Rigor. Relevance. Quality

CSCOPE

E-Newsletter

Science, First Six Weeks, 2009

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Newsletter edited by ESC Region XIII

Question-Signal-Stem-Share

Question-Signal-Stem-Share is a strategy that helps to actively engage all students in thinking and allows teachers opportunities to listen for student understanding, misconceptions, and use of academic vocabulary. It is simple to implement and stimulates discussion.

Q

Pose a **question** to students. This question should a thought provoking question that requires more than a one word answer. Write the question on the board or on a PowerPoint slide so that students can read the question and refer back to it while they are thinking. Sources for questions might include released TAKS items, TEKS, textbooks, curriculum documents and /or CSCOPE Guiding Questions found in the Exemplar Lessons.

S

Give students a **signal** that indicates they have thought about the question and are ready to share. For example, say, “When you can answer the following question, please stand up.” Signals might also include raise/lower hands, , sit down, pencils up/down, hand on chin, tap nose. Signals provide for wait time for all students. They allow ELL students time to translate information, if necessary, think, and formulate their answers. The result is higher level answers and students with more confidence in their answers. Wait time can also be used to allow students to write their responses in their journals.

S

Provide students with sentence **stems** as a framework to jump start their answers. Sentence stems provide grammatically correct models, thus allowing students to grapple with and focus on the content. This increases student confidence. When you expect student responses to be in complete sentences, providing a stem is essential.
Write stems on the board or in a PowerPoint. Provide word walls that include the major vocabulary used in the current topic of study. Prompt students to reference the wall as needed.

S

Students **share** their responses with a partner. In this way, each and every student has an opportunity to verbalize a response. Walk around the room and listen as students talk; check for understanding and listen for misconceptions.
After partners have shared, select several students at random to share either their responses or their partners’ responses. (This allows for more student confidence and eases stress.)

Based on the work of John Siedlitz

CSCOPE™
Texas Education Service Center Curriculum Collaborative (TESCCC)

Technology Corner: Tools for an Engaging *Engage*

Integrating new information with prior knowledge is key to comprehension and aides in the metacognitive process. When students participate in activities that activate background knowledge they become authentically engaged and motivated to explore. Furthermore, engaging students to elicit background knowledge allows teachers a unique window into what students already know, and more importantly, where misconceptions might exist. The CSCOPE Instructional Focus Documents (IFDs) each begin with a section that provides insight into commonly held misconceptions and underdeveloped concepts. Teachers can expand this and identify localized misconceptions, which will vary from student to student. Many of these localized misconceptions are the result of students' prior experience with instruction that was not a component of an aligned curriculum and did not include specificity to the TEKS. In short, teachers throughout student academic careers may have inadvertently introduced misconceptions and these must be identified prior to continuing in a lesson.

Considering the importance of engaging learners from the start, it is critical that teachers identify and use tools and strategies that accommodate a wide range of student backgrounds and experiences, while at the same time, continuing to target the concepts and key understandings outlined in the IFD. Fortunately, certain technology tools can be integrated into the "engage" activities that provide for relevant and exciting experiences that transform teaching and learning in ways not otherwise possible. The following table provides columns to explain the high-level roles and responsibilities of students and teachers in the "engage" activities of a 5-E CSCOPE Lesson. On the following page, you will find classroom applications and corresponding resources that suggest strategies and practices teachers can adopt. (For more information about any of these resources and how to get started, visit http://www5.esc13.net/instructionaltech.)

Article contributed by Lannon Heflin
Education Specialist for Instructional Technology
Education Service Center Region XIII

Developing Academic English for English Language Learners using the English Language Proficiency Standards (ELPS)

Imagine that you are a student in the grade level that you teach. You are expected to follow written and oral instructions, interpret words with multiple meanings, learn hundreds to thousands of abstract vocabulary words related to content-area concepts, write essays in response to literature and expository texts, and use comprehension strategies and prior knowledge to interpret what you are reading. Now imagine that you are must accomplish all of these tasks in a language that you don't know very well. Sound exhausting? Welcome to the world of an English language learner. English language learners (ELL) face the daunting task of being responsible for making progress in content area classes while simultaneously learning academic English, an abstract, complex form of English specific to content area subjects. In order to support ELL ability to produce academic English both orally and in writing, teachers should align their instruction with the English Language Proficiency Standards (ELPS).

The ELPS charge educators with integrating second language acquisition techniques with quality content area instruction in order to ensure that ELLs acquire social and academic language proficiency in English, learn the knowledge and skills in the TEKS, and reach their full academic potential. The English Language Proficiency Standards (ELPS) specifically outline the student expectations for using language in the classroom to develop fluency in the areas of learning strategies, listening, speaking, reading and writing. The ELPS also outline the English language proficiency level descriptors that ELLs may exhibit within the language domains of listening, speaking, reading, and writing for the levels of for the levels beginning, intermediate, advanced, and advanced high. These proficiency level descriptors show the progression of second language acquisition from one proficiency level to the next and serve as a road map to help content area teachers provide linguistic accommodations to instruct ELLs commensurate with students' linguistic needs.

Using Language Objectives to Develop Academic English

Instruction for English learners must incorporate activities that support students' language devel-

(continued on page 6)

The Student…	*Engage* Activities…	The Teacher…
Asks questions. Why did this happen? What do I already know about this? What can I find out about this? How can this problem be solved? Shows interest in topic. Responds to questions demonstrating their own entry point of understanding	Initiate the learning task. The activity should make connections between past and present learning experiences, and anticipate activities and organize students' thinking toward the learning outcomes of current activities. Generate interest Access prior knowledge Connect to past knowledge Set parameters of the focus Frame the idea	Raises questions and problems. Elicits responses that uncover students' current knowledge about the concept/topic. Generates interest. Generates curiosity.
Integrated Technology Strategy	**Integrated Technology Strategy**	**Integrated Technology Strategy**
What – Peer Collaborative Discussion – Online Learning Community **Why –** Students need to participate in two way conversations with both teachers and peers. These discussions, although facilitated, are intended to be structured around open ended questions that require a personal response. Furthermore, each response should inspire feedback and "banter" about the subject. The more each student participates in discussing and defending their contribution, the more background knowledge and misconceptions are revealed. **When –** It is often difficult or impossible to ensure that every learner has equal opportunity to participate in this level of engaging discussion. Large classes, introverted/reluctant learners, and limited time continue to inhibit all-inclusive meaningful class discussions. Structure an online community of learners so that limited, flexible class time is needed to initiate the dialogue, and the conversations can continue anytime-anywhere. **How –** Fortunately for educators there are many free and easy online resources for building effective collaborative learning communities. Although the purpose of an online community of learners includes much more than discussion, the opportunity for learners to participate in a variety of discussion formats is an extremely important factor. The following tools are examples that represent tools teachers have used with students. It is important to understand the subtle and obvious differences, the pros and cons (such as sign up processes and front-loaded time) and the implications for security and legal concerns. PBWiki Wikispaces Ning-- Google Apps/Docs/Sites Moodle ELGG VoiceThread OfficeLive	**What –** Pre and Post Learning Maps (Mind Mapping) **Why –** Activating background knowledge is most valuable when learners can visually represent connections to existing information and new information. One strategy is to have students create graphic organizers such as mind maps. **When –** Creating dynamic pre and post learning maps should begin before any formal instruction. The idea is to have students use graphics and connecting lines with annotation to scribe everything they know, or believe they know. Teachers might consider having students begin with KWL charts to collect initial thoughts. Consider the pre learning map as a draft that will transform as learning takes place. **How –** Using the IFD as a guide, the teacher should provide students with the Key Understandings for Learning and the Concepts. Students then make a list, create a Venn diagram, KWL chart, or any form of note taking to record everything they know or believe they know about the information. Teachers review these informally and note any misconceptions that will need attention. Compare these with the ones listed in the IFD.* Students then use any one of the following technology tools to create a draft pre learning map, making connections and comments. As learning occurs, students are given time to return to the saved versions of their graphics and add, remove, adjust, and modify accordingly. Teachers can formatively assess student learning through interaction with students and their learning maps. Inspiration Kidspiration Gliffy CMAP	**What –** Teacher facilitated blog with comments – problem based **Why –** When learners are confronted with messy, real-world problems, they must activate multiple problem-solving strategies simultaneously and draw heavily on what they already know. Teachers engage students early in the CSCOPE unit by posing open-ended, problematic situations related to each Exemplar Lesson. **When –** At the beginning of each Exemplar Lesson, there are Key Understandings and Guiding Questions. Teachers can open each exemplar lesson by crafting a real-world, messy (no clear answer) problem or using the Guiding Questions. **How –** A major challenge in a classroom setting is allowing for each student to participate and contribute to ongoing problem-solving. Using technology tools such as a blog or wiki, teachers can craft and post the problem statements and questions. Students then access these and comment, dialogue and document as a way of contributing their input. Young elementary aged students should write their responses in a way that is developmentally appropriate. The teacher can then compile these into a class blog and share the class's collective wisdom. Older students can participate by commenting directly to the prompts in the chosen tool. The result will be a collection of student generated common understandings and comments that can add to the *Explore*, *Explain*, *Elaborate* and *Evaluate* sections of the lesson. Some recommended tools are: Blogspot PBWiki Wikispaces Google Moodle Ning

Grouping Strategies

The lesson calls for you to assign the students into groups of 4-5. Now… you have some choices to make. Should you limit the size to 4? Should the students be heterogeneous or homogeneously mixed? Should you assign roles? The root of these questions exists as "What structures do I need to use?" In addition, reflecting on the goal(s) of the group learning experience is important.

Laurie and Spencer have many publications regarding Cooperative Learning. In the **Cooperative Learning Course Workbook** (2000), these goals are listed as "domains." The "domains" include: class building, teambuilding, mastery of content, thinking skills, communication skills, information sharing, and decision making. When you decide on the goals of the group learning experience, you can then plan the "structure" of the group.

Structure, according to Kagan & Kagan, is the "how" of teaching or the directions. Within each particular grouping strategy (examples: Carousel Feedback, Mix Pair Share, Inside-Outside Circle, and Numbered Heads Together), the teacher should consider positive interdependence of students, individual accountability, equal participation, and simultaneous interaction.

In **How to Differentiate Instruction in Mixed-Ability Classrooms** (2001), Carol Ann Tomlinson, illustrates a user-friendly chart for teachers as they prepare for any grouping strategy. (See sidebar.)

Cooperative grouping of students is essential to create an effective learning community. One key aspect of creating this environment is for the teacher and students to collaborate for mutual growth and success (Tomlinson, 2001). In addition, cooperative learning should be applied consistently and systematically (Marzano, et al., 2001). As with all instructional strategies, the success of cooperative learning is directly proportionate to the teacher's planning of the structure of the groups.

Teacher Checklist for Group Work

- Students understand the task goals.
- Students understand what's expected of individuals to make the group work well.
- The task matches the goals (leads students to what they should know, understand, and be able to do)
- Most students should find the task interesting.
- The task requires an important contribution from each group member based on the student's skills and interests.
- The task is likely to be demanding of the group and its members.
- The task requires genuine collaboration to achieve shared understanding.
- Time lines are brisk (but not rigid).
- Individuals are accountable for their own understanding of all facets of the task.
- There's a "way out" for students who are not succeeding within the group.
- There is an opportunity for teacher or peer coaching and in-process quality checks.
- Students understand what to do next after they complete their work at a high level of quality.

Sources.

Kagan, Laurie, and Spencer Kagan. Cooperative Learning Course Workbook. San Clemente: Kagan Publishing, 2000.

Marzano, Robert J., Debra Pickering, and Jane E. Pollock. Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement. Alexandria, VA: Association for Supervision & Curriculum Development, 2001.

Tomlinson, Carol Ann. How to Differentiate Instruction in Mixed-Ability Classrooms. Alexandria, VA: Association for Supervision & Curriculum Development, 2001.

Article contributed by
Jodi Kuhn, Social Studies Education Specialist
ESC Region XIII

CSCOPE Doc Spot

When planning instruction, remember to start with the **Instructional Focus Document.** It contains several useful sections.

State Resources. Links to other state resources and training and websites are listed, thus providing reminders and a "container" for state trainings that relate to the unit.

Rationale. Explains which TEKS are bundled in the unit and why. Makes reference to previous and future learning ties.

Misconceptions and Underdeveloped Concepts. Identifies where previous inaccurate or imprecise student learning may become a barrier to accurate current learning. Listen for these during instruction so they can be addressed and corrected.

Performance Indicators. Defines the content to be mastered by the end of the unit and a process for demonstrating that mastery. ELPS choices are suggested.

Concepts and Key Understandings for Learners. Overarching ideas and essential understandings that students should have by the end of the unit. Unit instructional activities should each tie to these concepts and key understandings. Guiding Questions which lead to these understandings can be found in the Exemplar Lessons.

Key Academic Vocabulary Supporting Conceptual. Identifies the vocabulary that carries the weight of the unit content load and that will be used across grade levels. Vocabulary of instruction that ties to this vocabulary and unit concepts is found in the Exemplar Lessons.

TEKS and Specificity. Lists unit TEKS and specificity; also found in the Vertical Alignment Documents. Clearly defines what each student expectation looks like for the grade level. Crossed out portions of the TEKS have been/will be addressed in other units and are not the focus for the current unit. Specificity comes from TAKS and other state resources, the ELA/R glossary, and the College and Career Readiness Standards.

Submitting Unit Feedback

To submit feedback for a specific unit, you must be working in the unit first.

1. Open a unit.
2. Select **View/Edit Unit**. (This is the first tab on the right side of the screen.)
3. Select **Collaborative Feedback**. (This is the third tab from the left.) You will be able to see all of the feedback from your district.
4. Select **Submit Feedback** on the far right side of the screen.
5. Enter feedback or comments. Be very specific, using unit number, lesson number, page number and problem numbers.
6. Choose the category of feedback. You may enter different kinds of feedback:
   - Grammatical/Punctuation/Format Errors
   - Developer Issues/Bad Web Links/Attachment Issues/Other Tech Issues
   - Content-related suggestions or recommendations
   - Assessment Issues
7. Select **Submit**.

Once you submit feedback, the response to that feedback will be placed on your home page under the Feedback tab. Select the unit title to view the feedback and the response.

(Continued from page 2)

opment. The English Language Proficiency Standards (ELPS), section C, outline the student expectations for developing language fluency in the areas of using learning strategies, listening, speaking, reading and writing.

Educators have long known the importance of clearly setting content objectives for students at the beginning of a lesson. These objectives should be aligned to the TEKS student expectations for the subject area. In addition to content objectives, teachers of English learners must establish *language* objectives in every lesson. Language objectives are aligned to the ELPS.

To craft language objectives for English learners, follow these easy steps:

1. Identify the content objective using the TEKS.
2. Determine what type of language skills the student will use to participate in the lesson and process the learning specified by the content objective (i.e. using learning strategies, listening, speaking, reading, and/or writing).
3. Choose the appropriate objective from the cross-curricular second language acquisition essential knowledge and skills sub-section C of the ELPS.
4. Craft a specific language objective for the lesson the ELPS. In the language objective, the teacher may want students to use specific content-area vocabulary words, sentence stems and/ or paragraph frames to help students scaffold language.

Example:

TEKS 8.7(C) Use pictures or models to demonstrate the Pythagorean theorem;	Content Objective: Students will use manipulatives to explain the Pythagorean theorem.
ELPS: 3(D) speak using grade level vocabulary in context to internalize new English words and build academic language proficiency.	Language Objective: Students will use the vocabulary terms "Pythagorean theorem" and "model" and "demonstrates while giving an oral explanation of the Pythagorean theorem.

To successfully implement language objectives for ELL, follow these simple guidelines. Language objectives should be:

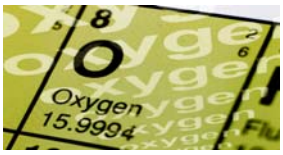
- ✦ Stated orally and posted in writing
- ✦ Discussed by the teacher and students at the start of the lesson
- ✦ Reinforced with explicit instruction during the lesson
- ✦ Practiced and assessed during the lesson

Reference: **ELPS Toolkit**, First Edition, Education Service Center Region XIII, 2008

Article contributed by Meredith Roddy
ESL Education Specialist
ESC Region XIII

2009-2010 1st Six Weeks Lesson Preview

Science



Kindergarten

As kindergarten children enter school for the first time, they will begin to learn about themselves and the world around them. **Unit One Exploring How I Grow and Change** focuses on students learning and developing ideas about how people and other animals, live, grow, feed, move, and use their senses. Students will create a year long notebook to track and record their growth and relate this learning to the life stages of humans. In **Unit Two The Properties of Matter**, students will build knowledge and understanding of matter through the exploration of their senses.

1st Grade

Unit 1 Investigating Weather bundles student expectations that address properties and patterns of events, specifically the weather and seasons, observing and recording the weather day-to-day and over seasons, and introduces students to some tools that help measure and record data. This unit will lay the foundation for careful observations and accurate recording of events in the natural world and provide students with experiences to make observations that will help them recognize patterns and changes over time.

2nd Grade

In **Unit 1 Patterns and Properties of Objects** students will have the opportunity to explore and describe patterns around them as well as classify the sequence of objects based on their physical properties. In **Unit 2 Change Occurs** through inquiry lessons, students will learn how to identify and measure change.

3rd Grade

During **Unit 1 Investigating The Solar System**, students will expand their knowledge to include not just the Earth, sun, and moon, but the rest of the planets in our solar system. After exploration of the planets, students will better understand the Earth's role in our solar system.

4th Grade

This six weeks focus in **Unit 1 Investigating the Universe** addresses the sun's energy immense role for our planet in order to connect many processes on Earth (weather, winds, plant growth, water cycle, etc) back to the average star at the center of our solar system. Studying the sun as an inexhaustible energy source is a great way to start the year. The sun is essential to life. A section of this six weeks will be focused on weather, in order for weather observations to begin at the first of the year and continue through many seasonal or weather changes.

5th Grade

This six weeks, students will experience **The Physical Properties of Matter**. This unit's purpose is to set a foundation for understanding that addition or removal of energy causes change. In lesson one, students begin to classify matter through magnetism, electricity, and conductivity. Through hands on activities, they will then discover mixtures and solutions, and end the unit on investigating the constant properties of matter.

6th Grade

Unit 1 Chemical and Physical Properties address the progression of understanding matter to demonstrating that new substances can be made from chemical reactions. Students will gain an understanding that physical changes are about energy and states of matter, and chemical changes happen on a molecular level. Students will be able to identify substances as a solid, liquid or gas. They will conduct experiments and make observations to evaluate if chemical or physical reactions have occurred. In **Unit 2 Force and Motion** students will investigate the relationship between force and motion in order to introduce the laws of physics. During this unit students will gain an understanding that forces cause changes in an object's position, speed and direction, and that changes in motion can be measured and graphically represented.

2009-2010 1st Six Weeks Lesson Preview

Science

7th Grade

Unit 1 Organism Response to the Environment introduces students to the process of photosynthesis. The students are to identify the parts of plants that are involved in photosynthesis as well as the products and reactants involved. Students will also investigate the forces and tropisms at work on the growth of plant through lab activities. In **Unit 2 Ecosystems** students will focus on food chains, webs, and the transfer of energy in a system. Students will then engage in research and application of knowledge of biotic and abiotic factors of various ecosystems.

8th Grade

In **Unit 1 Atomic Structure** students will use models to investigate the parts of an atom. Students will also research various models of an atom to see how models change as new information is gathered. During **Unit 2 Physical and Chemical Properties** students will identify how the properties of atoms relate to their placement on the periodic table through the use of models. They will also investigate the physical and chemical properties of substances and relate them to the development and application of everyday materials. **Unit 3, Interactions of Matter and Energy** focuses on investigations of chemical reactions through laboratory activities and using models to represent the law of conservation of mass. Students will also investigate interactions between matter and energy through several lab activities.

Biology

In **Unit 1 Science Safety, Methodology, and Contributions** students are introduced to policies and procedures concerning classroom safety. They will review and demonstrate their ability to conduct a controlled experiment, and gauge abilities in understanding and conducting scientific investigations. Students will conduct research on the contributions of science to society and evaluate promotional claims, conduct research on contributions of scientists, and research science-related careers.

During **Unit 2 Ecology** students explore biomes and compare variations, tolerances, and adaptations of organisms in different biomes. They will analyze and interpret relationships and the flow of matter and energy in food chains and food webs. Students will also explore ecological pyramids, biological magnification, and analyze flow of matter through the carbon, oxygen, nitrogen, and water cycles.

Unit 3 Biochemistry focuses on reviewing chemistry concepts of the structure and function of carbohydrates, proteins, lipids, and nucleic acids. Students will conduct lab investigations identifying the presence of sugar, starch, protein, and lipids in foods, and will design an investigation to determine the effect of temperature on enzyme action.

IPC

Unit 1, Laboratory Management bundles student expectations that look at safety and the use of tools and equipment in the IPC classroom. This unit is designed to give students an overview of safety issues that are specific to the classroom where they will do their labs. In **Unit 2 Properties of Matter: Physical Properties** students will investigate the components of density (mass and volume) and explore using water displacement to determine the volume of an irregularly shaped object. They will also review their knowledge of elements, compounds, and mixtures and will create simple models to demonstrate the differences between the three in a tactile way. During **Unit 3 Properties of Matter: Chemical Properties** students will study the history of atomic theory, the challenges scientists have gone through, and the technology they have used to make new discoveries. Students will investigate the periodic table and be able to understand it's importance in determining which elements will bond with others to form compounds. At the end of this unit, students gain an understanding of how scientists use spectral analysis to determine the chemical content of substances.

2009-2010 1st Six Weeks Lesson Preview

Science

Chemistry

Unit 1 Laboratory Management students will look at safety and the use of tools and equipment in the chemistry classroom. This unit is designed to give students an overview of safety issues that are specific to the classroom where they will do their labs. **Unit 2 Matter,** bundles student expectations that focus on the properties of matter. A thorough understanding of matter gives students a building block to begin their study of chemistry. In **Unit 3 Atomic Structure and the Periodic Table** students gain thorough understanding of both the atomic structure of the atom and how that structure relates to the periodic table. Understanding how to read and use the periodic table will be a key factor in the success of the students in future units.

Physics

Unit 1 Laboratory Management is designed to give students an overview of safety issues that are specific to the classroom where they will do their labs. Focus on the organization and setup of a laboratory notebook and the introduction of other classroom organization tools and activities can also be introduced at this time. In **Unit 2 Graphing Motion** students build upon prior experiences with reading graphs depicting motion by measuring objects in motion, graphing the motion of objects, and correlating different graphs to specific types of motion. Students will finish the six weeks with **Unit 3 Kinematics of 1D and 2D Motion**. This unit addresses motion described with equations (Kinematics). This is the normal starting point for most physics courses, and the skills and concepts learned in this unit will be used throughout the year.

Have questions about the newsletter? Contact your Education Service Center.

Want to submit a newsletter article? Contact Cindy Hamilton (cindy.hamilton@esc13.txed.net).

Region 1
Hermelinda Hesbrook
Administrator for Curriculum and Instruction
hhesbrook@esc1.net

Region 2
Sonia A. Perez
Deputy Director for Instructional Services
361-561-8407
sonia.perez@esc2.us

Region 6
Lindy Haley
CSCOPE Coordinator
lhaley@esc6.net
936-435-8215

Region 7
Sheron Darragh, Ed. D
Associate Director,
Center for Curriculum Services
903-988-6824
sdarragh@esc7.net

Region 8
Cynthia Bayuk
Director of Curriculum and Instructional Technology
903-572-8551, ext. 2626
CBayuk@reg8.net

Region 9
Wes Pierce
Director, Department of Curriculum and Instruction Services
940.397.5379
Wes.pierce@esc9.net

Region 10
Danna Myers
Program Coordinator,
Curriculum and Assessment Products and Services
972-348-1522
Danna.myers@region10.org

Region 12
Becca Bell
Education Service Center Region 12
CSCOPE Services
254-297-1144
bbell@esc12.net

Region 13
Jennifer Drumm
Coordinator, CSCOPE Curriculum and School Improvement
512-919-5459
Jennifer.drumm@esc13.txed.net

Region 14
Leslie Koske
Education Consultant
325-675-8661
325-675-8659 fax
lkoske@esc14.net

Region 15
Judy Lisewsky
Associate Director
325-481-4035
Judy.lisewsky@netxv.net

Region 16
Diane Reid
Coordinator, Curriculum & Instruction
806-677-5177
diane.reid@esc16.net

Region 19
Nancy Crouch
Professional Development Consultant, Curriculum
915-780-5029
ncrouch@esc19.net

Region 20
Carolyn Castillo, Ph.D.
Coordinator, Instructional Services and Programs
210-370-5741 Office
210-370-5753 Fax
carolyn.castillo@esc20.net