Division of Mathematics, and Science

Workshop: Science Leaders and Coaches Dialogue Elementary **Session** 4

FOLLOW-UP: ACTION PLAN
(*REQUIRED FOR MASTER PLAN POINTS*)

To be completed no later than 2/0514 **Region** ______________

PD Location Gilbert Porter

Electronically: Please be advised that sign-in sheets/agenda should *be* scanned and sent electronically via EDMODO. Log in to Edmodo at http://miamidade.edmodo.com/home in the Menu on the left, select **join a group asap** and input your session 4:

Edmodo codes:

-Dr. Gilbert Porter ES: **qvi56t**

-John I. Smith K-8 Center: **m8k6kr**

-Henry West Lab ES: **r8b837**

- Hubert O. Sibley K-8: **jynmz9**

Action	Person Responsible	Date Completed
Meet with principal or AP to share the content of this professional development and collaborate to present to targeted staff.	J. Fayson	2/5/14
Conduct in-depth planning sessions with grade appropriate science teachers focusing on the content of this workshop. For these planning sessions, attach: ☑ Agenda with date(s) ☑ Sign-in sheets of planning sessions	M. Albelo, 5th grade teacher	2/5/14

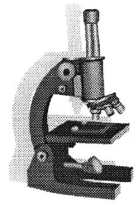
Participant Name: Marilyn Albelo **Work Location #:** 0121
Employee Number 234734

School: Auburndale Elem. **Regional Center:** CENTRAL

Principal's Signature: [signature]

Comments:

August 2013



5th grade Science Leaders Information Disaggregation

Teacher Name	Subject Taught	Signature
Jashon Fayson	Assistant Principal	
Marilyn Albelo	5th Grade Sciecne	
Elisa Groso	5th Grade EFL Science	
Saudi Perez	5th Grade Gifted	

Copy of email sent on February 3, 2014, is attached below. Copies of information placed in teachers mailboxes are attached…

Fellow 5th grade science teachers,

After attending the 5th grade science leaders meeting I am going to place some hard copies of pertinent information in your mailboxes that you may wish to include in your upcoming lessons.

Additionally, below you will find the link to the science Professional Development site where all the information covered will be placed. This is a great resource because it includes the power point and embedded videos.

http://science.dadeschools.net/elem/PDjan2014dialogue4_gr5.html

I will meet with you this week about the documents and to answer any questions that you may have.

Thank you,

Marilyn Albelo

Supporting Ideas With Evidence

A framework for helping students approach inquiry as scientists do

By Susan Gomez-Zwiep and David Harris

Introduction

We often hear about the value of critical thinking and problem solving in science, but what does that really mean in the elementary classroom? When students answer our questions (e.g., what do plants need?) quickly or with limited responses (e.g., dirt, sunlight), their thinking isn't visible. Although we ask students to collect data and to tell us what the data means, students do not always find it easy to make connections or explain the reasoning behind their conclusions.

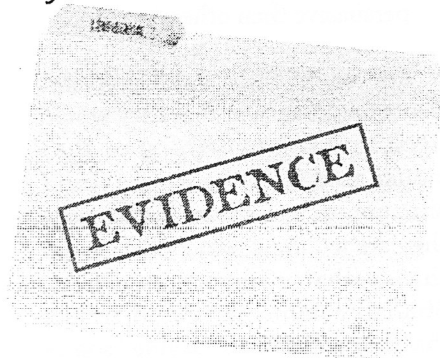
One way to help elementary students see connections more easily and to make their thinking more visible is to teach them to approach scientific investigation and problem solving as scientists do—from the framework of "finding evidence to support claims." In this article we begin by introducing students to the concept of evidence, then build on that idea by introducing the concepts of cause and effect and the need for accuracy in evidence (i.e., measurement), and finally by introducing the ideas of variables and control in an investigation. When students develop understanding of each of these concepts, they will be able to approach any inquiry investigation as scientists do. Students will understand the importance of evidence and how evidence can be used to explain the reasoning behind scientific ideas, which will be useful as they move to more independent investigations in their later school years.

Evidence

For many children, all ideas are equally plausible (Bransford, Brown, and Cocking 1999; Driver et al. 2000). Our goal as science teachers is to teach students that explanations with evidence are stronger than explanations alone. We need to first clearly define *evidence*. One way to do this is to ask students a series of questions based on a statement about something familiar. Choose a well-known subject matter so the focus is on evidence and not trying to understand a new science concept. For example, we present a statement about whether the color of a shoe affects how fast you can run.

- "I read an article that said 'red tennis shoes make you run faster than any other color of shoe.' Do we believe that?" *(Yes, some shoes make me faster than other shoes. No, the color doesn't have anything to do with it.)*
- Whether your students believe the statement is not as important as their response to your follow-up question, "What would make you believe that this claim is true?" *(I might believe it if I saw a track star running in red shoes. I would have to run fast in the shoes myself.)*

After you discuss students' ideas, redirect them to think about what would convince them to believe that red shoes do help one run faster. Ask,



- "Is the fact that the statement is in the newspaper good enough?" *(No, it could be a lie. Yes, because the newspaper does not just print anything.)*
- "What could we do to find out more about shoes and color?" *(We could ask people with different color shoes to run and see who is faster. We could interview runners about what they look for in a running shoe.)*

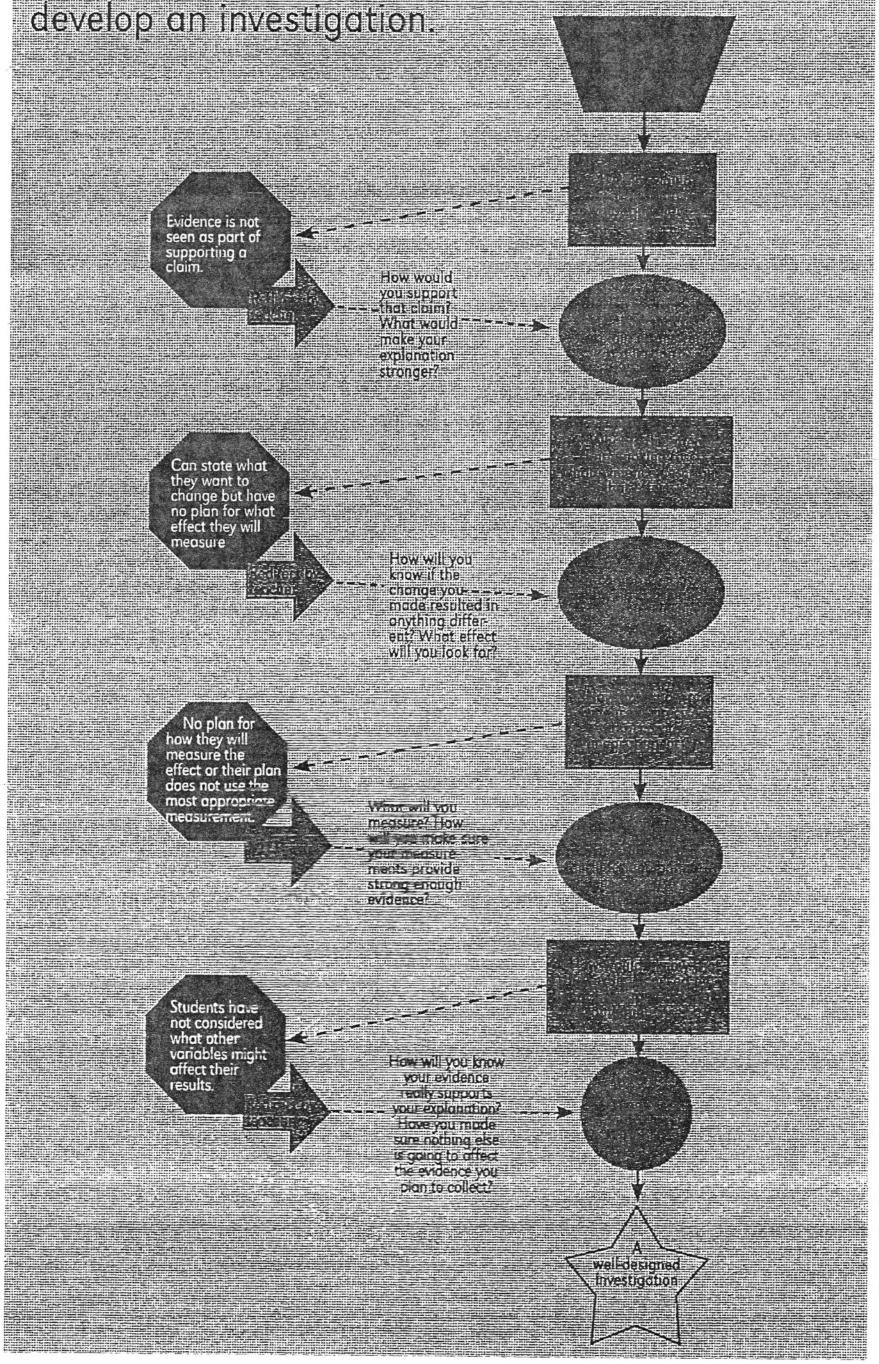
Explain to students that when we test these ideas, we are gathering information like scientists do. This information is called *evidence*. Once we have enough evidence, we can decide if a statement is supported. If we don't have any evidence, our statement is not as strong. So, the statement "red shoes make you run fast" is not a strong statement because we do not have any evidence to support it.

For primary students, the conversation could end here. For upper elementary students, the conversation could extend into more sophisticated discussions of evidence. Ask,

- What would we need to do to prove that *some* shoes help you

Figure 1.

Flow chart of students' thought processes as they develop an investigation.



data under the categories "what we did" and "what happened." Eventually, as students become confident with which data fits into each column, the terms *cause* and *effect* can replace the original table headings.

For upper elementary students this model of "cause" and "effect" can provide the connection to more academic language through translation into hypothesis statements: "If (I cause this change), then (this effect) will/will not happen. As they prepare to show or quantify the described effect, the quality changed can be labeled as the *independent variable* and the quality affected can be labeled as the *dependent variable.*

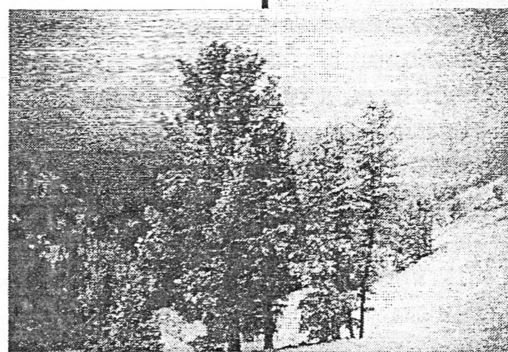
Measurement

Once students understand the connections between cause and effect in an investigation, they can move on to the idea that change needs to be quantified for comparison, and the way to achieve this is through measurement.

So far in our activities, students have discussed the effect of shoe color on performance and they have discussed speed or the color movement in water due to temperature. The questions were about effect. What was described? *The speed I ran did not change when I changed shoe color; the color moved faster, the water was hotter.* In science, however, such descriptions often require a comparison. Sometimes it is simply existence—color/no color; other times it is subtler—light red, dark red. In any case, there is a scale and units on that scale that help us describe our evidence. Whether centimeters, degrees Celsius, or clarity of water, measurement is the tool for describing and comparing the evidence gathered

Where Do Snowflakes Come From?

To many people, snow is one of nature's most beautiful displays. It falls from the sky in tiny flakes, and each snowflake forms its own unique shape called an ice crystal. None of these flakes are identical. Viewed up close, ice crystals form all sorts of fascinating patterns. As snow collects on surfaces, snowflakes form a fluffy white powder that reflects light in wondrous ways. Snowflakes give the winter months a special character all their own. Where do these magical flakes come from? How do they form?



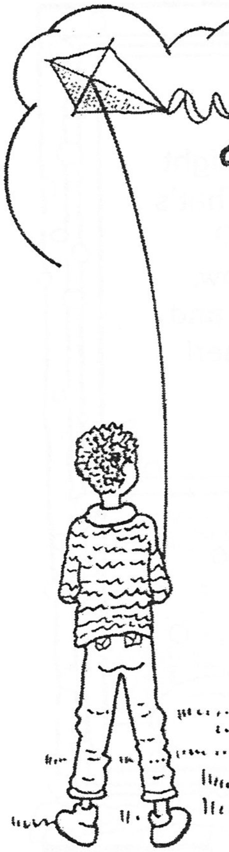
Snowflakes originate in clouds when water molecules form ice crystals. Ice crystals grow into larger snowflakes as they fall to the ground.

The process that forms snowflakes requires water in the atmosphere. Molecules of water are generally present in the air. The form of water present in the air is known as water vapor. Water vapor is present in the air in varying amounts. For instance, on hot, dry days the air is relatively free of water, whereas on cooler, more humid days more water collects in the air, making the air feel heavier and wetter. Humidity is a measure of the amount of water vapor in the air. Particularly hot and humid days feel very different from dry days due to the amount of water in the air.

Water vapor in the air is not usually visible. However, water vapor can be seen when it attaches to tiny dust particles, pollen, or bacteria that is stirred up by wind or other phenomena. When water vapor attaches to dust particles, it forms clouds. Therefore, clouds are a combination of dust and water. When the temperature is cold enough, tiny water droplets freeze around a pollen or dust particle. When this happens, a structure known as an ice crystal forms.

Gradually, ice crystals attract more water molecules. Once they are heavy enough, they begin to fall through the cloud and ultimately through the air below until they reach the ground. As they fall, more water molecules are attracted to the primary ice crystal. These additional water molecules attach to the ice crystal and increase its size. The ice crystals continue to grow in this way as they fall. Snowflakes are ice crystals that reach the ground.

Weather and Climate



You've probably heard the words weather and climate, but do you know the difference? Climate and weather are related, but they're not the same thing.

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Weather changes all the time. It is never exactly the same from one day to the next. The temperature may be different. The humidity might be higher. Maybe the winds have picked up.

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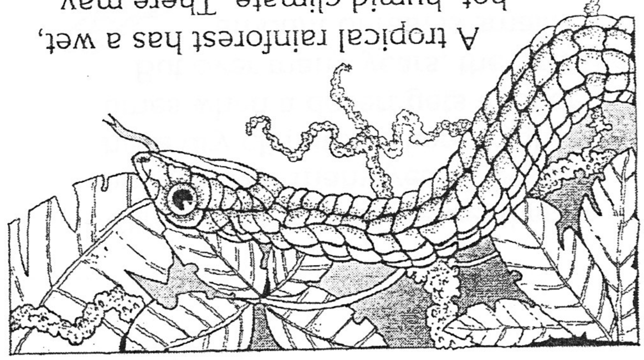
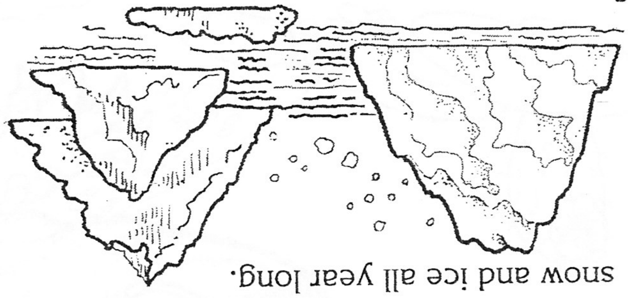


A tropical rainforest has a wet, hot, humid climate. There may be dry times, but in general, there is lots of rain. The temperature and the humidity are usually high.

Antarctica has a cold climate. There are snow and ice all year long.



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In your own words, describe the difference between weather and climate.

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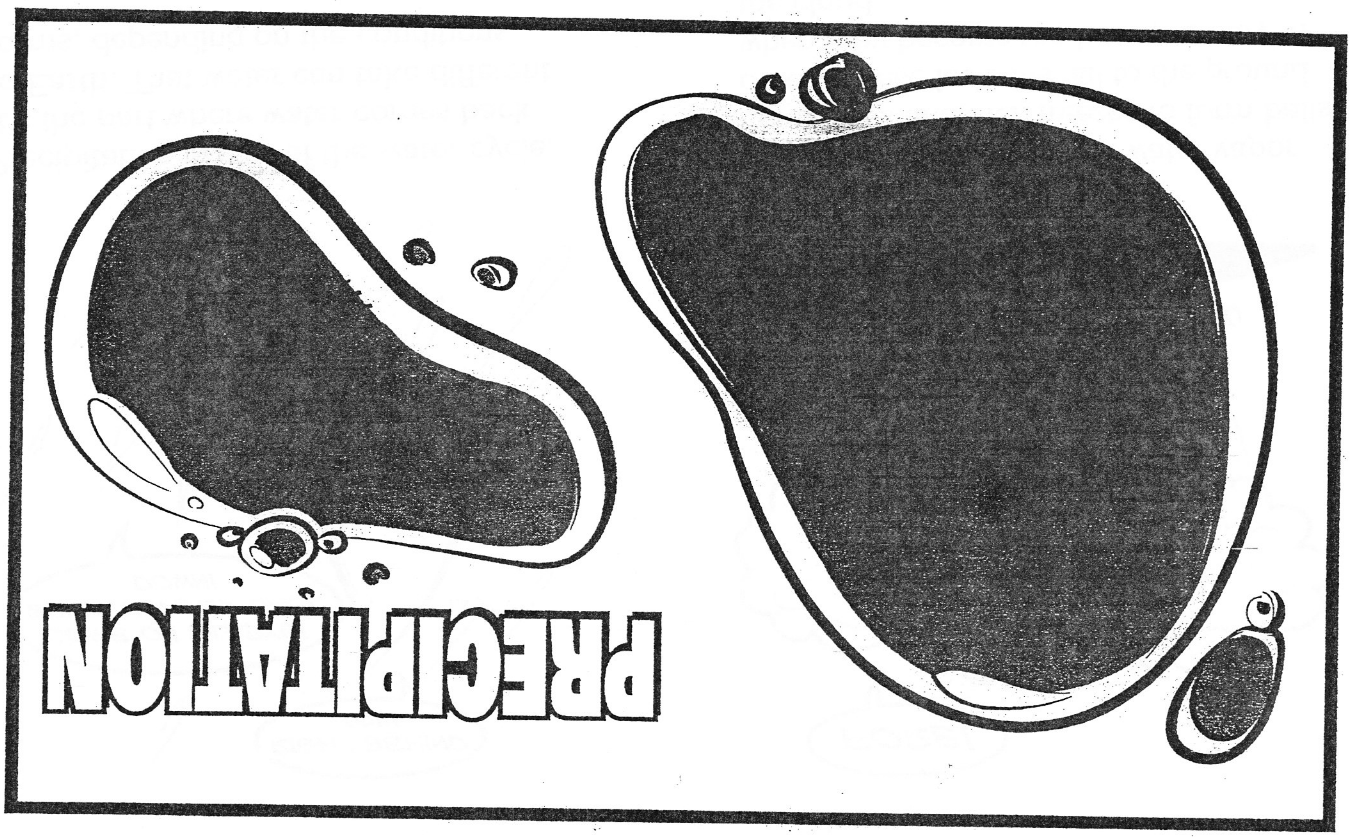
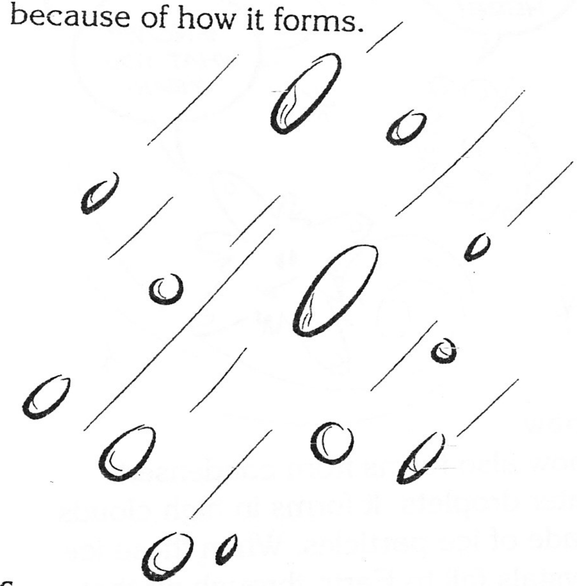


Sleet
Sleet is rain that has frozen between leaving the cloud and reaching the ground. It may also be snow that has partially melted and then refrozen in the air. It is looks similar to hail, but is different because of how it forms.



Rain, snow, sleet, and hail are four different kinds of precipitation. Each forms in a different way and has different characteristics.

Name____ Date ______________________

Claim-Evidence-Reasoning (CER)

Assignment: Write a scientific explanation that answers this question: How do snowflakes form?

Claim: (Write a sentence that states how snowflakes form.)

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Evidence: (Provide data about the weather conditions including quantitative data to support your claim about how snowflakes form.)

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Reasoning: (Write a statement that connects your evidence to your claim about how snowflakes form.)

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