishes, put them into two bags and brought them back to my classroom. I put paper clips on the bags to keep them closed. As I was getting a paper clip I accidentally dropped one bag! The one petri dish that cracked was from a volunteer from my classroom. I picked one of the extra samples I had taken to replace it. I was lucky I had taken extra samples!

I decided to keep the petri dishes laid out inside a cabinet in my classroom, rather than in bags. They stayed in the cabinet one week.

I Wonder

Results

Kindergarten: The boy had a small amount of bacteria, so I could count the specks. I counted about eight little specks of bacteria and one big speck, The big speck was about this big. (See graphic 1.) The girl had about five specks of bacteria.

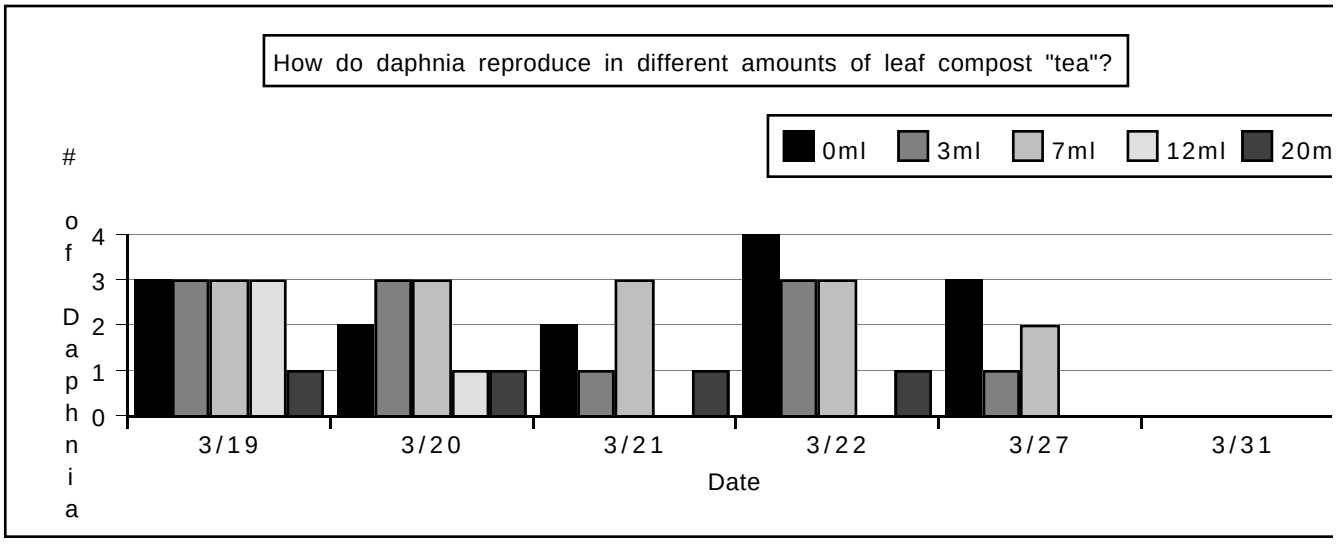
First grade: The boy's petri dish was speckled with little dots that were either black, orange or yellow. I counted about 21. There was also a fuzzy off-white colored blotch at the edge of the petri dish. It looked like this: (see graphic 2.) The girl grew lots of bacteria. All together I counted about 40 bacteria specks. They were colored orange, yellow and off-white, about the same color as the agar. She also had what looked like little specks stuck together.

Second grade: The boy's grew about 81 specks, many this size: (See graphic 3.) The colors were orange, yellowish/off-white and off-white. The girls, on the other hand, had almost no bacteria. I could see only one speck of bacteria, about this big: (See graphic 4.) The color was off-white.

Third grade: The boy had only about three specks of bacteria. They were yellowish/orange and off-white. One was this big (See graphic 5.), one was this big (See graphic 6,) and one was this big (See graphic 7.) The girl had about seven specks. One was about this big (See graphic 8.), one this big (See graphic 9.), and the rest just dots. They were off-whitish and yellowish/orange.

Fourth grade: I could see only three specks of bacteria in the boy's petri dish. They were small dots about this big: (See graphic 10.), and were white, off-white and a yellowish color. The girl grew about five specks of bacteria the same colors as the boy's. They were mostly the same size as the boy's bacteria.

Fifth grade: The boy's bacteria was a little different shape. It was more irregular, like this: (See graphic 11.) There were four spots like this. (See graphic 12.) They were either white or off-whitish in color. There were two spots that looked like specks stuck together, similar to what I found in the first grade girl's petri dish. The girl's grew about nine spots of bacteria about this big: (See graphic 13.) One looked like this: (See graphic 14.) Another looked like this: (See graphic 15.) They were white/off-white and yellowish/off-white.



One problem I had was having three outliers: 80 specks, 40 specks and 21 specks. An outlier is some data that doesn't fit in with the rest of the data.

If I were to do this inquiry project over, I would interview the kids before taking samples. I think that might have helped me figure out why the outliers occurred.

Interpreting results

My original hypotheses wasn't right. I thought that kindergartners would grow the most bacteria. I thought that they wouldn't know as much about washing their hands as the older kids. But, the fifth graders grew more or bigger bacteria. The only surprise I really had was having three outliers.

Acknowledgments

I would like to thank the following people: Ms. Seguin, for helping me make the agar and telling me how to grow the bacteria, the kids who volunteered to be sampled for bacteria, my Mom for helping me type this article, and Mr. Jeff for his help in so many ways.

Lima Bean, Kidney Bean and Black Bean

by Miranda Jones and Timmy Hadden, Hawthorne Elementary

Introduction

I started the project with Sarah Hoffmaster, but we had two different ideas about how the project should have gone. So Sarah went with Sama and Miranda went with me.

Our question came from last year's buddy project. We were trying to see what plant grew in what solution. The reason why we did what we did was because we were trying to find out if solutions would help our plants grow. We think our project is meaningful because if the plants grew with the solutions, people could water their plants like that on a daily basis. We expected that the plants would grow when we watered them with regular water. Our hypothesis was that the plants would grow with all four solutions, soap, salt, flour and water.

Procedure

The materials we used are: 4 lima beans, 4 kidney beans, 4 black beans, a 9 1/2 X 12 1/2 inch box, 12 medium plastic cups, and 15 cups of mulch.

We picked 3 different kinds of beans and planted each bean in 4 different cups. So now we have 12 cups. What we set up was the box with 12 cups cut in half, and filled each cup with a cup and a half of mulch. Then we watered the cups with a cup of regular water every 3 days. We would water the plants on the first day then observe them the other two days. We were going to water the plants with soap, salt, flour, and water, but we planned to water them with regular H_20 until they began to grow.

Results

The results are that only two of our plants grew: the lima bean we were going to water with soap water, and the kidney bean we were going to water with salt water. We really didn't get to water them with the solutions because they were not all growing very well.

Interpreting Results

We could not tell if our hypothesis was right or not because only two plants grew and we thought they all would. We do not know about the solutions because we did not use them. We do think we used enough plants to get a lot of data if the plants would have grown.

New Directions

We could try the experiment over again and use different beans or plants.

Acknowledgments

We would like to thank our teacher, Nancy Lanyon, and our student teacher, Jeff Beutel, for encouraging us to keep the project going.

Toad Project

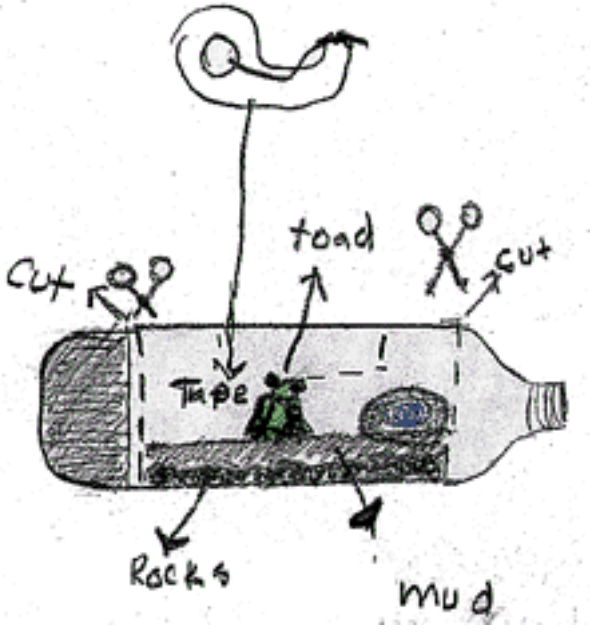
by Elsa Freer, Lincoln Elementary

My name is Elsa. I am in room 74 at Lincoln school. My question is: "What kinds of behaviors do toads have?" I thought up this question because I thought it would be fun and interesting. I didn't know that it would be as easy as it sounded.

Procedure

First, I drew a plan of how I wanted it to look and wrote down a list of things that I would need.

This was my initial drawing:



Then I took it home and showed it to my mom and dad. They said that they would help me. I was very happy my project was starting. The next day when I got home my mom and I went to get the supplies I would need. Then when we got home we looked at my design, got some bottles and started working. When we were finished I was tired. We had worked hard.

It looked great. The next thing that we had to do was put in rocks and dirt and water so I took it to school. With some help from my friend Emma we put in the things that would make it more like a habitat a toad would live in. The next step was getting a toad so we went to my grandpa's house (he has toads) and he gave me a toad. I named him Cricket. I feed him worms and he lives in his house of bottles.

Results

I have observed him a lot. Here is your basic toad day:

Every morning I give him a worm (and of course he eats it) then he goes in his little pond and sits there, I guess so that his food can digest. Then he wanders around and then after that he takes a nap and that is a basic toad day.

New Directions

Here are some questions that I may try to answer now that I have my toad. What food does the toad prefer? What area of my bottle does the toad prefer?

Acknowledgments

This project was fun and thanks to my mom, dad, grandpa and friend Emma it worked.

I Wonder

Can mold infected water affect a fresh piece of bread?

by Andrea Fetherston, Country View Elementary School

Introduction

My question came from my teacher, Mr. Gundlach. He knows how much I'm interested in mold and said maybe I could try to grow it underwater. I liked that idea, so I went to a book called Lots of Rot to help me. When I was looking in it, I found an experiment that sounded neat. You did the experiment by putting a moldy piece of food into a bag with something fresh. You had to make sure the objects were touching, and then see if the mold would spread onto the fresh object.

But I needed to find a way to connect the experiment to lakes. So I asked Mr. Gundlach what I should do. He said I should see if mold can spread through water onto a fresh piece of bread. I thought that was a great idea, and started planning the experiment. I decided to do what I did because I thought it was the only logical way to do the experiment. I think my project was worthwhile, even though I didn't grow any of the totally green mold that I expected.

My hypothesis was that mold would grow on the bread because the germs from the mold would use the fresh bread as their food. I expected to see the fresh bread turn green, because the mold in the water would "take over" the fresh bread.

Procedure

Materials I used were: a big bowl, tongs, a fresh piece of bread, green moldy bread (from a moldy sandwich that I had), water, and two plastic ziploc bags.

1. I filled the bowl half full of cold water. I don't think it matters what the water temperature is.

2. I put the moldy bread into the water with the tongs. The reason I used tongs was to keep my hands from getting wet.

3. I left the moldy bread in the water for twenty-four hours.

4. I took the moldy bread out with the tongs (which was very difficult), and replaced it with the fresh bread.

5. I put the bread in three conditions: Some of the bread was in a ziploc bag with no air, some of the bread in a ziploc bag with air, and some of it stayed in the water. I observed the bread for eight more days.

6. I wrote this report.

Results

Below are some observations that I wrote in my Science notebook:

3/17/97

Today I put the moldy bread in the water. I found a lot of things out. I found that when you push the mold under the water it comes back up and is dry. When you force the mold underwater it looks white.

3/18/97

Today I took the mold out of the bowl. It was time consuming, but Ms. Westphal helped me make the process go quicker. I also put the fresh bread in little chunks. Some really small chunks of moldy bread are still in the bowl.

3/19/97

Today I thought my experiment was a complete flop, but I guess it wasn't. Mr. Gundlach gave me some suggestions. He said I should put some bread in a bag without any air, some with air, and he said to keep some in the water for the rest of the data collecting days. So I set it up that way.

3/20/97

The bread without any air is a complete liquid today, and it has little black dots in it. The bread with air is soupy, but is still solid. The bread in the water is soggy, and the little tiny mold chunks have white around them.

3/21/97

The bread without water is just yellow soup. The bread with air is in the stages of becoming a liquid, but still is chunky. It also smells really bad. The bread in the water smells terrible. I think mold is starting to grow, and the big pieces of bread broke into tiny pieces.

3/24/97-3/27/97

I had spring break and I had to go on a trip so my mom observed and said that everything stayed the same.

3/28/97

The bread in the water has some brown, and the bread formed a circle. Some of the bread with air is gone. The bread without air has stayed the same.

Interpreting Results

My hypothesis wasn't right. I thought the mold in the water would make the bread turn green, but it did not. I discovered a lot of exciting surprises, like the wet bread without air turned from a solid into a complete liquid. The bread in the water formed a circle of bread and some of it turned brown. I learned that there are other kinds of mold besides green mold, and that when mold is in different places it can do some pretty weird stuff.

New Directions

I only observed for ten days, but you could observe for longer and see what happens over a longer period of time. BEWARE OF THE SMELL!

Acknowledgments

I would like to thank Mr. Gundlach for helping me with my problems and idea. Also, I would like to thank my mom for observing while I was gone.

Will Copper in Plant Food Affect Growth of Filamentous Algae?

by Holly Fitzgerald and Meredith Johnson, Country View Elementary School

Introduction

We started out wanting to do a project we found in the 1996 Great Blue. It was about what food daphnia live better on. We found out that a lot of people in our class were doing that, so we changed our project to: "Does copper in plant food affect the growth of filamentous algae?".

We got the idea when our class was talking about another type of algae called Scenedesmus. Our class was trying to grow Scenedesmus to feed daphnia, and we were using a fertilizer called Miracle Gro to help the algae grow. It didn't work too well though. We heard from a scientist at the university that copper kills algae, and Miracle Gro has copper, so we wanted to find out if that was true.

We were going to use Scenedesmus for our project, but we didn't have any left. So we used filamentous algae. We wanted to do this project because we wanted to find out if copper REALLY affects the growth of algae. To test our idea we used two kinds of plant food, one with copper, and one without copper. We thought the plant food with copper would make the algae die. We thought this because when we used plant food with copper, all of our Scenedesmus algae died. With the non-copper plant food we thought that the filamentous algae would grow longer and reproduce more.

I Wonder

Procedure

1. First we got two of the same containers and put the same amount of water in each container.

2. Then we tried measuring the length of our starting algae, but that didn't work so we weighed the algae using an electronic balance.

3. We put 3.8 grams of algae in each container.

4. Then we put 0.3 grams of plant food in each container.

5. We put Miracle Gro, which has copper in it, in one container and in the other container we added "All Purpose" plant food, which has no copper.

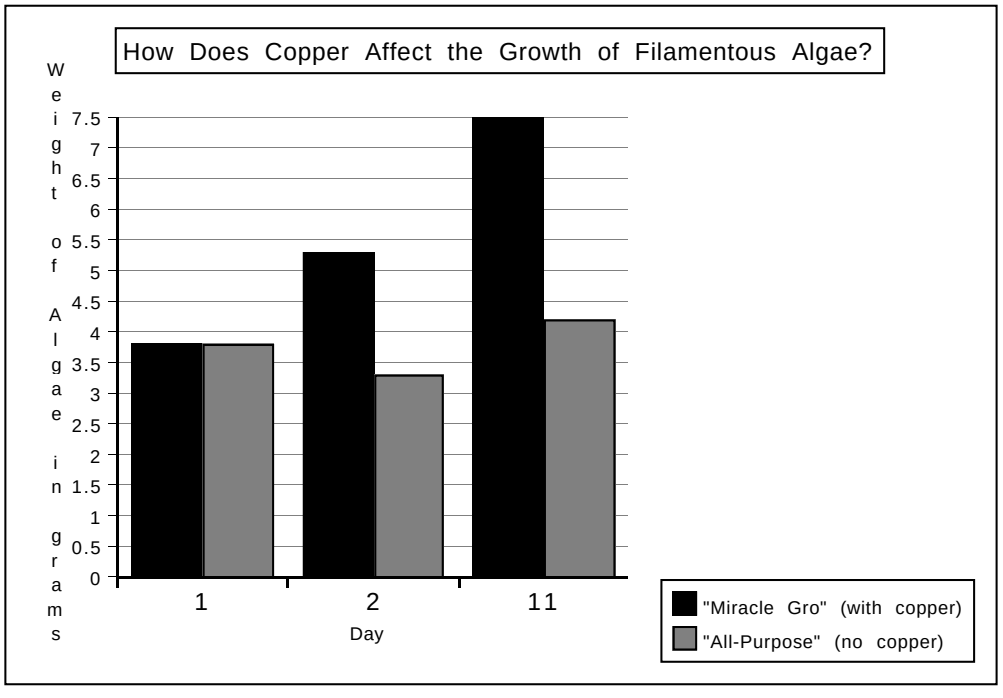
6. We put 0.3 grams of plant food in each container per day for 2 days. Over spring break we didn't add any plant food. Originally we were just going to put in 1/4 teaspoon of plant food, but that didn't work because according to the package a certain amount of plant food had to go with a certain amount of water. We picked 0.3 grams because we used math to find the closest match to the directions on the back of the packages. At first it was hard weighing the plant food, but then it got easy.

7. Every day when we had science we would weigh the filamentous algae to see if it had grown or reproduced, or if it was dying.

Results

Does copper affect the growth of filamentous algae?

Day	"Miracle Gro" (with copper)	"All-Purpose" (no copper)
1	3.8	3.8
2	5.3	3.3
11	7.5	4.2



On the second day we did this experiment, we found out that the algae whose food had copper was doing better. Non-copper algae weighed 3.3 grams, which is lighter than when we originally put it in! Copper fed algae weighed 5.3 grams, which is more than when we originally put it in! We had a10 day spring break, and didn't weigh the algae for 11 days. When we came back from vacation, we found out that the copper-fed algae was doing better. The algae with copper weighed 7.5 grams, and the non-copper algae weighed 4.2 grams.

Interpreting Results

Our hypothesis was wrong. We thought the plant food with copper would make the algae die, but it really helped the algae grow. We were surprised that on the second day the algae weights either went up high or they went down low from the original amounts. We think the reason the copper fed algae did better on this experiment than the other one with Scenedesmus algae is that we didn't read the directions on the package during our Scenedesmus experiment, and you can only have a certain amount of plant food with a certain amount of water. We probably overdosed fertilizer on the Scenedesmus.

New Directions

If we did this project again we would collect more data. We only weighed our algae three times over a 2 week period. We could do a full week of data collecting and use a different variety of plant foods.

Acknowledgments

We would like to thank Mr. Gundlach, our teacher, for helping us set up our experiment. We would also like to thank other classmates who helped us, especially Emma Fortune.

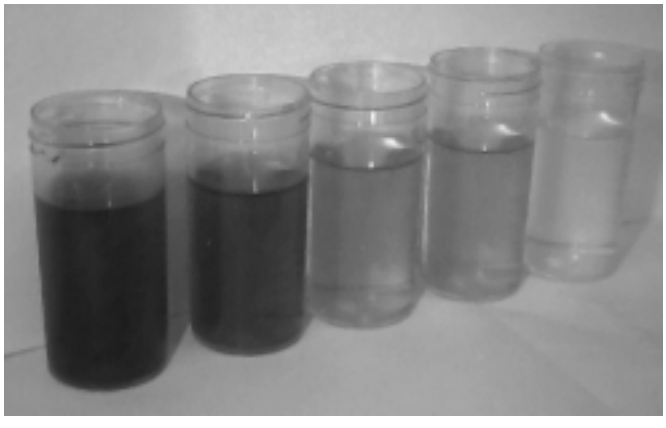
Do Daphnia Reproduce Better or Worse in "Decomposition Tea?"

by Shana Rudy and Caitlin Wilson, Country View Elementary

Introduction

Eureka, daphnia!! Our "I Wonder" question is, "Do daphnia reproduce better or worse in decomposition tea?" Decomposition tea is the colored water that comes from decomposing leaves. In our procedure section we explain how to make the tea. Daphnia are small, see-through animals that swim with their antennae. The reason our project might be important is if decomposition tea gets into lakes, and decomposition tea kills daphnia, then that might be the reason for the small population of daphnia in lakes. We got our idea from our teacher, Mr.Gundlach.

Caitlin thought that 7 milliliters (ml) of the liquid would make daphnia reproduce the best when added to about 40 ml of water. She thought so because it's a small amount, and in between all the other amounts that we tested. Shana thought that 3 ml of tea would make daphnia reproduce best because it's the smallest amount of liquid that we tested, and too much liquid would make the daphnia die.



Procedure

This is what we did step by step:

1. We made decomposition tea by decomposing leaves from our school forest. We did this by putting them in compost columns made from two liter bottles. The tea is formed when you pour water through the columns.

2. We got 5 plastic 65 ml containers, 15 daphnia and decomposition tea (liquid).

3. In each of the five containers we made a different mixture of tea and water. Container #1 had 0 ml of tea and 40 ml of water. Container #2 had 3 ml of tea and 37 ml of water. Container #3 had 7 ml of tea and 33 ml of water. Container #4 had 12 ml of tea and 28 ml of water. Container #5 had 20 ml of tea and 20 ml of water.

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4. In each of the containers we put three daphnia.

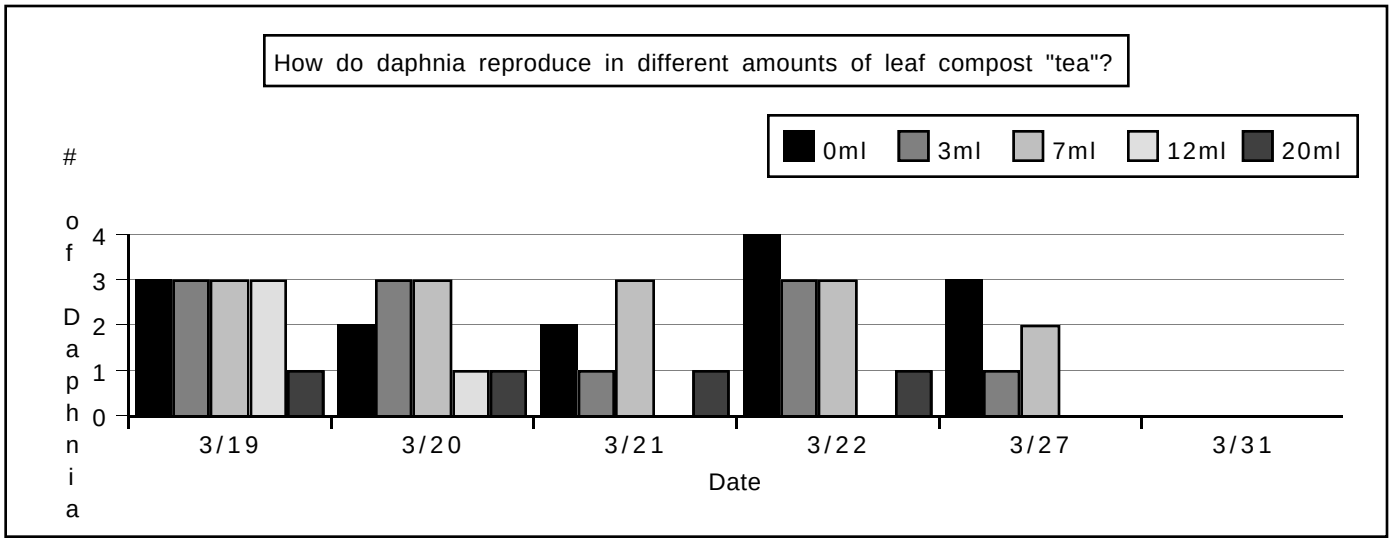
5. Then we observed each day and counted the number of daphnia in each container.

Results

The results we encountered are in the table and graph below:

"How many daphnia were alive with different mixtures of water and tea?"

	Amount of leaf compost "tea" we mixed into a 65 ml container :				
Day	0ml	3ml	7ml	12ml	20ml
3/19	3	3	3	3	1
3/20	2	3	3	1	1
3/21	2	1	3	0	1
3/22	4	3	3	0	1
3/27	3	1	2	0	0
3/31	0	0	0	0	0



Interpreting Results

Daphnia reproduced best when no tea was added to the water. The least amount of tea added caused the daphnia to do best, but the container with the most tea added was not the one where the daphnia did the worst! The container with 12 ml of tea did the worst.

We ran into two problems. One was that we needed more time to take data, and because Spring break was approaching we had to take our containers home. Shana took three containers, while Caitlin took two. The other problem we had was that we didn't know how to do percentages, so when we put 3 ml of tea in the container we thought it was 3% tea. Really it was just 3 ml of tea out of 40 ml, so we kept it that way.

New Directions

For a new direction, you could add a new daphnia every other day to see if that helped the other daphnia in the container, or you could see if daphnia reproduce better in tea or with another liquid substance.

Acknowledgments

We'd like to thank Mr.Gundlach for his supplies, support, and editing on this report!

ESP

by William Coggin and Joshua Frenkel, Randall School

Introduction

Hello. My name is Will. My partner,Josh, and I are working on an ESP project together. I got the idea at a “Great Blue” conference. After I started, Josh became my partner.

Hypothesis

Our hypothesis was that no one would get anything right. If anyone had gotten one right, it would probably be under these conditions: it would be in a quiet place in the school. Also they would probably have full concentration on the other person’s mind.

Procedures

These are the procedures when we tested people with the pictures. First we would go to a quiet place in the school. Then Josh would open up the folder so the person was not able to see the answers. I would sit in a chair with the notebook to record the data. Josh would concentrate on one of the five objects on the paper. The person would guess what the object was. We had cut the objects out of magazines. He’d do this for each of the five pictures.

This is the procedure for the card test. We would get half a deck of cards (26). Josh would put a card down on the table (face down) and the person would write down what they thought the card was and they would do this 26 times. Then we would make an answer key with what the cards really were and we’d write the name of whose answer key it was. Then we’d star the ones they got right and put it on a graph with their name, how many they got right out of the 26, whether it was a face card or a numbered card, and whether it was spades, hearts, clubs, or diamonds.

Results

These are the results for the card testing. We think that maybe only one person has ESP. We are still not sure. His name is Billy. He got eight right out of 26. That is very good. Afterwards he said that he saw the cards but we think that he just didn’t want to brag. Also another thing happened to Billy. On a Tuesday we were at computer lab. Billy was sick so he wasn’t at school. Then Josh got an e-mail message. It was from Billy. Billy must have sent it from his house. The message said, “Nice game”. The strange thing is that we had just played his team in a football game at recess. Figure 1is a graph of what people got right.

These are the results for the picture testing. We think that, at the most, 7 people have ESP. At the beginning of each test, we would tell them that we would test them three times, if they got one right. Most people just got tested twice. We tested the people who got one right three times, but that really didn’t help us very much. These are the names of the people who got one right: Fang-Xin, Maureen, Colin, Kevin Ga.., Kevin Gl.., Karen, and Charlotte. I don’t think they really have ESP. Accept for Kevin Ga. because he got one right in both the 2nd and 3rd test. Here is the graph of what everyone guessed. Also here are the answers for the picture test. See Figures 2 and 3.

Interpreting Results

For the person who got eight right on the card test, he had a 3 out of 100 million chance to get that many right. It took us a while to get the answer, but my dad helped us so we got the answer.

For the picture test, the odds are so highly stacked that any kid who got one right would probably have a really lucky guess. But if the kid had gotten one right on the third test I would think that he had ESP. Only one kid has gotten two right; his name is Kevin Ga.

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Figure 1:

NAMES	CARDS RIGHT	FACE CARDS RIGHT	NUMBERED CARDS RIGHT	SPADES RIGHT	HEARTS RIGHT	CLUBS RIGHT	DIAMONDS RIGHT
COLIN	1-26	0-26	1-26	0-26	0-26	1-26	0-26
BILLY	8-26	4-26	4-26	2-26	0-26	4-26	2-260
KEVIN GA.	1-26	1-26	0-26	1-26	0-26	0-26	0-26
FANG-XIN	0-26	0-26	0-26	0-26	0-26	0-26	0-26
TIMMY	0-26	0-26	0-26	0-26	0-26	0-26	0-26
GOVENOR	1-26	0-26	1-26	0-26	0-26	1-26	0-26
KEVIN GL.	1-26	0-26	1-26	0-26	0-26	1-26	0-26
FUE	1-26	1-26	0-26	0-26	0-26	1-26	0-26
WILLIAM	1-26	0-26	1-26	0-26	0-26	1-26	0-26
ALEX	1-26	0-26	1-26	0-26	0-26	1-26	0-26
JOSH B.	0-26	0-26	0-26	0-26	0-26	0-26	0-26
JANE	1-26	0-26	1-26	0-26	0-26	1-26	0-26
NIKKI	1-26	0-26	1-26	0-26	1-26	0-26	0-26
MAUREEN	1-26	0-26	1-26	1-26	0-26	0-26	0-26
MEAGHAN	2-26	1-26	1-26	0-26	1-26	0-26	1-26
CAITLIN	0-26	0-26	0-26	0-26	0-26	0-26	0-26
C.J.	0-26	0-26	0-26	0-26	0-26	0-26	0-26
KAREN	0-26	0-26	0-26	0-26	0-26	0-26	0-26
CHARLOTTE	1-26	1-26	0-26	0-26	0-26	1-26	0-26
NICOLE	0-26	0-26	0-26	0-26	0-26	0-26	0-26

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NAMES	TEST #1	TEST #2	TEST #3
CAITLIN	1. BROOM 2. SHAMPOO 3. FLOWER 4. FISH 5. CAR	1. BASKETB. 2. PAM 3. FAN 4. WATER 5. CHERRY TREE	
FANG-XIN	1. VAN 2. WATCH 3. COIN 4. TABLE 5. POOL	1. TABLE 2. CAR 3. TREE 4. FOOTB. 5. CAR	1. DICTIONARY 2. SPINWHEEL 3. PAINTING 4. HOUSE 5. TABLE
NIKKI	1.PAPERCLIP 2. CAKE 3. SHOE 4. FLOWER 5. T-SHIRT	1. SHOE 2. JAR 3. PLANT 4. WATCH 5. BASKETB.	
BILLY	1. SEAT 2. T.V. 3. PERSON 4. CASHION 5. BLANKET	1. NOTEBOOK 2. STOVE 3. DOOR 4. MUSIC NOTE 5. LOCKER	
TIMMY	1. FOOD 2. CLOTHS 3. HANGERS 4. CAR 5. CHAIRS	1. CAR 2. ROCKS 3. SHOE 4. PANTS 5. SHOES	
GOV	1. CAR 2. DOG 3. CLOCK 4. FOOTB. 5. BUILDINGS	1. CAR 2. FOOTB. 3. CHAIR 4. DOOR 5. STAIRS	
MEAGHAN	1. CAR 2. CHAIR 3. PICTURE 4. DOG 5. BOOK	1. T.V. 2. SHOES 3. LIGHT 4. HYDRANT 5. FIRE ALARM	
MAUREEN	1. HORSE 2. GLASS 3. CARD 4. TOY 5. BASEBALL	1. EXIT SIGN 2. CAR 3. CAT 4. SHOE 5. AIRPLANE	1. COMIC BOOK 2. GLOBE 3. T-SHIRT 4. BIRD 5. SHAMPOO
COLIN	1. T.V. 2. CAR 3. PENCIL 4. RADIO 5. FORK	1. STAPLER 2. LIGHT BULB 3. ZIPPER 4. CAR 5. CAR	1. WHEELS 2. TIGER 3.HELCOPTER 4. TRUCK 5. AIRPLANE
FUE	1. CHAIR 2. SPOON 3. HOSE 4. NEEDLE 5. PAPERCLIP	1. SEAT 2. BLANKET 3. RADIO 4. T.V. 5. LANTERN	
JANE	1. FOOTB. 2. SOCCERB. 3. TREE 4. PLANT 5. DOG	1. BIRD 2. PENNY 3. BOOK 4. BIRD 5. WATER	
KEVIN GA.	1. FURNITURE 2. TRUCK 3. LOTTERY 4. RHINO 5. CAR	1. SHIRT 2. AIRPLANE 3. SHORTS 4. PICTURE 5. CAR	1. FURNITURE 2. TOY 3. COW 4. COKE 5. WINDEX
KEVIN GL.	1. HOUSE 2. BUGS 3. MONEY 4. BOAT 5. FOOTB.	1. CAR 2. AIRPLANE 3. SHIRT 4. BIKE 5. SHOES	1. CAR 2. AIRPLANE 3. SHORTS 4. MONEY 5. BIRD DROPPINGS
KAREN	1. FLOWER 2. FLAG 3. WISCONSIN 4. CRUISE SHIP 5. MEADOW	1. BAR 2. BASEB. 3. WINDSOCK 4. TREE 5. SHOES	1. CAR 2. MONEY 3. WINDEX 4. PLANTS 5. CARDS
JOSH B.	1. EAGLE 2. FISH 3. COW 4. D.N.A. 5. AIRPLANE	1. FOOTB. 2. CAR 3. DOOR 4. CHAIR 5. CHAIR	
CHARLOTTE	1. FOOTB. 2. SOCCERB. 3. DOG 4. CAR 5. HOUSE	1. FISH 2. EAGLE 3. CHAIR 4. COW 5. AIRPLANE	1. FOOTB. 2. BASEB. 3. BASKETB. 4. DOG 5. TENNISB.
C.J.	1. CAR 2. FISH 3. PERFUME 4. CAR 5.JEWELY	1. TOOTHPASTE 2. WATCH 3. BIKE 4.WHITE GLOVE 5. HAT	
ALEX	1. SHOE 2. SHAMPOO 3. TIRE 4. SHIRT 5. BIRD	HE SAW THE ANSWERS.	
WILLIAM	1. CAR 2. DISH 3. COUCH 4. CLOTHS 5. CHAIR	1. WARDROBE 2. FIRE 3. PLANT 4. HEATER 5. SHOES	
NICOLE	1. SHOE 2. FOOTB. 3. WALLET 4. BASKETB. 5. CAR	1. GLOVES 2. CHAIR 3. PAINTING 4. PLANT 5. CHESSB.	

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Figure3:

	ANSWER KEY FOR TEST#1	ANSWER KEY FOR TEST #2	ANSWER KEY FOR TEST#3
THIS IS THE ANSWER KEY FOR THE PICTURE TEST	1. COIN 2. PEN 3. HAWK 4. BOAT 5. HOUSE	1. COUCH 2. PENCIL 3. WATCH 4. SHOE 5. CAR	1. HORSE 2. TOY 3. CLEANER 4. CAMERA 5. CROW

New Directions

If we kept on doing the project on ESP, we would probably do many things. Since there are three kinds of ESP and we only tested two of them, we would probably test the third kind. This is how we would test the people. First, I would ask them what card they thought would be on top. Then we would shuffle the deck and look at the top card. If it was the card they had guessed, then they would be right.

Another thing that we would do is test everyone in my class again with the cards. The last thing that we would do is test the people many more times if they had gotten any right in all of the kinds of testing that we did.

Acknowledgments

We would like to thank: the kids in Mr. Wagler's 4-5 class, Mr. Wagler, our student teacher Thipp, and our computer lab teacher Mrs. Lopez. Also we would like to thank Josh's dad for typing and editing our article, and my dad for figuring out data.

Fruit Fly Genetics

by William Sadkovich and Billy Her, Randall school

Introduction

One day my teacher was telling two kids in my classroom that if they really wanted to work with mice, they could study the genetics of mice, but they didn't accept the idea. I asked if I could do that project. Mr. Wagler said that I could, but he preferred me to work with fruit flies because they breed faster than mice do. I agreed with Mr. Wagler about the fruit flies, and that is how I got the question about fruit fly genetics.

I thought it was going to be fun and it was fun too, which is why I chose fruit flies as one of my inquiry projects. After awhile Billy worked with me. Our questions was, if we cross white-eyed males with red-eyed females, and white-eyed females with red-eyed males, what will the off-spring look like?

Procedure

Rebecca Kirkland, a graduate student who has a master's degree, brought the fruit flies in a vial. She has been helping me. The hard part was sorting out the fruit flies because you keep on forgetting how to tell them apart. The fun part is sorting them apart and looking at the larva and the life cycle. The life cycle of a fruit fly is first the egg, then the first stage larva, then the second stage larva, then the third stage larva, then a pupa, and finally a fully grown adult.

I expected to discover what the generation was going to look like, but some parts of the generation weren't the same as the other flies in that generation. Some have different types of eye color, that's a difference. I expected them to look the same, but I was wrong.

I cross-bred the virgin female with any kind of male, whether it is a virgin or not a virgin. The reason we needed to mate a virgin female is so that we would know which male it was bred with. When the females are virgin they have a white end and have a longer end than the males.

The fruit flies we didn't need were put into the morgue. The morgue is vial with a type of alcohol. We used fly nap to put the fruit flies to sleep so we could sort them into different groups. The ones we put in the morgue are the non-virgin females. I used fly nap to make the flies sleep, so we could sort them out under the microscope.

We used the paintbrush to move the flies around on the microscope. We put the flies in with the alcohol that we didn't need. And we used the fly nap for making flies go to sleep. These are the tools we had with us for this inquiry project.

Results

I set up one experiment that included observing. I was supposed to observe them and see how long until they are fully adult. But that never got done. I started a graph. I will draw a picture of it.

vial	w+male	w+female	w male	w female	date
1	4	6	0	0	4/8/97
2	2	5	0	0	4/8/97
1	4	1	0	0	4/10/97
2	7	13	0	0	4/10/97
3	0	4	10	0	4/10/97
1	8	8	0	0	4/14/97
2	9	5	0	0	4/14/97
1	1	1	0	0	4/15/97
2	5	6	0	0	4/15/97

The results were that all the white-eyed and curly-winged fruit flies died. The red-eyed were the generation that survived the longest of all of the fruit flies that we had. The fly nap killed most of the flies we had tried to make go to sleep. What the data proved was that the number of fruit flies had been slower at reproducing than at dying. It also proved that we have more white-eyed fruit flies. Our second hypothesis was right because our hypothesis was that fruit flies die quicker then they reproduce.

We didn't even have that much of a surprise at all. The only surprise was that the fly nap killed most of the fruit flies. That is what the big surprise was. We think that's how all the white-eyed died.

This is what we had learned about our inquiry project: We learned how to tell fruit flies apart. We also learned about the eye figure and the eye colors. The basic eye color is w+=wild type (which means red-eyed), w=white eyed. The extra ordinary is bar-eyed, yellow-eyed, and two different kinds of color eyed. We also learned about the wing type: cy=curly winged, and normal wings.

New Directions

We could do cockroach genetics. I don't think we would need to kill the cockroaches we don't need. I think they could mate for eternity. We'd have to get a bigger container for the cockroaches. So that's what we would do if we had to start a new project on genetics.

We could do genetics of different kinds of insects and compare them to each other. We could compare horse flies with fruit flies. We could compare earth worms with red worms.

Acknowledgments

We thank Rebecca Kirkland for helping us on our project. She helped us a lot on our project. We thank Thipp Kommavang for helping us too. He is our student teacher and was interested in the fruit fly project too. And we thank one more person for giving us the idea for our project. We thank Mark Wagler.

Up, Up And Away

by Tommy Devries and Zachary Millis, John Muir School

Introduction

We are doing a project on flight. We wanted to make a bottle fly, by using vinegar, baking soda, and a cork. We got the idea for flight from some other kids that were trying to make a helicopter fly. Later, we looked back at a project Zach had done with vinegar and baking soda. Zach found out that it created carbon dioxide. So we used the carbon dioxide for pressure to make the cork fly out of the bottle. We also wanted to make an airplane fly. So we attached it to the cork. Our question is what structure would glide? Our hypothesis is the air planes would glide.

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Procedure

We used a bottle, cork, vinegar, oil and baking soda to make a airplane fly. We would attach the cork to the airplane. When we tried it, the carbon dioxide would leak out of the bottle before we could get the cork on. Then we thought of putting oil in between the vinegar and baking soda so that it wouldn't mix until we shook the bottle. After we launched, we had measuring tape on the floor and we would measure how far it went. After we were done launching, we would keep track of data by writing the amount of vinegar, baking soda, and oil. Then we would write the angle, weight and distance.

Results

The data is shown in the following table:

			Launch Data			
		Baking Soda		Angle of	Distance	
Launch number	Vinegar (ml)	(ml)	Oil (ml)	launcher	Traveled	Problems
1	75	50	20	N/A	4.3 m.	none
2	75	50	20	65*	no data	none
3	75	50	20	N/A	no data	none
4	75	50	20	65*	4.3 m.	none
5	100	75	30	85*	2 m.	none
6	75	50	20	40*	5.6 m.	none
7	75	50	30	40*	0 m.	Hole in cork
8	75	50	30	40*	0 m.	incomplete
9	75	50	35	40*	0 m.	plane broke

We had a couple of unexpected crash-landings, but the rest of the launches were pretty good. (They actually flew.) We expected the planes to glide but they didn't.

Interpretation

We think launch 6 was the best because we changed the plane into a hang glider with dowels on the ends. We think launch 4 and 5 didn't go as far as others because the angle was almost straight up. Our hypothesis was wrong. We thought the airplanes would glide but they didn't.

Sometimes we forgot to write down all the data. We think we would have done better if we wrote down everything.

New Directions

We had a couple questions that arose during the project. One was how to get a hole in a cork filled. We tried to make better planes but most died. We think that if we could spend more time building airplanes than having fun launching, we'd get better results.

Acknowledgments

We want to thank our teacher and student teacher. We also want to thank everybody who brought materials.

Are Raccoons Pests?

by Hanna Braverman and Lauren Phelan, Lapham School

Introduction

We got our question from doing a project on our favorite animal, raccoons. We started the project because we wanted to get more information about raccoons. They look cool. They look like bandits. We wanted to know what other people think about our favorite animal. We thought that practically everyone would answer that they weren't pests.

Procedure

We did a survey because we thought it would be fun and so we could find out what other people thought about raccoons. We took our survey to three other classes at Lapham. We had our room do it too. We took it home and gave it to our parents and they gave it to people they work with. Some neighbors did it too. This was our raccoon survey:

1. Do raccoons live in Madison? Circle your answer. YES NO

2. Do raccoons steal from us? YES NO

3. Are raccoons pests? YES NO

4. If you think raccoons are pests, what should we do about them?

Results

Raccoon Survey		
Question	Answer Yes	Answer No
Do raccoons live in Madison?	79	11
Do raccoons steal from us?	58	29
Are raccoons Pests?	39	37

If you think raccoons are pests, what should we do about them?
(some responses)

* Shoo them away.
* Keep food inside.
* Take to the wild.
* Leave them alone.
* Let them do what they want to do.
* Put the garbage away.
* Trap them and make fur coats.
* Feed them.
* Send them to Illinois.
* Treat them like moles.
* Save some of the wildlife areas for them to live.
* More help from the Humane Society - to catch them and take them out to the woods.

Interpreting Results

A lot of people answered, “yes” that raccoons were pests. We didn’t expect that so many people would say that. Two of the answers we did not agree with. We hated them. They said (in answer to what to do about pesty raccoons): “Kill them,” and “Trap them and make fur coats.”

New Directions

If we could repeat the project we would make the questions harder. Like: Do you think that raccoons might think that we are pests? What do you think is similar about raccoons and people? What do you think is different about raccoons and people?

Acknowledgments

We want to thank our teachers, Ken Swift and Natalie Kowalczyk. They helped and encouraged us.

Hot Air Balloons

by Mark Penisten and Ty Barta, Black Hawk Middle School

Introduction

We wanted to know how hot the air had to be in a hot air balloon before it would rise. Our hypothesis was that it would have to be about 200 degrees Fahrenheit.

Procedure and Results

For our first attempt (Bat 1) we used a sterno can for heat, a plastic bag for the balloon, and a tin can to hold the sterno. We stripped the insulation off some wire and wired the sterno to the can. When the sterno was lit,

the bag shriveled up because of the heat, and it never left the ground.

For the second attempt (Bat 2) we did the same thing, only we used a pie plate instead of the tin can, figuring that the pie plate would be lighter. This time the air reached about 100 degrees Fahrenheit in the bag, but, again, the bag melted before it got hot enough.

Still thinking that the weight of the equipment was the problem, we tried to wire the balloon right to the sterno can. We also made the bag smaller so there would be less air in it to heat up. But Bat 3 still didn't work, because the bag again shriveled up.

Realizing that the plastic bag would keep melting before the air in the bag could get hot enough, we decided to make a cloth bag. For the launch of Bat 4, the temperature in the bag reached 220 degrees, but the balloon did not lift up. Was the balloon still too heavy?

For the launching of Bat 5, we used a nylon bag. The air in the bag got up to 235 degrees, but still no lift.

Because time was running out, we decided to ask our science teacher, Mr. Dunn, if he had any ideas on how to make a hot air balloon. He had some plans that said to make it out of tissue paper and use a hair dryer for heat. We tried his plans, and it worked—the tissue paper balloon lifted up several feet into the air.

Interpreting Results

We looked up "hot air balloons" and it said they had to get up to 212 degrees Fahrenheit, which was cooler than what the temperature was in some of our bags. But our heat source (sterno) and the other equipment was probably too heavy. The plastic bags did not work because they tended to melt before the air in the bag could get to a high enough temperature. We also read that it was better for the balloon to be larger, so that it could contain more heated air. We were thinking that a smaller bag would be quicker and easier to heat.

New Directions

Next time we would make a tissue balloon that was as light as possible. The challenge would be to see how we could keep it up for longer and longer periods of time.

Acknowledgments

We'd like to thank Ms. Coccari for introducing us to the Heron Network and Great Blue and meeting with us, Mr. Dunn for his directions on how to make a hot air balloon that finally worked, and our parents for letting us get together a bunch of times to do this experiment.

How To Make A Battery

by Shaun Bibo and Michael McKinley, Lincoln Elementary

Introduction

We were looking through a book when we found: How to make a battery out of a lemon. This seemed like an interesting idea because everyone thought it was impossible so we wanted to show them it wasn't.

Procedure

We needed zinc metal, a small cardboard box, a compass, electrical wire, a lemon, an apple, an orange, a copper coin, and an alligator clip. First we had to get the zinc metal. We tried calling hardware stores. None had zinc metal. Next we called hobby shops but they didn't have zinc either. Then our teacher told us to try calling Northern Platting Company. They had zinc metal and we got it for free. When we got it, it was a ball of zinc which was not what we needed. Then our teacher told us to call the department of physics at the university. They told us they would call us back. We waited a week but they never

called us back. Then we called them back again. They said they would call us back again. They never did. Finally we called them back and they gave us a phone number that we could call. A man from the UW sent a letter to us with the phone number and the address to call Illinois. So we called Illinois. Then we waited for three days and we finally got the zinc metal.

We had to cut the zinc metal. Our teacher said a hack saw would cut the zinc so we asked a teacher in our school who has a whole bunch of tools to bring one the next day. He forgot but our teacher brought one in. We cut the zinc. It was harder then we thought! Then we had to set up the experiment. Here's how we had to set it up: we put the compass in a box with electrical wire wrapped around the box 30-50 times. We then made a hole in the lemon for the penny and the zinc. We hooked up the alligator clips to the penny and zinc. Then we hooked the wire connected to the alligator clips to the wire that was wrapped around the box. Then we put the penny and the zinc in their spot's in the lemon and we watched what happened.

Results

The compass was supposed to jerk around like it was going crazy. Nothing happened.At first we weren't sure what was wrong. Then we figured out that the compass was not magnetized. We didn't do anything else because we didn't have time.

New Directions

Next, we are going to have to get a magnetized compass and try it again. If it still doesn't work we will keep working at it until it works. We have fun, but it was also sort of frustrating waiting for the zinc to come.

Acknowledgments

We would like to thank: our teacher, Mr. Pete, Illinois for our zinc, the UW for the phone number to get the zinc, and a big thanks to Oscar Suggs for his help.

What dreams are most common in different grades?

by: Barbara Heindl, Lincoln Elementary

Introduction

HI! My question is what dreams are most common and in what grades?

I got the question when we had to think of questions from each area in Great Blue. I thought of this and decided to answer it for my Great Blue question. My hypothesis is that fifth graders will have less scary dreams and third grade and down will have more scary dreams.

Procedure

I decided to make a survey and give it out to each class in my school. The survey had 5 different kinds of dreams scary, fantasy, present, future, past. Then I put little summaries next to each dream type, like for scary, those are dreams that scare you. Also on the survey for three classes I asked for volunteers in that class to tell me honestly about their dreams, but I don't think I ran out of time.

This is my letter to teachers:

Dear Teacher,

I am doing an I Wonder project on dreams. My question is: Which dreams are most common and in what grades? I would like you to take a survey in your class. Please, ask your class what kind of dreams they remember most.

Mark down how many kids there are in each kind of dream and send it back to me in Mr.Wirths

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class or room 74. Here are the choices:

Scary_____
Fantasy_____

A dream that scares Like floating in you the clouds

Present_____
Future_____

Things that happened recently things that may happen in the future Past/Things that have already happened

Thanks for helping me,

Barbara

Results

I've only gotten 2 of the surveys but the results from that were: 1st fantasy, 2nd scary, 3rd present, 4th future and last is the past.

Problems

The problems I had were that I didn't get the surveys back until the last day and I for got to tell on the survey to write the class grade (I was hoping they would write their grade on it), and I didn't get much time to answer my question.

New Directions

If I did this again I would make sure I did my survey right and I would start it earlier so it would get done on time.

Acknowledgments

I would like to thank: Mr. Wirth, Mrs.G. and all the classes that helped me with the survey.

Is a Hamster Smarter than a Guinea Pig?

By Salina Brandon, Jeanine King and Melissa Emond, Lincoln Elementary

Introduction

Hello, our names are Salina, Jeanine , and Melissa. Jeanine is from Wisconsin.Melissa is from Minnesota. Salina is from Washington D.C. Our question camefrom Salina. Salina asked Jeanine and Melissa to do a question with her.We are from Lincoln Elementary. We are all in 4th grade.

Our question is, "Is a hamster smarter then a guinea pig?". So far we are not getting very far because once we had a fight with oneof our friends and then we got back together. But we did build a new maze.

Procedure

To start our project we got cardboard boxes. Then we made our maze. Afterthat we tried Jeanine's hamster in the maze that we made. We tried veryhard to get the guinea pig, but Salina's friends did not let us use theirguinea pig because Salina had to bring all of the other baby guinea pigs.

Results

First we got our boxes and made a maze, but then our teacher, Mr. Dave,threw our maze out because it was coming apart. We got some more boxes andmade another. Then he threw that maze out .

New Directions

I guess we did not really answer our question or we did not finish ourproject. We were supposed to see if hamsters were smarter than guinea pigs.

Acknowledgments

We would like to thank our teacher, Mr. Jenks, and Ms. Afi for theirhelp. Salina would like to thank Jeanine and Melissa for their help and encouragement.

I Wonder