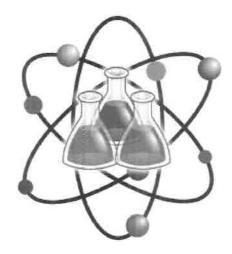
My Science Journal Environments

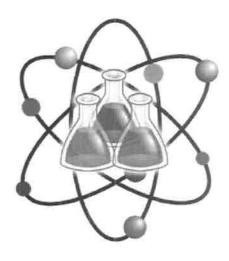
Name_____



4th Grade

My Science Journal Environments

Name _____



4th Grade

Mealworm Observations

- 1. Observe the structures of a mealworm.
- 2. Draw a mealworm and label its structures (parts of body).
- 3. List three mealworm structures. Describe each one's function (what the structure helps the mealworm do).
- 4. Observe and describe the mealworm's behavior (what it does).
- 5. What questions do you have about mealworms?
- 6. What do you need to know about the mealworm to keep it alive and healthy in the classroom?

Mealworm Observations

- 1. Observe the structures of a mealworm.
- 2. Draw a mealworm and label its structures (parts of body).
- 3. List three mealworm structures. Describe each one's function (what the structure helps the mealworm do).
- 4. Observe and describe the mealworm's behavior (what it does).
- 5. What questions do you have about mealworms?
- 6. What do you need to know about the mealworm to keep it alive and healthy in the classroom?

How do mealworm structures and behaviors help them grow and survive?

How do mealworm structures and behaviors help them grow and survive?

Week Observation 1 Observation 2 Comments

Mealworm

Week 8	Week 7	Week 6	Week 5			Week 4	Week 3	Week 2	Week 1	
				Observation 1	Life					Observation
				Observation 2	Life of a Mealworm					C 230 4 80 C 2 1
				Comments						And the second s

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Environments Module Investigation 1: Environmental Factors
No. 2—Notebook Muser

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Environments Module Investigation 1: Environmental Factors No 2- Notebook Master

Life of a Mealworm

		æ	

Isopod Investigation

Part 1. Setup							
Number of pill bugs Number of sow bugs							
Environmental factor tested							
Describe how you set up the container.							
Part 2. Observations							
Record where each animal was and what it was doing (on surface,							
buried, moving).							
This is where the animals were after minutes.							
Short run							
This is where the animals were after hours.							
Long run							
Part 3. Interpretation							
What can you say about the animals' environmental preferences?							

Isopod Investigation

Part 3. Interpretation

What can you say about the animals' environmental preferences?

What moisture conditions do isopods prefer?

What moisture conditions do isopods prefer?

Isopod Environment Map

- 1. How much water did you put into your terrarium?
- 2. Where did you put it?
- 3. List the environmental factors.

Isopod Environment Map

	Key	
<u> </u>		

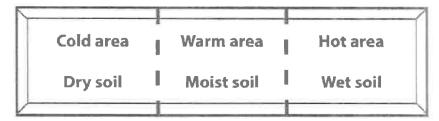
- 1. How much water did you put into your terrarium?
- 2. Where did you put it?
- 3. List the environmental factors.

¥			

Response Sheet—Investigation 1

A student wanted to find out isopod preferences for temperature. Below is his notebook entry.

We put dry, moist, and wet soil in the basins, just like we did before in class. Next, we put a heating pad under part of the basin to make three areas, each with a different temperature. That way we could find out if isopods like it cold, warm, or hot.



Results

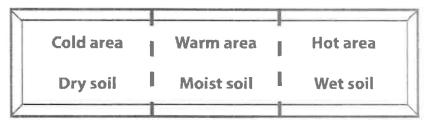
After 10 minutes, we found some isopods in the warm and hot areas. After an hour, we found all of the isopods in the warm area. Inference: Isopods like it warm.

- 1. Do you agree that the student's investigation supports his inference? Why or why not?
- 2. What would you do differently to improve his investigation?

Response Sheet—Investigation 1

A student wanted to find out isopod preferences for temperature. Below is his notebook entry.

We put dry, moist, and wet soil in the basins, just like we did before in class. Next, we put a heating pad under part of the basin to make three areas, each with a different temperature. That way we could find out if isopods like it cold, warm, or hot.



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- 1. Do you agree that the student's investigation supports his inference? Why or why not?
- 2. What would you do differently to improve his investigation?

What are the characteristics of animals living in the leaf-litter environment?

What are the characteristics of animals living in the leaf-litter environment?

Critter Record

Your name:
Date:
Use the Critter Replicator to help you draw your selected organism.
Head Thorax Abdomen
Size: Draw a line as long as the organism.
Where did you find your organism?
How did your organism behave?

Critter Record

Your nam	e:	
Date:		
Use the Corganism		tor to help you draw your selected
Head	Thorax	Abdomen
		ong as the organism. our organism?
How did	your organisr	m behave?
•		

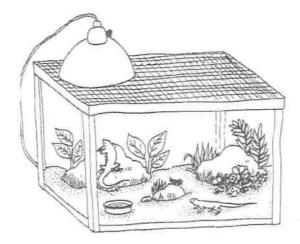
		ω.	

HEAD	Critter B THORAX	ody Parts ABDOMEN	WINGS	HEAD	Critter B	ody Parts ABDOMEN	WINGS
	rood	erren over		(4444	opp	
	2020				acrosso	-	
				A			
				X)			
				Sold Sold Sold Sold Sold Sold Sold Sold		\bigcirc	
		\approx				\approx	

What are the environmental factors in an aquatic system?

What are the environmental factors in an aquatic system?

Living and Nonliving Factors

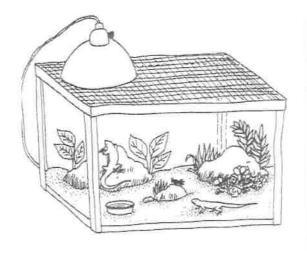


salamanders L
cricket L
rocks
pan of water
broad-leaved plants L
light L
grassy plants L
glass terrarium
thin-leaved plants L
soil L
flowering plants L
temperature

A student used the picture above to make a list of all the environmental factors she saw in this terrestrial environment. She put an *L* next to each factor she identified as a living factor. The list the student made appears above.

- 1. Do you agree that all the factors she marked with an *L* are living? If not, tell which ones you don't agree with and explain why you don't agree.
- 2. Describe how two of the nonliving factors might influence the living factors in this terrarium.

Living and Nonliving Factors



salamanders L
cricket L
rocks
pan of water
broad-leaved plants L
light L
grassy plants L
glass terrarium
thin-leaved plants L
soil L
flowering plants L
temperature

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Aquarium Observation Log Observations Water temp. Time Date Week 5

Aquarium Observation Log

	Observations							
Water	temp.							
	Time temp.							
	Date							
	Week	-	7	m	4	ın	9	_

		9	

Practice with Food Chains

Make several food chains of at least three organisms. Use arrows to show how food moves from organism to organism.

- · American robin
- Aquatic snail
- Bacteria
- Black bear
- Brook trout
- Chipmunk
- Coyote
- · Dead plants and animals
- Earthworm
- Grama grass
- Great blue heron
- Green algae
- Grouse
- Hare
- Mayfly
- · Pine trees
- Red-tailed hawk
- Scuds
- · Tubifex worm
- Wild blueberry

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- Grama grass
- Great blue heron
- Green algae
- Grouse
- Hare
- Mayfly
- Pine trees
- Red-tailed hawk
- Scuds
- Tubifex worm
- Wild blueberry

What are the roles of organisms in a food chain?

What are the roles of organisms in a food chain?

Response Sheet—Investigation 2

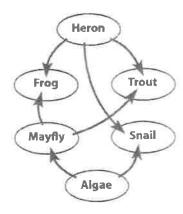
Here is a description of the organisms that live in a pond.

Aquatic snails and mayflies eat algae.

Frogs and trout eat mayflies.

Herons eat frogs, trout, and snails.

Bacteria decompose the dead organisms.



A student read the information about organisms living in a pond. Then she drew a food web.

Is this food web accurate? You can draw a new food web if needed.

Write your comments and draw on the facing blank notebook page.

Response Sheet—Investigation 2

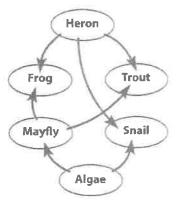
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Is this food web accurate? You can draw a new food web if needed.

Write your comments and draw on the facing blank notebook page.

How does food affect a population in its home range?

How does food affect a population in its home range?

Population Simulation Results

Year	# of deer at start	# of deer at end	Survival predictions
1			
2			
3			
4			
5			

In year 2, we started with	_ deer and ended with	- *
The number of deer		_ because
	ii ii	
In year 4, we started with	_ deer and ended with	
The number of deer		_ because
:		
In year 5, we started with	_ deer and ended with	
The number of deer		because
	·	

Population Simulation Results

Year	# of deer at start	# of deer at end	Survival predictions
1			
2			
3			
4			
5			

In year 2, we started with deer and ended with	
The number of deer	
In year 4, we started with deer and ended with	
The number of deer	
In year 5, we started with deer and ended with	•
The number of deer	

How do animals use their sense of hearing?

How do animals use their sense of hearing?

RESPONSE SHEET—INVESTIGATION 2

A boy told his friend he heard frogs in a pond the previous night. He said, "I think the frogs were croaking because it was a nice warm night and they were happy."

The friend said, "I don't think they were croaking because they were happy. I think they were communicating with one another."

What do you think?

RESPONSE SHEET—INVESTIGATION 2

A boy told his friend he heard frogs in a pond the previous night. He said, "I think the frogs were croaking because it was a nice warm night and they were happy."

The friend said, "I don't think they were croaking because they were happy. I think they were communicating with one another."

What do you think?

How can we find out if salinity affects brine shrimp hatching?

How can we find out if salinity affects brine shrimp hatching?

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Brine Shrimp-Hatching Experiment

Question

Write the question you will answer with your investigation.

Materials

4 Plastic cups with lids

1 Vial of brine shrimp eggs

4 Labels

1 Minispoon

1 Cup of salt

1 Craft stick

1 Spoon, 5 mL

1 FOSS tray

1 Beaker, 100 mL

Container of water

Tape

Procedure

- 1. Label four cups—0 spoons, 2 spoons, 4 spoons, and 6 spoons salt. Write your group name on each label.
- 2. Measure 150 mL of water into each cup. Use the 100 mL beaker.
- 3. Measure salt into the labeled cups, using the 5 mL spoon. Use a craft stick to level the measure. Put lids on the cups. Gently swirl the cups to dissolve the salt.
- 4. Put 1 level minispoon of brine shrimp eggs in each cup. Put the lids on. Gently swirl the water to wet the eggs.
- 5. Place all four cups on the FOSS tray.

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Brine Shrimp-Hatching Experiment

Question

Write the question you will answer with your investigation.

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- 1 Vial of brine shrimp eggs

4 Labels

Minispoon

1 Cup of salt

Craft stick

1 Spoon, 5 mL

- 1 FOSS tray
- 1 Beaker, 100 mL
- 1 Container of water

Tape

Procedure

- 1. Label four cups—0 spoons, 2 spoon, 4 spoons, and 6 spoons salt. Write your group name on each label.
- 2. Measure 150 mL of water into each cup. Use the 100 mL beaker.
- 3. Measure salt into the labeled cups, using the 5 mL spoon. Use a craft stick to level the measure. Put lids on the cups. Gently swirl the cups to dissolve the salt.
- 4. Put 1 level minispoon of brine shrimp eggs in each cup. Put the lids on. Gently swirl the water to wet the eggs.
- 5. Place all four cups on the FOSS tray.

How does salinity affect the hatching of brine shrimp eggs?

How does salinity affect the hatching of brine shrimp eggs?

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Brine Shrimp-Hatching Observations Part 1

What day of your setup day as day		nt did you	first notic	e hatching	? (Count
□ Day 1 □	Day 2	☐ Day	3 🔲	Day 4	
	er did you ons ons	4 sp	oons	ng?	
What additional observations on				•	
Part 2					
Record the numb	er of eggs	that hatch	ed in each	salt cond	tion.
Make an X in one	box for eac	ch salt con	dition.		
Day	(Count set	up day as	day 1.)		
Salt Conditions					
	0 spoons	2 spoons	4 spoons	6 spoons	
Most					
Some					

WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

Brine Shrimp-Hatching Observations Part 1

rart i					
What day of your setup day as day	,	nt did you	first notic	e hatching	? (Count
Day 1	Day 2	☐ Day	3 🔲	Day 4	
In which contain 0 spo 2 spo	ons		oons	ıg?	
What additional observations on		•		,	
Part 2					
Record the numb	er of eggs	that hatch	ed in each	salt cond	tion.
Make an X in one	box for ea	ch salt con	dition.		
Day	(Count set	up day as	day 1.)		
		Salt Cor	ditions		
	0 spoons	2 spoons	4 spoons	6 spoons	
Most					
Some					
None					

None

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Brine Shrimp-Hatching Conclusions

As a class, we conducted an experiment using multiple trials. Here are the class data on day _____.

Salt Conditions

	0 spoons	2 spoons	4 spoons	6 spoons
Most				
Some				
None				

Write a report answering Dr. Bryan's question. Is salinity an environmental factor that affects brine shrimp egg hatching? **WARNING** — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

Brine Shrimp-Hatching Conclusions

As a class, we conducted an experiment using multiple trials. Here are the class data on day _____.

Salt Conditions

	0 spoons	2 spoons	4 spoons	6 spoons
Most				
Some				
None				

Write a report answering Dr. Bryan's question. Is salinity an environmental factor that affects brine shrimp egg hatching?

Does changing the environment allow the brine shrimp eggs to hatch?

Does changing the environment allow the brine shrimp eggs to hatch?

Response Sheet A—Investigation 3

A student set up a science fair project to find out how temperature affects mealworms. She knew that insects go through different stages in their life cycles. She wanted to know if temperature affected the speed in which the mealworm would go from larva to adult. Below is her lab report.

Prediction

I think temperature will make the mealworm life cycle go faster. I think that is true because it seems like there are a lot more insects around in the summer when it is warm, than in the winter when it is cold.

Materials

- 30 Mealworms
- 1 Box of wheat bran
- 3 Cardboard boxes
- 1 Thermometer
- 1 Apple

Procedure

- 1. Label three boxes: 10°C, 25°C, and 40°C.
- 2. Put equal amounts of wheat bran in each box (food for the mealworms).
- 3. Put equal amounts of apple in each box (for moisture).
- 4. Place 10 mealworms in each box and close the lid.
- 5. Place each box in an area where you can keep the temperature at the level shown on the box.
- 6. Check the boxes each day to make sure the mealworms have plenty of wheat bran and apple.
- 7. Record observations after 2 weeks, 4 weeks, and 6 weeks.

Data

After 2 Weeks		
	2	7
10	8	3
10°C	25°C	40°C
	10	2

	After 4 Weeks			
Adults			5	
Pupae		4	5	
Larvae	10	6	0	
	10°C	25°C	40°C	
			_	

	After 6 Weeks			
Adults			10	
Pupae		8	0	
Larvae	10	2	0	
	10°C	25°C	40°C	

40°C

25°C

Response Sheet A—Investigation 3

A student set up a science fair project to find out how temperature affects mealworms. She knew that insects go through different stages in their life cycles. She wanted to know if temperature affected the speed in which the mealworm would go from larva to adult. Below is her lab report.

Prediction

I think temperature will make the mealworm life cycle go faster. I think that is true because it seems like there are a lot more insects around in the summer when it is warm, than in the winter when it is cold.

Materials

- 30 Mealworms
- 1 Box of wheat bran
- 3 Cardboard boxes
- 1 Thermometer
- 1 Apple

10°C 25°C 40°C

Procedure

- 1. Label three boxes: 10°C, 25°C, and 40°C.
- 2. Put equal amounts of wheat bran in each box (food for the mealworms).
- 3. Put equal amounts of apple in each box (for moisture).
- 4. Place 10 mealworms in each box and close the lid.
- 5. Place each box in an area where you can keep the temperature at the level shown on the box.
- 6. Check the boxes each day to make sure the mealworms have plenty of wheat bran and apple.
- 7. Record observations after 2 weeks, 4 weeks, and 6 weeks.

Data

	Afte	2 Weeks		. Af	
Adults				Adults	
Pupae		2	7	Pupae	
Larvae	10	8	3	Larvae	10
	10°C	25°C	40°C		10
					_

	Afte			
Adults			5	A
Pupae		4	5	Pu
Larvae	10	6	0	La
	10°C	25°C	40°C	

	After 6 Weeks			
Adults			10	
Pupae		8	0	
Larvae	10	2	0	
-	10°C	25℃	40°C	
			-	

What are some benefits of having variation within a population?

What are some benefits of having variation within a population?

Response Sheet B—Investigation 3

- 1. What is the optimum temperature for the mealworms? (Circle the one best answer.)
 - A. 10°C
 - B. 25°C
 - C. 40°C
- 2. What inference can the student make from her observations? (Circle the one best answer.)
 - A. The warmer the temperature, the faster mealworms move through their life cycle.
 - B. All of the mealworms in the 40°C box changed to adults in 6 weeks.
 - C. Mealworms in the 10°C box will probably never change into the adult stage.

Record your answers to questions 3 and 4 on the next blank page in your notebook.

- 3. How do the data show that the student's prediction is right or wrong?
- 4. Do you think the student should try testing mealworms in temperatures higher than 40°C? Why or why not?

Response Sheet B—Investigation 3

- What is the optimum temperature for the mealworms?
 (Circle the one best answer.)
 - A. 10°C
 - B. 25°C
 - C. 40°C
- 2. What inference can the student make from her observations?

 (Circle the one best answer.)
 - A. The warmer the temperature, the faster mealworms move through their life cycle.
 - B. All of the mealworms in the 40°C box changed to adults in 6 weeks.
 - C. Mealworms in the 10°C box will probably never change into the adult stage.

Record your answers to questions 3 and 4 on the next blank page in your notebook.

- 3. How do the data show that the student's prediction is right or wrong?
- 4. Do you think the student should try testing mealworms in temperatures higher than 40°C? Why or why not?

How much water is needed for early growth of different kinds of plants?

How much water is needed for early growth of different kinds of plants?

Plant Experiment—Water Tolerance

Environmental factor tested:

Controlled environmental factors:

Procedure

a. Apply the four container labels and be sure they are securely attached:

DRY-0 mL

MOIST-0 mL

WET-40 mL

VERY WET-80 mL

- b. Put in 1 level plastic cup of soil without compacting it.
- c. Add three seeds of each of the four kinds (12 total). Put the seeds in exactly the same locations in all four containers.
- d. Make sure each seed is 1 cm deep in the soil. Add more soil if needed. Gently pat the soil, using the bottom of the cup.
- e. Add the experimental amount of water evenly to the WET and VERY WET containers, using the 100 mL beaker.
- f. Put each container in a large zip bag and seal it.
- g. Put the bagged container in the FOSS tray.







Plant Experiment—Water Tolerance

Environmental factor tested-

Controlled environmental factors:

Procedure

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- g. Put the bagged container in the FOSS tray.





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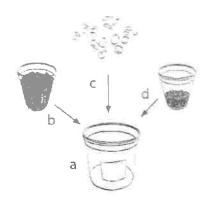
Plant Experiment—Salt Tolerance

Environmental factor tested:

Controlled environmental factors:

Procedure

- a. Label four planters, one for each type of water.
- b. Put 1 level cup of soil in each planter.
- Put three seeds of the four kinds (12 seeds total) in each planter.
- d. Make sure each seed is 1 cm deep in the soil. Add more soil if needed. Gently pat the soil, using the bottom of the cup.
- e. Wait for instructions on how to water the seeds.



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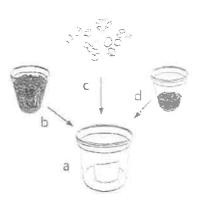
Plant Experiment—Salt Tolerance

Environmental factor tested:

Controlled environmental factors:

Procedure

- a. Label four planters, one for each type of water.
- b. Put 1 level cup of soil in each planter.
- Put three seeds of the four kinds (12 seeds total) in each planter.
- d. Make sure each seed is 1 cm deep in the soil. Add more soil if needed. Gently pat the soil, using the bottom of the cup.
- e. Wait for instructions on how to water the seeds.



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Plant Experiment Setup Map where each seed is. Key Barley Corn Pea Radish

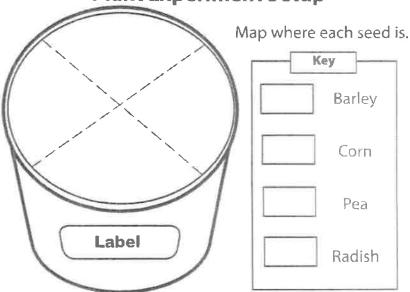
Plant all four containers exactly the same. Environmental factor tested:

Controlled environmental factors:

Number of each seed planted on this date:
Barley
Corn
Pea
Radish

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Plant Experiment Setup



Plant all four containers exactly the same.

Environmental factor tested:

Controlled environmental factors:

Number of each seed planted on this date _____:

Barley _____

Pea

Radish _____

Plant Observations A

Environmental factor tested
Planting date
Seed type
Number of seeds of this kind planted

Part 1. Number of days after planting_

Environment	How many plants came up	Height of tallest plant

Part 2. Number of days after planting _

	How many plants	Height of	Most leaves on one
Environment	came up	tallest plant	plant
Livioninent	carne up	tallest plant	plant

Plant Observations A

	Environmental factor tested
	Planting date
	Seed type
	Number of seeds of this kind planted
-	

Part 1. Number of days after planting _

Environment	How many plants came up	Height of tallest plant

Part 2. Number of days after planting _

	How many		Most leaves
	plants	Height of	on one
Environment	came up	tallest plant	plant

	180	

Plant Observations B

Part 3. Number of days after planting

Environment	How many plants came up	Height of tallest plant
Most leaves on one plant	Length of longest leaf	Length of longest root

Part 4. Use this table to determine the range of tolerance. Label the columns. Mark an X where each plant grew.

	Environment			
Peas				
Corn				
Barley				
Radishes				

Plant Observations B

Part 3. Number of days after planting

Environment	How many plants came up	Height of tallest plant
Most leaves on one plant	Length of longest leaf	Length of longest root

Part 4. Use this table to determine the range of tolerance. Label the columns. Mark an X where each plant grew.

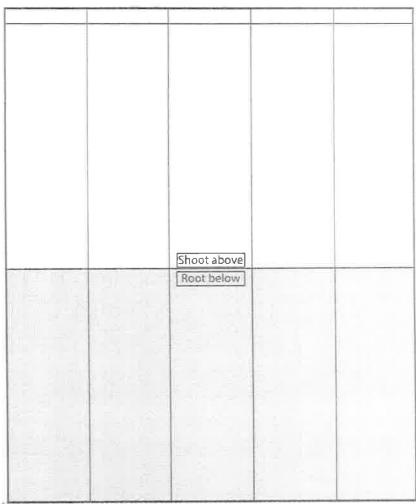
	Environment			
Peas				
Corn				
Barley				
Radishes				

Plant Profile

Plant type Days of gro		Environme	ntal facto	or		
	olumns w	ith the env	rironmen	ts bein	g studie	d.
ordiv the p	nants in pi	ace.				_
		Shoot abo				
		Root beld	DW.			
				2.1		

Plant Profile

	_
Draw the plants in place.	
Label the columns with the environments being studie	·C
Days of growth	
Plant type Environmental factor	



How does mapping the plants in the schoolyard help us to investigate environmental factors?

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Response Sheet—Investigation 4

A student designed an experiment to test for the water tolerance of sunflower seeds. She controlled all environmental factors except for the amount of water used. Her design included three water conditions.

Moist: 0 mL of water

Wet: 50 mL of water

Super wet: 100 mL of water



Below are her recorded observations on two different days and her conclusions.

May 10

There are 3 sprouts in the moist cup.

May 13

There are 3 sprouts in the moist cup and 5 sprouts in the wet cup. One in the wet cup is pretty tall. There is a tall one in the moist cup also. One of the plants in the wet cup has 4 leaves.

Conclusions

The wet condition is best for growing sunflowers.

Describe how this student could improve her observations.

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