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June 2009

4th Grade Science - 3 Week Unit

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Contextual Factors

Community, Classroom and Student Characteristics

Community Characteristics

The school is located in an urban area with a high level of diversity (see figures 1 and 2). Both the district and the school have more than 50% of their students qualifying for free or reduced lunch. Within the community there are many resources available to families including: child care resource and referral; domestic violence programs; senior centers; coalition to end homelessness; ADA support groups; veterans affairs offices; early learning services; fair housing board; Department of Social and Health Services; public libraries; and metro parks.

Classroom Characteristics

The classroom is light and spacious with a vaulted ceiling and 10 foot windows along the back wall. The walls are painted a creamy tan color and left fairly clear of posters or other distractions. The desks are in two columns, three rows deep and four desks wide. There are storage cabinets along the walls most of the way around the room, some tall with doors and some shorter with open fronts. In the back corner of the classroom there are four laptops set up for student use. There are an additional four laptops in the storage cabinet at the front of the room for students to use.

There are five classroom rules: Listen and follow all directions, keep hands, feet and objects to yourself; always do your best; work quietly; be nice. If students choose not to follow the rules they turn their color tag and receive the consequence. There are three levels of consequence/punishment in the classroom: time out; loss of recess; principal parent phone call. Each day follows the same schedule. (See photos on right). There is also a grid in which all of the day's assignments are recorded so that students are able to see what they should be doing if they come in late or are confused.

Student Characteristics

The students are diverse ethnically, socio-economically and learning ability. There are 24 students in the class of which 16 are male and 8 are female (see figure 4). There are five different ethnicities represented in the class (see figure 3) and five different home situations (see figure 5). There are three English Language Learners and two students with special needs/IEPs. There are also several documented health concerns among some of the students (see figure 6).

Figure 1- Ethnic Breakdown City

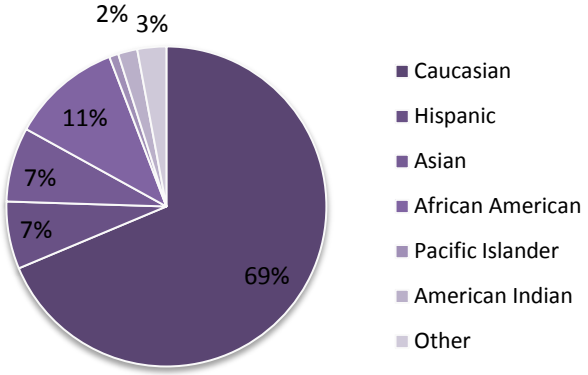


Figure 2- Ethnic Breakdown School District

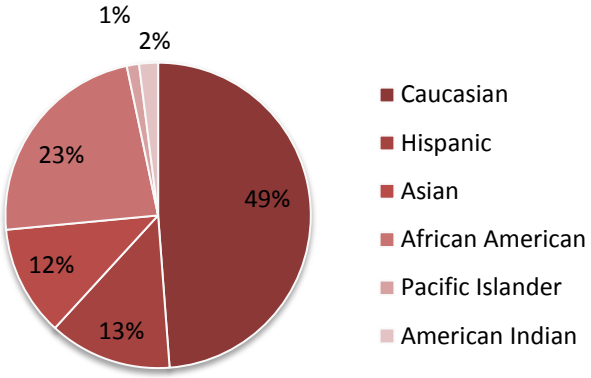


Figure 3- Ethnic Breakdown Classroom

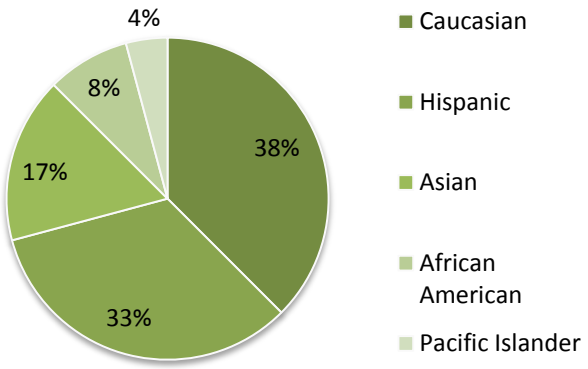


Figure 4- Gender Breakdown Classroom

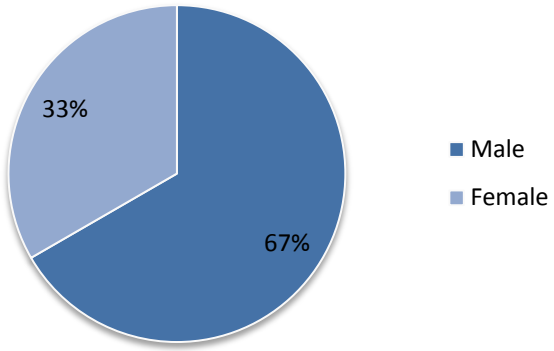


Figure 5- Living Situation Classroom

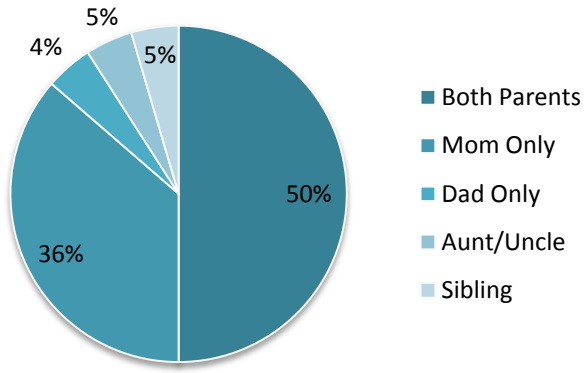
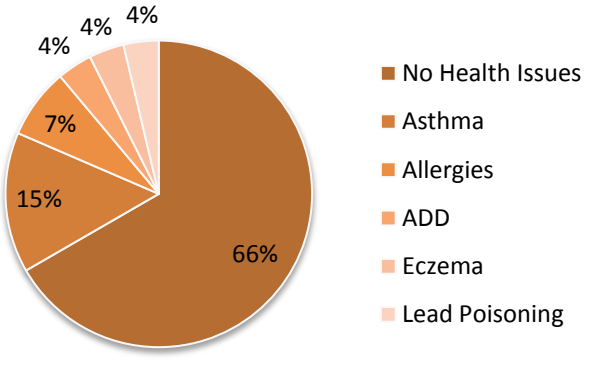


Figure 6- Health Issues Classroom



Student Profiles

Student #1

Student #1 is an African American female whose family immigrated to the area from Uganda to escape the problems in Uganda, go to school and start a family. Student #1 is quiet in class and does not appear to have developed any close relationships with the other students. She is a hard worker and consistently achieves at or above grade level in all her work. Her family speaks Ugandan in the home and she has one sister who will start school next year. She enjoys the arts: playing piano, singing and drawing.

Student #2

Student #2 is a Caucasian male who lives with his sister. He is a hard working student who is achieving near grade level. He is somewhat disorganized, however employs numerous organizational steps to try and stay on top of his work. He is highly social and has a hard time sitting still and being quiet. His work is variable in both its quality and content. Although he misses portions of the day due to instructional pullouts, he still completes his work.

Student #3

Student #3 is a mixed race female who is the oldest member in her class. She lives with her grandmother and has seven siblings, a mix of half, step and natural. She is highly social and achieving at grade level in most subjects. She excels at writing and is interested in the arts including music and chorus. She began her education in a home school and private school environment which has aided her in some subject areas but has also put her at a disadvantage for her social development and she often interacts in an inappropriate manner with her classmates.

Student #4

Student #4 is a mixed race male whose mother immigrated to the United States from Peru. He speaks Spanish, French and Korean at home as well as English in school. His family moved to the Tacoma area to be in a better school district. He has two siblings one of whom is in school as well. He is an intelligent student who performs at grade level, with occasional bursts of above grade level work. He needs a challenge and enjoys assignments that require more than just reading and answering the questions. He is extremely social and is friends with everyone in the class. I believe he is often bored with the work and many of his negative behaviors stem from that.

Student #5

Student #5 is a mixed race male (African American and Caucasian) who lives with his mother and step-father. He has one sister in the school and several step-siblings all of whom are in the school system. His family moved to the area to have a bigger house and so that his mother could get a better job. He is an average student who seeks the attention and approval of both his classmates and teachers. He is quick to volunteer for any extra tasks, which often pulls him out of the classroom. He enjoys sports and often receives praise for his efforts in this area.

Instructional Implications

Due to the diversity of students in the class and the large range of learning styles and abilities students will be placed in small learning groups. Each group will consist of at least one student who is achieving at or near grade level in science and demonstrated at least partial prior learning in the content area which will be determined by the pre-assessment. For this unit each student will be given a specific job in their group. Each student will have the opportunity to experience each job, which will both push them in areas they struggle and empower them in the areas in which they excel. Students will also be graded on participation which will encourage teamwork and community building.

I will also employ a variety of assessment strategies including written, oral, drawing, fill in the blank and multiple choice assignments. This will ensure that each students learning is accurately measured and their needs are met. Because of the diversity in learning styles in this classroom and the range of abilities in the students each group will be responsible for making sure that its members are engaged and involved in each lesson and that there is an opportunity for everyone to experience the activity. For students with lower writing abilities I will provide pre-written forms for them to work with.

To address the positive impact on student learning I will review with the class as a whole and individual students as needed each PISL question and some possible answers. I will have students generate a list of possible answers and create a space for them to discuss the questions amongst themselves. I will use student friendly language and offer synonyms and examples for each question as needed.

Because of the varying degrees of prior learning I will encourage students to share examples from their own lives for each of the learning goals and facilitate a home/school connection as often as possible through open ended discussions and questions. I will encourage students to work together and to not use me as a switchboard operator, instead relying on themselves and their classmates for approval and sounding ideas.

Learning Goals

Learning Goals

UNIT: Given a unit on magnets in which students explore, investigate and test the properties of magnets and other objects through individual, small group and whole class activities SWBAT understand how to use the properties and characteristics of objects to classify them; and how force affects objects in terms of strength and direction.

GLE 1.1.1: Given several learning activities that require students to make predictions about the magnetic properties of several objects based on physical properties and then test those predictions SWBAT identify, describe, sort and classify objects and materials using observed physical properties.

GLE 1.3.1: Given several learning activities that require students to test the force between two magnets, between one magnet and another object and switch between attraction and repulsion SWBAT describe a force that is acting on an object in terms of strength and direction (e.g. magnetic force, a push, or a pull) and compare the strength of one force to the strength of another force.

Essential Academic learning Requirements

Science GLE 1.1.1. Understand how to use properties to sort natural and manufactured materials and objects.

Science GLE 1.3.1 Understand forces in terms of strength and direction

Essential Questions

What will the magnet stick to? How do magnets and iron objects work together? Can the force of magnetism go through materials? How can the strength of the force of attraction between two magnets be measured? How can we be sure that the force of attraction doesn't work if two magnets are too far apart? How did the iron filings help you find the magnets? How did the compass help you find the magnets?

What are you learning? Why are you learning this? How is this learning related to previous learning? How are you being evaluated? What strategies do you have?

Bloom's Levels

Lesson	Knowledge	Comprehend	Apply	Analyze	Synthesize	Evaluate
Pre-Assessment		x	X	x		
Investigation 1, Part 1.1		x	x	x		
Investigation 1, Part 1.2		X				
Investigation 1, Part 2		X				
Investigation 1, Part 3.1	X	x	x			
Investigation 1, Part 3.2	x		x			
Investigation 1, Part 4	x	x	x			
Summative Assessment		x	x	x		

Developmental Appropriateness

In this unit I will use mainly lower level thinking questions. This will serve two purposes: to serve the students who are achieving below grade level in one or more content areas and help to raise their knowledge and skill in this subject; and to empower those students who are achieving at or above grade level and help them to extend their knowledge through guided teaching and modeling. Because of the frequent pullouts, interventions and absenteeism that occur each day there will be students missing from most lessons. This will serve as an opportunity for other students to apply the learning they have done and create stronger connections by explaining and working with these missing students. By allowing students to serve as mentors and teachers I will foster a sense of accomplishment, pride and enthusiasm for the learning.

Discuss why your learning goals and essential questions are appropriate in terms of student development; necessary pre-requisite knowledge, skills; and other student needs

Assessment

Overview of Assessment

Lesson	Learning Goal	Type of Assessment	Adaptations
Pre-Assessment	Assess what they know about magnets; and explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.	Multiple Choice and Short Answer Quiz PISL Questions	Extra Time Context Clues Verbal Direction
Investigation 1 Part 1.1	Understand how to use properties to sort natural and manufactured materials and objects by making guesses and then checking them and giving a written explanation about what they discovered.	Pre and Post T-Chart Written Explanation	Context Clues Verbal Direction
Investigation 1 Part 1.2	Write a paragraph explaining the magnetic forces of repulsion and attraction and give one example from their investigation that day that illustrate each force.	Written Explanation Illustration	Context Clues Verbal Direction
Investigation 1 Part 2	Accurately explain magnetic force and temporary magnetism through written explanation to a prompt.	Written Explanation	Context Clues Verbal Direction Oral Explanation
Investigation 1 Part 3.1	Describe one way the strength of the force of attraction between two magnets can be measured.	Written Explanation	Teacher Guided Context Clues Verbal Direction Oral Explanation
Investigation 1 Part 3.2	Accurately describe how the force of attraction is affected by two variables (distance, spacers).	Written Explanation	Fill in the Blank Verbal Direction Oral Explanation
Investigation 1 Part 4	Sort objects based on physical properties and explain how the iron filings and compass can help you detect magnets.	Pre and Post T-Chart Written Explanation	Verbal Direction Oral Explanation
Summative Assessment	Assess what they know about magnets; and explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.	Multiple Choice and Short Answer Quiz PISL Questions	Extra Time Context Clues Verbal Direction Oral Explanation

Pre and Post Assessments

The pre-assessment and post assessment used will be the end of unit assessment provided by the FOSS science kit and the positive impact on student learning questions. At the beginning of the unit I will give the end of unit assessment in its entirety assessing the questions that relate to each investigation separately. For this investigation I will focus on questions 2, 5, 11, 15 (a, b, c & d) and 16 (a &b). This will enable me to accurately judge their learning specific to the GLE's I have selected (science 1.1.1 & science 1.3.1).

For each of these GLE's I will create a rubric for assessing their learning, this will be the same rubric for both the pre and post assessment. I will also assess students learning by using the positive impact questions. I will ask the same questions at both the beginning and end of the unit and will assess using a rubric.

Formative Assessments

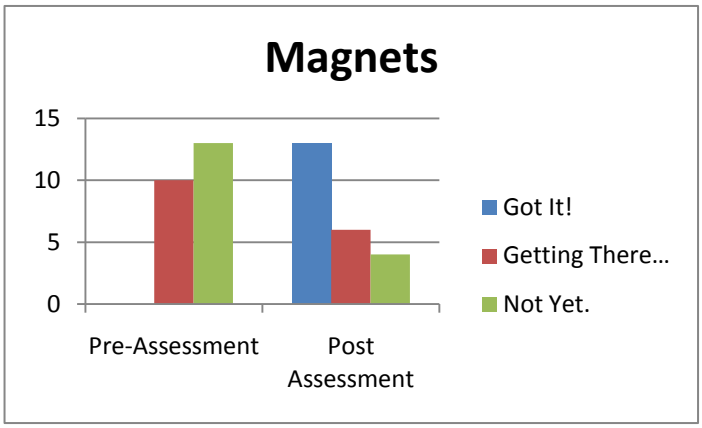
I used several different formative assessments. All included a written component and most offered a secondary means of expressing their learning. I varied the secondary means by using graphic organizers, oral explanation, guided response and context cues. Each student completed all their work in a science notebook which was available to them throughout all the investigations and formative assessments. It also served as an organizational tool for some and a way

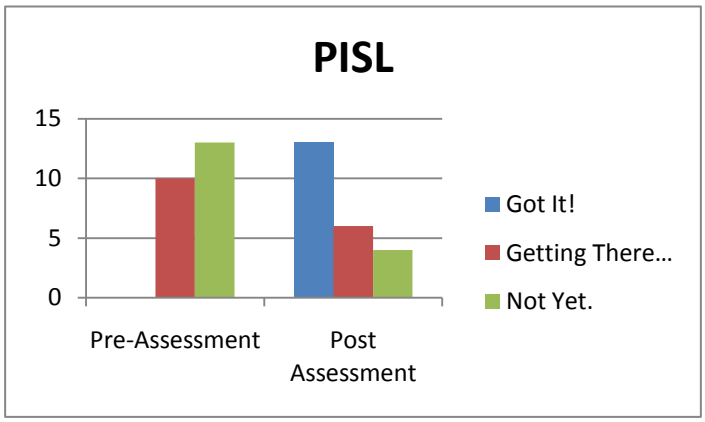
for each student to keep a record of their individual learning. I often encouraged the students to look back over the content we had previously covered if they were stuck or in need of ideas.

I informally assessed students during the investigation by circulating through the classroom and offering support and/or **jkalj;df** questions to extend their thinking. I collected notebooks each week for a more formal assessment of each part of the investigation using varying rubrics designed to assess students' movement toward the final learning objectives.

PISL

In order to be able to assess each students learning and their ability to identify and reflect on their progress I will give the positive impact questions with the pre-assessment. I will use a rubric to determine each student's initial ability to self-assess their learning and will use this information to focus on specific skills and strategies they can use.

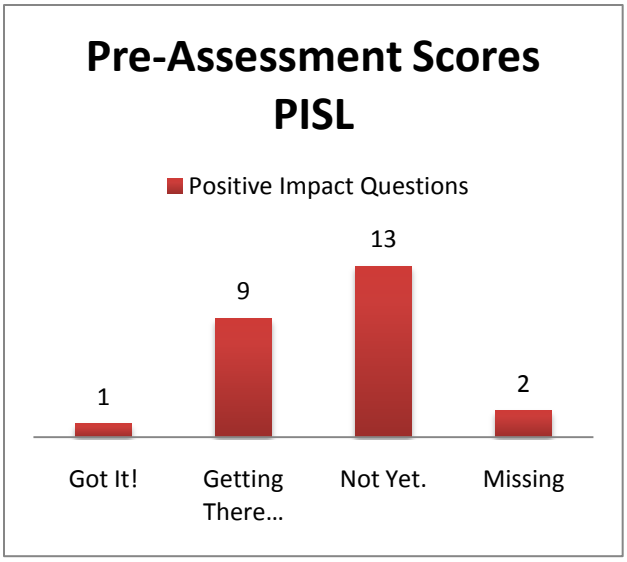


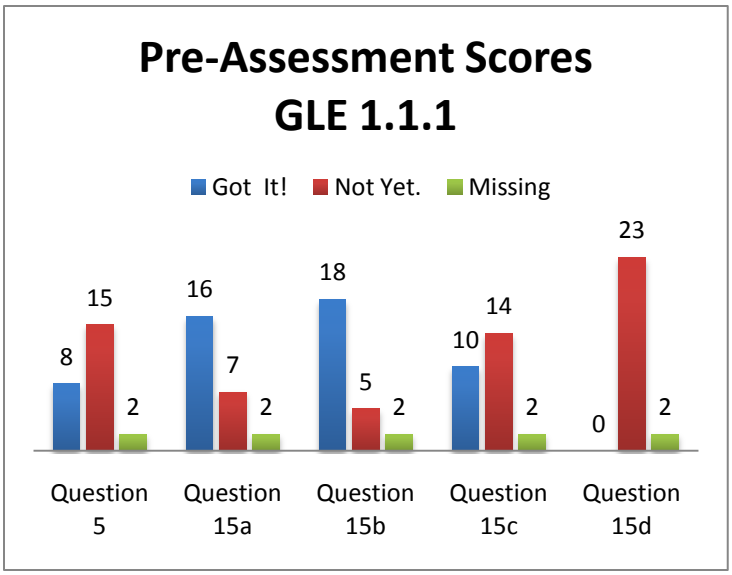


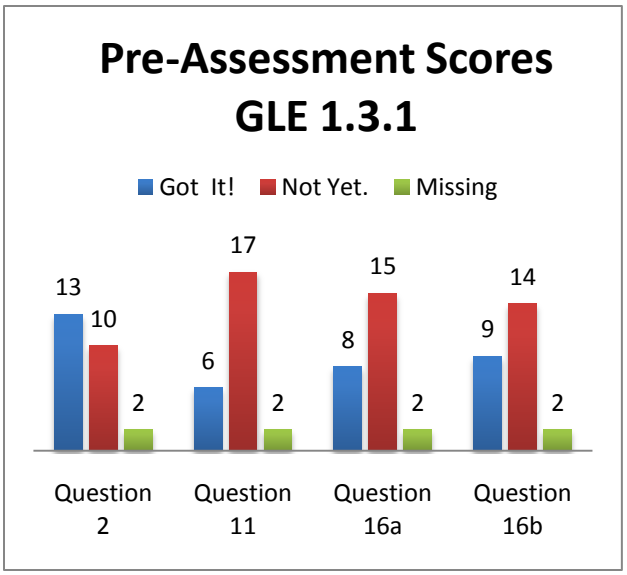
Design For Instruction

Results of pre-assessment

For my pre-assessment I chose to give the summative assessment provided by the FOSS science curriculum. From that assessment I chose to look at only the questions that related to magnets. When I analyzed that data I found that many students had a base knowledge of some aspects of magnetism and that most had little experience answering questions that required them to think about what and why they were learning. I chose to focus my unit on strengthening student's ability to answer these meta-cognitive questions and science GLE's 1.1.1 and 1.3.1 which covered identifying objects based on physical observations and measuring and comparing force.







Learning Activities.

Investigation 1, Part 2

This lesson focused on magnetic force and temporary magnetism. This directly related to science GLE 1.3.1 (understand forces in terms of strength and direction) by allowing students to experiment with how magnets interact with one another and other objects. In this lesson I used science notebooks, doc-cam, magnets and test objects. Each student was given a magnet and each group a bag of test objects to work with. They used their science notebooks to record that days question and their findings. I circulated around the room asking follow up questions to extend their investigation. While circulating I tracked group participation and engagement. As a final assessment I had students answer a prompt which asked them to explain to another student why a paperclip would stick to a nail which was stuck to a magnet. I used a rubric to assess their understanding of the concept. I encouraged students to review their learning from the previous two lessons and that day's lesson as well. After reviewing their entries I noted which students scored "not yet" and talked with each of those students to see if they were able to verbally explain why the paperclip stuck.

Investigation 1, Part 3.1

This lesson focused on the strength of the force of attraction between magnets. This directly related to science GLE 1.3.1 (understand forces in terms of strength and direction) by allowing students to experiment with how to measure the strength of the force of attraction. In this lesson I used science notebooks, doc-cam, magnets, balances, and washers. Each group was given a balance, two magnets and a bag of washers. They used their science notebooks to record that days question and their findings. I circulated around the room asking follow up questions to extend their investigation. While circulating I tracked group participation and engagement. As a final assessment I had students answer the question, "what is one way the strength of the force of attraction between two magnets can be measured?" I encouraged them to use examples from that day's investigation to help explain their answer. I used a rubric to assess their understanding of the concept. I encouraged students to review their learning from the previous two lessons and that day's lesson as well. After reviewing their entries I noted which students scored "not yet" and talked with each of those students to see if they were able to verbally explain how to measure the strength of the force of attraction.

Investigation 1, Part 4

This lesson focused on both magnetic force and classifying objects based on their magnetic properties. This directly related to science GLE 1.3.1 (understand forces in terms of strength and direction) by allowing students to experiment with magnets and their effects on other objects and science GLE 1.1.1 (understand how to use properties to sort natural and manufactured materials and objects) by investigating which other objects are affected by magnets. In this lesson I used science notebooks, doc-cam, magnets, test objects, iron filings and a compass. Each group was given a box with two magnets taped inside, and a bag of test objects, compass and iron filings to use to try and detect the magnets. They used their science notebooks to record their predictions about which objects would detect and then their findings. I circulated around the room asking questions to extend their investigation. While circulating I tracked group participation and engagement. As a final assessment I had students answer two questions which asked them to explain how the compass and then the iron filings helped or did not help them detect the hidden magnets in the box. I used a rubric to assess their understanding of the concept. I encouraged students to review their learning from the previous two lessons and that day's lesson as well. After reviewing their entries I noted which students scored "not yet" and talked with each of those students to see if they were able to verbally explain how these items helped.

Technology

In this unit I used the following:

Smart Board
Doc-Cam

Teaching procedures

I will begin each lesson with an oral review of the things we have covered in the previous lessons (i.e. who can remember one thing we have learned about magnets so far? What other things have we learned about magnets so far?) We will also begin each lesson by adding that day's investigation to our science notebook table of contents. Each entry in the science notebook will begin with the days date and the time which we began the investigation. I will use a combination of seven guiding methods of investigation: procedure (how we will conduct the investigation), materials (the supplies we will need to complete the investigation), question (the essential question for the investigation), prediction (a guess about what might happen during the investigation), results (what we find in our investigation), conclusion (what we discovered in response to our question in the investigation), and summary (what we found in our investigation.

Transitions will be managed by a call and response technique in which I say "scientists" and the students fold their hands, stop talking and reply "yes". I will also end each set of directions by either having the students repeat back to me the steps, writing them on the board or both.

Unit Overview- 4th grade science

Learning Objective: Given a unit on magnets SWBAT self assess what they know about magnets; explain why it is important to know about, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.

- Science GLE 1.1.1. Understand how to use properties to sort natural and manufactured materials and objects.

SWBAT	3 - Got It!	2 - Getting There…	1 - Not Yet
Identify, describe, sort and classify objects and materials using observed physical properties.	Accurately describes, sorts and classifies objects and materials using observed physical properties.	Partially describes, sorts and classifies objects and materials using observed physical properties.	Incorrectly describes, sorts and classifies objects and materials using observed physical properties OR does not complete work.

- Science 1.3.1 Understand forces in terms of strength and direction

SWBAT	3 - Got It!	2 - Getting There…	1 - Not Yet
Describe a force that is acting on an object in terms of strength and direction (e.g. magnetic force, a push, or a pull) and compare the strength of one force to the strength of another force.	Accurately describes a force that is acting on an object in terms of strength and direction and can compare the strength of one force to the strength of another force.	Partially describes a force that is acting on an object in terms of strength and direction and can compare the strength of one force to the strength of another force.	Incorrectly describes a force that is acting on an object in terms of strength and direction and can compare the strength of one force to the strength of another force OR does not complete work.

Date	Lesson	Objective	Science Strand
Wk 3 4/14/09	Pre-Assessment	Given a multiple choice and short answer quiz about magnets and electricity SWBAT assess what they know about magnets; assess where they are on the rubric; and explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.	GLE 1.1.1 GLE 1.3.1
Wk 3 4/17/09	Investigation 1-Part 1.1	Given a guided discovery about the properties of magnets, an individual investigation about what magnets stick to and a group investigation about what magnets will stick to followed by a discussion about what properties make magnets stick SWBAT understand how to use properties to sort natural and manufactured materials and objects by making guesses and then checking them and giving a written explanation about what they discovered.	GLE 1.1.1
Wk 4 4/21/09	Investigation 1-Part 1.2	After an exploration on how magnets interact with one another and a group discussion on students' discoveries and a review of the vocabulary and key ideas SWBAT write a paragraph explaining the magnetic forces of repulsion and attraction and give one example from their investigation that day that illustrate each force.	GLE 1.3.1
Wk 4 4/23/09	Investigation 1-Part 2	After a review of the previous learning about magnets, further investigation about magnetic properties and a group discussion/sharing about discoveries SWBAT accurately explain magnetic force and temporary magnetism through written explanation to a prompt.	GLE 1.3.1
Wk 5 4/29/09	Investigation 1-Part 3.1	Given an opportunity for small group independent investigation on force using magnets, balances and washers, small group discussion and whole class discussion on magnetic force and strength SWBAT describe one way the strength of the force of attraction between two magnets can be measured.	GLE 1.3.1
Wk 5 5/1/09	Investigation 1-Part 3.2	After an investigation in which students use a balance and large washers to measure the force of attraction between two magnets; they systematically investigate what happens to the force of attraction as the distance between the two magnets increases, and then graphing their results SWBAT accurately describe how the force of attraction is affected by two variables (distance, spacers).	GLE 1.3.1
Wk 6 5/6/09	Investigation 1-Part 4	After an investigation in which students make predictions about whether test objects will detect magnets and then test them, and then make observations about what iron filings and a compass to do to detect magnets SWBAT explain how the iron filings and compass can help you detect magnets.	GLE 1.1.1 GLE 1.3.1
Wk 6 5/8/09	Summative Assessment	Given a multiple choice and short answer quiz about magnets and electricity SWBAT assess what they know about magnets; assess where they are on the rubric; and explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.	GLE 1.1.1 GLE 1.3.1

Date: April 10, 2009

Lesson Title: FOSS Pre-assessment
Grade Level: 4th

Related Standards: Science
GLE 1.1.1. Understand how to use properties to sort natural and manufactured materials and objects.
GLE 1.1.4. Understand that energy comes in many forms.
GLE 2.1.5. Understand how to report investigations and explanations of objects, events, systems, and processes.

Objective:
Given a multiple choice and short answer quiz about magnets and electricity SWBAT assess what they know about magnets and electricity; assess where they are on the rubric; and explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.

Materials:
Quiz
Rubric
Doc-cam
Rubric/PISL

Room Arrangement:
Rows

Procedures:
FRIDAY
Introduce to the students that they are going to be taking a quiz on magnets and electricity. Explain that in the next weeks they will be beginning a new science unit on these areas and that this quiz will help both you and them find out what they already know and what areas they need to do some more learning. Explain that they will be correcting their quizzes and then scoring themselves on a rubric.

Have helpers pass out quizzes and then read the directions aloud for the whole class to hear. Go over each section of the quiz. Ask for questions. Tell students that after they take the quiz they will turn it in to me and then get a silent reading book. Ask one or two students to repeat back the steps (multiple choice questions, short answer questions, check answers, turn in to Ms. Lind, silent reading) and write them on the board. Have students begin.

MONDAY
Pass out quizzes to students for correcting. Place a master quiz on the doc-cam and go over the questions and answers together. Ask for questions. Have students give the quizzes back to their owners. Have students check their tests and see what they missed and what they knew. Ask if anyone was surprised about how they did. Did anyone do better than they thought they would? Did anyone do worse? Put the rubric/PISL on the doc-cam. Have students self-assess where they believe they are on the rubric and explain why they chose that box. Then have them answer the PISL questions on the bottom of the same paper.

Assessment/Evaluation Tasks

SWBAT	3 – Got It!	2 – Getting There…	1 – Not Yet.
Assess where they are on the rubric and explain why;	Student self assessed accurately and gave a reasonable explanation for their choice with specific references to the quiz.	Student self assessed accurately and gave a partial or general explanation for their choice without specific references to the quiz.	Student self assessed inaccurately or gave no explanation for their choice. Did not include any references to the quiz.
Assess what they know about magnets and electricity;	Student answers questions completely and correctly. Answers contain additional, unexpected or outstanding features.	Student partially answers questions or gives information that is related but does not answer the question.	Student does not answer the question or gives an answer that is unrelated to the question.
Explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.	Student clearly explained what they were learning about and why it is important. Student gave reasonable examples for use in their own life. Student made clear connections to other areas of the curriculum where these concepts overlap.	Student gave a broad explanation of what they were learning and why it is important. Student gave partial examples for use in their own life. Student make general connections to other areas of the curriculum where these concepts overlap.	Student gave an incomplete or incorrect explanation of what they were learning and why it is important. Student did not give examples for use in their own life. Student did not make or made incomplete connections to other areas of the curriculum where these concepts overlap.

Date: April 16, 2009

Lesson Title: Introduction to Science
Grade Level: 4th

Materials:
Science Notebooks

Room Arrangement:
Small groups

Procedures:
Move students into science groups. Create a chart and put it on the doc-cam for students to refer to. Have students clear EVERYTHING off of their desk!

Have students open up their science notebooks. Have students start a new page and title it Science Jobs. Have them write the sentence: My job in science is _____. Explain that each one of them has a special science job in their group. Have them listen closely and write down their job description when they hear it.

If their desk is colored orange then their job is GETTER. A GETTER's job is to get materials; this means that when you give directions for materials to be collected from the materials station ONLY the GETTER's will get up. **Questions?**

If their desk is colored purple then their job is RECORDER. The RECORDER's job is to keep notes for the group, so when there are worksheets to be filled out as a group the recorder will be the one to do that. **Questions?**

If their desk is colored green then their job is TIMEKEEPER. The TIMEKEEPER's job is to keep the group on task and on time. This means that they need to be checking on time and helping the group move forward when they get stuck. **Questions?**

If their desk is colored blue then their job is TAKER. A TAKER's job is to take the materials back, this means that when the group is done and it is time to clean up ONLY the TAKER will be up. **Questions?**

Explain that each job is equally important to the group and without any of them the group would not be able to function. That is why it is super important that they come to school every day and that they are ready to participate.

Assessment/Evaluation Tasks

What are we going to be learning?

Why are you learning this?

How is this tied to previous learning

How are you going to be evaluated?

What strategies are available to you?

Date: April 17, 2009

Lesson Title: Investigation 1- Part 1.1
Grade Level: 4th

Related Standards:
Science 1.1.1 Understand how to use properties to sort natural and manufactured materials and objects.

Objective:
Given a guided discovery about the properties of magnets, an individual investigation about what magnets stick to and a group investigation about what magnets will stick to followed by a discussion about what properties make magnets stick SWBAT understand how to use properties to sort natural and manufactured materials and objects by making guesses and then checking them and giving a written explanation about what they discovered.

Materials:
Magnets
Bags of test objects
Scrap paper
Magnetic Observation Page
Smart Board
Bag

Room Arrangement:
Science groups

Procedures:
Tell students that you have hidden something inside of this bag. Invite one student to come up and feel inside the bag and describe without telling what it is what they feel (size, shape, feel, etc). Tell them that they need to be listening closely to the description and trying to visual (create a mental picture) about what is inside the bag. After the student has run out of things to say to describe the object let the rest of the class ask questions about the object. After there are no more questions have students draw a picture of what they think inside the bag. Once they have completed their drawing (no more than 5 minutes), remove the object from the bag and let them compare their drawings to the object. Ask what kinds of information would have been helpful to make their drawings more accurate (have them write these questions on the back of their drawing.

Have the helpers pass out one magnet to each student. Ask students to generate a list of things this object can do (roll, sticks to things, etc) and write these on the board. **KEY IDEA** *magnets stick to some objects but not all objects.*

Have students take two minutes to find out how many objects they can find that their magnet will stick to without getting out of their seat (2 minutes). Have them talk to their group about what they discovered. What things are the same about the objects that their magnets stick to? Have groups share their discoveries, write on the board what similarities they found. **KEY IDEA** *magnets stick to metal, but not all metal, just some metal.*

Show the students the bag of test objects. Tell them that inside of this bag there are many things that their magnet will stick to, but there are also many things that their magnet won't stick to. Their job is to work in their group to investigate which items stick and which don't.

Show steps on the board, explaining as you go.

Get the materials and bring them back to your group. Put your magnets in a pile for now.
Sort through the bag of objects and make hypotheses (guesses) about which items will stick and which won't, and sort the items into two piles.
Record your hypotheses (guesses) on the worksheet.
Check your hypotheses (guesses) using the magnets.
Record your results on the worksheet.

CLEANED UP BY 3:10

Have groups share their findings. Ask if any of the groups were surprised by any of the objects they tested. WHY? Have the students look at their lists. Ask if the items in the "things that stick" have anything in common. Are there any metals in the "things that don't stick" group? What do you think is different about those metals? **KEY IDEA** *there is only one common kind of metal that magnets stick to. It is the metal iron. Sometimes iron is mixed with other metals to make steel. Magnets stick to steel because it is mostly iron. The rule is, if a magnet sticks to an object, that object is iron or steel.*

In their science notebooks have them write a short paragraph on what magnets stick to and why.

Assessment/Evaluation Tasks

SWBAT	* Got It!	+ Getting There…	- Not Yet.
Understand how to use properties to sort natural and manufactured materials and objects by making guesses and then checking them and giving a written explanation about what they discovered.	Student correctly sorts materials that stick to magnets; writes that magnets only stick to materials made of iron or steel.	Student correctly sorts materials that stick to magnets; writes that magnets only stick to metal.	Student cannot sort materials that stick to magnets OR doesn't write what they stick to.

Name _____ Date _____

MAGNETIC OBSERVATIONS

Part 1: How does your magnet interact with the test objects?

guesses

Things that stick	Things that don't stick

Magnets stick only to _____

Part 1: How does your magnet interact with the test objects?

tests

Things that stick	Things that don't stick

Magnets stick only to _____

Date: April 21, 2009

Lesson Title: Foss Investigation 1, Part 1.2
Grade Level: 4th

Related Standards:
Science 1.3.1 Understand forces in terms of strength and direction

Objective:
After an exploration on how magnets interact with one another and a group discussion on students' discoveries and a review of the vocabulary and key ideas SWBAT write a paragraph explaining the magnetic forces of repulsion and attraction and give one example from their investigation that day that illustrate each force.

Materials:
Magnets
Pencils
Science Journals
Science Story
Smart Board

Room Arrangement:
Science groups

Procedures:
Review what we learned about magnets in part 1.1
KEY IDEA *there is only one common kind of metal that magnets stick to. It is the metal iron. Sometimes iron is mixed with other metals to make steel. Magnets stick to steel because it is mostly iron. The rule is, if a magnet sticks to an object, that object is iron or steel.*

Have GETTERS get magnets for their group. Ask students to explore what happens when magnets interact with each other. If the groups get stuck walk around and offer suggestions.
Moving one magnet on a desk using another magnet under the desk.
Making a talking magnet by balancing the force field of one magnet on a second magnet.

When students are beginning to lose steam and run out of things to do stop the groups and ask them to describe what they discovered. Write answers on the board and allow students to repeat discoveries. Have students demonstrate some of them on the camera so that all the students can see. Ask for final key ideas about the different ways that magnets interact. **KEY IDEA** *when two magnets come together so that they stick, we say they attract. When two magnets come together so that they push, we say they repel.* (Have students copy into their science journals).

Demonstrate in the front of the room placing four magnets on a pencil so that they repel. Have students do the same. Ask students to describe
What it feels like when they push the repelling magnets together.
What they think is causing the magnet to push apart.

Write some of their ideas on the board. Introduce force: **KEY IDEA** *that something you can't see, smell, taste or grab but that you can feel between the magnets is a force. It is a magnetic force. When magnets pull toward one another and stick it is a force of attraction; when they push apart, it is a force of repulsion.* (Have students copy into their science journals).

Have students clean up their desks and have the TAKER's return all the materials to the materials station.

Create a word bank of all the new vocabulary they have learned including: force, magnet, magnetism, attract, repel. Include any other words the students think of too. Create a key idea list as well: magnets stick to iron, two magnets can attract or repel, a force is a push or a pull. Include any other ideas the students think of too. (Have students copy into their science journals).

Have students write a short paragraph explaining both the force of repulsion and the force of attraction, giving one example of each from their investigation that day.

Introduce and read the science story *Magnus gets stuck.*

Assessment/Evaluation Tasks

SWBAT	* Got It!	+ Getting There…	- Not Yet.
Write a paragraph explaining the magnetic forces of repulsion and attraction and give one example from their investigation that day that illustrate each force.	Student clearly explains the magnetic forces of repulsion and attraction and gives examples that illustrate both of those forces.	Student broadly explains the magnetic forces of repulsion and attraction and gives an example of one of those forces.	Student gives an incorrect or unclear explanation of the magnet forces of repulsion and attraction and/or does not give or gives inaccurate examples.

Date: April 23, 2009

Lesson Title: Inv. 1, Part 2
Grade Level: 4th

Related Standards:
Science GLE 1.3.1 Understand forces in terms of strength and direction

Objective:
After a review of the previous learning about magnets, further investigation about magnetic properties and a group discussion/sharing about discoveries SWBAT accurately explain magnetic force and temporary magnetism through written explanation to a prompt.

Materials:
Magnets
Doc-Cam
Test objects
Science notebooks

Room Arrangement:
Small groups

Procedures:
When students come in have them clear off their desks and open up their science notebooks to the table of contents. Have them copy today's entry and page number (Induced magnetism pg 5). Have students review what we learned in part 1: magnets only stick to iron, magnets attract or repel, magnets have a force.

Tell students that today we will be testing our magnets again to find out more about what they do with other materials. Have students write today's date and the time at the top of their page and then get out their **blue** crayon to write today's questions. Tell them that today they have two questions to answer: *How do magnets and iron objects work together? Can the force of magnetism go through materials?*

Have the GETTERS's get a bag of test objects and magnets for their group and let them begin their investigation. Walk around to the different groups and offer guidance as needed. Ask questions if they get stuck: *can you "chain" objects from the magnet? Can a steel nail stuck to a magnet pick up a paper clip? Can a magnet attract a paper clip through a piece of paper, or through a piece of metal foil?* Give each group a five minute warning and let them know that they need to come up with one of their findings to share with the class. This will be the RECORDERS job to share, but everyone needs to write it in their science notebook. **KEY IDEA**: some steel objects become temporary magnets when they are touching a magnet. Magnets can attract a piece of steel through paper and plastic.

Have all the groups share their one thing while I write them on the board. Let students know that they are going to continue to explore and investigate with the magnets. Write some additional questions to guide them through the second half of their investigation.

Does an iron object have to tough a magnet to become a temporary magnet?
Can magnets attract steel through all kinds of material?
Can a magnet attract a paper clip through a thin sheet of metal like copper or aluminum?
Can a magnet attract a paper clip through a large, thin sheet of steel, like the side of a filing cabinet?

Give each group a five minute warning and let them know that they need to come up with one of their findings to share with the class and they need to clean up their materials. This will be the RECORDERS job to share, but everyone needs to write it in their science notebook. **KEY IDEA:** magnetic force acts through all of the objects they tried except those

with a large surface area made of iron. When the distance between the magnet and the steel object is large enough, the magnetic force is not strong enough to attract the object.
Have the TAKER's return their materials and magnets to the materials station. Have students explain what they discovered as they investigated with their magnets. **FINAL THOUGHT:** *when a magnet touches an iron object, that iron object becomes a temporary magnet. It stays a magnet only as long as it is in the invisible magnetic field of the permanent magnet. Iron objects are not magnets themselves, but they become magnetized quite easily. This kind of temporary magnetism is called induced magnetism.*

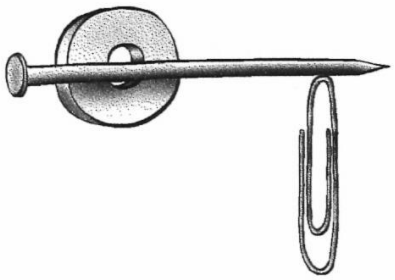
Have students get out their **orange** crayon and write conclusion on the back of the previous page. Tell them that today they have a prompt to which they need to respond. Put the handout on the doc-cam and read it aloud to them. Tell the students that their job is to write a note to this person explaining why this happens. Tell them it is ok to use their notes from today's investigation. When they are finished have the students turn in their science notebooks to my desk and read silently.

Assessment/Evaluation Tasks

SWBAT	* - Got It!	+ Getting There…	- Not Yet.
Accurately explain magnetic force and temporary magnetism through written explanation to a prompt.	Says the paper clip and nail must be iron or steel; explains that magnetism has been induced in the nail and paper clip from the permanent paper clip; offers as evidence the fact that the nail would not stick to the paper clip before it was touching the magnet.	States that the nail has become a temporary magnet (or uses other words to describe), gives no evidence to support conclusions.	Gives some information about magnets but does not relate it to the assigned task, or includes misconceptions.

Name _____ Date _____

RESPONSE SHEET—INVESTIGATION 1



Students in a fourth-grade class were investigating which objects stick to magnets. One of them drew a picture in his journal like the one you see above, and then wrote,

I was surprised! I had a nail stuck to a magnet, and when I accidentally touched the nail to a paper clip, the paper clip stuck to the nail. I wonder why this happens.

Write a note to this student. See if you can help him understand more about what is happening.

Date: April 26, 2009

Lesson Title: Investigation 1, Part 3.1
Grade Level: 4th

Related Standards:
Science GLE 1.3.1

Objective:
Given an opportunity for small group independent investigation on force using magnets, balances and washers, small group discussion and whole class discussion on magnetic force and strength SWBAT describe one way the strength of the force of attraction between two magnets can be measured.

Materials:
Balance
Washers
Magnet on a post
Plastic cups
Magnet
Science notebook

Room Arrangement:
Small Groups

Procedures:
When students come in have them clear off their desks and open up their science notebooks to the table of contents. Have them copy today's entry and page number (Breaking the Force pg 6). Have students review what we learned in part 1 and 2: magnets only stick to iron, magnets attract or repel, magnets have a force, some steel objects become temporary magnets when they are touching a magnet, magnets can attract a piece of steel through paper and plastic.

Tell students that today we will be testing our magnets again to find out more about magnetic force. Have students write today's date and the time at the top of their page and then get out their **blue** crayon to write today's questions. Tell them that today they have two questions to answer: *How can the strength of the force of attraction between two magnets be measured? How can we be sure that the force of attraction doesn't work if two magnets are too far apart?*

Explain that today they will be working on breaking the magnetic force. Each group will need to collect their materials and they are broken into groups so I will have one group at a time go up. Each group will have a balance, a magnet and a magnet on a post, two cups and a bag of washers. They will need to set up their equipment first and then work together to try and break the magnetic force using only the materials provided.

Have groups collect their materials and then return to their group to begin. Walk around the room checking on the groups and asking questions as I go. *Does it make a difference where you place the washers in the cup? Does it make a difference how you place the washers in the cup (random, stacked, etc)? Does it matter if you drop the washers in the cup or place them there?* Encourage each group to find out which is the best way of measuring how many washers it takes to break the magnetic force. Let the groups know that the RECORDER will be sharing what they find at 3:10 so they need to have all their materials cleaned up and be ready to present at that time.

When each group is done, cleaned up and they have all come to what they think is the best way of measuring and the number of washers it takes to break the force have the groups share. Write some examples on the board. Have the students write a final conclusion (**orange crayon)** paragraph on the back of the day before page answering the question: **What is one way the strength of the force of attraction between two magnets can be measured? Use examples from today's investigation.**

Assessment/Evaluation Tasks

SWBAT	* - Got It!	+ Getting There…	- Not Yet.
Describe one way the strength of the force of attraction between two magnets can be measured.	Accurately describes how the force of the attraction between two magnets can be measured. Gives examples from the investigation.	Partially describes how the force of the attraction between two magnets can be measured.	Does not describe or incorrectly describes how the force of the attraction between two magnets can be measured.

Date: April 27, 2009

Lesson Title: Investigation 1, Part 3.2
Grade Level: 4th

Related Standards:
GLE 1.3.2

Objective:
After an investigation in which students use a balance and large washers to measure the force of attraction between two magnets; they systematically investigate what happens to the force of attraction as the distance between the two magnets increases, and then graphing their results SWBAT accurately describe how the force of attraction is affected by two variables (distance, spacers).

Materials:
Balances
Washers
Magnet
Magnets on posts
Science notebook
Graph and dots
Spacers

Room Arrangement:
Small Groups

Procedures:
When students come in have them clear off their desks and open up their science notebooks to the table of contents. Have them copy today's entry and page number (Breaking the Force pt2 pg 6). Have students review what we learned in part 1: magnets only stick to iron, magnets attract or repel, magnets have a force, some steel objects become temporary magnets when they are touching a magnet, magnets can attract a piece of steel through paper and plastic. Review what we did the previous day with the magnets and the washers.

Tell students that today we will be testing our magnets again to find out more about magnetic force. Have students write today's date and the time at the top of their page and then get out their **yellow** crayon because today we are going to make a prediction. Tell them that yesterday they discovered how many washers it took to break the force between two magnets that were touching. Tell them that today they will be trying to find out how many washers it takes to break the force when the magnets are not touching. Have students leave five lines at the top to write their prediction and then have students draw a T chart in the science notebook and label one side # of spacers and the other side # of washers. Make sure they start their left column with a 0 and go through 6. Tell them that they all need to make a guess about what will happen when they put plastic spacers in between the magnets. Have them write this and then hear what a couple of students think. Tell the students that when they get their materials they will need to retest their work from yesterday and find out how many washers it takes to break the force. Tell them that they will then test 1 spacer, then 3 spacers, then 4, then 5 and finally 6. Tell them they will skip doing 2 spacers because they will come back to it later.

Have GETTER's go gather the same materials from yesterday plus six plastic spacers. Have students get to work making sure they record their data on their T chart. Walk around the room checking on their work. As I walk around pass out one graph sheet and dots for them to record their final findings. This is the RECORDER's job. Tell them that once they have finished with six spacers they will need to make a prediction based on their findings as to how many washers it will take to break the force with two spacers. Have them test their predictions.

Once the groups are cleaned up have the RECORDER in each group share their graph and discuss what they found. **KEY IDEA:** as the number of spacers increases (the distance between magnets increases), the force of attraction (number of washers needed to break the force) decreases.

Have students fill out the worksheet questions from "The Force: Conclusion" and the PISL questions at the bottom.

Assessment/Evaluation Tasks

SWBAT	* Got It!	+ Getting There…	- Not Yet.
Describe how the force of attraction is affected by two variables (distance, spacers).	Accurately describes the relationship between number of spacers and number of washers AND is able to use the data to explain the change in force of attraction (example: that as the distance between the two magnets increases, less force is required to pull them apart; or the less distance between the magnets; the stronger the attraction).	Accurately describes the relationship between number of spacers and number of washers but is not able to explain the change in force of attraction.	Is not able to describe the relationship between number of spacers and number of washers or explain the change in force of attraction.

Name _____ Date _____

THE FORCE

Number of spacers	Number of washers

Measured (responding) variable: _____

Changed (manipulated) variable: _____

Investigation 1: The Force
No. 4a—New Student Sheet
WA Edition

Name _____ Date _____

THE FORCE, CONCLUSION

Look at the pattern you see on your graph. Write about what the graph tells you about the relationship between the number of spacers and the distance between the two magnets.

Based on the data, what conclusion can you make about how the distance between two magnets affects the force required to pull them apart?

Date: April 28, 2009

Lesson Title: Investigation 1, Part 4
Grade Level: 4th

Related Standards:
GLE 1.3.1
GLE 1.1.1

Objective:
After an investigation in which students make predictions about whether test objects will detect magnets and then test them, and then make observations about what iron filings and a compass to do to detect magnets SWBAT explain how the iron filings and compass can help you detect magnets.

Materials: Compass
Test objects
Magnets
Iron filings
Science notebook
Cardboard box
Paper plate
Baggie
Tape

Room Arrangement:
Small Groups

Procedures:
When students come in have them clear off their desks and open up their science notebooks to the table of contents. Have them copy today's entry and page number (Detecting the Force pg 7). Have students review what we learned in parts 1-3: magnets only stick to iron, magnets attract or repel, magnets have a force, some steel objects become temporary magnets when they are touching a magnet, magnets can attract a piece of steel through paper and plastic, as the distance between magnets increases, the force of attraction decreases.

Tell students that today we will be investigating with our magnets again to find out more about magnetic force. Have students write today's date and the time at the top of their page and then get out their **yellow** crayon because today we are going to make a prediction. Have them draw a chart on their page with test objects on the left column, predictions in the middle, and test on the right.

Test Objects	Prediction – Y/N	Test – Y/N
Screen		
Aluminum foil		

Explain that each group will receive a box today. They will also get two magnets, the bag of test objects and some other materials throughout the lesson. When they get their materials they need to break into two teams in their group, you will be partnered with the person sitting next to you. One team will tape the two magnets inside the lid of the box. Don't tell the other team where they are. The other team will then use the materials in this list to try and figure out where the magnets are located without looking inside. After one team has gone the other team will have a chance to tape the magnets inside the box and the other team will have a chance to find them using the same materials. Tell the

students that there is to be absolutely no writing or drawing done on the boxes. All recording needs to be completed in their science notebooks. **Questions?**

Have students complete the prediction column of their chart. Have GETTER's come to material station and collect their supplies. Let students work.

BREAK

After both teams have had a chance, call students back to attention. Tell them that you are going to collect give them two new tools for detecting. In their notebook they need to write down IRON FILINGS and COMPASS skipping three lines in between. Tell them that you are going to take their boxes and switch them with other groups and their job will be to work as a group to use their new tools to detect the magnets. Then they will need to write down in their notebooks what they say their tools doing.

Have GETTER's collect new tools and let the groups get started. After about 5 minutes remind them that they need to be writing their observations down in the notebooks. After about 5 more minutes call the group back to attention and have them clean up and return their materials.

Once they are ready have them copy down question 1: *How did the iron filings help you find the magnets?* Have students answer this individually. Call on a few for ideas. Remind them to use full sentences and complete ideas.

Have students copy down question 2: *How did the compass help you find the magnets?* Have students answer this individually. Call on a few for ideas. Remind them to use full sentences and complete ideas.

Assessment/Evaluation Tasks

SWBAT	* Got It!	+ Getting There…	- Not Yet.
Explain how the iron filings and compass can help you detect magnets.	Explains that iron filings and a compass needle are made of iron and are attracted to a magnet, the filings line up with the magnetic field of the magnet hidden in the box, the compass needle points to the magnet because the compass needle is also a magnet.	Explain that iron filings, and a compass needle are made of iron and that all iron materials stuck to a magnet but gives no further details.	Cannot explain why the iron filings or the compass can help detect magnets.

Name _____ Date _____

DETECTING MAGNETS

Step 1: Which Test Objects would be helpful in detecting magnets? Make a prediction before carrying out the test.

Test Objects	Prediction		Actual Test	
	Helpful	Not Helpful	Helpful	Not Helpful
Screen				
Paper Fastener				
Craft sticks				
Aluminum foil				
Rubber bands				
Screw				

Step 2: Detecting hidden magnets using iron filings and a compass.

	Observations
Iron filings	
Compass	

1. How did the iron filings help you find the magnets?

_____

_____

_____

2. How did the compass help you find the magnets?

_____

_____

_____

Date: May 1, 2009

Lesson Title: FOSS Post Assessment
Grade Level: 4th

Related Standards: Science
GLE 1.1.1. Understand how to use properties to sort natural and manufactured materials and objects.
Science GLE 1.3.1 Understand forces in terms of strength and direction

Objective:
Given a multiple choice and short answer quiz about magnets and electricity SWBAT show what they know about magnets and electricity; and explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.

Materials:
Quiz/PISL
Docu-cam

Room Arrangement:
Small Groups

Procedures:
Introduce to the students that they are going to be taking a quiz on magnets.

Have helpers pass out quizzes and then read the directions aloud for the whole class to hear. Go over each section of the quiz. Ask for questions. Tell students that after they take the quiz they will turn it in to me and then get a silent reading book. Ask one or two students to repeat back the steps (multiple choice questions, short answer questions, check answers, turn in to Ms. Lind, silent reading) and write them on the board. Have students begin.

Assessment/Evaluation Tasks

SWBAT	3 – Got It!	2 – Getting There…	1 – Not Yet.
Assess what they know about magnets;	Student answers questions completely and correctly. Answers contain additional, unexpected or outstanding features.	Student partially answers questions or gives information that is related but does not answer the question.	Student does not answer the question or gives an answer that is unrelated to the question.
Explain why it is important to know about electromagnets, how they will use this learning in their own lives and how this learning is connected to other areas of the curriculum.	Student clearly explained what they were learning about and why it is important. Student gave reasonable examples for use in their own life. Student made clear connections to other areas of the curriculum where these concepts overlap.	Student gave a broad explanation of what they were learning and why it is important. Student gave partial examples for use in their own life. Student make general connections to other areas of the curriculum where these concepts overlap.	Student gave an incomplete or incorrect explanation of what they were learning and why it is important. Student did not give examples for use in their own life. Student did not make or made incomplete connections to other areas of the curriculum where these concepts overlap.

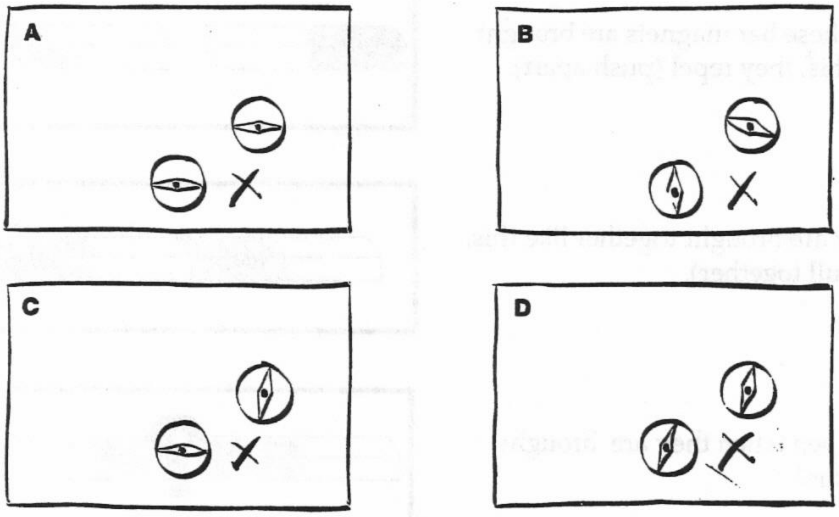
Name _____

Date _____

END-OF-MODULE ASSESSMENT for Magnetism and Electricity

MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

2. A student placed two compasses on a box to detect a magnet that was hidden inside. If "X" marks the spot where the magnet was hidden, which drawing shows how the compasses looked when she found the magnet?



5. A nail stuck to a permanent magnet picked up a small washer. The nail could pick up the washer because
   A. nails have magnetic fields.
   B. the nail has electromagnetic frequency.
   C. the nail and washer are made of the same thing.
   D. magnetism was induced in the nail.

11. A magnet attracted a paper clip even when a thin piece of cardboard was placed between the magnet and paper clip. But when a sponge was placed between the magnet and the paper clip, the paper clip fell to the floor. This happened because
   A. magnetism goes through cardboard but not through a sponge.
   B. cardboard conducts magnetism but a sponge does not.
   C. the distance between the magnet and paper clip was too far.
   D. the magnetism gets trapped in the holes of the

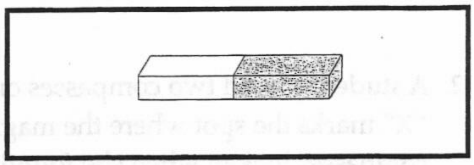
Name _____

Date _____

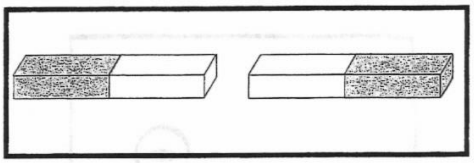
END-OF-MODULE ASSESSMENT for Magnetism and Electricity

NARRATIVE ITEMS

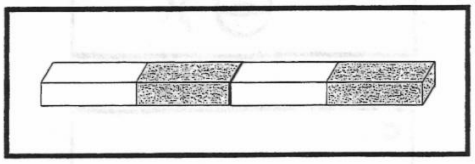
16. A certain kind of bar magnet is darker on one half.



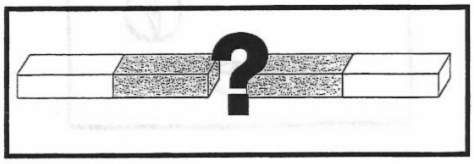
When two of these bar magnets are brought together like this, they repel (push apart).



But when they are brought together like this, they attract (pull together).



a. What will happen when they are brought together like this?



_____

_____

_____

b. Why?

_____

_____

_____

_____

_____

_____

15. On each line below, write one object from the box that fits the description given (there is more than one right answer).

FABRIC	BASKETBALL HOOP			BASKETBALL		PENNY	WOODEN SPOON		SPONGE
MAGNETITE	SOUP CAN	ALUMINUM FOIL	SCREWDRIVER HANDLE		BOTTLE CAP	ERASER		CARDBOARD	

Sticks to a magnet: _____

Does **NOT** stick to a magnet: _____

Conducts electricity: _____

Sticks to a magnet but does **NOT** conduct electricity: _____

- *What are you learning?*

- *Why are you learning this?*

- *How is this tied to previous learning?*

- *How are you being evaluate?*

- *What strategies are available to you?*

Instructional Decision Making

Lesson Modification Example 1

After Investigation 2 I realized that one of my students was consistently not meeting expectations. I found that this was in part because she did not have enough time to write all of the instructions and complete the investigation. I had several conversations with her about what she was learning and she was able to at least partially explain the content and investigation process. I decided to modify the lessons for her by providing pre-made handouts which she could fill in with her learning. This aided her by allowing her to focus on the investigation instead of spending the entire time writing down the instructions and the steps.

I also moved her into a smaller group so that she would have more of an opportunity to engage in the lesson without having to share the materials and desk space with as many of her peers. This enabled her to participate more fully and resulted in her movement through the rubric from “not yet” to “getting there”.

Lesson Modification Example 2

After Investigation 3.2 I realized that the learning of some students was not sticking, because as we reviewed the previous lessons they could not recall any of the key ideas we had covered in the previous lessons. As a result I decided to implement a more consistent and formulaic approach to the investigations. I adopted the science practices of my mentor teacher combined with my own organizational ideas.

This looked like a color coded, partitioned page in the students science notebook. We would begin each lesson with the date, time and the question we would be investigating written in blue. We would then divide our page into four boxes. The first box we would title materials in purple and then write down all the materials they would need for that lesson. The second box was sometimes titled procedure in green and they would write down the steps they would follow or prediction in yellow where they would make a hypothesis about the answer to the question. The third box would be either result or test written in red. The final box would be either summary or conclusion written in orange.

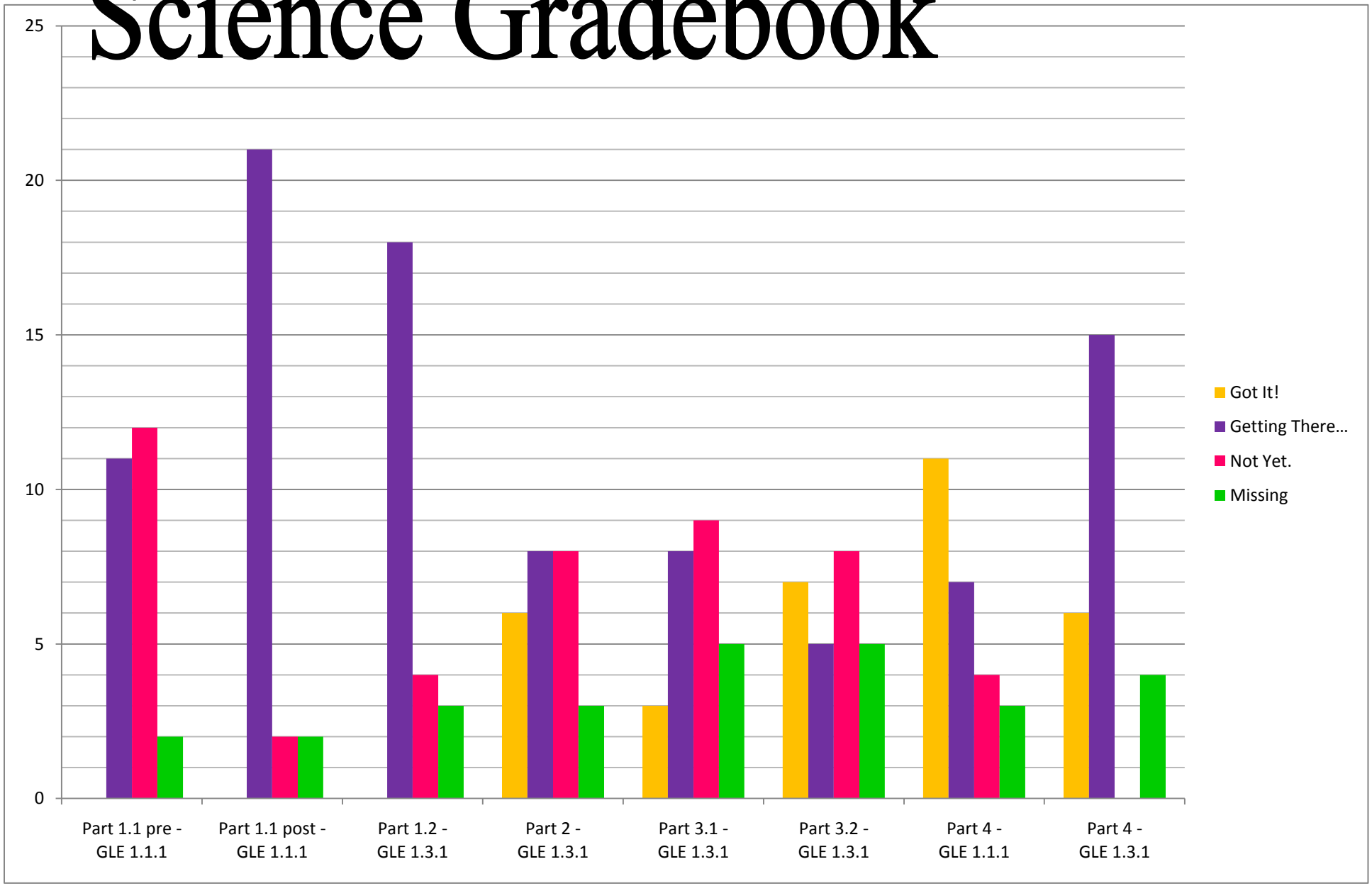
This method provide a structure for their investigation and a pattern for them to follow. It allowed the students to have an easier time reviewing their prior learning and also made assessment easier for me. I was able to see at what point students were either disengaging or falling behind and could then work specifically with those students in their groups to ensure they were understanding the material.

Analysis of Student Learning

Gradebook

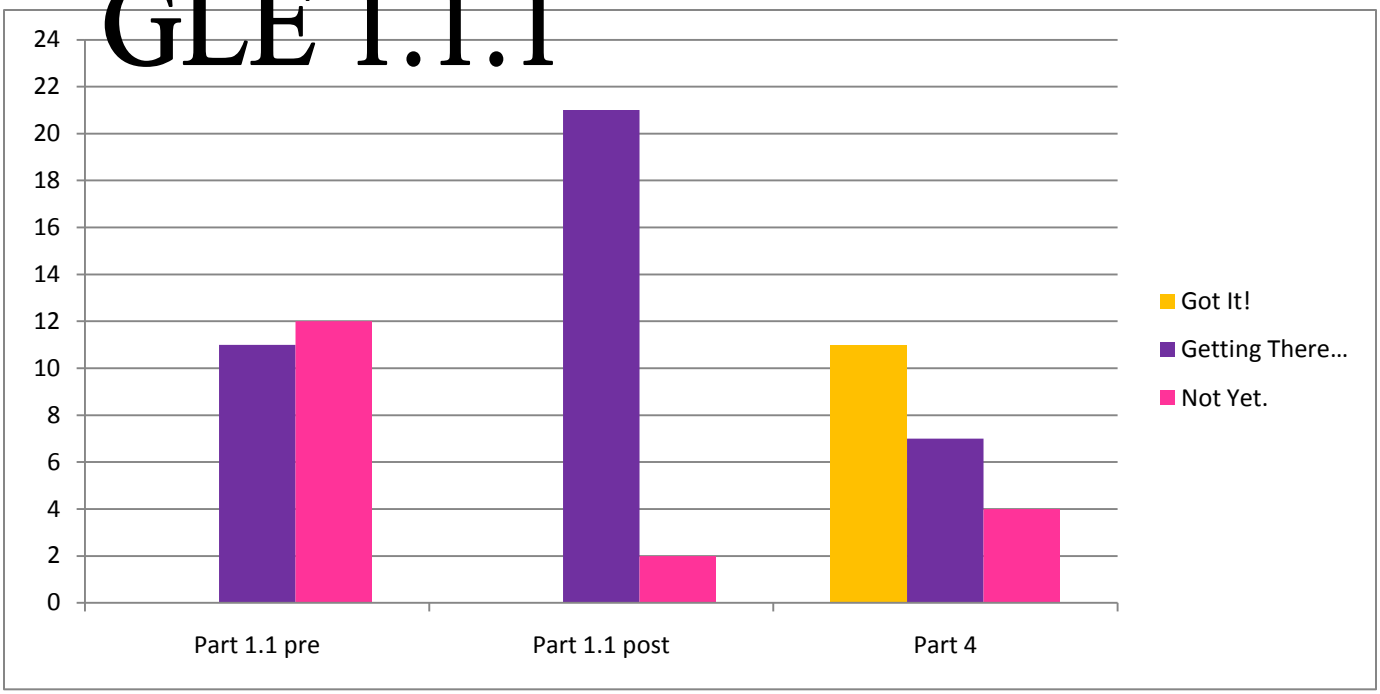
	4/14/09		4/17/09			4/20/09	4/21/09		4/23/09		4/27/09		4/28/09		4/29/09			5/1/09	
	Pre-Assess		Inv.1 Part 1.1			Inv. 1 Bonus	Inv.1 Part 1.2		Inv. 1 Part 2		Inv. 1 Part 3.1		Inv. 1 Part 3.2		Inv. 1 Part 4			Sum. Assess	
Student	1	1+	2	2	x	x	1	x	1	x	1	x	2	x	1	2	x		
Student	2	2	2	2	x	x	2	x	3	x	2	x	3	x	3	2	x	3	2
Student	2	1+	1	2	x	x	2	x			1	x	2	x	3	2	x	3	3
Student #1	2	1	2	2	x	x	2	x	2	x			3	x	3	3	x	3	3
Student	1	2	2	2	x			x	1	x	1	x	1	x	2			3	2
Student	1	1	1	1	x		1	x	1	x	1	x	1	x	2	1+	x	1	1
Student	2	1	2	2	x	x	2	x	2	x	2	x	1	x	3	2	x	3	2+
Student #2	1	2	1	1	x	x	2	x	3	x	2	x	3	x	3	3	x	3	2
Student	1	2	1	2	x	x	2	x	3	x					2	2	x	2	2
Student			1	2	x	x	2	x	1	x	1	x	1	x	2	2	x	2	1
Student	2	1	1	2	x		2	x	1	x								2	2
Student			2	2	x	x	1	x	2	x								3	2
Student	1	1	1	2	x	x	2	x	1	x	1	x	1	x	2	2	x	2	2
Student	1	2	1	2	x	x	2	x	3	x	3	x	2	x	1	3	x		
Student	2	1	1	2	x	x	2	x	3	x	2	x	3	x	1	2	x	3	3
Student #3	2	1	2	2	x	x	2	x	2		2+	x	3	x	3	3	x	2	2
Student	2	2	1	2	x	x	2	x	1		1	x	2	x	3	2	x	2	1
Student	1	1			x													1	1
Student #4	1	2+	2	2	x	x	2	x	2	x	2	x	1	x	2	2	x	3	3
Student	1	1	1	2	x	x	1	x	1	x	1	x	1	x	3	2	x	3	2
Student #5	1	1	2	2	x		2	x	3	x	2	x	3	x	3	2	x	1	3
Student	1	2	2	2	x	x	2	x	2	x	2	x	3	x	2	3	x	3	3
Student	2	2	2	2	x	x	2	x	2	x	3	x	2	x	3	3	x	3	3
Student	2	2	1	2	x	x	2	x	2	x	2	x	2	x	3	2	x	3	3
Student	1	1	1	1	x		1	x			1	x	1	x	1	2	x	1	1
	Magnets	Self-Assessment	Science 1.1.1 Pre	Science 1.1.1 Post	Participation	Participation	Science1.3.1	Participation	Science 1.3.1	Participation	Science 1.3.1	Participation	Science 1.3.1	Participation	Science 1.1.1	Science 1.3.1	Participation	Magnets	Self Assessment

Science Gradebook



Whole Class Science Grades

GLE 1.1.1



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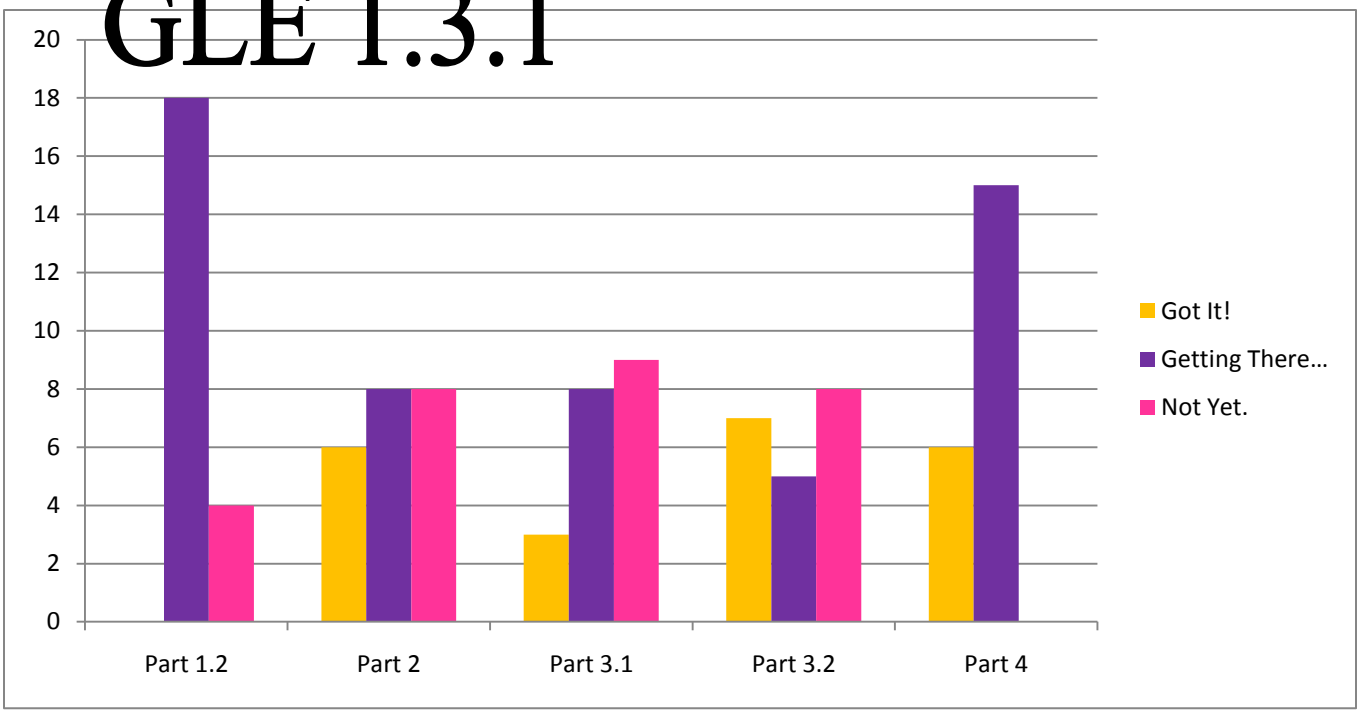
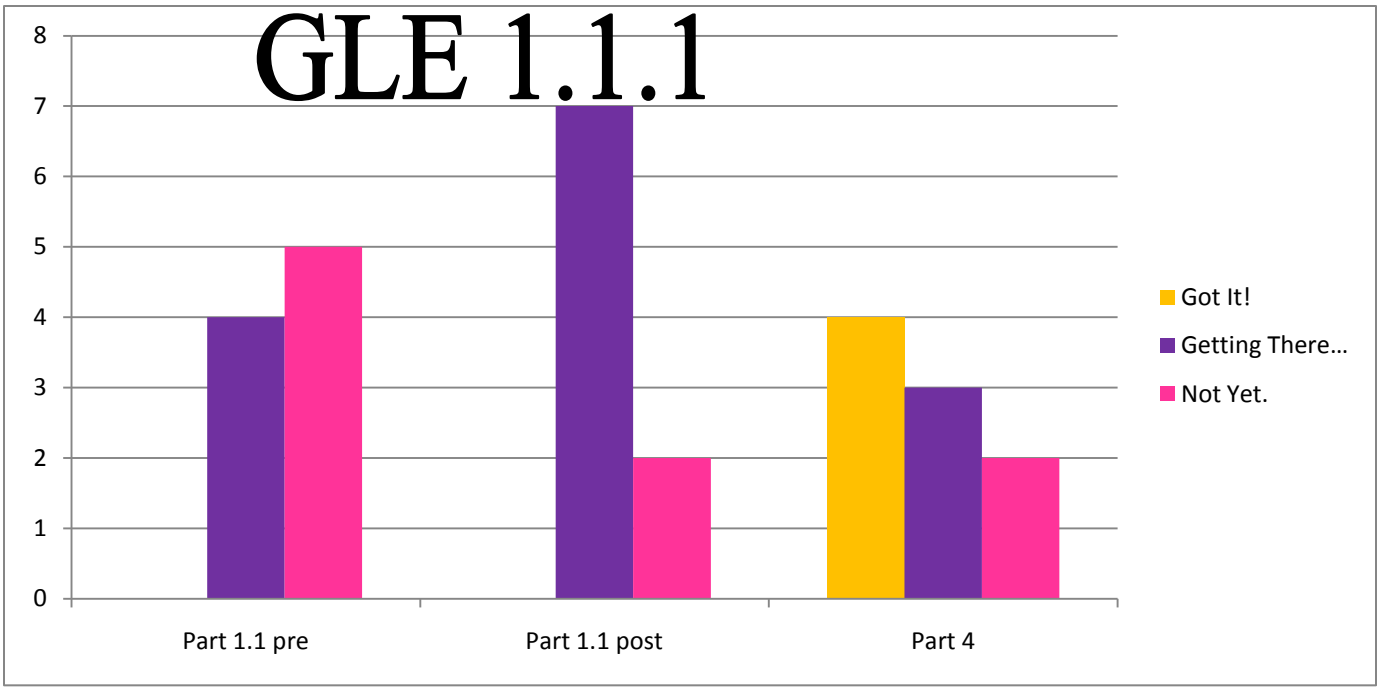
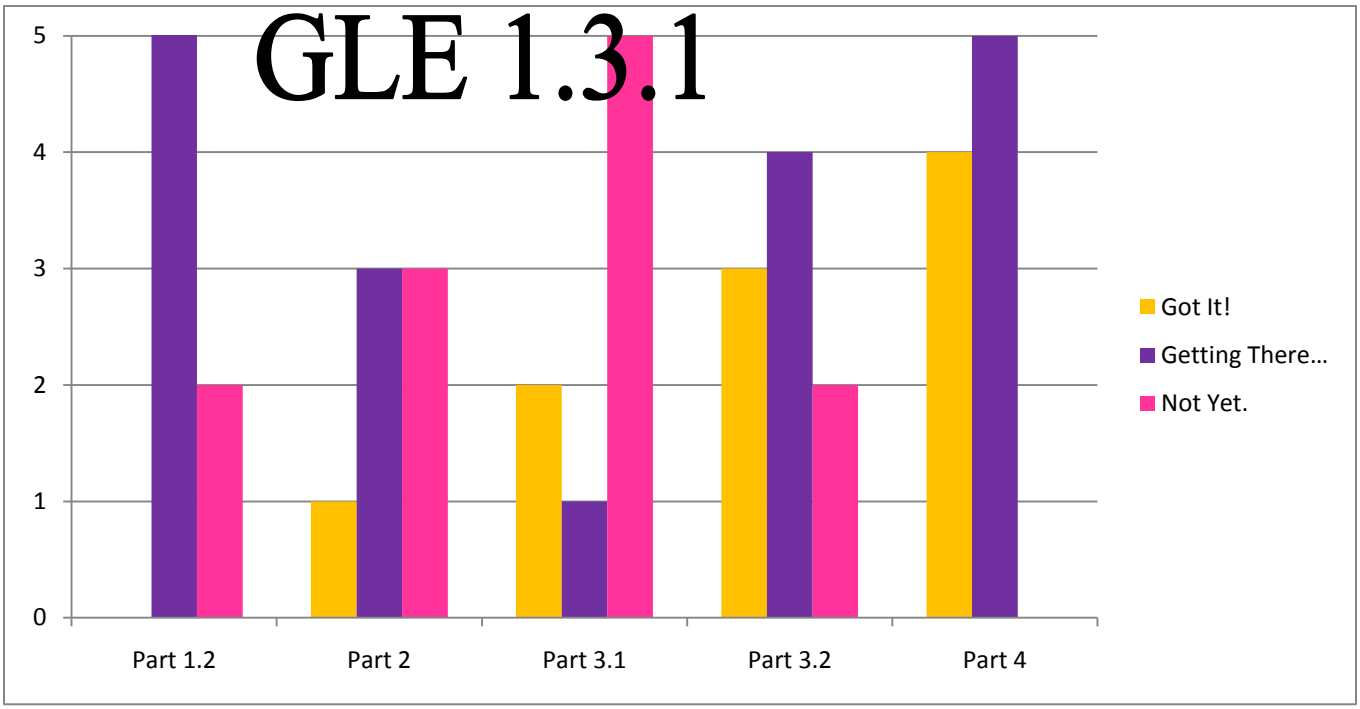
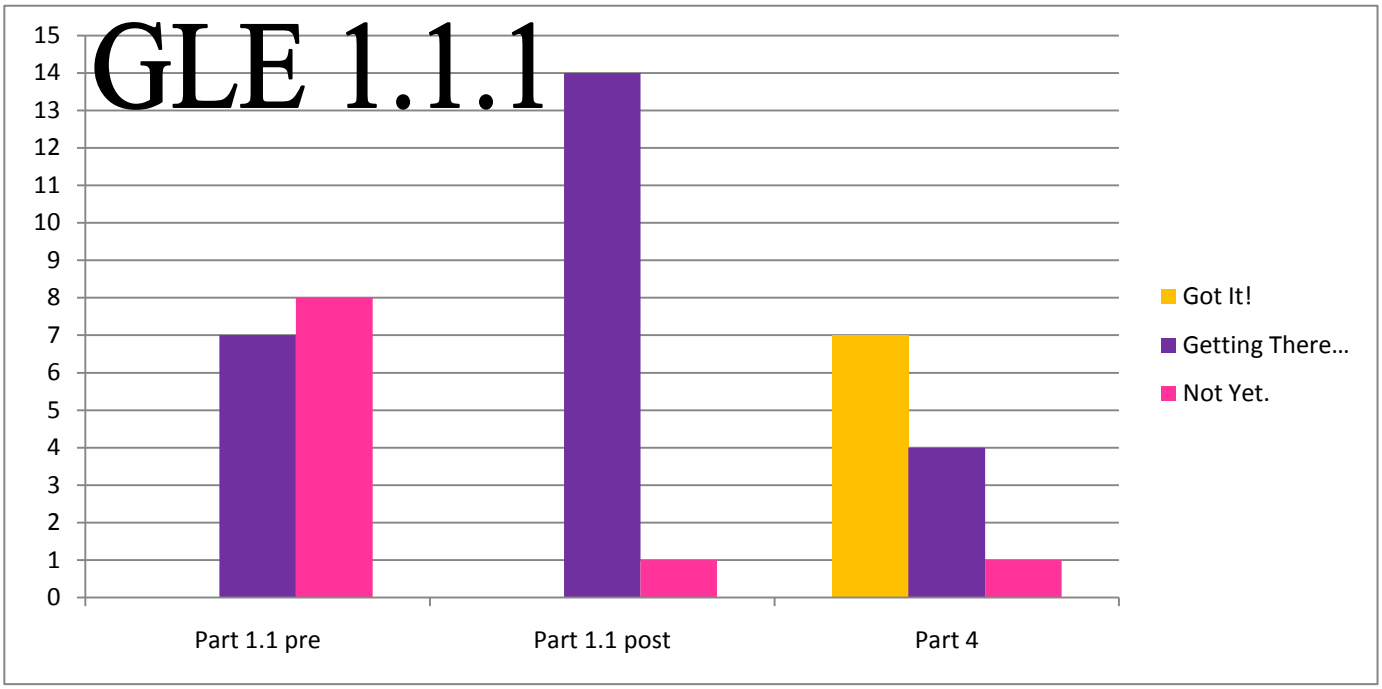


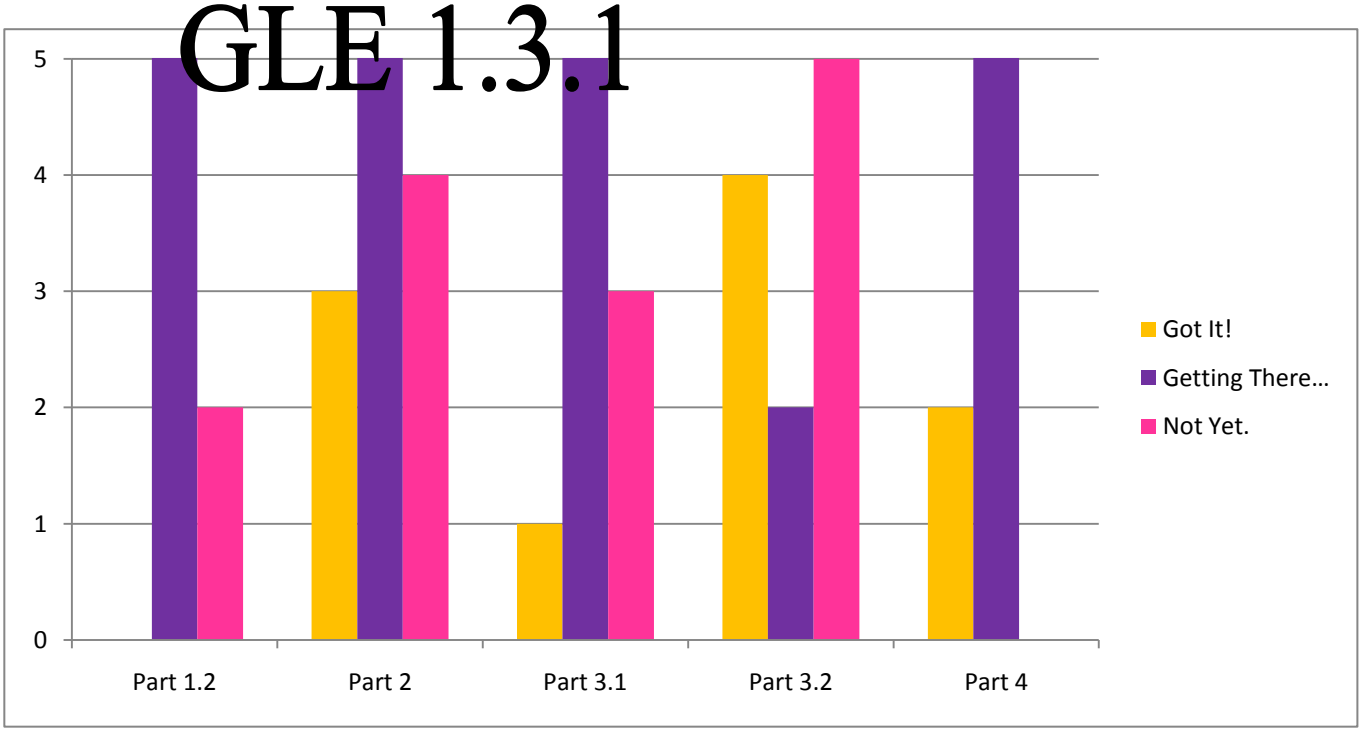
Girls Science Grades





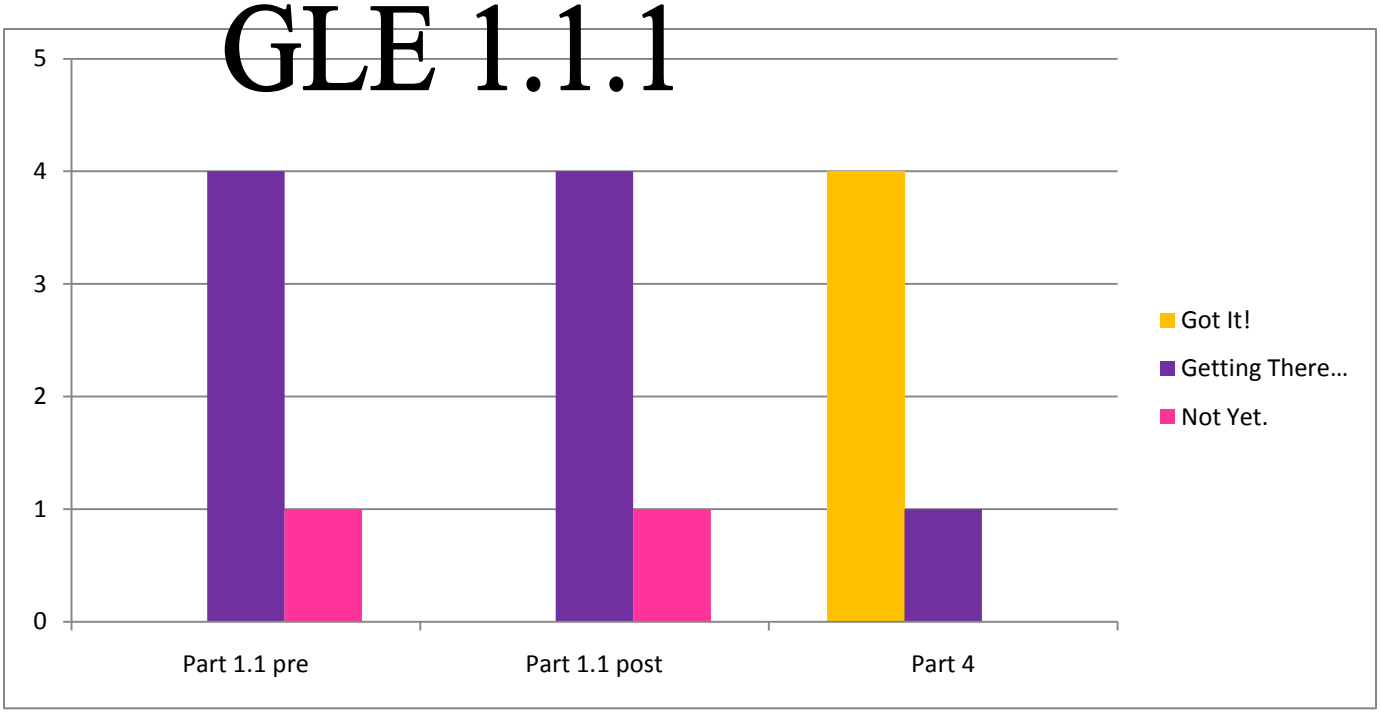
Boys Science Grades



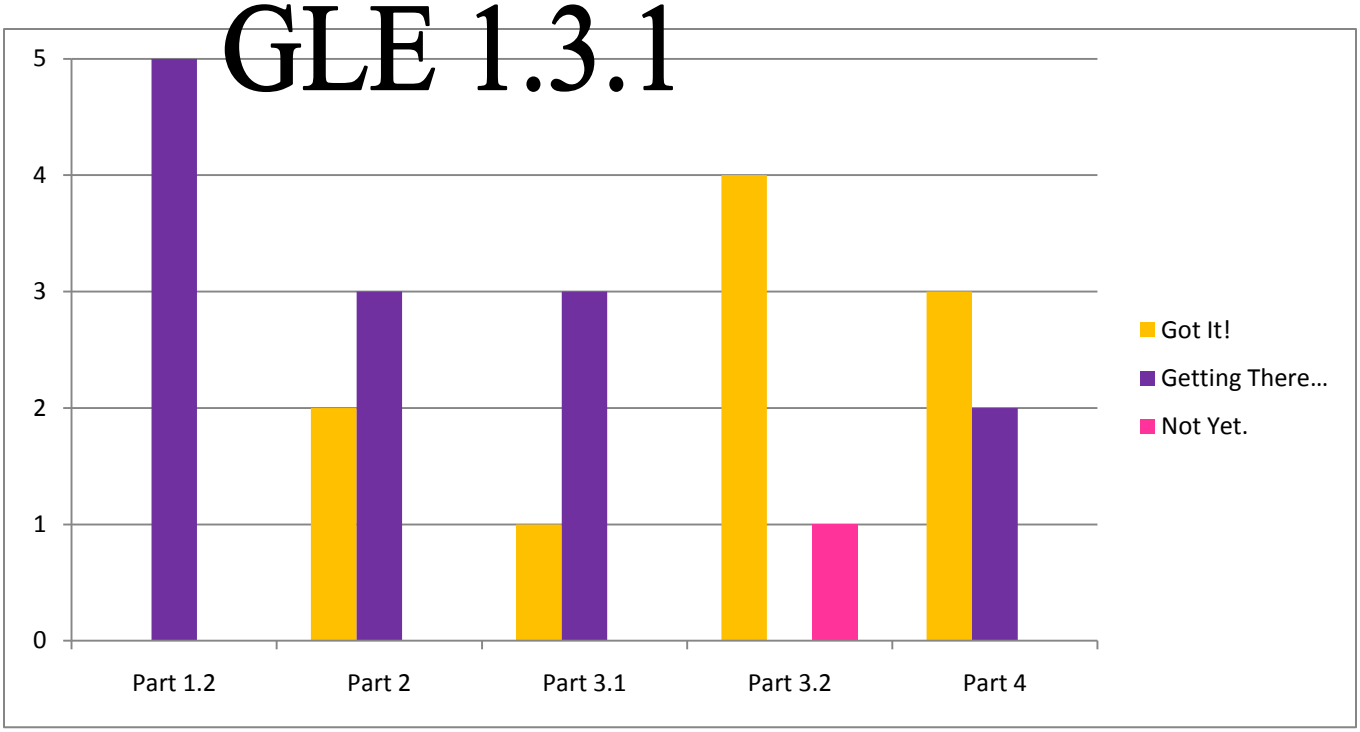


Individuals Science Grades

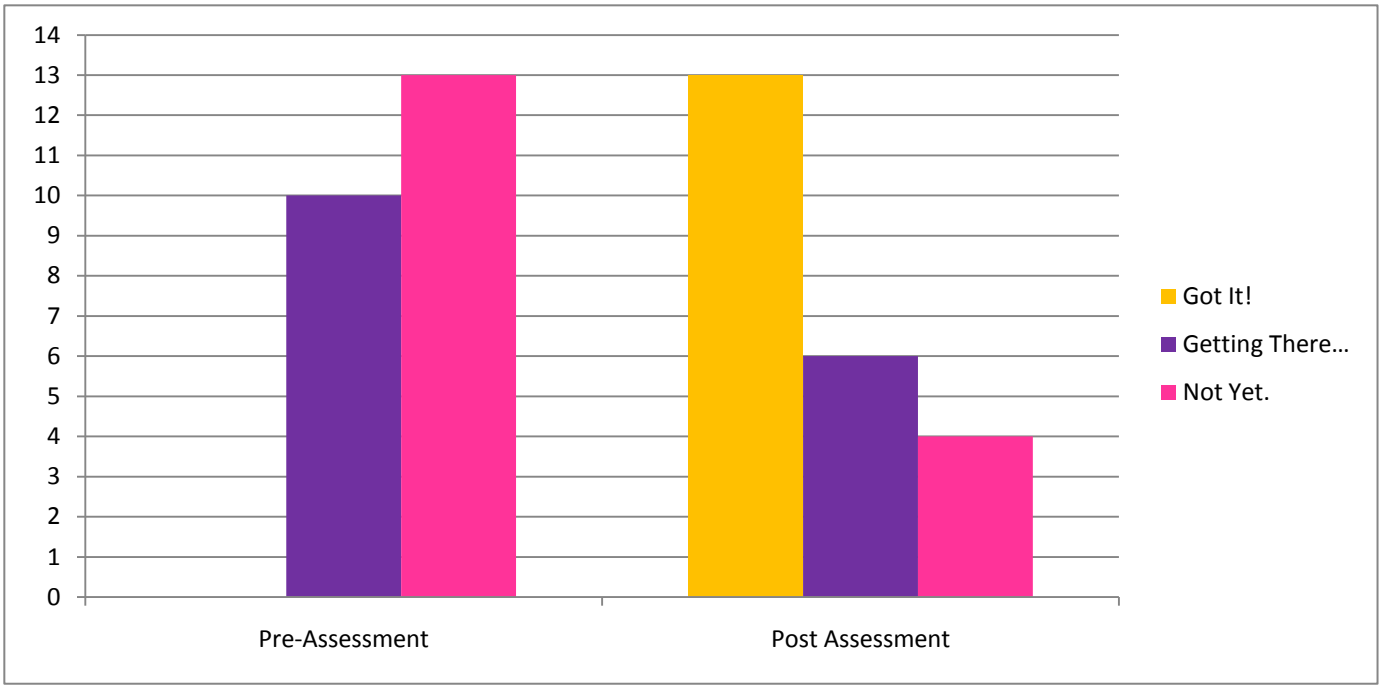
GLE 1.1.1



GLE 1.3.1



Positive Impact on Student Learning



Whole Class Summary

This unit began with no students being proficient in either science GLE (1.1.1 or 1.3.1). Although there were a significant number of students who had prior knowledge in these content areas, there were also a significant number of students who had no prior knowledge. As we progressed through the unit the number of students who became proficient grew. Although at the end of the unit it appears some students regressed, it should also be noted that there were many students with missing assignments or unexcused absences whose grades negatively affected the overall growth of the class as a whole. These missing assignments were in part due to the frequent pull outs and interventions that many of the students in my class participate in on a daily basis.

With no students achieving at goal at the beginning of the unit having eleven students achieving at grade level was exciting. Similarly the number of students achieving significantly below grade level dropped from twelve to four. This shows that although I was not able to effectively reach each and every student during this unit I did positively affect over 80 % of the class.

Girls and Boys Subgroups Summary

I chose to analyze the differences in achievement between girls and boys in my class as there was a striking disparity in the ratio. Because there were more than twice as many boys as girls in my class I was curious to see how the two groups would compare. At the beginning of the unit the two groups had similar understandings on science GLE 1.1.1. With both groups split nearly half and half between significantly below grade level and almost at grade level to begin with the growth between the groups was nearly identical. Both groups progressed almost completely to almost at grade level with only one or two still significantly below grade level by the end of the second lesson. By the final lesson regarding science GLE 1.1.1 half of each group was at grade level, the majority of the rest almost at grade level with only one or two remaining below grade level.

Individuals Summary

I chose five students to analyze for this section. I chose two who perform consistently below grade level, two who perform almost at grade level and one who performs consistently at grade level.

Student #2 and student #5 both perform below grade level in most areas and struggle with organization and appropriate behaviors in class. I felt that it was important to partner these two students with students who could be more capable peers to them so that they could become successful. I found that for student #2 this approach was completely successful. For student #5 I found that although his grades and understanding moved forward on the rubric and his understanding of the content was strong on his final assessment his grade dropped significantly. I felt this was due in part to behavior issues in the classroom between other students and myself. When I spoke to this student about his test score and then reviewed the problems with him he was able to accurately explain and answer all the questions.

Student #3 and student #4 achieve between at grade level and below grade level in most areas. This is not a matter of their knowing the content or being able to express their ideas. These two students are highly social and have a great deal invested in their social reputation. This was a disservice in the group work aspect of this unit as they were often off task and disruptive. Although their scores reflect growth and learning had they been on task and more actively engaged I feel they would have moved even further.

Student #1 consistently performs at grade level and I feel it is partially because of the focus on academics and lack of social interaction in the class. She moved from almost at grade level to at grade level quickly and remained there. In retrospect I would have liked to have differentiated the lessons for her as well providing more challenges and opportunities for further growth.

Reflection and Self Evaluation

Most Successful Lesson

The most successful lesson I taught was probably part 1.1. In this lesson I had students make hypotheses about the magnetic properties of a bag of test objects, they then tested their hypotheses using magnets. After the investigation I provided students with a list of objects and they had to determine whether or not the objects would stick to magnets or not. This lesson had very little direct instruction and was very student driven. It was also the first opportunity the students had to work in groups. Also, because it was the first lesson in this unit my expectations were more in line with developmentally appropriate expectations. I had placed students in groups based on the pre-assessment and their prior knowledge, interest areas and personalities.

In this lesson the students went from fifty percent significantly below grade level and fifty percent almost at grade level to ninety percent almost at grade level and only ten percent below grade level. This was the most significant shift in understanding in any of the lessons.

Least Successful Lesson

I think that the least successful lesson was not so much the lesson itself, but rather the transition of the concept (science GLE 1.3.1) from one format to another. In part 2 there were approximately thirty percent of the students achieving at grade level, and thirty five percent achieving almost at grade level and below grade level each. For lesson 3.1 only ten percent of the students were achieving at grade level and forty five percent achieving almost at grade level and below grade level each. I think this was due to the fact that part 2 had been more teacher directed and concrete in it's method. Students were hands on testing the effects of magnetism on different objects in part 2 and in part 3.1 they were testing the strength of that force. It was still hands on but a little bit more abstract as you can't see the force or feel the force the same way.

Possibilities for Profession Development

I would like to improve on my skills as a reflective practitioner. I would like to be more cognizant of the way my teaching, my words and my non-verbal communication impact the students in my classroom. To do this I will most likely participate in professional development courses through the district I teach in and also through outside agencies that offer online opportunities for growth in this area.

I would also like to improve my skills in differentiating curriculum not only for lower achieving students but also for high achieving students. I would be interested in professional development opportunities for gifted education and learning more about how to extend the lessons I teach while still maintaining similar learning objectives and goals for my students. I am not sure how to do this in a way that keeps the student engaged in the task and incorporates high level thinking. To do this I will seek opportunities for professional development in these areas and seek the support of other teachers who I feel effectively do this.