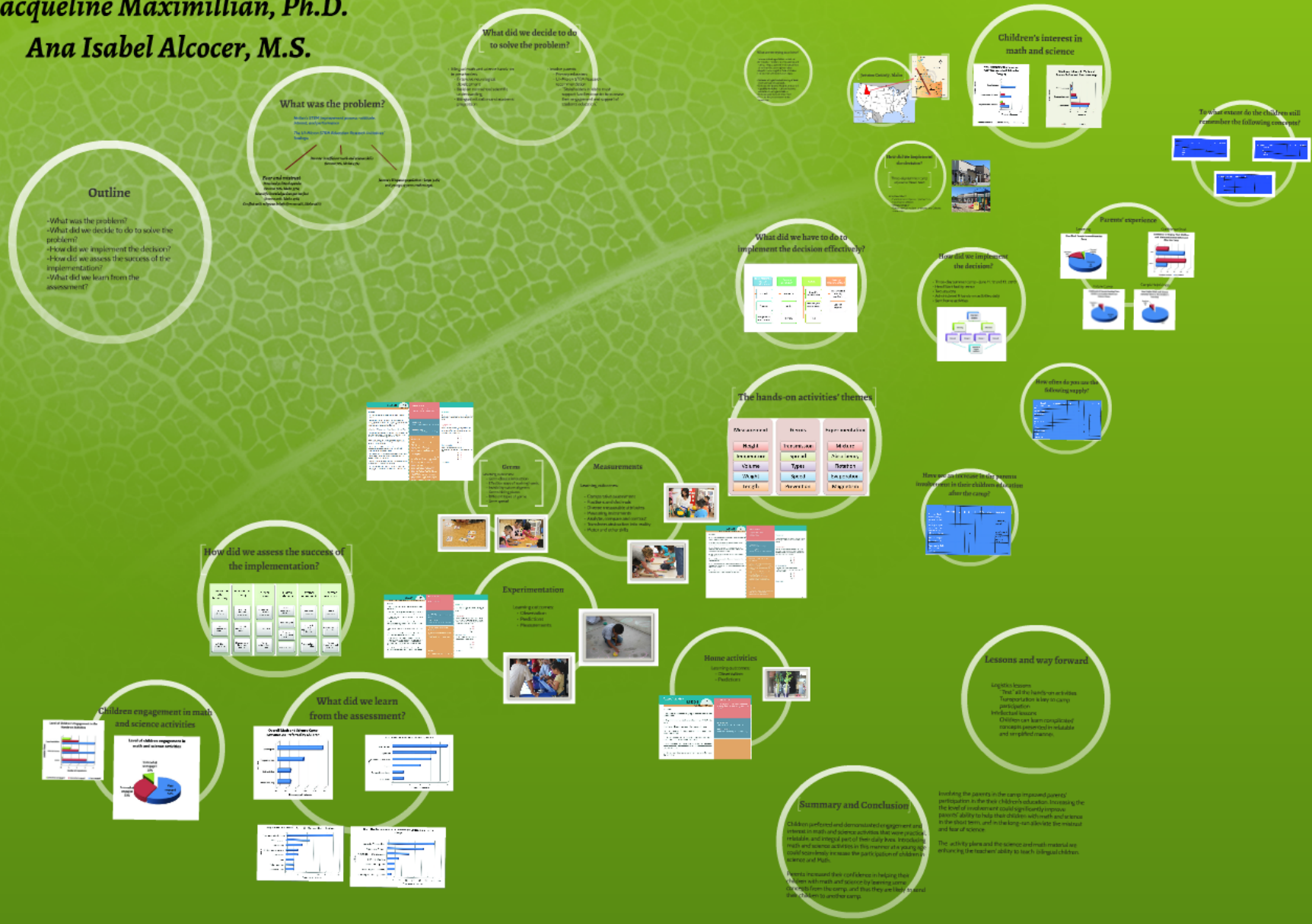
Jerome Head Start Math and Science Summer Camp Experience

UI-Micron STEM Education Research Initiatives

Jacqueline Maximillian, Ph.D.

Ana Isabel Alcocer, M.S.



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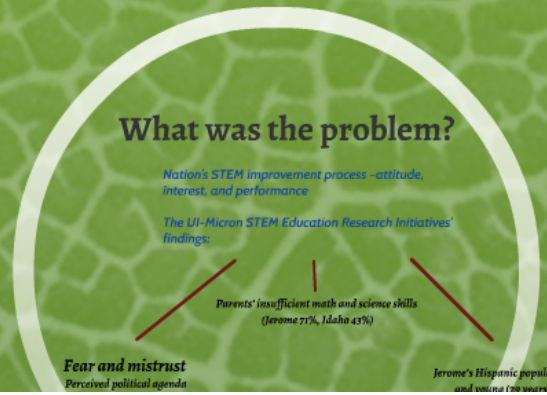
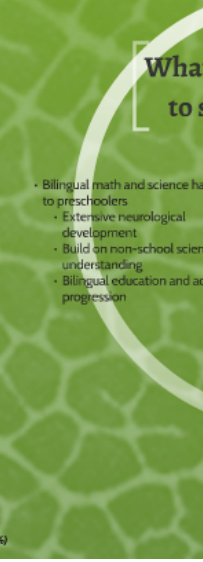




Outline

-What was the problem?
-What did we decide to do to solve the problem?
-How did we implement the decision?
-How did we assess the success of the implementation?
-What did we learn from the assessment?

What did we decide to do to solve the problem?

- Bilingual math and science hands-on to preschoolers
  - Extensive neurological development
  - Build on non-school scientific understanding
  - Bilingual education and academic progression
- Involve parents
  - Primary educators
  - UI-Micron STEM Research recommendation
    - "Stakeholders in Idaho must support families in order to increase their engagement and support of students' education."

What are we trying to achieve?

"..enable school age children as well as community members to view science and math as integral parts of their natural lives rather than the seemingly complex subjects and prerogative field of studies that conflict with beliefs and values."

- Increase bilingual understanding of basic math and science concepts;
- Enhance the Jerome Head Start teachers' capability to deliver math and science education to bilingual children;
- Enhance parents level of comfort;
- Evaluate the performance of the innovation.

How did we implement the decision?

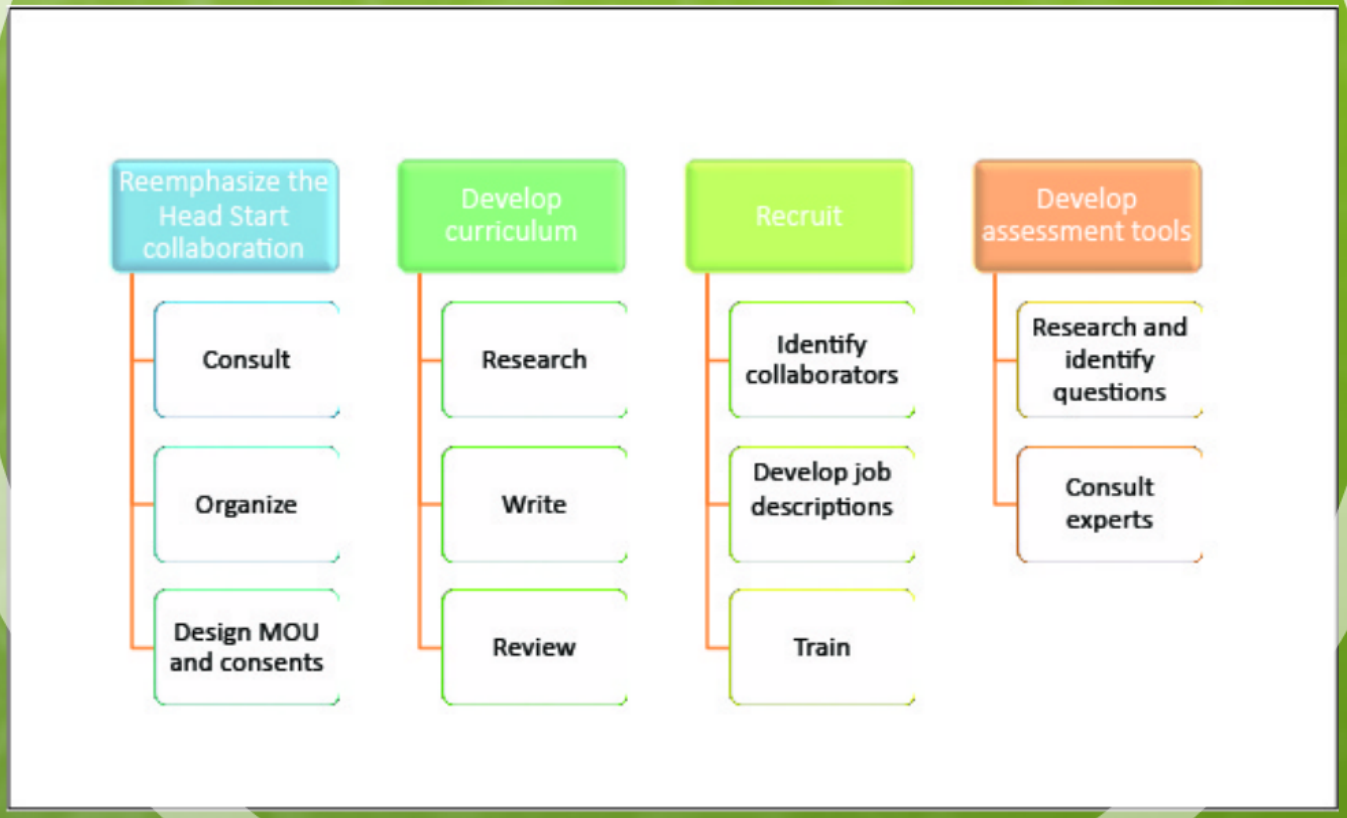
Three-day summer camp at Jerome Head Start

Why Head Start?

- Community and parents partnership
- Low income children
- Bilingual program
- Department of Modern Languages and Cultures connection

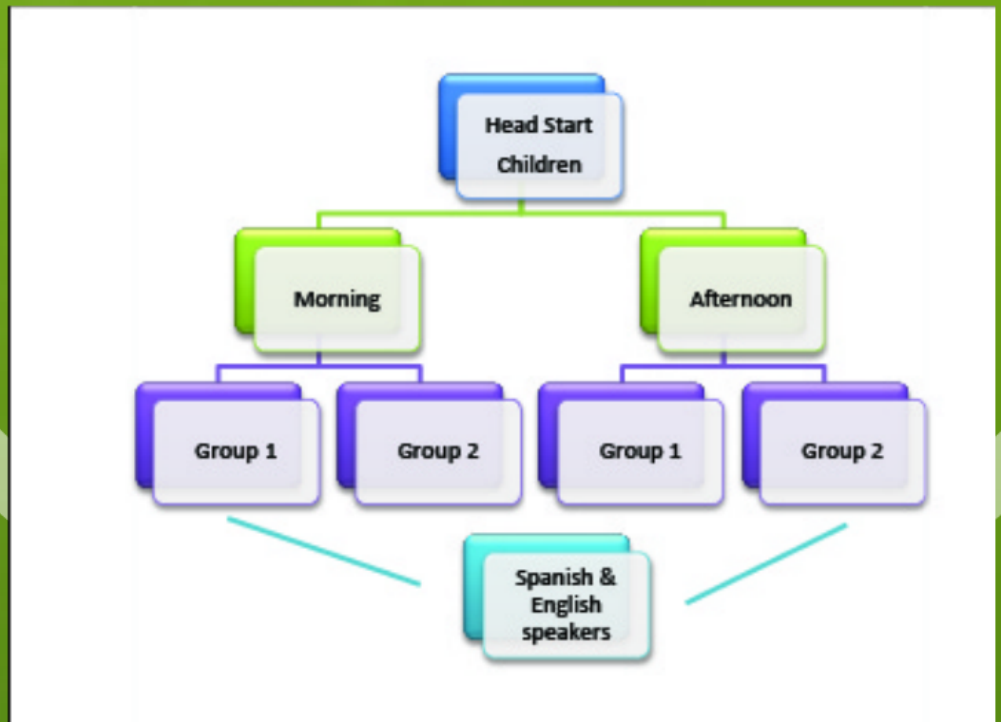
Cultures

What did we have to do to implement the decision effectively?



How did we implement the decision?

- Three-day summer camp - June 11, 12 and 13, 2013
- Head Start facility venue
- Two sessions
- Administered 9 hands-on activities daily
- Sent home activities



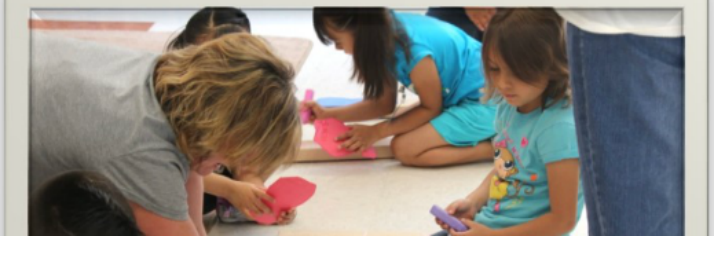
The hands-on activities' themes

Measurement	Germs	Experimentation
Height	Transmission	Mixture
Temperature	Spread	Absorbency
Volume	Types	Flotation
Weight	Speed	Evaporation
Length	Prevention	Magnetism

Measurements

Learning outcomes:

- Comparative assessment
- Fractions and decimals
- Diverse measurable attributes
- Measuring instruments
- Analyze, compare and contrast
- Transform abstraction into reality
- Motor and other skills



LESSON 2

HOW BIG IS OUR CLASSROOM AND DOORS?

Procedure:

1. Have each child take their calibrated "traced/cardboard bodies" made in Lesson Plan 1.

2. Ask the children how we can measure the size of the classroom and the classroom door.

3. Have the children measure the classroom by laying the traced body on the classroom floor and marking each measurement with a chalk or tape.

4. Have each child say how many "bodies" the classroom is. Help them count.

5. Have children measure the classroom doors using the cardboard bodies.

6. Help the children figure out how many feet are in the classroom and doors since their traced bodies are already calibrated in "feet."

7. Have the children discuss how they can arrive at the same measurement of the classroom and the door.

Materials required:

Children traced bodies
Chalk or tape
Recording paper

Investigation:
Measuring length and height

Processing Skills:
Measuring, inferring, communicating

Questions to guide the children's participation:

1. How are you going to measure the size of the classroom or door?
2. Why do you think each person is getting different number of bodies in the same classroom?
3. How big is the classroom? How big is the door?
4. Can you figure out the size of this classroom using your feet?
5. It looks like there are different measurements for the classroom, what should we do to have the same measurement?

Teaching tips:

If the children understand measurement units, they can convert their measurements into actual units.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25 ○
50 ○
75 ○
100 ○

Understanding

Are the children demonstrating an understanding of measuring, inferring, and measuring unit?

25 ○
50 ○
75 ○
100 ○

Comments

Germs

Learning outcomes:

- Germ-disease interaction
- Effective ways of washing hands
- Invisibility nature of germs
- Germs hiding places
- Different types of germs
- Germ spread

LESSON 13

GERM SPEED

Procedure:

1. Ask children to tell you what happen when a person sneezes.

2. Explain to children that when a person sneezes or coughs, the germs come out of the nose/ mouth in lots and lots of little germ-containing droplets really fast - even faster than a car driving on a motorway.

3. Get the children to name things that travel really fast

4. Explain to the children that germs are tiny and can't be seen, but that they are going to use confetti/hole punch pieces to demonstrate how germs can be spread.

5. Using the funnel, fill the balloon up with confetti or hole-punch disks of paper. Once full, remove the funnel and inflate using the pump.

6. Explain to the children that the balloon is going to demonstrate how we sneeze or cough and that the confetti/disks represent the germs.

7. Ask the children to indicate how far and wide they think the germs will travel. (You could mark these distances using the children or markers).

8. When ready, let go of the opening of the balloon, whilst still holding onto the tip of the balloon.

9. Ask the children about how far the germs went and what the germs landed on. Was it further/wider than they expected?

Materials required:

Balloons, confetti or hole-punch disks, funnel and balloon/bicycle pump

Investigation:
Demonstrating how germs are spread in the air

Processing Skills:
Observing, predicting, communicating

Questions to guide the children's participation:

- What happens to the germs when a person sneezes?
- How far will the germs go?
- What things travel really fast?
- How far did the germ go? Did the germ go further or closer than you expected?

Teaching tips:

- A single sneeze produces more than 40,000 droplets of moisture and millions of germs, propelled over a distance of 32ft.
- The fastest recorded sneeze was 103.6mph. The average speed is between 80mph and 100mph.
Source: Telegraph Newspaper website: http://www.telegraph.co.uk/news/uknews/1568919/Sneezing-into-sleeve-stops-germs-spreading.html (last accessed 9th July 2009)
- Using a larger balloon and holding the balloon opening in a downward direction (so the paper discs/glitter are near the entrance), gives the best results.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25 ○
50 ○
75 ○
100 ○

Understanding

Are the children demonstrating an understanding of how germs are spread in the air?

25 ○
50 ○
75 ○
100 ○

Comments

Experimentation

Learning outcomes:

- Observation
- Predictions
- Measurements

LESSON 24

OUTSIDE ACTIVITY: WATER PAINTING AND EVAPORATION

Procedure:

1. On a sunny day give children buckets of water and wide paintbrushes.

2. Let the children experiment with painting the tables and benches, steps, sidewalk, shed, or anything else outside.

3. Watch what they do and listen to what they say before asking questions.

4. Children love to water paint. Encourage them to notice the changes as the water dries. Ask them to paint something that is in the shade.

5. Ask them to notice if it dries as fast as something in the sun.

6. Have each of the children paint a big water spot on the ground and then outline the spot with chalk.

7. Have them all sit back and watch what happens. If some spots are in the shade, ask children to predict which will dry faster. After a few minutes have children draw around the spot that is still wet. (Some spots will have disappeared altogether.)

8. Ask children where they think the water went. Tell them it is in the air even though they can't see it. (NSTA 2007, p217)

Materials required:

Wide paints brushes
Water in containers
Pail

Investigation:
Discovering that water evaporates into the air

Processing Skills:
Observing, comparing, communicating

Questions to guide the children's participation:

1. What does the (bench) look like when it's wet?
2. Is it still wet?
3. Where do you think the water is going?

Teaching tips:

Let the children repeat this activity several times.

Assessment:

Please indicate the percentage of children that are engaged and show an understanding of this lesson.

Engagement

Are the children actively participating in the activities - paying attention to the instructor, asking questions, and responding to questions even if answers are incorrect?

25 ○
50 ○
75 ○
100 ○

Understanding

Are the children demonstrating an understanding of evaporation?

25 ○
50 ○
75 ○
100 ○

Comments

Home activities

Learning outcomes:

- Observation
- Predictions

Home Activity

LESSON 2

PLANTS ABSORBENCY

Procedure:

1. Tell your child she/he is going to observe how plants absorb water.

2. Help your child fill a tall, clear glass or jar half-full with water.

3. Add a few drops of red food coloring and mix well.

4. Trim the bottom of a large stalk of celery, leaving the leaves on the stalk.

5. Place the celery stalk in the glass or jar. Leave overnight in order for the stalk to "drink" the water.

6. Have your child draw a picture of the celery stalk "before" it drinks the red water and then write a sentence to describe what he/she sees.

7. Bring the experiment and your child's picture to the camp the next day.

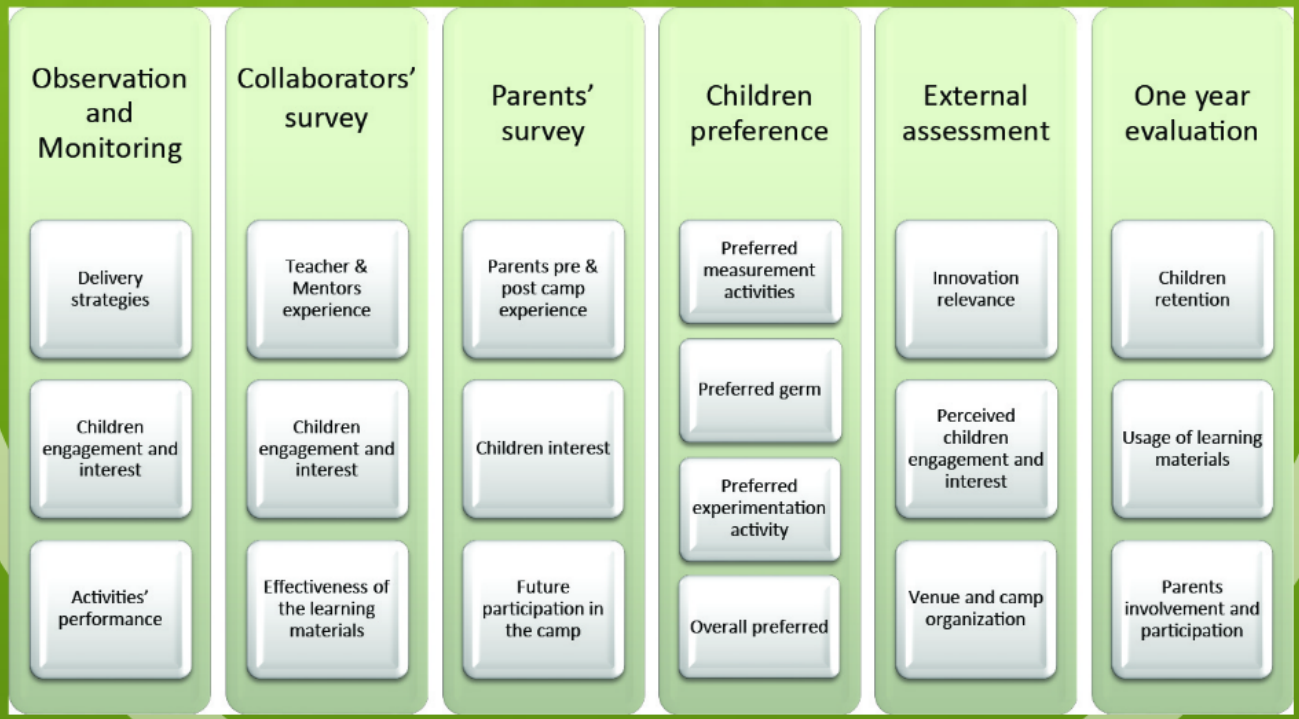
Materials required:

Tall clear glass or jar, water, red food coloring, scissors, and celery stalk with leaves

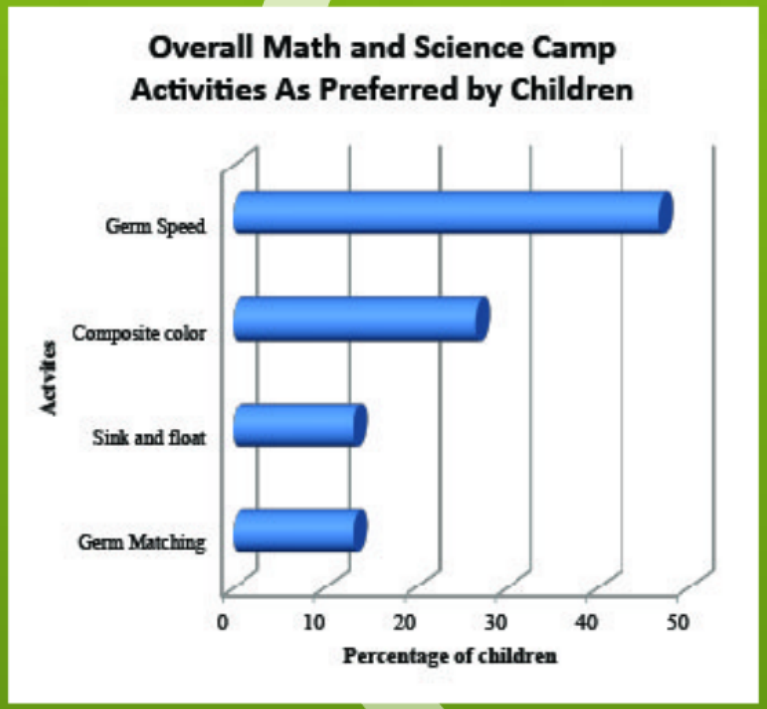
Investigation:
Demonstrating plant absorbency

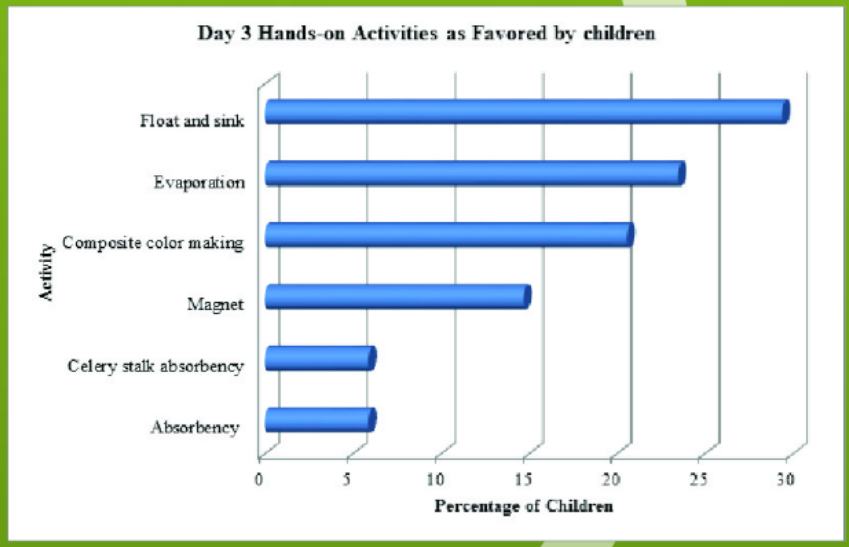
Processing Skills:
Predicting, observing, communicating

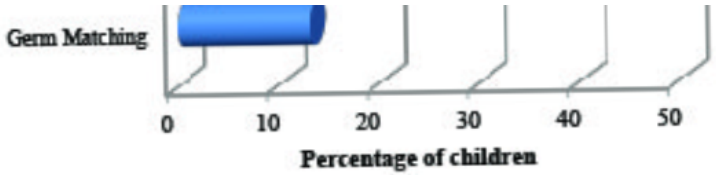
How did we assess the success of the implementation?



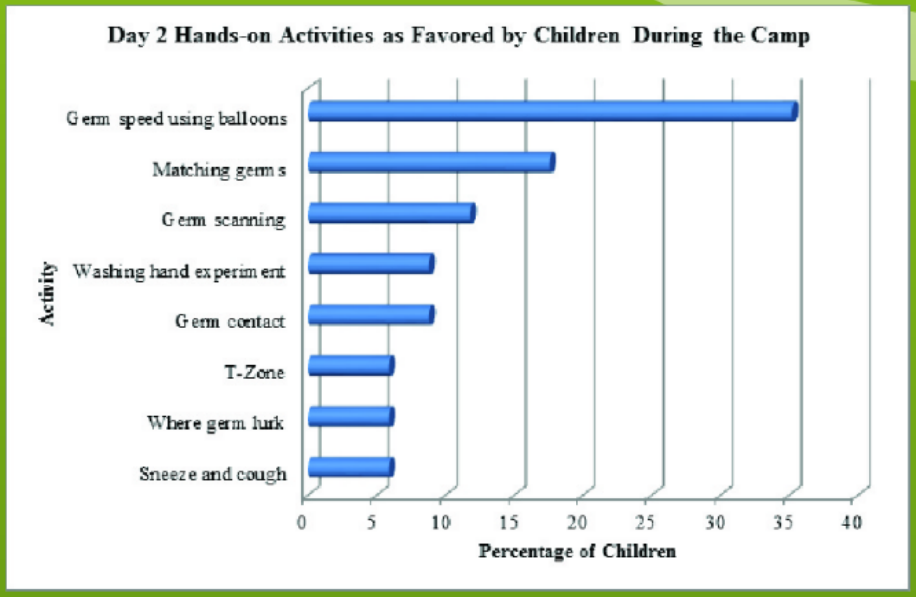
What did we learn from the assessment?

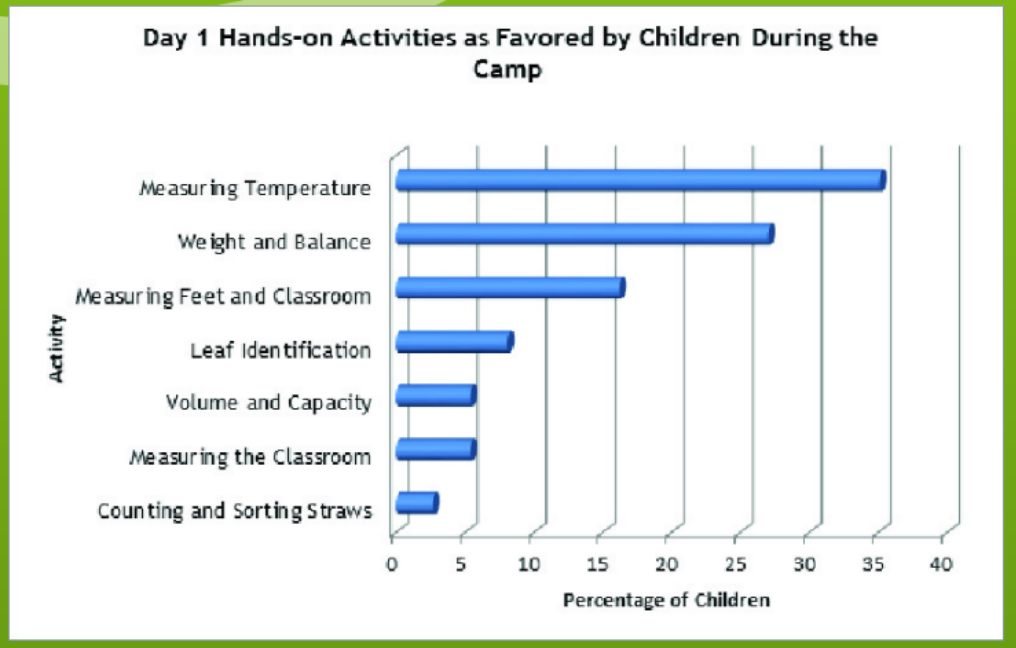




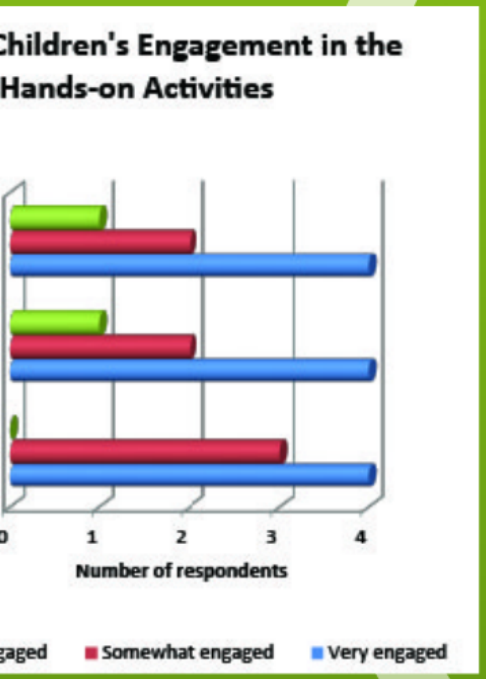

Germ Matching
0
10
20
30
40
50
Percentage of children

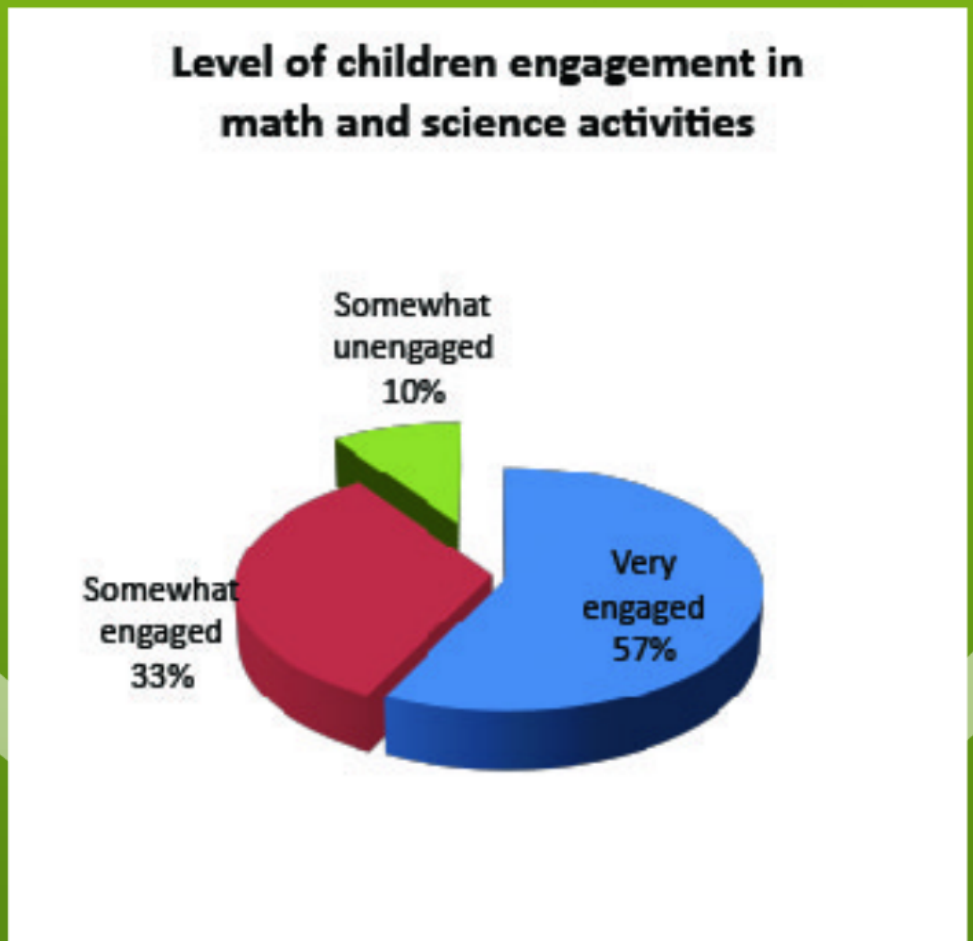

0
5
10
15
20
25
30
Percentage of Children


Day 2 Hands-on Activities as Favored by Children During the Camp
Germ speed using balloons
Matching germs
Germ scanning
Washing hand experiment
Germ contact
T-Zone
Where germ lurk
Sneeze and cough
Activity
0
5
10
15
20
25
30
35
40
Percentage of Children

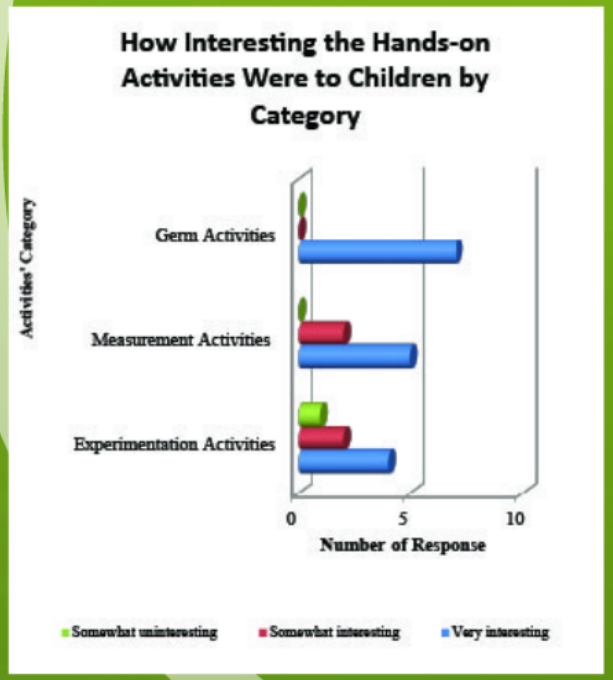

Day 1 Hands-on Activities as Favored by Children During the Camp
Measuring Temperature
Weight and Balance
Measuring Feet and Classroom
Leaf Identification
Volume and Capacity
Measuring the Classroom
Counting and Sorting Straws
Activity
0
5
10
15
20
25
30
35
40
Percentage of Children

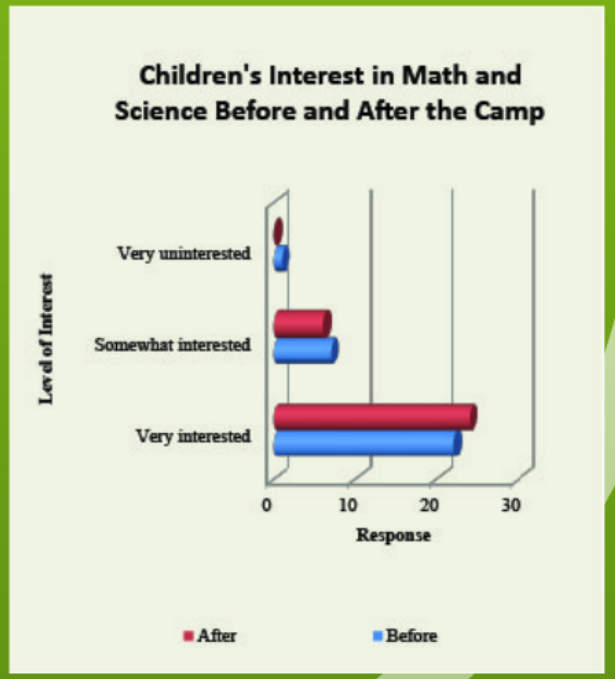
Children engagement in math and science activities





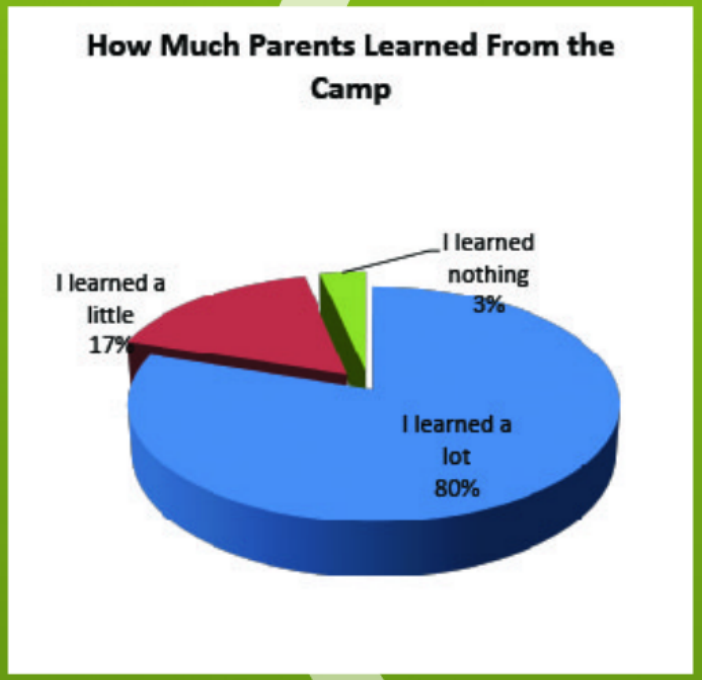
Children's interest in math and science





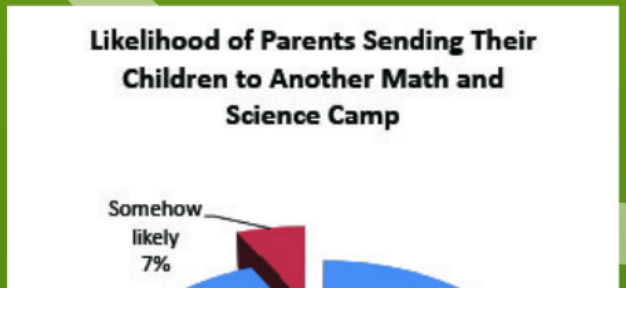
Parents' experience

Learning

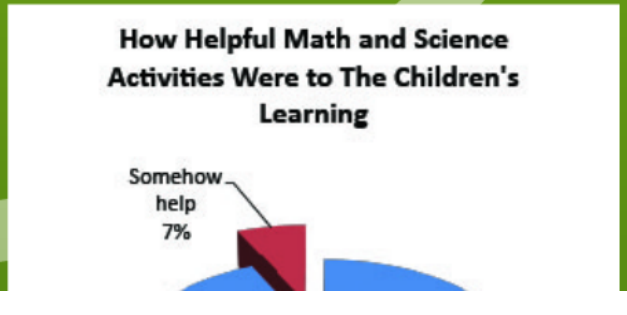


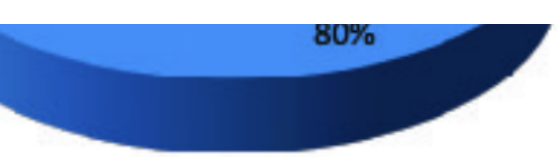
Confidence level

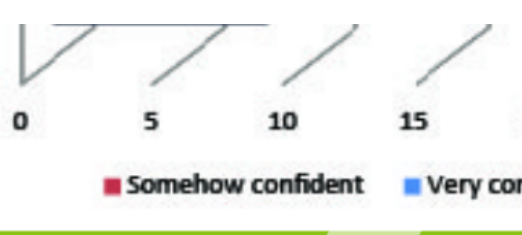
Future Camp



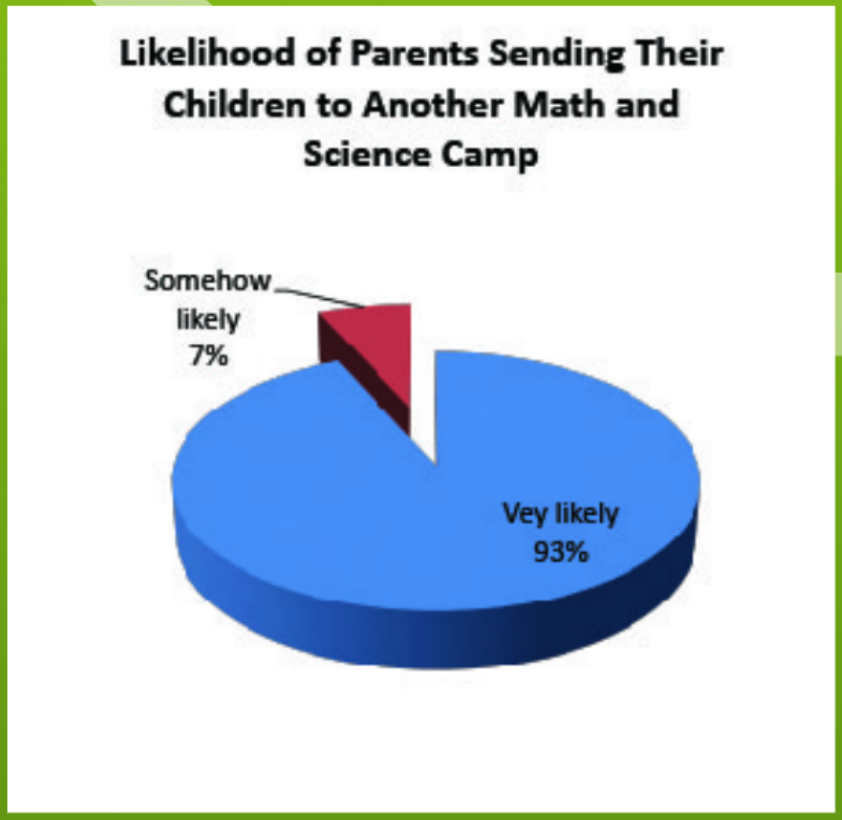
Camp's Helpfulness



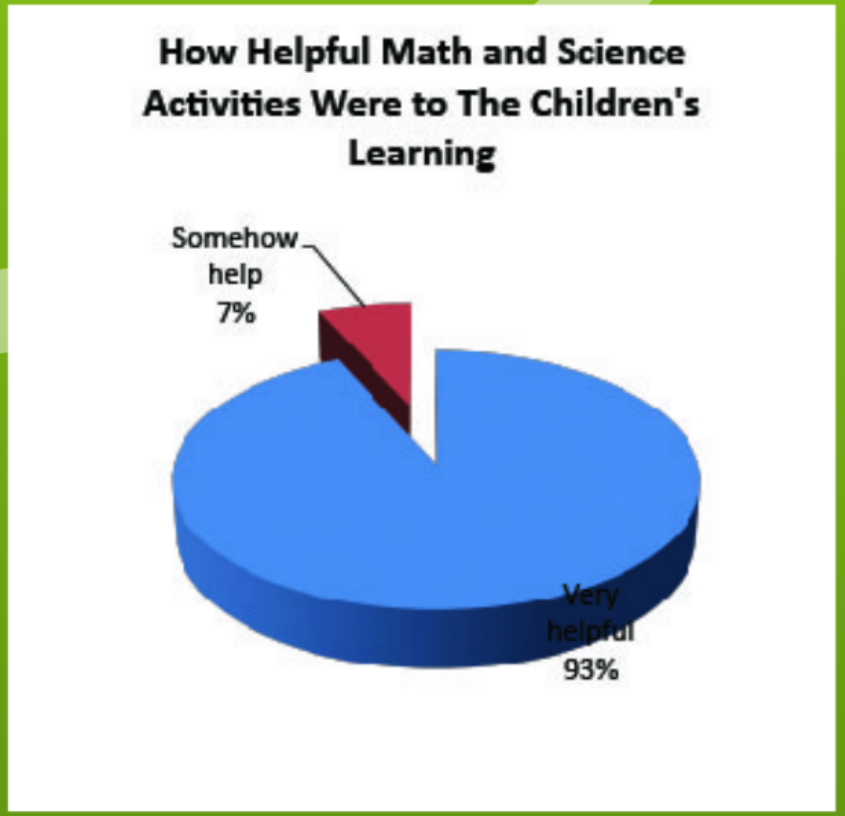




Future Camp



Camp's Helpfulness



To what extent do the children still remember the following concepts?

		Not at all	1	2	3	4	5	Extensively
Measurements activities						X		
	Height					X		
	Temperature				X			
	Volume				X			
	Weight						X	
	Length						X	

Germ activities		Not at all	1	2	3	4	5	Extensively
	Transmission							X
	Spread							X
	Types				X			
	Speed						X	
	Prevention							X

Experimentation activities		Not at all	1	2	3	4	5	Extensively
	Mixture					X		
	Absorbency					X		
	Buoyance and Flotation					X		
	Evaporation					X		
	Magnetism							

How often do you use the following supply?

Supply	Not at all	1	2	3	4	5	Extensively
Henry the hand School Kit					X		
Balloon pump					X		
Balancing scale							X
Magnets							X
Measuring set							X
Rulers						X	
Scissors							X
Scissors' caddy						X	
Colored sponges							X
Activity plan						x	

Have see an increase in the parents involvement in their children education after the camp?

	Not at all	1	2	3	4	5	Extensively	Comment
Participating in the Head Start general decision making							X	Joined Policy Council
Participating in education-related conversations with school staff					X			More involved this year
Volunteering in the classroom						X		Provided dental lessons to classroom
Volunteering in in other school activities								

Summary and Conclusion

Children preferred and demonstrated engagement and interest in math and science activities that were practical, relatable, and integral part of their daily lives. Introducing math and science activities in this manner at a young age could seamlessly increase the participation of children in science and Math.

Parents increased their confidence in helping their children with math and science by learning some concepts from the camp, and thus they are likely to send their children to another camp.

Involvin
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Involving the parents in the camp improved parents' participation in the their children's education. Increasing the the level of involvement could significantly improve parents' ability to help their children with math and science in the short term, and in the long-run alleviate the mistrust and fear of science.

The activity plans and the science and math material are enhancing the teachers' ability to teach bilingual children.

Lessons and way forward

Logistics lessons

- "Test" all the hands-on activities
- Transportation is key to camp participation

Intellectual lessons

- Children can learn complicated concepts presented in relatable and simplified manner.