Project Smart Team Action Report Form

Using Common Core Learning Standards & Data to Improve Student Achievement

Teacher(s)/School: Carol N. Burch Hannibal High School

SUNY Oswego faculty member: Sue Witmer

Teacher Participant Names: Carol N. Burch

Project or Team Name: Hannibal MST

Please answer the following questions:

Action: Describe your CCLS project. Which CCLS standards will you target?

1. Graphing- *Students will represent data in visual forms and interpret visual representations of ideas into words.*

2. ELA Literacy- Technical and scientific reading comprehension and written expression in RSP9
   Students will read and respond to science articles and news, daily journal writing tasks in a hardbound journal, and active note-taking skill development. Written expression tasks related to procedural thinking will develop technical writing skills.

3. Critical Thinking & Problem Solving- Procedural thinking and problem solving using Lego robotics as key culminating unit activity in RSP9
   Students will complete a scaffolded set of unit activities to develop procedural thinking and communicating skills as well as problem-solving skills. Students will give/receive specific directions for a variety of tasks, verbal and written, and provide peer feedback. Students will program using LOGO to write code for completing introductory programming activities. Lego Mindstorms robotics will provide students with tasks/activities from simple to complex to read written instructions, perform complex problem-solving tasks for robotics programming, and complete project logs to track progress, reflect on daily work, and think about next steps to solve problem.

ELA Common Core Literacy standards

RST.9-10.1 "Cite specific textual evidence to support analysis of > science and technical texts, attending to precise details of explanations or descriptions."

RST.9-10.2 "Determine central ideas or conclusions of a text; trace the > text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text

RST.0-10.3 "Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text."

RST.9-10.7 "Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words."

WHST.9-10.2 "Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes."

WHST.9-10.6 "Use technology, including the Internet, to produce, publish, and update individual or shared writing projects, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically."

WHST.9-10.10 "Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences."

MATH Common Core standards:
A-SSE.1 "Interpret expressions that represent a quantity in terms of its context."

F-IF.4 "For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship."

F-IF.6 "Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph."

Rationale: Fully state your **rationale** for the project. Why is this work important?

1. Creating and interpreting graphs and other visual representations of data is an essential skill across all sciences and is a skill useful in everyday life as more info-graphics are used to represent ideas across all areas of life. Students will create a variety of graphs from lab experiences across the entire year. Students will interpret visual representations of information across the entire year from a wide variety of sources including technical readings, news articles, and other sources.

2. ELA literacy skills are a focus in the Common Core and an area that is quite weak across all of my RSP9 students. Using engaging Scholastic Science World news stories, a monthly publication, students will engage in technical reading, writing, encounter technical vocabulary, and develop discussion skills within the class. Journal entries will be made periodically across the school year related to their selected readings where students will read, provide facts/evidence from stories, and write summaries of their readings. The journal should show growth in writing skills across time.

   Additional writing skill development will occur within the procedural thinking unit, especially during several introductory activities. Students will also be reading peer instructions providing many opportunities to have peer feedback to grow skills. Since literacy skills are at the heart of all student success, all efforts in this area should help the student be more successful.

3. Critical thinking and problem solving are also very weak within this group of RSP9 students. 21st college and career readiness skills stress this as one of the primary areas for students to be competent in by the end of high school. All science and math classes require students to apply these skills regularly as part of their coursework. To focus clearly on thinking and awareness of procedures, details, sequences, and specific vocabulary, all students should develop transferable skills.

Responsibilities/Timeline: Identify a series of **action steps** you will take to complete your project. Next to each step, identify person(s) **responsible** for carrying out that task. For each step also identify your **timeline** (during what month(s) you plan to complete each step).

(All tasks are the responsibility of Carol Burch)

1. Graphing: Entire school year
   Sources of info-graphics (graphs, charts, diagrams, etc) will include news websites, Scholastic Science World, science texts, Regents examinations from the past, and other sources.
   Action steps find additional graphics to use, add more graphing to labs, collect Regents graph problems, use daily news on the web as sources of info-graphics.

2. ELA literacy skills: Entire school year
   -Daily journaling prompts will be created to be used at the beginning of each class for reading/writing.
   -Sources of technical reading, more complex text from science websites, and news stories will provide reading material for the classroom
   -Written extended responses will be added to existing labs
   Action steps Buy hardbound journals for students, find additional technical reading materials, develop extended response lab questions

3. Critical thinking, problem-solving, and procedural thinking skills: Entire school year with Feb-April for procedural thinking focus
   -Daily journal prompts will include critical thinking experiences on a regular basis
   -Inquiry lab experiences will engage a higher level of critical thinking and problem-solving
   -Procedural communication activities (Feb)
   -LOGO programming (March)
   -Lego Mindstorms NXT 2.0 activities and projects (March-April)
   Action steps Research LOGO software and activities targeting middle school students and find/develop activities using LOGO, plan procedural thinking activities and buy materials needed to complete, buy Lego kits, find resources to support integration in the classroom, find/buy print materials for NXT 2.0 programming, download projects, software, and other computer-based materials for students, organize Lego robotics kits (building materials) for student use, create/find curriculum materials for Lego Mindstorms NXT 2.0

Evaluation: What **data** will you collect that shows the impact of your project on student achievement of CCLS? How will you document student learning? Teacher learning?

1.) Graphing samples over the year as pre, interim, and post samples to measure growth. Quality of graphing will be assessed on a 1 to 4 point scale.
2.) Reading and writing skills based on news stories from Scholastic's Science World magazine. Students will respond to the same prompt over the entire school year using consistent reading materials in terms of text difficulty, scientific details and vocabulary, and asked to write a summary with details from the reading. Using a 1 to 4 point scale similar to rating state exams, scores will be compared for growth across pre, interim, and post samples of writing.
3.) Writing procedures for others to follow will be compared across a period of time to provide pre, interim, and post samples of student work. The 1 to 4 point scale will be used to assess clarity, completeness, organization, and degree of detail provided through written instructions.

Resources: What resources will you need for this project? What costs, if any, will be incurred? What are possible sources of funding for needed resources?

A subscription for Scholastic Science World magazine will be purchased using Hannibal Central School District funds. Hardbound journals will be purchased by the teacher (out of pocket). Four Lego Mindstorms NXT 2.0 robotics kits, batteries, storage materials, and related books will be purchased using Entergy MST funds. Other resources will be found on the Internet at no cost.

Analysis of Data on Teacher Learning: We examined our reflections on the 6 shifts, and CCLS and found the following: (Support each claim with examples/evidence)

Shift 1: Balancing Informational & Literary Texts (N/A) *No fiction/literature was used in class this year*

Shift 2: Knowledge in the Disciplines Students in RSP9 used many different sources for information that ranged from Scholastic Science World, science texts, news stories from the internet, daily weather blogs from 9WSYR, and other sources. After reading information, students typically wrote responses and/or discussed what they read with the class. *(Daily journaling prompts – see file on wiki of prompts over time)*

Utilizing many more resources, requiring students to read and discuss brought the class to a new level of learning from my past practices. The "shift" is empowering for the teacher and puts more of the sharing of info in the control of the students.

Shift 3: Staircase of Complexity Increasing the difficulty, length, and details put into evidence in writing steadily increased the challenge for the students. My co-teacher focused on developing active note taking skills whenever possible and how to read to extract details and construct meaning. Seeing her provide this aspect of instruction helped inform my own practice. *(Example: longer reading passages were projected on a smartboard as students worked through sections. Vocab words were identified by students, meanings were derived from context when possible, all vocab was restated in students' own words, summary sentences of paragraphs were written by students to create notes on their readings.)*

Shift 4: Text based answers Students consistently were prompted to provide evidence from readings, experiments, observations, and any other situation where details (facts) were included in discussion or writing. As a science teacher, focusing on evidence, details, and facts is not a shift in practice at all.

Shift 5: Writing from Sources This year changed the emphasis on the level of writing (details, depth, length) required by my RSP9 students. It has turned out to be a very positive change in my classroom and a change that I was nervous about working on. Consistency in the expectations with students, predictable tasks (journaling daily), and firm positive coaching for reluctant writers proved to be a successful set of strategies to incorporate this shift. *(Example: daily journaling using many sources and varied prompts provided many different sources of information for students to pull from when completing writing tasks. The best writing examples were prompts asking students to state opinions or create from within, which was surprising to me as a teacher)*

Shift 6: Academic Vocabulary Incorporating technical vocabulary in a science classroom is not a shift in practice. We rely on very specific language to understand the concepts, processes, and phenomena that occur related to science.

Analysis of Data on Student Learning:
We collected data related to the three areas of focus over the school year. Samples of student work (entire class set) were saved at intervals over the school year to serve as direct comparisons to assess growth.

Data collected:
(1) For graphing, student created graphs from lab experiences and other activities were used to assess the level of quality of graphing using a 1 to 4 point scale (Title, labeled axes, appropriate scale, correct plotting, & trend line).

(2) For reading/writing CCLS ELA skills, student journal responses to the SAME prompt using Science World News stories (same level of complexity, length, focus, and level of interest in reading material) were compared over the school year. Selected entries from fall, winter, and late spring were rated using a 1 to 4 point scale (quality of response, length of response, and degree of detail included from reading source).

(3) For procedural communication, written directions produced by students at the beginning, middle, and end of the unit were saved for comparison to assess growth. The degree of detail, increased number of specific identified steps, and improved organization were rated on a 1 to 4 point scale to indicate student growth.

DATA INTERPRETATION: (Table of data shown below)
Students completed activities that we tracked across three general skill areas.

(1) Graphing is an essential science skill and aligns with the new Common Core Literacy standard RST.9-10.7. The graphing skill analysis shows an **average increase of 1.81 point**s on a 4 point scale across the class. This is significant! Data interpretation by students was also always paired with graphing activities, again aligning with this CCLS.

(2) Reading scientific brief news articles from Scholastic's Science World magazine provided a fairly consistent level of reading, text rich with detail, evidence/facts, and connected to the real world. The same prompt was used across the year- students were asked to pick two Science News stories to read, record details, and write summaries of in their journals. Three time periods were evaluated in this data analysis to evaluate progress toward the goal of improving the quality, length, and degree of detail included in student writing. The reading/writing skill analysis shows an **average increase of 0.81 points** on a 4 point scale across the class and aligns with the CCLS RST.9-10.1, RST.9-10.2, & RST.9-10.4. The class average increase is notable since writing is a difficult exercise for many in these classes. Reluctant writers grew smaller amounts as compared to a typical student. The daily journaling addresses CCLS WHST.9-10.10

(3) Procedural writing was analyzed across time as well, but over a shorter period of two months. ALL students improved, but the easily frustrated improved the least, with reluctant writers next. The class **average increase was a gain of 1.3 points** on the 4 point scale. The degree of detail, increased number of specific identified steps, and improved organization are quite noticeable when reviewing student work over this time period. This area of analysis corresponds to CCLS RST.9-10.3, and WHST.9-10.

Evaluation Item	Pre	Interim	Post			Avg change
(scored on 1, 2, 3, 4 scale)	Coins Lab	Phase Change Lab	Reindeer			
1.) Graphing	**12-Oct**	**12-Dec**	**13-Jun**			
Average	1.55	2.27	3.36			plus 1.81
2.) Science News Summary w/ details	**12-Dec**	**13-Jan**	**13-May**			**Avg Change**
Average	2.33	2.84	3.14			plus 0.81
3.) Procedural Communication	**13-Mar**	**13-Apr**	**13-May**			**Avg Change**
	Paper airplane	Walking directions	Lego design			
Average	1.1	2.0	2.4			plus 1.3

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