

Soccer! What's It All About???

The Science and Math behind the game you love.

Unit Plan by:

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For:

Grades 3-5

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Introduction

Rationale:

I chose to create a unit about the Science and Math that are the foundations of the game of soccer for a few reasons. First, we are a soccer family. My husband and I both played competitively throughout high school, both of my boys have played since they were three and my daughter will be playing for the first time in the fall. I absolutely love everything about the game of soccer, and, in my experience as a teacher, the more excited I am about what I am teaching, the more enthusiastic the kids are to learn. I also chose to base my unit of study on soccer because it is popular with so many kids these days, both boys and girls. I knew that due to the fact that I was creating lesson plans for a summer camp, even if it was for highly intelligent ones, that I had better make it fun! Lastly and most importantly, I chose soccer as my unit of study because I felt strongly that if I could get my students to think about the why behind every aspect of the game and provide them with scientific and mathematical explanations for them, they would then apply that newfound knowledge to their own soccer game, ultimately becoming a better player.

The concept presented in this unit was *Knowledge*, with my essential understanding as *Knowledge facilitates Movement*. From the moment we are born, we begin to acquire knowledge and we continue to learn things every day, whether we want to or not. I try very hard as a teacher to show my students how the knowledge that I am imparting on them can be used, in some form or fashion, in their everyday lives and this unit was no different. I remember many lessons from all of my years of school and the ones I remember the most fondly were the lessons that really hit home for me. So, when I began my career as a teacher, I decided to always try and make learning as meaningful as possible for my students because I knew firsthand the impact it would have years down the road. When I began to think about session ideas for SPARK Camp, I knew I wanted it to open the door for me to share my knowledge about keeping taking care of our bodies, another of my passions. So, I knew I wanted my session to be fun and active. I also knew that I would have to weave in relevant content knowledge and process skills along the way and my ideas naturally progressed to "Soccer! What's It All About???" "The Science and Math Behind the Game You Love."

There was a lot of content knowledge embedded in this unit. First, I wanted students to understand that they could use their knowledge of force and motion and the relationship between the two to improve their soccer game. For example, when trapping the ball, it is extremely important to maintain bodily contact with the ball long enough to get it under control. If you allow the ball to simply bounce off of your foot, chances are it's going to get

away from you and be picked up by an anticipating opponent. If you absorb the ball's momentum, however, by bringing it back with the inside of your foot, say, you will be able to bring it to a controlled rest so you are ready to make the next play. Forces and Motion, of course, are heavily taught in the fifth grade, so, seeing as how I had only rising 4th and 5th graders, I hope they will connect the dots when their Science teacher begins talking about Sir Isaac Newton and his Laws of Motion. I also wanted students to understand that if we take care of our bodies by eating right and training specifically for the game, our bodies are going to perform better for us. For example, students gained knowledge about how the human body works together like one big machine, beginning with the digestion of the food we eat. They learned the importance of eating nutrient dense food for maximum performance and what happens when you don't make good choices before a big game. You guessed it, this falls under fourth grade Science curriculum, more specifically Molecular Biology. Finally, I wanted students to understand that they could use their knowledge of angles and angle measurement to increase their shooting accuracy, which, of course, is also part of the fourth grade Math curriculum. With so much content knowledge to learn, how could there possibly be anything else to teach while all the while learning about such an amazing sport? But there was more to teach. Skills! So many skills that students are sure to use time and time again both in their careers as students as well as their eventual careers as an adult.

When we learned about topics such as Forces and Motion and soccer and Angle Measurement and soccer, the skills students acquired or improved on seemed to go hand in hand. On both of these days, students worked on using The Scientific Method to conduct experiments. They also used certain tools, such as protractors and tape measures that scientists use on a daily basis. From there they collected, organized and analyzed data to make predictions about things like the best place to take a shot from on the soccer field to ensure shooting accuracy. The vessel in which I delivered the knowledge about how to take care of our bodies so that they perform well for us in a soccer game happened to be a really cool website that the kids had to navigate through and read. In doing so, students had to analyze the content that they were reading to determine what part of that informational text was relevant to them. They also had to draw conclusions about the information they read as well as to infer meaning of new and challenging words based on context clues. Last but certainly not least, students had to craft their own "dig deep" questions on a daily basis.

Differentiation for Gifted Learners:

This unit lent itself beautifully to differentiation for gifted learners. First, the content was above grade level based on topics of study and reading level. Second, the processes the students were asked to complete were complex, such as a science experiment to be carried out at their own pace with the expectation that they would remain focused and on task, even when

the teacher was engaged with other students. In addition to complex experiments, students were asked critical thinking questions throughout the entire camp session. In addition to content and processes created with the gifted learner in mind, students were also expected to create an original product the week what would demonstrate their essential understanding. Finally, students had mobility throughout the lesson; half took place inside the classroom and the other half outside on the soccer field.

Intended Population for Unit:

This unit was created for rising 3rd - 5th graders who have been formally identified as AIG in Durham Public Schools. Since the students and /or their parents were given a list of classes that would be offered at SPARK Camp before they signed up, it was assumed that most of my students would have had at least a small knowledge base of the game, although, I did end up having one student who had never played a day in his life, which made for pretty interesting circumstances.

*Needs
elaboration
and
demographics*

Goals and Outcomes

GOAL 1: (Content Goal) - To develop an understanding of how the game of soccer is almost entirely explained by Science and Math and how this understanding can be used to improve one's soccer game.

Students will be able to...

- A. Understand how force, motion and the relationship between them apply to the game of soccer.
- B. Explain the importance of as well as how to take care of the human body so that it can perform at a superior level.
- C. Analyze data gathered in an experiment to determine what angles on the goal shots should be taken at to deliver accuracy.

GOAL 2: (Process Goal) - To synthesize information and use it to improve one's soccer game.

Students will be able to...

- A. Predict the effect a given force will have on a soccer ball based on data collected through experimentation.
- B. Analyze content and determine relevance of an informational text about the human body and to apply their knowledge to their own soccer games.
- C. Analyze observational data to create generalizations about the best places on the field to take shots on goal.

GOAL 3: (Concept Goal) - To understand the concept of knowledge.

Students will be able to...

- A. Explain how knowledge of forces and motion and the relationship between the two can be used to improve one's soccer game.
- B. Explain how knowledge of the human body and how it works can help one make optimal choices in regards to eating and training in order to perform to the best of his or her ability.
- C. Explain how knowledge of angles and angle measurement can be used when trying to improve shooting accuracy.

Assessment Plan

My entire unit was designed with thoughtful critical thinking questions embedded in each part of every day's lesson plans. These questions were intended to be (and were) asked orally as a part of an ongoing discussion about our learning throughout the week. These questions served as an immediate informal assessment for me so that I could either clear up any misconceptions students may have or move the discussion forward.

Also ongoing throughout my entire unit was the summative assessment or performance task. This performance task consisted of two parts. In the first part, students were asked to create an original training guide for brand new soccer coaches that would be used in a soccer clinic designed to get those coaches ready to teach young children all about the game of soccer. The guide was to be called "A Beginner's Guide to Coaching Soccer; the More You KNOW the More You GROW!". Students were asked to include in this guide the importance of incorporating knowledge of Science and Math concepts such as force and motion, the human body and how to care for it, and angle measurement and geometry as it applies to the game of soccer. The second part of the performance task was in the form of an actual scrimmage where students were to (and did a fabulous job!) "show what they know" by way of demonstrating some of the above Science and Math concepts as they played a game of soccer. For example, I looked for things like keeping one's body in contact with the ball when trapping to absorb momentum thus gaining control of the ball.

Finally, at the end of each day, students were given an index card on which they were to respond to the question "In what ways does knowledge facilitate movement?". The notecards were collected and read at the end of each day so that I knew how what I needed to either revisit or build on the following day.

Soccer! What's It All About???

Jenny West

Day One

Jenny West		1
MODEL	CONTENT AREA	GRADE LEVEL
Questioning	Science	Elementary (3-5)
CONCEPTUAL LENS		LESSON TOPIC
Knowledge		Force and Motion
LEARNING OBJECTIVES (from State/Local Curriculum)		
Science Standard Course of Study: 5.P.1 Understand force, motion and the relationship between them: 5.P.1.1 - Explain how factors such as gravity, friction, and change in mass affect the motion of objects. 5.P.1.2 - Infer the motion of objects in terms of how far they travel in a certain amount of time and the direction in which they travel. 5.P.1.4 - Predict the effect of a given force or a change in mass on the motion of an object.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Knowledge facilitates movement.		How does knowledge facilitate movement?
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)		PROCESS SKILLS (What will students be able to do as a result of this lesson?)
- Students will know that movement is the act of changing physical location or position, or, of having this changed. - Students will know that a force is anything that can push or pull an object. - Students will know that forces interact with objects to influence motion or movement. - Students will know that Isaac Newton's Three Laws of Motion explain how different forces affect the movement of an object. - Students will know that gravity pulls any object on or near Earth toward it without touching it. Students will know that friction is a force that is created any time two surfaces move or try to move across each other. Students will know that all matter has mass. - Students will understand that a change in any or all of these factors will affect the motion of an object. - Students will know that knowledge is facts, information and skills acquired by a person through education or experience. - Students will understand that knowledge facilitates movement.		- Students will be able to make inferences based on observations. - Students will be able to experiment. - Students will be able to organize data. - Students will be able to analyze data. - Students will be able to make predictions based on data. - Students will be able to synthesize information. - Students will be able to create products that demonstrate learning. - Students will be able to make connections across disciplines.

GUIDING QUESTIONS			
What questions will be asked to support instruction?			
Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding			
Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:	
What do you see? What else do you see?? Why do you say that? What is movement? What is knowledge? What do you "know" about the relationship between force and motion? How might force and motion impact the movement of the eggs?	What is a scientist? What do scientists do? How do scientists act when they are gaining knowledge? What kinds of things might they do?? Who has heard of Isaac Newton? What is a law? What do you think this means: "An object in motion will remain in motion and an object at rest will remain at rest unless acted on by an outside force?" Various questions embedded in Part One of the experiment (see attached experiment and observation student guide, Part One). What do think this means: "Acceleration is produced when a force acts on a mass. The greater the mass (of the object being accelerated) the greater the amount of force needed (to accelerate the object)"? Various questions embedded in Part Two of the experiment (see attached experiment and observation student guide, Part Two). What do you think this means: "For every action there is an equal and opposite reaction."?	What knowledge did you gain about movement during the egg activity? What knowledge did you gain about Newton's First Law of Motion? What knowledge did you gain about movement through experimentation of Newton's First Law?? What knowledge did you gain about Newton's Second Law of Motion? What knowledge did you gain about movement through experimentation of Newton's Second Law?? What knowledge did you gain about Newton's third law? How can your new knowledge of Forces and Motion and Newton's Laws of Motion have a positive impact on your soccer game? How does knowledge facilitate (aid in) movement?	
DIFFERENTIATION			
(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.			
Content	Process	Product	Learning Environment
Content is above level based on topic and reading level.	Critical thinking questions will be the focus of the lesson.	Students will create an original product throughout the week based that will demonstrate the essential understanding.	Students will have mobility throughout the lesson; half of the lesson will take place inside and the other half will take place outside.

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

As students enter the classroom, the teacher will simultaneously greet her students and spin two eggs on a desktop. Music about movement will be playing in the background.

With the students in a circle around her, the teacher will then spin the eggs again, this time waiting for them to come to a stop by themselves. Once both eggs have stopped spinning the teacher will ask: What do you see?

After students respond, the teacher will spin the eggs once more only this time she will quickly yet gently touch the top of the top of each egg to stop it from spinning and then let go. The teacher will direct students to continue watching the eggs and to observe what happens before asking: What else do you see?

After students share more detailed observations about what they see, the teacher will ask: What makes you say that? The teacher then says: Let's investigate further.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

After a brief discussion on the possible reasons the eggs behaved the way they did, the students will have a chance to experience the above process firsthand.

First the teacher asks the students to get into small groups of 3 - 4.

Then she will ask the students to take turns spinning the eggs just as she did, reminding them to do so quickly yet gently. Students will then each take a turn spinning both eggs two times. The first time they spin they will let the eggs come to rest on their own and the second time they will briefly stop the spinning eggs. When all students have had the chance to complete the above task, the teacher will ask: Would anybody like to add to their observations about the behavior of the eggs during either one of their spins? What further (additional) thoughts do you have and would like to share about why the eggs might have behaved differently even though they seem to be the same? After a student inevitably mentions the concept of "motion" in their response, the teacher will say: I heard (student) say (something related to movement) in his/her observation, what does the word "motion" mean? The teacher will record a collaborative definition of "motion" on chart paper for future reference. She will also tell the kids that there is motion all around them; even inside of their bodies because their blood is moving as we speak! Following student responses, the teacher will then say: I heard (student) mention (something having to do with "force", even if they don't use the actual word). Does anybody know what the word "force" means? The teacher will again record a collaborative definition on the chart paper. The teacher will then say: There are examples of force all around us like: (The teacher will then give concrete examples of force) machines, a huge engine on a rocket ship or a motor. There are also forces in nature, like a breeze that shakes a leaf or ocean waves that make boats bob up and down. The teacher will then move on to less concrete examples of force by saying: There are other examples of force that are harder to see like pushing, pulling and lifting as well as gravity and friction (more on these soon!). Following these student responses, the teacher will ask: Based on what you already "knew" about force and motion, and perhaps what you just learned during our egg experiment, what can you tell me about the relationship between force and motion? Following students responses, the teacher will say: So, based on what you "know" about force and motion so far, how might that relationship affect the movement of our eggs? The teacher will thank the students for sharing their above "knowledge" finally asking: Can anyone tell me what the word knowledge means? The teacher will again record student responses on chart paper for future reference.

Explain - Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding

Building on above student responses, the teacher will begin a brief discussion on the relationship of force and motion. She will explain that inertia is the tendency for an object at rest to remain at rest and the tendency for an object in motion to remain in motion. This definition will be added to the chart paper vocabulary list. The teacher will continue to explain that in the above experiment, the liquid parts of the uncooked egg had more inertia than the solid, hard-boiled egg. Because of inertia, the uncooked egg resisted spinning and also resisted stopping once it was in motion. When the two eggs were forced to stop, the inertia of the liquid egg started the egg spinning again. Eventually, though, both eggs lost their momentum, stopped spinning and came to rest. This was due to a force called "friction" acting against the motion of the eggs. The word friction and its definition will then be added to the vocabulary list on chart paper.

At this time, the teacher tells the students that they are going to continue their exploration of the relationship between force and motion, but they are going to do so... on the soccer field!

Elaborate - Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Once on the soccer field, the teacher will gather the students in a group for a brief discussion on scientists. She will ask: What is a scientist? What do scientists do?? How do scientists behave when they are gathering knowledge? Following student responses about scientists and what they do, which will more than likely include the idea of experimentation, the teacher will tell the students that they are going to act like a scientist as they conduct an experiment to find out how various forces affect the motion of a soccer ball. The teacher will add that the game of soccer is all about physics, or the study of matter and energy and that physics explains the speed and direction of the ball. It also explains why a ball can curve around players and go into the net! The teacher will then ask if anyone has heard of the famous scientist Isaac Newton. Anticipating that most have not, she will share quick biographical details about him, including the fact that he discovered gravity. She will then ask if anyone knows what gravity means. After concluding that gravity is the force that pulls things towards the center of the Earth (definition to be added to ongoing anchor chart in classroom), she will tell the students that though Newton is famous for discovering

gravity, perhaps he is most well-known for his three laws of motion. The teacher will then ask: what is a law?, assuming that all students will know that a law is a rule about something, she will add that Isaac Newton came up with three laws that explained how things move after spending countless hours observing the movement of many different things.

The teacher will then tell the students that they are about to go outside so that they can see firsthand how Isaac Newton's Laws of Motion explain so much of the game they love! Before heading out, the teacher will ask each student to pick up a clipboard and a pencil and she will hand them a copy of the experiment guide they will be using on the field.

Experiment Part One -

Once all students have gathered on the field, the teacher will ask: Who knows what I mean when I say "An object in motion will remain in motion, and an object at rest will remain at rest, unless acted on by an outside force"? The teacher will hold up a poster of Newton's First Law of Motion, in kid-friendly terms, and allow students to read it, think for a moment or two and then respond to the teacher. After a very brief discussion, the teacher will tell the students that in a moment they are going to perform the first part of an experiment that will help them understand how Newton's laws of motion explain how soccer "works". The teacher will then ask students to get into the same groups of 3 or 4 that they were in in the classroom, to grab a soccer ball and spread out across the field, staying in their small groups. Groups should read the directions on their paper and follow them (see attached experiment guide) to conduct Part One of their experiment. After all students have done this, the teacher will call the whole group together to go over students' observations thus far and clear up any misconceptions they may have before moving on to a brief introduction to Newton's Second Law of Motion and Part Two of their experiment.

Experiment Part Two -

While in a whole group, the teacher will ask: Who knows what I mean when I say "Acceleration is produced when a force acts on a mass. The greater the mass (of the object being accelerated) the greater the amount of force needed (to accelerate the object)."? The teacher will follow the same procedure as above (with a poster containing Newton's Second Law) before dismissing groups to conduct the second part of their experiment. Again, after all students have had the chance to complete the second part of the experiment, the teacher will gather the whole group together to go over their observations from this part of the experiment and clear up any misconceptions they may have before moving on to a brief introduction to Newton's Third Law of Motion and Part Three of their experiment.

Experiment Part Three -

While in a whole group, the teacher will ask: Who knows what I mean when I say "For every action, there is an equal and opposite reaction."? The teacher will once again follow the same procedure as above before (with a poster containing Newton's Third Law) The teacher will then ask the students if they can think of a time during a soccer game that exemplifies Newton's Third Law. If no one mentions it, and it is anticipated that they will not, the teacher tells the students that best example of Newton's Third Law of Motion in a soccer game is when the ball is headed. The teacher will then tell students that heading is no longer "legal" in youth soccer due to the risk of head injuries like concussions, but, that we are going to briefly discuss them none the less. She will then go on to explain that during a header, the player's head and the ball are the two objects. The player's head pushes against the ball while the ball pushes against the player's head with an equal amount of force! Ouch!! This completes the experiment for the day and the teacher will lead students back to the classroom.

Once back in the room, observations from the experiment are shared with the whole class.

When all groups have finished, the teacher will ask the Post Lesson Questions (see above list). Students will volunteer answers and feedback from multiple students is discussed.

The teacher will then introduce the student product that will be due at the end of the week. The teacher will show a sample product (A New Soccer Coaches' Training Guide: The More you KNOW the more you GROW!,) The teacher will explain to students that they are going to use the knowledge they gain throughout the week to create a guide for new soccer coaches that will help them as they plan for practices. The guide they create should demonstrate how knowledge of certain science and math concepts can help them effectively coach young soccer players. The teacher will remind the kids that today they learned all about Forces and Motion and how Newton's Laws of Motion explain the game of soccer. She will then ask them the following question: How do you think the knowledge you gained about Forces and Motion and Newton's Laws of Motion can have a positive impact on your soccer game?

Students will then be given 10 minutes of planning time to start brainstorming about their product. They should refer to the experiment and observation form used during the day as a resource. The teacher will also be available to answer any individual questions students may have.

Evaluate – This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.

The teacher ends independent work time by announcing that is almost time for class to end. The teacher asks for questions from the students about what they learned during the day's lesson/s. The teacher then requests: Tell me something you discovered today through your experimentation that caused you to think and why it made you think. Tell me something you discovered today that surprised you and why it surprised you. Tell me something you learned today that you want to share with someone. Who will you share it with and why? The teacher will then take several volunteers for each question so that everyone who would like to is able to share.

Finally, students will be given an index card on which to write a response. The teacher says: Based on what we have learned today, answer the following question:

In what ways does knowledge facilitate (or aid in) movement?

Handout, Day One

How do different forces affect the movement of a soccer ball???

Conduct the experiment below to find out the answer!!!

Answer the following question to create your HYPOTHESIS. How do you THINK, based on what you've learned so far, different forces affect the movement of a soccer ball?

1. Get into your small groups (the same ones you were in in the classroom), grab a soccer ball, and form either a triangle or a square. Now pass the ball back and forth several times. As you are passing the ball, think about the following:

Will a soccer ball that is at rest on the grass start moving all by itself? Why or why not??
What about a soccer ball that has been kicked and is moving along the grass to your teammate. Will that ball stop if no one touches it? Why or why not??

After discussing the above with your teammates, answer the following questions: How does Newton's First Law of Motion, in part, explain the game of soccer?

What is one example of a force you observed while passing the ball? HINT: There is more than one answer to this question. One of those begins with the letter "F", and, we might have talked about it during the egg experiment.

Now, take turns punting the soccer ball (like a goalie doing a goal kick!) and observe what happens. Record what happens below.

Meet with your group and discuss the following:

What keeps a punted soccer ball from flying straight out into space? HINT: Isaac Newton discovered it 😊.

There is also another force that acts on the soccer ball as it's flying through the AIR. Can you think of what that might be??

Now, go and grab a drink and a quick rest while you meet with your teacher to discuss what you've observed so far.

11. With your team, take your ball and spread out in your triangle or square formation again. Now, dribble the ball around for a minute or so before passing it off to a teammate. Take turns dribbling for about a minute until everyone has had the chance to do so. As you are dribbling, think about the following:

Does it take a lot or a little bit of force to dribble effectively?

After everyone has had a chance to dribble the ball, spread out in front of the goal, at about midfield, and pretend you are on offense taking the ball down the field to score. For this drill, let's have two group members go at a time, one person starting in the center of the field (the midfielder) and the other ready to receive a pass closer to the goal (the forward). The midfielder should dribble the ball a little to get it closer to the goal before passing it to the forward who is ready to take the ball to the goal and shoot it. Switch places with your partner so that each of you gets to be both the midfielder and the forward. While you are doing this, think about the following:

YOU MAY HAVE TO SHARE THE FIELD WITH OTHER TEAMS AT THIS TIME. IF YOU DO, BE A SCIENTIST AND OBSERVE WHILE OTHER TEAMS ARE RUNNING THEIR DRILL 😊.

Does it take a lot or a little bit of force to pass the ball (if I'm the midfielder) to my teammate? Does it take more or less force to shoot the ball (if I'm the forward)?? What happens if I apply too much or too little force when dribbling, passing or shooting the ball?

Once all teammates have had the chance to be both a midfielder and a forward, discuss the questions above and then answer the following:

According to Newton's Second Law of Motion, acceleration is related to how much force is used. (REMEMBER: acceleration is the change in an objects speed OR direction of motion. How does Newton's Second Law of Motion explain, in part, the game of soccer?

Now, get back in your triangle and square formation. Pass the ball back and forth with your teammate, trapping and controlling it before you pass, but this time pay close attention to the length of time your foot remains in contact with the ball when you pass it AND when you trap it. Vary the time you keep your foot on the ball when you pass and when you trap the ball. As you do this, think about the following:

How does the length of time my foot is in contact with the ball, in both passing and trapping, affect the motion of it?

Discuss the above with your group members before completing the following:

The _____ I leave my foot in contact with the ball, the _____ the ball travels when I kick it. The _____ I leave my foot in contact with the ball when I trap it, the _____.

Now, head over to the rest of the group for a drink and a quick rest while discussing your observations of this part of your experiment.

Day Two:

TEACHER NAME		Lesson #
Jenny West		2
MODEL	CONTENT AREA	GRADE LEVEL
Socratic Seminar	Language Arts, Science	Elementary (3-5)
CONCEPTUAL LENS		LESSON TOPIC
Knowledge		The relationship between a healthy habits and superior athletic performance.
LEARNING OBJECTIVES (from State/Local Curriculum)		
<u>SCIENCE STANDARDS:</u> Molecular Biology 4.L.2.2 - Explain the role of vitamins, minerals and exercise in maintaining a healthy body. Structures and Functions of Living Organisms 5.L.1.2 - Compare the major systems of the human body (digestive, respiratory, circulatory, muscular, skeletal and cardiovascular) in terms of their functions necessary for human life. <u>ENGLISH/LANGUAGE ARTS STANDARDS:</u> 4.1.1 - Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. 4.1.2 - Determine the main idea of a text and explain how it is supported by key details; summarize the text. 4.1.4 - Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Knowledge facilitates movement		How does knowledge facilitate movement?
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)		PROCESS SKILLS (What will students be able to do as a result of this lesson?)
- Students will know that successful athletes make conscious decisions about their food and actions based on how healthy something is for their bodies, which allows them to perform to the best of their abilities. - Students will know that in order to maintain a healthy body, which will, in turn, allow them to be successful athletes they must eat a variety of nutrient dense foods. - Students will know that the digestive system is responsible for processing the nutrient dense food they eat and for distributing those nutrients to the entire body. - Students will know that the muscular system and skeletal systems work together to produce the movement necessary to play soccer. They will also know that there are specific things they can do, like exercising daily, to keep their muscles strong and healthy. - Students will know that the heart is a very special muscle, specific to the cardiovascular system, which is necessary for pumping oxygen-rich blood to the body. They will also know that because it is a muscle, it, too, can be kept healthy with daily exercise. - Students will know that the lungs, at the center, of the respiratory system, are responsible for taking in new, clean air and getting rid of old, stale air. They will also know that there are many things they can do, like avoiding smoking and exercising every day, to keep their lungs healthy and strong. - Students will know that sugar can have a devastating effect on their athletic performance. They will also know that, much to their surprise, their favorite snacks include far more sugar than		- Students will be able to analyze content and to determine relevant information in an informational text. - Students will be able to draw conclusions about various topics in informational text. - Students will be able to infer meaning of new and challenging words in an informational text. - Students will be able to craft questions and/or use inquiry to make connections. - Students will be able to create products that demonstrate learning. - Students will be able to make connections across disciplines.

they ever imagined.		
- Students will know that taking care of the body as a whole enables them to move and to practice as long and as hard as they would like to in order to improve their soccer game. - Students will understand that knowledge facilitates movement.		
GUIDING QUESTIONS <i>What questions will be asked to support instruction?</i> Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding		
Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
- What was happening in the video you watched? - Do you think it would be easy or difficult for the trainees in the video to play a game of soccer at that day in time? What makes you say that?? - Why do you think the trainees are not as physically fit as they would like to be? - What do you think they have learned by being a contestant on <i>The Biggest Loser</i>? - Suppose the same trainees you saw on the video decided to participate in a soccer game a year from the time the video was done. Do you think it would be easy or difficult at that point in time?? What makes you say that? - Who remembers from yesterday what knowledge means? - How might knowledge of how to keep your body as healthy as possible help to improve your soccer game?	- Why is the digestive system such an important part of the human body? - What are some ways that you can help maintain a healthy digestive system? - How do you think your knowledge about how to take care of your digestive system can help you be a better soccer player? - Kids, kid athletes especially need to eat a variety of nutrient dense foods to be physically ready to play sports. What types of foods should be included in this varied diet? - How are kid athlete's caloric needs different than an average kid's? - Why are Calcium and Iron especially important nutrients for kid athletes? - Should kid athletes diet? Why or why not?? - What does it mean to be dehydrated? What is the best way to avoid dehydration?? - Should you eat a big meal right before a soccer game or practice? Why or why not?? What is the best way to fuel your body before a big game or practice??? - Why should you avoid sugary stuff like candy, soda and even most sports drinks before practice or a game? - How do you think your knowledge about how kid athletes should eat and drink can help you be a better soccer player? - Why is the circulatory system such an important part of the human body? - What are some ways that you can help maintain a healthy circulatory system? - How do you think your knowledge about how to take care of your circulatory system can help you be a better soccer player? - Why is the respiratory system such an important part of the human body? - What are some ways that you can help maintain a healthy respiratory system? - How do you think your knowledge of about how to take care of your respiratory system can help you be a better soccer player?	- What new knowledge do you have about how you can eat smarter to play harder? - What new knowledge do have about things you can do (movement) to make your heart and lungs as well as your muscles stronger so that you can, in turn, be a better soccer player? - How will you use this combined knowledge to improve your soccer game? - How does knowledge facilitate (or aid in) movement?

DIFFERENTIATION <i>(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.</i>		
Content	Process	Product
Content is above level based on topic and reading level.	Critical thinking questions will be asked throughout the lesson. <i>Socratic Seminar?</i>	Students will create an original product throughout the week based that will demonstrate the essential understanding.
		Learning Environment
		Students will have mobility throughout the lesson; half of the lesson will take place inside and the other half will take place outside.

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

As students enter the classroom, the teacher will provide each of them with an index card. Also upon entering, students will be asked to first watch the video that is looping on the Active Board, and then to use their index cards to respond to questions posted on the chart paper at the front of the room. The chart paper will read:

"How did you feel as were watching this video? What were some of your thoughts as you watched?"

As the students enter the room, the video that will be looping is a short excerpt from TV's *The Biggest Loser* reality show. The video shows several different trainees struggling physically and emotionally to complete rigorous workouts. Intermittently, the trainees speak to their physical and mental states as they were working out. Once all students have had a chance to view the video, they will be asked to share their responses to the questions on the chart paper. Once all students have had an opportunity to share their thoughts and feelings about the video, the teacher will ask the following **Pre Lesson Questions**:

- What was happening in the video you watched?
- Do you think it would be easy or difficult for the trainees in the video to play a game of soccer at that day in time? What makes you say that??
- Why do you think the trainees are not as physically fit as they would like to be?
- What do you think they have learned by being a contestant on *The Biggest Loser*?
- Suppose the same trainees you saw on the video decided to participate in a soccer game a year from the time the video was done. Do you think it would be easy or difficult at that point in time?? What makes you say that?
- How might knowledge of how to keep your body as healthy as possible help to improve your soccer game?

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Students will each be provided with a copy of several partial articles for kids from the Kids Health website. There are only bits and pieces of most of the articles used in today's reading because the entire article did not pertain to today's lesson, however, the bits and pieces that were used were necessary. One article from the website, *Eating for Sports*, was used in its entirety. The teacher will call all students to sit on the floor with her and she will facilitate a close read of the first section of the reading, *The Digestive System*. The teacher will ask if students are familiar with the "close reading" strategy and let them know that, if they are not, it's not a problem as she will be demonstrating her expectations and guiding them along the way. The teacher will read the entire first section on the digestive system aloud before pausing. She will tell the students that the first reading of a close read is to simply focus on the key ideas and details of what's being read. She will remind students that it's always good practice to stop and check for understanding periodically, especially when reading assignments are on the lengthy side like this one. The teacher will then ask students to chat with a neighbor for a moment about what they've just read. It's also the next step of a close read to pause and decide which, if any, parts of the reading need to be read a second time. She will explain that the parts of a reading that will typically need to be reread include complex elements or ideas that need to be explored to arrive at a deep understanding of the text, like new and interesting vocabulary. The first paragraph is simply an introduction to the digestive system and the teacher will say just that. She will then proceed to reread the second paragraph in the first section. She will explain that this paragraph is a little more "meaty" and that they need to dig a little deeper to make sure they have a deep understanding of what they've read. The teacher will then give students time to reread this paragraph silently. Next, she will model what she expects students to note as they employ the "close reading" strategy and the types of questions they will be expected to come up with, as they will be asked to do this with a partner momentarily. She will then ask students if there are any new and interesting vocabulary words that they would like to make a note of. Naturally they will say that the words *digestion* and *digestive system* must be important because they are in bold print. She will tell the kids that they should write a quick definition, in their own words of the word *digestion* out in the margin of their papers. **The teacher will then ask the students why the digestive system is a necessary part of the human body.** She will take answers and facilitate the discussion until students arrive at the conclusion that the digestive system is responsible for taking nutrients out of the food we eat and distributing them throughout the rest of the body and without this process, it would be impossible for us to grow and remain healthy. **The teacher will then ask the students if there is any other part of what they just read together that is important and worthy of reading again.** Hopefully, the students will realize that the third paragraph is also very important as it tells us how to maintain a healthy digestive system. After a brief discussion about this, the teacher will then tell the kids that they are going to be responsible for creating five "dig deep" (as opposed to "right there") questions as they close read with their partners. She will tell them that they may indeed need to read the information one last time if they are having a hard time completing this task. She will then model a "dig deep" question for the section on the digestive system. She will ask students **"How do you think the knowledge that you have gained from reading about the digestive system can help you to be a better soccer player?"** Time will be given for students to think about and discuss their responses to this question before they are shared orally with the class. The teacher will then lead a brief discussion on why this is a "dig deep" question to be sure the students understand what will be expected of them.

The teacher will then ask students to find a partner and to partner read the rest of the article/s together, taking turns reading aloud every paragraph or so for the first read. They should then talk about the key ideas and details of what they read before finally discussing what

parts they may need to reread for a deeper understanding. Once they have decided on that, students should reread the chosen parts silently. Upon finishing their second read, partners should discuss questions. Students will more than likely decide to read at least a few parts of the article/s for a third time before completing their list of five "dig deep" questions. The teacher will tell students that the questions they craft are going to be used in a bit. The teacher will circulate and listen as students are partner reading and creating questions, offering support when needed. She will also be looking for questions that would be good openers for the Socratic Seminar that will happen later in the lesson.

Explain – Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.

Once all partnerships have completed their task, the teacher will ask **During Lesson Questions** (see above list). Students will share responses orally and the teacher will record abbreviated versions of those answers on chart paper that is pre-labeled with the different subheadings of the reading. Hopefully, at the end of the discussion, students will arrive at the conclusion that the condition their bodies are in has a direct impact on their soccer game. They should also be developing a deep understanding of all the ways they can take care of their bodies so that they are able to perform to the best of their abilities. The essential understanding of how their knowledge of the body and how it works will be further developed in the next phase of the lesson.

Elaborate – Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Students will be participating in a Socratic Seminar to deepen their understanding of the essential question. Due to the fact that many of them will have never experienced this kind of activity before, it will be necessary to give a brief explanation of what they will be doing. In this brief explanation, students will be asked to think about a fishbowl. The teacher will tell the students that in a few minutes they are going to be taking part in activity that is very similar to watching fish swim in a fishbowl. They will have the chance to be both the fish in the bowl and the kids on the outside of the bowl observing the fish swimming. The teacher will then tell her students that the action they will be observing if they are on the outside of the bowl, is, in fact, their classmates having a discussion about what they have all just read on the inside of the bowl. She will tell them that this is where they are going to use the fantastic questions they crafted earlier in the lesson. At this time, the teacher will distribute a copy of "Rules and Responses" of Socratic Seminar to all students (see attached handout). She will then briefly go over all expectations and answer any questions students have about what is expected of them. The last thing that the teacher will do before the Seminar begins is to ask the students choose a partner. They will be focusing mainly on that partner during the Seminar and then the roles will be reversed. Finally, the two circles will be physically formed and the kids will take their seats. The inner circle members will begin the dialogue while the outer circle members take notes about the discussion, write down any new questions that are raised for them and observe one participant of the inner circle (their partner for the Socratic Seminar). The leader, one student designated by the teacher based on her observations of student questions as they worked independently earlier in the lesson, will begin the Seminar with a provocative question. Inner circle members will respond in a dialogue fashion throughout the entire Seminar and will follow all expectations that were discussed prior the Seminar.

Opening questions might include: (If the designated student does not have an opening question, these could be used. These questions could also be used if students appear to be stuck or there is a lull in the dialogue.)

How can the knowledge you have gained about the human body help you to become a better soccer player?
What are some things that you, personally, could work on to improve your game??
How can the knowledge you have gained today facilitate movement?

Students will dialogue for 10 minutes and then the inner and outer circles will change places. The new outer circle members will now be taking notes and crafting questions.

And now for the fun part! Before heading back out to the soccer field, the teacher will tell her students that they are going to practice making a nutrient dense, balanced snack that will give their bodies the fuel they need to practice hard. The teacher will then help the kids make a homemade trail mix to enjoy on the way out to the field. **The teacher is aware of food allergies and will plan trail mix ingredients accordingly.**

Just before heading out to the soccer field, the teacher will distribute a checklist entitled "Stronger for Soccer" (see attachment). This checklist is going to be a simple list of a few basic exercises to strengthen both the heart and lungs as well as the muscles. Once on the field, the teacher will demonstrate ten different exercises that the kids perform in a circuit. She will also explain that the physical benefit of each exercise for the human body. Each station will be labeled and have simple directions such as "jump rope for two minutes. Any equipment needed will also be at each station. The stations will be:

Exercises for your Heart and Lungs:

1. Jump Rope
2. Jumping Jacks
3. High Knee Runs/ Booty Kick Runs
4. Tuck Jumps/Frog Jumps
5. **Running – During the demo of this station, the teacher will explain that the more one bounces when they run, the more energy they waste on the bounce, therefore they should try to run without bouncing.**

Exercises for your Muscles:

1. Push-Ups
2. Lunges
3. Squats
4. Crunches
5. Planks

Once all kids have gone through the circuit created by the teacher, all students will grab a soccer ball and head to the goal. There the teacher will take one minute tell students that the final thing they are going to do today will be practice taking shots on goal, focusing on using their strong thigh muscles to bring the lower leg around the knee as fast as possible in order to launch a powerful kick. The teacher will ask the students **"Who remembers from our lesson on Force and Motion yesterday the mechanics of the kick?"** Hopefully at least one student will remember that upper thigh muscle pulls the leg forward and centripetal force accelerates the lower leg to rotate around the knee where it then whips forward and propels the foot to exert force on the ball, causing it to launch. The teacher will then make the connection for students that in order for the thigh to pull the lower leg around quickly, it has to be strong. She will tell her students that the lunges that they just did in the circuits will make their quadriceps strong and so will taking shot after shot after shot. Students will continue taking shots on goal as long as time allows.

Once all students have returned to the classroom, the teacher will ask **Post Lesson Questions** (see above list). Student answers will be shared and the teacher will facilitate a discussion that will hopefully end with students having a deep understanding of how taking care of and training their bodies can help them be better soccer players, thus understanding that knowledge facilitates movement.

At this time, students will be handed back their original product, a training guide for new soccer coaches, so that they can add their newfound knowledge and expand on what they started the previous day. Before they begin to work independently on their products, the teacher will remind students that while they have now learned about how certain Science topics, such as Force and Motion explain some aspects of the game of soccer, today they learned that knowledge about the human body and how it works and how to take care of it can also help them improve their game. As the students are working, the teacher will quietly circulate and offer support where it is needed. Students will be given 15-20 minutes to work on their products.

Evaluate — *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

The teacher ends independent work time by announcing that it is almost time for class to end. The teacher asks for questions from the students about what learned during the day's lesson. The teacher then requests, as she did on the previous day: Tell me something you discovered today through your "fishbowl" experience that caused you to think and why it made you think. Tell me something you discovered today that surprised you and why it surprised you. Tell me something you learned today that you want to share with someone. Who will you share it with and why? The teacher will then take several volunteers for each question so that everyone that would like to is able to share.

Finally, students will be given an index card on which to write a response. The teacher says: Based on what we have learned today, answer the following question: **In what ways does knowledge facilitate (or aid in) movement?**

Day Three:

Handout, Day Two

"Rules and Responses"

for participating in a FISHBOWL!!!

RULES FOR PARTICIPATION:

1. Be courteous. No put-downs or sarcasm.
2. Allow each speaker enough time to begin and finish his or her thoughts - don't interrupt!
3. Involve others in the discussion and ask others to elaborate on their responses.
4. Build on what others say: ask questions, re-state and add, clarify, synthesize a variety of views in your own summary.
5. Use your best active listening skills: nod, make eye contact, provide feedback, and listen carefully to others.
6. Participate openly, knowing you may pass whenever you need to.
7. Support your opinions with evidence from the text.
8. Remember the goal is EXPLORATION - keep an open mind and push for deeper and deeper interpretations.

PROPER RESPONSES TO THE STATEMENTS OF OTHERS INCLUDE:

- I agree with... but would like to add...
- I disagree with... but would like to add...
- I am confused by...
- My feelings about this piece ties right back to (specific paragraph or line)
- The author has clearly stated in line 22 that...
- It may not say this in the text, but we can conclude... because in the past...
- Could you restate that? Or could you clarify that?
- Paraphrases of other students: "Nicole, what did you understand Amy to say?"

TEACHER NAME		Lesson #
Jenny West		3
MODEL	CONTENT AREA	GRADE LEVEL
Bruner	Math	Elementary (3-5)
CONCEPTUAL LENS		LESSON TOPIC
Knowledge		Geometric Measurement; understand concept of angle and angle measurement. Representation and interpretation of data.
LEARNING OBJECTIVES (from State/Local Curriculum)		
<u>SCIENCE AS INQUIRY</u> Improve strategies for finding solutions to questions by gaining experience in conducting simple investigations and working in small groups. <u>MEASUREMENT AND DATA</u> Geometric measurement; understand the concepts of angle and angle measurement. 4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a "one-degree angle", and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. 4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. 4.MD.7 Recognize angle measures as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find out to find unknown angles on a diagram in in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Knowledge facilitates movement		How does knowledge facilitate movement?
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)		PROCESS SKILLS (What will students be able to do as a result of this lesson?)
- Students will know that movement is the act of changing physical location or position, or, of having this changed. - Students will know that skilled soccer players constantly make observations about their game, including their physical movement. - Students will know that the best soccer players use specific methods to inform their knowledge, such as shooting from various angles to see which leads to better accuracy in scoring. - Students will know that good soccer players use the knowledge they gain from doing drills like the one above to increase shooting accuracy. - Students will know that experienced soccer players also use their knowledge of angles when passing; using a wide-angled pass is less probable to be intercepted than a "square" pass. Skilled soccer players are constantly aware of not only their movements, but, also the movement of their teammates. - Students will know that effective soccer teams utilize all members on the playing field to move the ball toward their goal by strategically passing, as in a triangle formation, so that opponents are not able to anticipate and intercept the ball. - Students will know that good soccer players never cease in trying to improve their game, realizing that all the knowledge they gain through game after game and practice after practice will, most definitely, facilitate their movement.		- Students will be able to apply the scientific method to perform an effective observation. - Students will be able to analyze observational data to create generalizations. - Students will be able to identify and apply tools used by scientists. - Students will be able to collect and organize data necessary to create inferences. - Students will be able to synthesize information. - Students will be able to create products that demonstrate learning. - Students will be able to make connections across disciplines.

GUIDING QUESTIONS			
What questions will be asked to support instruction?			
Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding			
Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:	
What does a soccer player do? What else does a soccer player do?? What is movement? What is knowledge? What do soccer players know? What do soccer players have to think about as they are playing?? What do you know about Geometry? What are some examples of shapes on the soccer field? What can you tell me about angles? How might soccer players use their knowledge of basic geometric shapes, like triangles and squares, to help them plan their movement on the soccer field? How might they use this knowledge to help them anticipate a pass from their teammates?? How might a soccer player's knowledge of angles and angle measures help them as they move toward the goal with the ball, hoping to score? How does a soccer player use his knowledge of Math concepts like the ones above to improve his soccer game?	What is an angle? What are some examples of angles that we see every day?? What is a protractor and what is it used for? How do you think experienced soccer players use the concepts of angles and angle measures to make strategic decisions about their movements on the soccer field? What are some examples of shapes on the soccer field? How do you think experienced soccer players use their knowledge of basic geometric shapes, like triangles and squares, to plan their movements and anticipate the movements of their opponents? How do you think professional soccer players use the knowledge they gain through practice and reflection to improve their soccer game?	What knowledge did you gain about angles today? What about shapes?? What knowledge did you gain about the relationship between angles and the game of soccer as you experimented today? What knowledge did you gain about the relationship between basic geometric shapes, like squares and triangles, as you experimented today?? How do you plan to use the knowledge you gained today about shapes on the soccer field to improve your soccer game? How do you plan to use the knowledge you gained today about angles and angle measures on the soccer field to improve your soccer game? How will the knowledge of the Math concepts above help you make strategic movements on the soccer field? How does knowledge facilitate movement??	
DIFFERENTIATION			
(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.			
Content	Process	Product	Learning Environment
Content is above level based on topic and reading level.	Students will be asked to conduct a complex science experiment at their own pace with the expectation that they will remain focused and on task, even when the teacher is engaged with other students. Critical thinking questions will be asked throughout the lesson.	Students will create an original product throughout the week based that will demonstrate the essential understanding.	Students will have mobility throughout the lesson; half of the lesson will take place inside and the other half will take place outside.

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

As students enter the classroom, the teacher will simultaneously greet her students and dribble a soccer ball. The teacher will be dressed in a soccer jersey of a famous player. The teacher will also give each child a notecard as they enter and ask them to use the front side to answer the question written on chart paper at the front of the room. The question will read:

"If you could have a private coaching session with any soccer player in the world, who would it be and why? This soccer player can be famous, or, simply a great player that you know of, like an older brother or sister. What is special about this individual and why do you think they are such a success on the soccer field?"

After five minutes or so and after all students have had adequate time to think and respond to the above question, the teacher will inform them that they are going to watch a famous soccer player in action! The teacher will play segments of a video, "CR7 LIVE! - Cristiano Ronaldo interactive coaching lesson!" The teacher will tell students that they are to think about the following questions as they watch the video clip. These questions will also be listed on chart paper as they are going to be asked to answer them after they watch. The questions will read:

"What do soccer players do?"

"What do soccer players know?"

"How can a soccer player use that knowledge to improve his or her game?"

After five minutes of listing, students will be asked to share their thoughts with the class. The teacher will record responses so that the list is visible to the class. Once responses become repetitive, or if students appear to be stuck, the teacher will ask "what do soccer players have to THINK about to play the game well?" The teacher will revisit the class list, adding any new responses. Hopefully these responses will naturally evolve into the discussion of remaining **Pre-Lesson Questions**.

The teacher will ask the remaining Pre-Lesson questions, and elaborate on student responses when appropriate.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Following the brief discussion above, the teacher will inform students that today they are going to continue learning about soccer players... on the soccer field!!! The teacher will inform students that they will be performing another experiment that will help them understand how soccer players use their knowledge of Math topics, like geometry, to make strategic plays and effective moves that help them win their games. The teacher will then tell the students that before heading out they are going to prepare for the experiment in the classroom.

The teacher will tell the students that they are going to be using their knowledge of angles to complete an experiment that will answer the question "How does the angle of a shot affect goal scoring?" Based on the fact that about half of the class will be rising fourth graders and the other half rising fifth graders, the teacher will need to briefly discuss the concept of angles, as this is a fourth grade standard. The teacher will show a short BrainPOP video on Angles to introduce the concept. Immediately following the video, the teacher will ask the following questions:

"What is an angle?"

"What are some examples of angles that we see every day?"

"Do you recall any specific types of angles from the video?" "If so, what were they and what makes them different from one another?"

Student answers to these questions, as well as illustrations of each answer, will be recorded on chart paper and saved for use as an anchor chart throughout the week. The teacher will then tell students that they are almost ready to head outside, but, they must first plan out their experiments. The teacher will then distribute the experiment handout and go over what they will be doing once they are outside.

As stated in Part II. of the experiment, students must complete a diagram of the soccer field they are going to be performing their experiments on by finding the measures of nine different angles they will be shooting from. Due to the fact that half of the students will more than likely not have had experience with using a protractor to measure angles, the teacher will gather everyone together on the floor so that she can model how to do so. Students will complete this portion of the experiment as a whole group so that the teacher can circulate and offer support when necessary.

Upon completion of the soccer field diagram, students will need to measure a piece of twine that is exactly 40 feet long. Due to the fact that most kid-friendly tape measures do not measure 40 feet, the teacher will have one heavy duty tape measure that is at least 40 feet long for the students to share. Once all groups have measured and cut their piece of twine, they will grab their water bottles and head out to the field.

Once on the field, students will work in their small groups to complete the remainder of the activities on their experiment guides. The remaining **During Lesson Questions** will be asked throughout the experimentation process as the teacher circulates and observes the students.

in action (please see attached Experiment Guide).

Explain – *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding*

Once they are back in the classroom, the teacher will gather the whole group together and provide time for students to draw conclusions based on all of their observations. Each group will be asked to report their findings. Each group will also be asked to share their conclusions and the reasons for their conclusions. Students will then be encouraged to discuss the conclusions of other groups and to contribute to the discussion by asking questions and adding their own conclusions.

At this time, Post Lesson Questions will be asked by the teacher. Students will respond to the Post Lesson Questions orally. Answers will be discussed further and elaborated on by the teacher. At this time any misconceptions the students may have will be corrected.

Elaborate – *Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

At this time, students will be handed back their original product, a training guide for new soccer coaches, so that they can add their newfound knowledge as well as add to what they started the previous day. Before they begin to work independently on their products, the teacher will remind students that while they learned yesterday that the knowledge of certain Science topics, such as Force and Motion, explain some aspects of the game of soccer, today they learned how certain Math topics, such as Angle Measurement and basic Geometric Shapes, also have a place in the game they love so much. As the students are working, the teacher will quietly circulate and offer support where it is needed. Students will be given 15-20 minutes to work on their products.

Evaluate – *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

The teacher ends independent work time by announcing that is almost time for class to end. The teacher asks for questions from the students about what they learned during the day/s' lesson/s. The teacher then requests, as she did on the previous day: Tell me something you discovered today through your experimentation that caused you to think and why it made you think. Tell me something you discovered today that surprised you and why it surprised you. Tell me something you learned today that you want to share with someone. Who will you share it with and why? The teacher will then take several volunteers for each question so that everyone who would like to is able to share.

Finally, students will be given an index card on which to write a response. The teacher says: Based on what we have learned today, answer the following question:

In what ways does knowledge facilitate (or aid in) movement?

Day Four

Handout, Day Three

How does the angle of a shot affect goal scoring???

Conduct the following experiment to find out!!!

Answer the following question to create your hypothesis below: How do you THINK the angle you shoot a soccer ball from will affect the accuracy of goal scoring?

I. Working in the same groups you were in yesterday, gather the following materials for your experiment:

Blank diagram of playing field (one sheet for every member of your group) ____

Ruler (one for every member of your group) ____

Protractor (one for every member of your group) ____

One ball of twine ____

One pair of scissors ____

Clipboard (one for every member of your group) ____

II. Once we are on the field, we are going to need to place cones at NINE different angles on the goal in order to perform our experiment. In order to do that, we are going to need to use a ruler and a protractor, a tool used to measure angles, to create a sketch of the playing field.

A. Using your ruler, find the length of the goal on your diagram. Then use that measurement to find the center of your goal. What is the length of the goal on your diagram? _____

What is distance to the middle of your goal?? _____

B. Measure 5 inches straight out into the "field" from your center point to find 90 degrees on your diagram. Use your protractor to be sure you are accurate.

C. Next, measure 5 inches directly to the right and left of the center of the goal, along the goal line on your diagram, to find 0 degrees and 180 degrees.

D. Then, using your protractor, find the following angles on the goal and mark them on your paper, in this order: 45 degrees and 135 degrees and then 22.5 degrees, 67.5 degrees, 112.5 degrees and 157.5 degrees.

III. Take turns with other groups to quickly but accurately measure a piece of twine that is 40 feet long. Don't lose this piece of twine as you will most definitely need it on the field. Then, once all groups have measured their twine and the teacher says it's time, grab your water bottles and head out to the field!!!

IV. Once you have reached the field, find a goal, and, taking turns with the one and only tape measure, find the length of the actual goal. What is it? _____. Then, as you can probably guess, you will need to find the center point on your goal line. What is the distance from either goal post to the center point on the goal line? _____. From there, you will need to use your piece of twine to measure 40 feet straight out into the field to find 90 degrees. Place a cone there. In the same order that you followed to complete your diagram, use your piece of twine and your diagram with angle measures to find 0 degrees, 180 degrees, 45 degrees, 135 degrees, 22.5 degrees, 67.5 degrees, 112.5 degrees and 157.5 degrees. Mark each angle with a cone. You should have exactly NINE cones placed around your goal.

V. Now, taking turns shooting and then chasing your own balls. Take 5 shots from each cone around the goal for a total of 45 shots. Record your results below.

90 degrees: ____ out of 5 goals scored

0 degrees: ____ out of 5 goals scored

180 degrees: ____ out of 5 goals scored

45 degrees: ____ out of 5 goals scored

135 degrees: ____ out of 5 goals scored

22.5 degrees: ____ out of 5 goals scored

67.5 degrees: ____ out of 5 goals scored

112.5 degrees: ____ out of 5 goals scored

157.5 degrees: ____ out of 5 goals scored

VI. Once everyone in your group has had the chance to shoot 5 times from every cone around the goal, discuss your observations. What can you infer regarding the relationship between the angles you shot from and the number of goals you made?

Why do you think this is the case?

How can you use this knowledge to help you improve your shooting accuracy in a soccer game?

VII. The last thing we are going to do on the field today is to use our knowledge of basic geometric shapes, specifically triangles and squares, to be effective offenders AND defenders. You will be scrimmaging with another group to test out these formations. As you create plays, try to visualize the triangle or square that yourself and your teammates are creating so that there is always someone to pass to. Remember, the quicker you pass the ball on, with control, of course, the harder it is for an opponent to anticipate where it is going and intercept the play. After you have completed your scrimmage, talk with your group about how your knowledge of basic geometric shapes helped you improve your game today. Use the space below to explain your conclusions.

TEACHER NAME		Lesson #
Jenny West		4
MODEL	CONTENT AREA	GRADE LEVEL
Jigsaw	Language Arts and Science	Elementary (3-5)
CONCEPTUAL LENS		LESSON TOPIC
Knowledge		Soccer and How it Works; The Science Behind the Game (everything from Force and Motion to Molecular Biology and Structures and Functions of Living Organisms).
LEARNING OBJECTIVES (from State/Local Curriculum)		
<u>ENGLISH/LANGUAGE ARTS STANDARDS:</u> 4.1.1 - Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. 4.1.2 - Determine the main idea of a text and explain how it is supported by key details; summarize the text. 4.1.4 - Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. <u>SCIENCE STANDARDS:</u> 5.P.1.1 - Explain how factors such as gravity, friction, and change in mass affect the motion of objects. 5.P.1.2 - Infer the motion of objects in terms of how far they travel in a certain amount of time and the direction in which they travel. 5.P.1.4 - Predict the effect of a given force or a change in mass on the motion of an object. 4.L.2.2 - Explain the role of vitamins, minerals and exercise in maintaining a healthy body. 5.L.1.2 Compare the major systems of the human body (digestive, respiratory, circulatory, muscular, skeletal, and cardiovascular) in terms of their functions necessary for life.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Knowledge facilitates movement		How does knowledge facilitate movement?
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)		PROCESS SKILLS (What will students be able to do as a result of this lesson?)
- Students will know that basic principles of force and motion, like drag and friction, explain the need for proper equipment in the game of soccer. - Students will know that the basic principles of force and motion, like centripetal force and angular velocity explain exactly what happens when a soccer ball is kicked, both in their bodies and in their surroundings. - Students will know that basic principles of force and motion explain when and how to handle the ball in all scenarios of a soccer game. For example, skilled soccer players know that when trapping a soccer ball, no force is necessary at all, but it is necessary to absorb the ball's momentum by keeping a foot on the ball long enough to gain control of it. - Students will know that goalies rely on basic principles of force and motion to make split second decisions. - Students will know that there are many ways that they can train their bodies to best prepare it for the game of soccer. They will also know how to properly fuel their bodies so that they are able to play to the best of their abilities. - Students will know the game of soccer is almost entirely explained by Math and Science, therefore, their knowledge of certain concepts in Math and Science can be used to help them make smarter moves on the soccer field.		- Students will be able to analyze content and to determine relevant information in an informational text. - Students will be able to draw conclusions about various topics in informational text. - Students will be able to infer meaning of new and challenging words in an informational text. - Students will be able to craft questions and/or use inquiry to make connections. - Students will be able to create products that demonstrate learning. - Students will be able to demonstrate their knowledge in a physical capacity. - Students will be able to make connections across disciplines.

GUIDING QUESTIONS

What questions will be asked to support instruction?

Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
Who is this? Based on what you have learned this week, what is knowledge? What is movement?? What do you think Messi knows about the relationship between force and motion and the game of soccer? What is one example of something specific he might or might not do because of this knowledge?? What do you think Messi knows about geometry and the game of soccer? What is one example of something specific he might do or not do because of this knowledge?? What do you think Messi knows about the relationship between training and taking care of your body and the game of soccer? What is one example of something specific he might or might not do because of this knowledge?? What new knowledge do you have about any of these topics (force and motion, geometry or the body) that you plan to use to help improve your game? How does knowledge facilitate (aid in) movement??	How does the structure of the ball reduce drag and why is that important in the game of soccer? In regards to force, why is it so important to have a properly inflated ball? What can happen if there is too much air? Too little?? What would happen if a player wore turf shoes on soft, wet ground? Why would this happen?? This is an EASY one. How does Newton's First Law of Motion apply to the game of soccer? What about Newton's Second Law? This Law involves force, mass and acceleration. As you know, it is now illegal for kids to head the ball in a soccer game because of the risk of injuries like concussions. How is this an example of Newton's Third Law? How would one increase ball speed during a kick? Should you ALWAYS kick the ball as hard as you can? Why or why not?? How is "the kick" an example of centripetal force and angular velocity? When would you want to "bend it like Beckham" and why? What role does momentum play in a soccer game? When a ball is headed, what determines the speed of the ball? Why does a "diving" header apply more force to the ball than a "glancing" header? What is the key to trapping the ball? How is trapping the ball different than all other soccer skills when it comes to applying force and momentum?? Why is it better to run a little before throwing the ball in if you want it to go farther? Who can think of another time that a little running start improves your soccer game?? What should you ALWAYS do when you throw the ball in whether it's a short or a long throw? Why is this so important?? Why does kicking with your instep yield more accurate passes? When would you use the top of your foot to pass the ball? When is the force greater, when you pass with your instep or with the top of your foot? Why is this so?? Why does it get increasingly difficult for a striker to get the ball in the net the closer he or she gets to the goal? Why is it so important for a goalie to move forward as he is making contact with the ball? How is Newton's First Law of Motion put into action when a goalie punches the ball?	How can your knowledge about proper equipment make you a better soccer player? What is one way that you can use your knowledge of Newton's Laws of Motion to improve your soccer game? How can you use your knowledge about how a kick "works" to improve your soccer game? How can a deep understanding of the Magnus Effect help you improve your soccer game? How can you use your knowledge about momentum to improve your soccer game? How can you use what you have learned about trapping the ball to improve your soccer game? How can running make your throw-ins or corner kicks more effective? How can you use your knowledge of force as it applies to kicking the soccer ball to determine what part of your foot to use when you kick? If you are a goalie, how can you use your knowledge about momentum to improve your goal keeping skills? How can you use your knowledge about the body and how it works to improve your soccer game? Using your newfound knowledge about the relationship of forces such as drag and friction, on a soccer ball, what will you do differently in terms of moving the ball? Using your newfound knowledge about the relationship of angle measures and shooting accuracy, what will you do differently in terms of your movement toward the goal as you prepare to take a shot? Using your newfound knowledge of the human body and how, if you take care of it properly and condition it well, it can most definitely help you improve your soccer game, what changes will you make in your day to day actions and movements? How does knowledge facilitate (or aid in) movement?

	What is the difference between a one-fisted punch and a two-fisted punch?? Why do goalkeepers run an average of six feet just before they throw the ball into play? How can you run "smarter"? How are kids' bodies different than adults' bodies in terms of the energy their muscles make? What are some ways you can get your muscles into shape by both increasing their endurance and by making them stronger? How will increasing the endurance of your muscles improve your soccer game? How will making your muscles stronger improve your soccer game? Why shouldn't all soccer players train do the same exact exercises? What is the best fuel for the game and why?	
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DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
Content is above level based on topic and reading level.	Critical thinking questions will be the focus of the lesson.	Students will create an original product throughout the week based that will demonstrate the essential understanding.	Students will have mobility throughout the lesson; half of the lesson will take place inside and the other half will take place outside.

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

Upon entering the classroom, students will find that the teacher has hidden five large pieces of a puzzle. The puzzle pieces will be in a colored envelope with just enough of that envelope showing that they are able to find all the pieces with a little bit of effort. Kind of like an Easter Egg Hunt ☺. Once all five pieces have been found, students will work together to assemble the puzzle. When put together, the puzzle will actually be a large poster of Lionel Messi, a world famous soccer player with whom most students will be very familiar. The teacher will then assist the students in taping together the pieces of the puzzle so that it will stay intact if it is moved.

Once the puzzle is taped, the teacher will ask students to come to the front of the room and sit together where she will hold up the poster and ask students the **Pre Lesson Questions** (see above). She teacher will call on several volunteers to share their answers to the last Pre Lesson Question.

Once all students who want to share have done so, the teacher will tell students that they are going to have the chance to do a little further exploration, by way of partner reading a really cool Sports Illustrated KIDS book, in just a few minutes. The teacher will hold up Soccer: How It Works, by Suzanne Bazemore, and will read the back cover of the book to spark the kids' interest. She will then read aloud, to the whole group, the introductory chapter called "Go for the Goal!" The teacher will facilitate a very brief discussion before holding up the Messi poster one more time.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Finally, the teacher will ask a student to flip the poster over. On the back of the poster, the students will find five questions, one on each piece of the puzzle. The questions will be:

1. How does knowledge of soccer equipment facilitate (aid in) movement?
2. How does knowledge about "the kick" help facilitate (aid in) movement?
3. How does knowledge of ball control help facilitate (aid in) movement?
4. How does knowledge about protecting the goal facilitate (aid in) movement?
5. How does knowledge of training and eating for the game facilitate (aid in) movement?

These questions will also be written on the top of five pieces of chart paper and taped to the whiteboard for use in just a few minutes. The teacher will tell students that they are about to get into their small groups so that they can partner read the rest of the book she just started. She will then explain that, for the sake of time (because the goal is to get out onto the soccer field!), each small group is going to be responsible for doing a Close Read of ONE chapter from the Sports Illustrated KIDS book and becoming an expert on it. She will also explain that after small groups are finished reading and becoming experts on their chapters, they will then regroup, with each original group member becoming part of a new group that consists of one expert for each chapter. She will explain that in this way, students will be teaching each other what they learn about how knowledge facilitates movement. Finally the teacher will remind the students that when they participate in a Close Read of this book, they will most definitely need to read the text at least twice, one for key ideas and details and another to gain a deeper understanding of the science concepts as well as new and interesting vocabulary words that are relevant to their task. The teacher will also remind the students that with Informational Text, such as this book, it is almost always necessary to read and reread because the ideas and concepts presented are very complex, and to fully comprehend what they read they will really need to stop, think, and talk about the text periodically.

The teacher will ask if there are any questions about what they are about to do, and, once all students are ready, she will dismiss them into the same small groups they have been in all week and assign each group a chapter to read and become an expert on. The teacher will inform students that as they read, they should ALL take notes on notebook paper so that when they are ready, they can use these notes to make one anchor chart (with the chart paper she gives them containing one of the above questions). These notes are also absolutely necessary because they will be used as a reference when new groups are made and they have to be "the teacher". As students are reading, the teacher will circulate and observe students as they read and discuss what they have read. More than likely students will be able to analyze the text and generate ways in which knowledge of their topic facilitates movement. If, however, students are struggling to find deep meaning in what they are reading, the teacher will facilitate a brief discussion to nudge students in the right direction. The brief discussion will more than likely include some of the **During Lesson Questions** (see above), which all be discussed with the whole group as original groups share their knowledge following the activity.

Explain – Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding

Once all original groups have finished the Close Read of their assigned chapter and their anchor chart, the teacher will help students form new groups so that every new group has at least one expert from every chapter. The teacher will then remind students that they are to use the notes

they took individually as they read to teach their new group what they learned about how knowledge facilitates movement. The teacher will also remind students that they are to take turns speaking, going in sequential order by chapters, and sharing what they learned. The teacher will tell students that when they are not "teaching", they are to be respectful listeners and to ask questions by raising their hands at appropriate times, which may not be until "the teacher" finishes speaking. "The teacher" should then answer all questions before the next chapter's expert becomes "the teacher". Once students have all had a chance to be "the teacher" and each new group has learned about the entire book, the teacher will call all students back to the front of the room for a brief discussion before they head out to the field.

At this time the teacher will tape the anchor charts made by each original group and briefly discuss their contents, tying up any "loose ends" and clearing up any misconceptions the students may have.

The teacher will then distribute to each child a checklist (see attachment), or performance task, that each of them are going to be demonstrating once they are on the field. This will be Part 2 of the Performance Task students created during the first three days of camp. This is the part where they will "SHOW what they KNOW"!!! The teacher will remind students that with their pamphlets for new coaches complete, it is necessary for me, the director of the local youth soccer association, to see that they are able to demonstrate to me that knowledge facilitates movement so that I can hire the most qualified coaches for our young soccer players. If executed correctly, or at least a correct execution has been attempted, and it is clear that each student understands how to demonstrate the different ways knowledge facilitates movement (by completing tasks on checklist), the teacher will check off that they have done so. Though it sounds complicated, the teacher will tell students that they are simply going to be scrimmaging each other, five versus five so that there can be subs and time to rest, and showing what they know!!! If they forget what they are supposed to show, the teacher will just remind them, as she will really become more of a coach at that point ☺. The teacher will give the kids a few minutes to drink a little water and read over the performance task so that the knowledge they need to demonstrate is fresh in their minds. After a few minutes, it will be time to hit the field!!!

Elaborate – Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Once they are on the field, the teacher will divide the students into two teams of five and let the games (or game) begin!!! As they are playing, the teacher will observe the students and complete a checklist for each child. Again, students will receive a check for any attempt they make that demonstrates understanding that knowledge of the concepts, which the items on the checklists were based on, facilitates movement. After the teacher has had an opportunity to observe each student demonstrating their knowledge and completed his checklist, it will more than likely be time to head inside.

Once back in the classroom, students will be asked to join the teacher at the front of the room one last time for a quick wrap up of what they've learned throughout the week. The teacher will then ask **Post Lesson Questions** (see above).

Evaluate – This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.

The teacher asks for any final questions the students may have about anything they have learned over the last four days. The teacher then requests: Tell me something you discovered today that caused you to think and why it made you think. Tell me something you discovered today that surprised you and why it surprised you. Tell me something you learned today that you want to share with someone. Who will you share it with and why? The teacher will then take several volunteers for each question so that everyone who would like to is able to share.

Finally, students will be given an index card on which to write a response. The teacher says: Based on what we have learned today, answer the following question:

In what ways does knowledge facilitate (or aid in) movement?

Triangle United Soccer Association (TUSA) is looking for knowledgeable soccer coaches in the area to train beginning soccer coaches to do the incredibly important job of teaching young athletes to be the best soccer players they can be. Only highly qualified coaches will be considered for these positions. We are currently in need of a new training guide to use at this year's clinic, so get ready to show us what you know.

Your task is to create a "How To" guide for first time soccer coaches to be used in a soccer clinic THIS WEEKEND!!! The guide, entitled "A Beginners Guide for Coaching Soccer; The More You KNOW the More You GROW!", should explain how the knowledge of basic Science and Math concepts such as Force and Motion, Angle Measurement and

Performance Task

Triangle United Soccer Association (TUSA) is looking for knowledgeable soccer coaches in the area to train beginning soccer coaches to do the incredibly important job of teaching young athletes to be the best soccer players they can be. Only highly qualified coaches will be considered for these positions. We are currently in need of a new training guide to use at this year's clinic, so get ready to show us what you know.

Your task is to create a "How To" guide for first time soccer coaches to be used in a soccer clinic THIS WEEKEND!!! The guide, entitled "A Beginners Guide for Coaching Soccer; The More You KNOW the More You GROW!", should explain how the knowledge of basic Science and Math concepts such as Force and Motion, Angle Measurement and Geometry and Structure and Functions of the Human Body, if applied correctly, can really improve a player's game. Eligible coaches should also be prepared to demonstrate how the knowledge of these basic Science and Math concepts apply to the game of soccer by way of scrimmaging with other applicants. A list of skills we are looking for will be provided to you on the day of the scrimmage. Remember, the individuals you will be teaching will be BEGINNING soccer coaches, so be sure to be very clear and concise in your explanations. As we already mentioned, the clinic will be held this weekend, so, all finished products should be submitted no later than this Thursday.

Unit Resources

Books:

Badiru, D. (2010). The physics of soccer: using math and science to improve your game. New York: Universe.

Youth Soccer Training Slides A Math and Science Approach. (2014). Universe Inc.

Bazemore, S. (2010). Soccer: how it works. Mankato, MN: Capstone Press.

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The Web's most visited site about children's health. (n.d.). Retrieved August 05, 2017, from <http://kidshealth.org/>

Cristiano Ronaldo - CR7 - Real Madrid | Portugal | 2017. (n.d.). Retrieved August 05, 2017, from <http://www.ronaldo7.net/>