

THE EFFECTS OF BLOGGING AND PODCASTING ON STUDENT
ACHIEVEMENT AND ATTITUDE IN THE SIXTH GRADE SCIENCE CLASSROOM

by

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ABSTRACT

This action research-based project was conducted to determine the effects of blogging and podcasting on student achievement and attitudes in a sixth grade Earth science classroom. Various blogging and podcasting opportunities were provided. Assessment scores were used to determine their effect on student achievement and attitudes. The research indicated that while blogging and podcasting foster a positive student attitude, they do not increase assessment scores.

INTRODUCTION AND BACKGROUND

For the past ten years, I have been teaching at Marlboro Memorial Middle School located in Morganville, New Jersey. The middle school has a total of 1089 students, with 79% being of Caucasian descent, 14.8% of Asian descent, 3.8% of Hispanic descent and 2% of African American descent. The school culture is one of high expectations and high student achievement, with our school motto being: “every student is an honored student.” Morganville is a section of Marlboro Township, a large suburb with a population of approximately 40,141 (Wikipedia, 2012).

I teach sixth grade Earth science, with a total of 105 students. I chose to implement my study of the effects of blogs and podcasts on student achievement and attitude with my period three and period six classes ($N = 40$). The majority of students are Caucasian, with eleven students being Asian, one being Hispanic and two being African American. During the time of treatment, the students were studying the unit of astronomy in my classroom.

Since beginning my master’s degree, I have taken many classes that piqued my interest in Web 2.0 tools. In one particular class, I learned about and created blogs and podcasts. Through speaking with my colleagues, I learned that many teachers were interested in using these technologies in the classroom. I am motivated to use these technologies in my classroom and also to identify their impact. This interest led me to focus on incorporating blogs and podcasts into the science classroom and to measure their impact on student achievement and attitude. This study was also chosen because of the importance of incorporating technology into the 21st century classroom. Incorporating technology into the classroom is important because it is a component of the

New Jersey Core Curriculum Content Standards. According to *N.J. Technology Standard 8.1-- Educational Technology*, “All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.”

The purpose of this study was to investigate the effects of blogging and podcasting on student achievement and attitude. Specifically, I wanted to identify if blogging and podcasting in the classroom would improve test scores. I also wanted to examine students’ attitudes toward using these technologies and find out if students enjoy blogging and podcasting in science class.

CONCEPTUAL FRAMEWORK

Our students are surrounded by technology and media. Many have access to a wealth of information on the Internet, witness rapid changes in technology tools, and have the ability to collaborate and make individual contributions to technology constantly. They were born into this digital world, so they will need to manifest a range of functional and critical thinking skills related to information, media and technology (The Partnership for 21st Century Skills, 2004). Web 2.0 tools may help to facilitate this process, as these tools can be used to research, organize, evaluate and communicate information.

Web 2.0 tools are web-based software services that allow users to become more involved in the creation and manipulation of data. A Web 2.0 site allows user interaction and collaboration in a social media dialogue as users become creators of content in a virtual community (Wikipedia, 2013). They were designed to be less passive and more

contributory in nature. These tools provide a huge, untapped resource for educators because of their ability to enhance learning in virtually any environment (Web 2.0, 2008). Two important Web 2.0 tools that can be utilized in the classroom are blogs and podcasts.

An audio podcast is an audio file similar to a radio broadcast, which can be downloaded and listened to on a computer, mp3 player or mobile phone (Dictionary.com, 2011). A blog is a website containing a writer's or group of writers' own experiences, observations, opinions, and often contains images and links to other websites. Both of these technologies can help to break down the walls of the classroom and increase students' intrinsic motivation to learn about science (Barlow, 2008). Blogs and podcasts may extend the learning beyond the curriculum because the students are interested in using these technologies (Barlow, 2008; Columbo, 2007; & Erickson, 2009). Blogs provide teachers with a user-friendly online format that can be used to reinforce strategies, introduce new topics, ask questions, review concepts, review for tests, have debates and provide enrichment opportunities. Multiple resources like picture galleries, bulleted lists, personal narratives and formal essays can be used in a blog. The process of blogging requires students to read, evaluate, synthesize and determine a meaningful way to respond. Students can continuously comment on their learning since the materials of the blog are always available for reflection and analysis (Barlow, 2008).

Blogs can increase student motivation, challenge critical thinking skills, aid in differentiated instruction, extend the classroom walls and cash in on student interest in technology (Sawmiller, 2010). Through the use of blogs, students learn how to express their thoughts and opinions and communicate this information by writing, while also reflecting on real-world problems (Duplichan, 2009). Blogs can also give the "silent

student” a voice, those students that are not very comfortable speaking in front of the class. The blog can offer a “safe place” for these students’ voices to be heard in a lower pressure environment. Since blogs are public, they also have the potential of using a broader audience. In essence, blogs can be utilized for collaborative knowledge-building through inquiry-based interaction in a learning environment (Luehmann and Frink, 2009).

According to Barlow, 2008, implementing Web 2.0 tools into teaching was a stimulating and creative experience for both students and teachers. His students were engaged in the content because it was relevant, current, and real world. In another study results indicated that students felt blogging was “fun” and “helpful” and made them look forward to science (Erickson, 2009). Blogging allows students the opportunity to take charge of their own learning (Luehmann and Frink, 2009).

Podcasts are a merger between blog and radio, as they capture the human voice, and provide the ability to be uploaded online and then shared with the world. One significant benefit of podcasts is their versatility, since they can be listened to anywhere. Just like blogs, podcasting can also help to break down the walls of the classroom. Podcasts can be used to introduce or reinforce information, remediate students who need additional instruction, and provide access to discussions. Podcasting provides students with the opportunity to create original products, while helping the students develop skills such as vocabulary, writing, editing, public speaking and presentation (Putman and Kingsley, 2009). Through podcasting, students can learn communication, time management and problem solving, as well as sentence fluency and speech. Using podcasts allows students to learn at their own pace and in a safe environment (Piecka, Studnicki, & Zuckerman-Parker, 2008). Podcasts have proven beneficial for both

auditory and kinesthetic learners (Panday, 2009). Auditory learners learn best by hearing information. Podcasts can be played audibly anywhere and anytime, leading this technology to be especially beneficial to auditory learners. Kinesthetic learners learn best by moving their bodies. They are “hands-on” learners. Podcasting provides them with a hands-on learning experience because the act of creating a podcast is, in itself, an active process. The use of podcasting in one study showed an increase in motivation and higher-level thinking, as well as improvements in writing and listening skills. It was even reported that an increase in quiz and test scores was noticed after using podcasts in the classroom (Putmen and Kingsley, 2009).

Blogs and podcasts integrate the subjects of science, writing and technology. Both technologies have proven beneficial when used in the science classroom. Utilizing blogs and podcasts helps to foster a safe, student-centered community where the students are intrinsically motivated to learn. These technologies are beneficial for auditory, visual and kinesthetic learners. Blogging and podcasting can help students’ improve various skills including reading, writing, vocabulary, and communication (Panday, 2009).

METHODOLOGY

My capstone research occurred between January and March of 2013. I began my study with the Blogging and Podcasting Pre-Survey (Appendix A). This was a useful introduction into the study for my students and was helpful for me, as it helped me to gain insight about students’ initial attitudes towards blogging and podcasting. During this interview, I asked students to write about their exposure to blogs and podcasts and their attitude towards these Web 2.0 tools. I analyzed the Pre-Survey by looking for

patterns between students' responses and then interpreting those patterns. Upon completion of the Blogging and Podcasting Pre-Survey, my students began blogging and podcasting in science class. All of the blogging and podcasting was done through my school teacher page. During the twelve-week treatment period, students in my periods three and six classes blogged and podcasted ($N = 40$). My students were required to participate in three blogs that were related to the current topic of study in class. I posted various blog comments on my teacher page and my students responded to them for a homework assignment. My students podcasted the science vocabulary during class and then I uploaded the podcasts onto my teacher page. The students were expected to listen to the podcasts at home as a study aid for the science assessments. Students in my other science classes, periods two and seven, did not blog or podcast in science class ($N=40$). These students were taught the same units of study, but they did not participate in these technologies in the classroom or at home.

I began the study during our astronomy unit with the Earth-Moon System Podcasts (Appendix B) and then the Earth-Moon System Blog (Appendix C). Students were asked to respond to the following questions in paragraph form: What is the Earth-Moon system?, Why is it called a system?, and What have you learned so far about this system from the investigations we've conducted in class?

Upon completion of the unit, my students took two assessments: the Earth-Moon System Quiz (Appendix D) and then the Earth-Moon System Test (Appendix E). Both assessments were scored out of a total of one hundred points. I chose to use two assessments because this is what I normally do in my classroom. When I am just about through a unit, I usually assess my students on science vocabulary with a short quiz.

Then, a few days later I assess my student on all of the content of the unit with the unit test. The unit test is always much more challenging as it requires higher-order thinking skills as compared to the vocabulary which requires memorization. A spreadsheet was used to obtain the mean, median and mode of the students' scores and then this information was placed in the Control vs. Treatment Mean Assessments Comparison Table (Table 2), the 2012-2013 Quiz Grades Data Table (Table 3) and the 2012-2013 Test Grades Data Table (Table 4). Each data table was analyzed for an increase in assessment scores. A Triangulation Matrix (Table 1) was used to organize my data sources. My data sources included teacher made quizzes, teacher made tests, pre and post surveys and direct teacher observation.

Table 1
Triangulation Matrix

Research Questions	Data Source		
	1	2	3
1. What are the effects of blogging on student attitude?	Teacher observation	Blogging and Podcasting Pre-Survey	Blogging and Podcasting Post-Survey
2. What are the effects of podcasting on student interest?	Teacher observation	Blogging and Podcasting Pre-Survey	Blogging and Podcasting Post-Survey
3. What are the effects of blogging on student achievement?	Quiz Scores	Test Scores	Teacher Observation
4. What are the effects of podcasting on student achievement?	Quiz Scores	Test Scores	Teacher Observation

Students' assessment scores were analyzed using PowerTeacher, the grading program utilized at my school. I then created two Excel spreadsheets from the

PowerTeacher data. These tables contain assessment grades for all students in the treatment. I chose to compare assessment scores in two ways. First, I compared assessment scores pre-treatment and during treatment for the same students during the 2012-2013 school year. I compared the mean, median and mode of grades on the assessments taken while blogging and podcasting to the mean, median, and mode of grades on the assessments taken before the study. The assessments taken before the study included the Rock Cycle Quiz (Appendix F), the Rock Cycle Test (Appendix G), the Meteorology Quiz (Appendix H), and the Meteorology Test (Appendix I).

Next, I used the PowerTeacher assessment data to create another data table, which compared last year's scores to this year's scores on the same assessments, since my students did not blog and podcast last year. Upon completion of the Earth-Moon system unit, a second round of the study was conducted during the next unit which was the solar system unit of astronomy. My students participated in the Sun Vocabulary Podcasts (Appendix J). Upon completion, the podcasts were uploaded onto my teacher page and my students were instructed to listen to them at home as a study aid.

Next, there were two rounds of blogging done before the solar system assessments were completed. My students were first required to participate in the Sun Blog (Appendix K). For this blog, students were asked to add information or pictures about the sun and to use this blog to enhance everyone's knowledge of the sun. Then, my students podcasted The Solar System Vocabulary Podcasts (Appendix L) and participated in the Test Review Blog (Appendix M). For the test review blog, students were asked to post questions they had, answered the questions of other students and post explanations of concepts and vocabulary. Upon completion of the solar system unit, my students took

two assessments: the Solar System Quiz (Appendix N) and the Solar System Test (Appendix O). All of these data were then compared and analyzed for increases in the mean, median, and mode of each assessment.

Upon completion of two treatments, my students participated in the Blogging and Podcasting Post-Survey (Appendix P). This survey was analyzed for student interest. I compared the responses of the Post-Survey to the responses to the Pre-Survey and used this information as basis for determining students' attitudes towards blogging and podcasting upon completion of the study.

DATA AND ANALYSIS

The blogging results of the Pre-Survey indicated that sixty-two percent of students interviewed were already blogging in reading class ($N=40$). Seventy-five percent stated that the purpose of a blog is to share information with other people. Twenty-five percent reported that a blog's purpose was to extend on information to learn new things. Another twenty-five percent said blogs were used to "express or explain how you feel." One hundred percent of students stated they can learn from a blog. Thirty-seven percent said that a blog could expand learning and twenty-five percent said that blogging can help them learn from their peers. Eighty-eight percent of students interviewed stated that a blog can make class more interesting and fun. One student stated that blogging would be "a fun way to communicate." Another stated that "blogging would make the class memorable." One student said that blogging would "sort of make class more interesting and fun because we could share the information and go over it during class."

The blogging results of the Post-Survey indicated that ninety percent of students felt that they benefited from using the blog, while ten percent felt that the questions I posed were “too simple” and they “already knew the information.” One student stated “the purpose of a blog is to promote and engage students to learn and discover science not only at school, but at home as well.” Forty percent of students said that it was beneficial to learn from their peers. One student felt that the blog was “an extra review of topics taught in class,” while another student felt it helped in studying for tests and quizzes. Seventy five percent of my students found blogging in science class fun and interesting, while twenty five percent did not find it enjoyable. These students felt that blogging was “just another writing assignment.” Fifty percent of the students who enjoyed the blogging enjoyed learning from their peers. Twenty five percent of the students who enjoyed blogging enjoyed seeing other people participate. As for the twenty five percent who did not find it enjoyable, one student stated that the blog questions were boring, while another stated it was “just like doing homework.”

The podcasting results of the Pre-Survey indicated that seventy-five percent of students had heard of podcasting before. One podcasting mechanism a student mentioned was iTunes. Sixty-three percent said that the purpose of podcasting was to share information. One student said that podcasting is “a form of interactive learning.” Other purposes mentioned include “studying and learning things from home” and “listening to vocabulary words and facts repeatedly.” Eighty-six percent said that we could use podcasting in the classroom to “record what we learn in school and use it to study at home.” One hundred percent of students interviewed said that they would listen to the podcasts at home as a study aid and that podcasting would make class more

interesting and fun. One student response was that it would be “better than studying from a textbook.” Another student stated that “listening was an easy way of learning.” A student stated that “adding a blog and making a podcast would be a productive learning experience.” Some students responded that “podcasting can change people’s way of studying and help them learn more.”

The podcasting results of the Post-Survey indicated that one hundred percent of students understood that the purpose of a podcast was to listen to them to help learn the topics. Fifty percent of my students would like to podcast answers to my study guides in addition to podcasting science vocabulary. One hundred percent of my students enjoyed podcasting in class and found it beneficial. Sixty percent of those students said they feel they “learn better by hearing.” One hundred percent of students said they listened to them at home as a study aid. Ninety percent of students said they listened to them before a test or a quiz, while ten percent listened to them once a week. One hundred percent of students said that podcasting in the classroom made class more interesting and fun and all of them said it was fun to hear their own voice.

The assessment data were organized into five tables: The Control vs. Treatment Mean Assessments Comparisons Table (Table 2), the 2012-2013 Quiz Grades Data Table (Table 3), the 2012-2013 Test Grades Data Table (Table 4), the 2011-2012/2012-2013 Quiz Grade Comparisons Data Table (Table 5), and the 2011-2012/2012-2013 Test Grade Comparisons Table (Table 6). The results of the data analysis do not indicate an increase in assessment scores.

Table 2
Control vs. Treatment Mean Assessments Comparison Table, (N=80).

Assessments	Mean Scores
Earth-Moon System Quiz (Treatment)	86
Earth-Moon System Quiz (Control)	85
Earth-Moon System Test (Treatment)	81
Earth-Moon System Test (Control)	82
Solar System Quiz (Treatment)	87
Solar System Quiz (Control)	87
Solar System Test (Treatment)	86
Solar System Test (Control)	83

Table 3
2012-2013 Quiz Grades Data Table, (N=40).

Assessment	Mean	Median	Mode
Rock Cycle Quiz (Before Treatment)	90	100	100
Meteorology Quiz (After Treatment)	88	90	90
Earth-Moon System Quiz (During Treatment)	86	93	100
Solar System Quiz (During Treatment)	87	88	88

Table 4
2012-2013 Test Grades Data Table, (N=40).

Assessment	Mean	Median	Mode
Rock Cycle Test (Before Treatment)	78	81	80
Meteorology Test (After Treatment)	80	81	80
Earth-Moon System Test (During Treatment)	81	88	94
Solar System Test (During Treatment)	86	86	100

Table 5
2011-2012/2012-2013 Quiz Grade Comparisons Data Table, (N=40).

Assessment	Mean	Median	Mode
2011-2012 Earth-Moon System Quiz	85	86	100
2011-2012 Solar System Quiz	91	93	100
2012-2013 Earth-Moon System Quiz	86	93	100
2012-2013 Solar System Quiz	87	88	88

Table 6
 2011-2012/2012-2013 Test Grade Comparisons Data Table, (N=40).

Assessment	Mean	Median	Mode
2011-2012 Earth-Moon System Test	84	88	88
2011-2012 Solar System Test	83	95	87
2012-2013 Earth-Moon System Test	81	88	94
2012-2013 Solar System Test	86	87	100

The Control vs. Treatment Mean Assessments Comparison Table was used to create the Control vs. Treatment Mean Assessment Scores Comparison Chart (Figure 1). In comparing the control vs. treatment groups, there was no evidence of an increase in assessment scores.

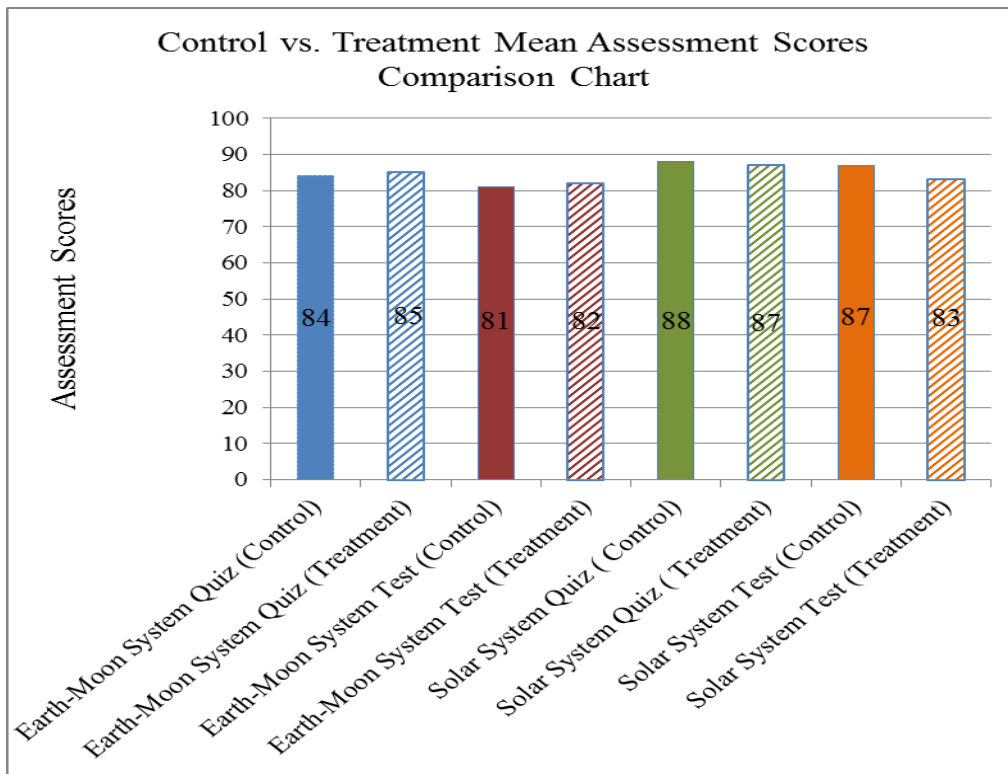


Figure 1. Control vs. Treatment Mean Assessment Scores Comparison Chart, (N = 80).

The 2012-2013 Quiz Grade Data Table was used to create the 2012-2013 Quiz Grade Graph (Figure 2).

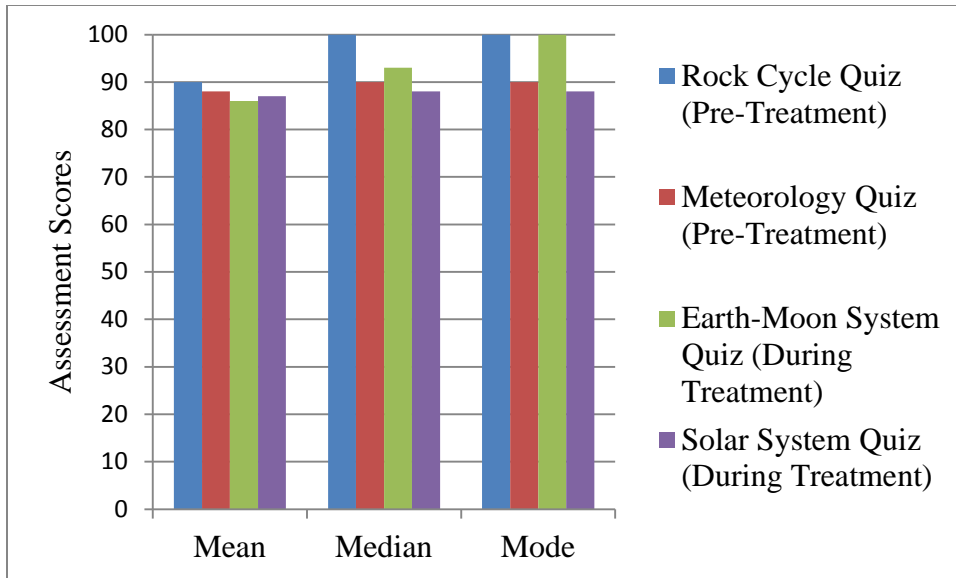


Figure 2. 2012-2013 Quiz Grade Comparisons Graph, ($N = 40$).

The average quiz grade was actually slightly higher during before the treatment than it was during the treatment. The average quiz score was about two points higher before the treatment. The median was the highest during the pre-treatment Rock Cycle Quiz. The mode, however, was the highest during both the pre-treatment Rock Cycle Quiz and the Earth-Moon System Quiz (treatment).

The 2012-2013 Test Grades Data Table showed different results. I used the 2012-2013 Test Grade Data Table to create the 2012-2013 Test Grade Graph (Figure 3).

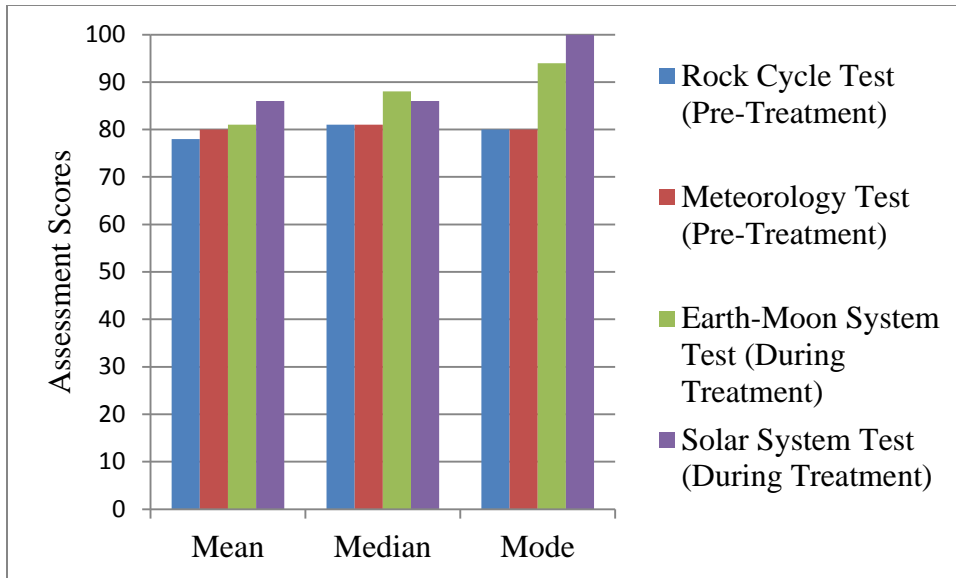


Figure 3. 2012-2013 Test Grade Comparisons Graph, ($N = 40$).

The highest average grade, the highest median scores and the highest modes occurred during the treatment. The Solar System Test had an average test score of an eighty-six, which was at minimum six points higher than pre-treatment tests. The highest median scores were during the Earth-Moon System Test and the Solar System Test. These median scores were at minimum five points higher than pre-treatment median scores. The highest mode scores were also during the Earth-Moon System Test and the Solar System Test. The Solar System mode score was twenty points higher than the mode of both the pre-treatment tests. The Earth-Moon System test had a mode fourteen points higher than both pre-treatment tests.

Since the data between the quiz and test scores was inconsistent, I also compared the current year's scores to the previous year's scores on the same assessments. Last year's students took the same assessments, but did not blog or podcast, while this year's students did blog and podcast. The 2011-2012/2012-2013 Quiz Grade Comparisons

Table was used to create the 2011-2012/2012-2013 Quiz Grade Comparisons Graph (Figure 4).

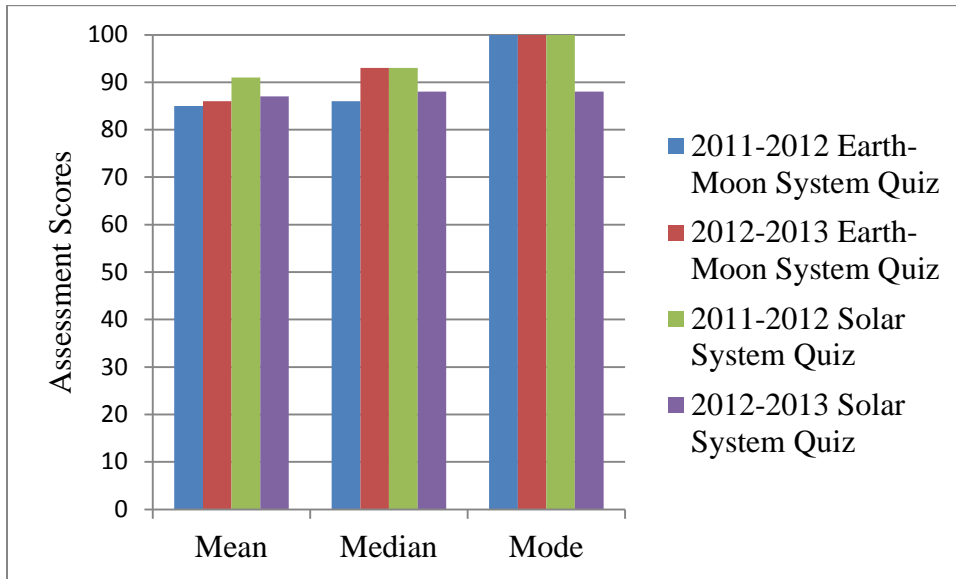


Figure 4. 2011-2012/2012-2013 Quiz Grade Comparisons Graph, ($N = 40$).

This year's Earth-Moon System average quiz score was one point higher than last year's, while this year's Solar System Quiz average score was four points lower than last year's. The median score for the Solar System Quiz was five points higher last year, but the Earth-Moon System median score was seven points higher this year. The mode was a one hundred both years for the Earth-Moon System Quiz, while the mode for the Solar System Quiz was twelve points higher last year.

Lastly, the 2011-2012/2012-2013 Test Grade Comparisons Table was used to create the 2011-2012/2012-2013 Test Grade Comparisons Graph (Figure 5).

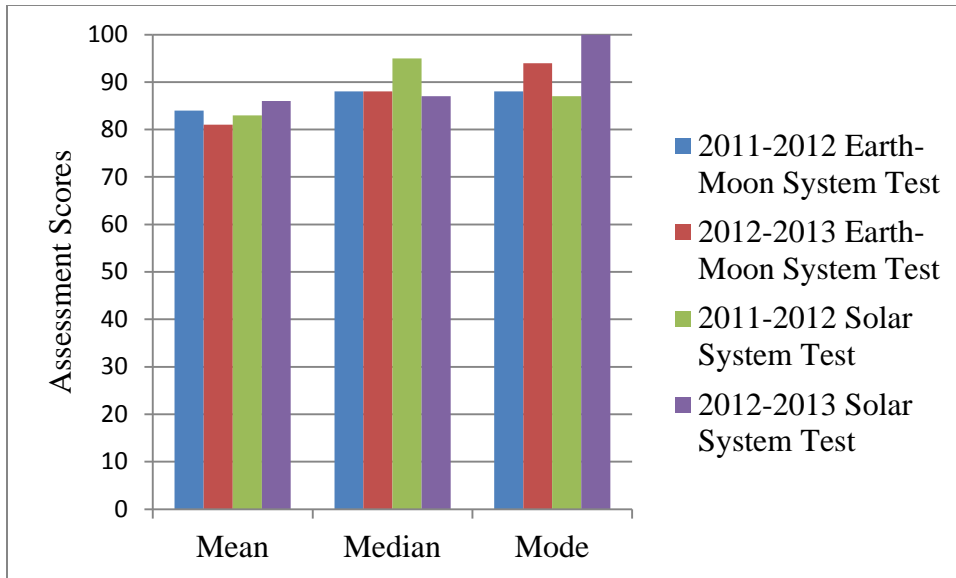


Figure 5. 2011-2012/2012-2013 Test Grade Comparisons Graph, ($N = 40$).

When looking at the test score data for both years, the average score on the Earth-Moon System Test was four points higher last year, while the average score for the Solar System Test was three points higher this year. The median score for the Earth-Moon System test stayed the same, while the median score for the Solar System Test dropped seven points. The mode, however, increased dramatically for both tests. The mode for the Earth-Moon system test increased by four points, while the mode for the Solar System Test increased by thirteen points.

INTERPRETATION AND CONCLUSION

Upon completion of my action research-based classroom study, I conclude that both blogging and podcasting in the science classroom had a positive effect on student attitude. My students enjoyed both blogging and podcasting and found both of these technologies to be beneficial. These Web 2.0 tools made my class more interesting and fun and also helped to break down the walls of the classroom by bridging the gap

between home and school. Most students in the treatment were motivated to participate in the blogging and podcasting because they found these technologies to be interesting and fun to use. Therefore, I can conclude that these technologies helped to increase students' intrinsic motivation to learn about science. These tools helped my students to develop skills like reading, vocabulary, writing, editing, communication, fluency, and presentation. The nature of these Web 2.0 tools allowed for the integration of science, reading, writing, and technology. My students were able to learn at their own pace and in a safe environment and fostered an increase in intrinsic motivation.

My students especially enjoyed creating the podcasts and said that they did listen to them at home to help prepare for quizzes and tests. My students enjoyed having the freedom of listening to the podcasts at home as a study aid. Podcasting science vocabulary is a great way to meet the auditory learners' needs and to provide learning in a versatile environment, since the podcasts can be listened to anywhere.

There were many reasons my students enjoyed blogging. One of these reasons is that they enjoyed both helping their peers, as well as learning from them. My students especially benefited from the test review blog, as they were asking each other questions, answering the questions of others, and even asking about study habits and how their peers learn the material. Blogging is also a great way to activate higher order thinking skills at home by requiring students to read, evaluate, and synthesize comments and then determine a meaningful way to respond. My students were able to express their own thoughts and opinions and communicate in the form of writing. The test review blog, as well as the other blog questions, definitely increased student motivation, challenged

critical thinking skills and extended the walls of the classroom, while piquing their interest with using the technology.

I cannot conclude from my data that that the blogging and podcasting increased assessment scores, since these data were inconsistent. When comparing this year's scores pre-treatment and during treatment, there was an overall decrease in quiz scores, but an increase in test scores. Then when I compared last year's quiz scores to this year's quiz scores for the same assessments, there was an overall increase for the Earth-Moon System Quiz, but an overall decrease on the Solar System Quiz. Then when I compared last year's test scores to this year's test scores for the same assessments, there was an overall decrease for the Earth-Moon System Test, but an overall increase on the Solar System Test. An increase in assessment scores is difficult to assess. These assessments may not be great comparisons. When I compared this year's assessment scores pre-treatment to this year's assessment scores during the treatment, I was comparing the scores of the same students, but on different assessments. Each assessment was on a different science unit. Some units might be more challenging than others based on the topics in that unit. Also, some students may understand one unit of study better than they do another unit of study. I also do not know how much time my students put into studying for each assessment, and if this time is consistent for all assessments. They may score higher on an assessment because they put more study time in, not necessarily because they blogged and podcasted during the unit. When comparing assessment scores from different years, I chose my two highest classes from each year, but I am still comparing the scores of different students of varying ability levels, which is like

comparing apples to oranges. Therefore, I did not observe that blogging and podcasting increased test scores in my class.

VALUES AND CLAIMS

Through conducting this study, I have witnessed the positive effects of blogging and podcasting in the classroom. While I did not observe that these tools necessarily raised assessment scores, I can conclude that they had a positive impact on students' attitudes towards my class, as they enjoyed podcasting and blogging and found both technologies beneficial to their study. Since they participated in these activities both at home and in school, it helped to bridge the gap between home and school and break down the walls of the classroom. Helping students to become more intrinsically motivated to learn science is a great accomplishment. I will continue to both blog and podcast in the years to come. The blog is definitely a user-friendly online format that I would like to use to primarily review the study guide for assessments. For next year, I think I will use the same format for the test review blog, but use it for every test. I would also make the blog questions more challenging, as some of my students thought the questions were too easy. When my students participated in the test review blog, they were truly learning from one another. They were even asking each other questions about study habits. As a sixth grade teacher, I know the importance of learning good study skills and if the blog helps them to achieve that through learning from each other, than I will continue to use it in years to come. Two goals that I have achieved through this study have been to breakdown the walls of the classroom by bridging the gap between

home and school and to increase students' intrinsic motivation to learn about and enjoy science.

Participating in the action research process has proven to be very beneficial to my teaching practice. This process has helped me to change my teaching and to try to make science class more interesting and fun through the use of technologies like blogs and podcasts. It has made my classroom more of an interactive learning environment and has shown me the importance of utilizing these technologies to enhance learning in any environment and breakdown the walls of the classroom. This action research has also shown me how to make my classroom more fun for my students. Our students are surrounded by technology, so why not use it to our advantage? I will continue to conduct action research in my classroom so that I can use real data to make accurate assertions about my classroom and about the education of my students.

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APPENDICES

APPENDIX A

BLOGGING AND PODCASTING PRE-SURVEY

Blogging and Podcasting Pre-Survey

1. What do you think is the purpose of a blog?

2. What blogs do you know of/read?

3. Do you think that you can learn anything from using a science blog?

4. What information would you want to find in a science blog?

5. Do you think that a science blog would make class more fun/interesting?

6. What do you think is the purpose of a podcast? What podcasts have you heard before?

7. How can we use podcasting in the classroom?

8. If you were to create a podcast, how would you make it interesting to listen to?

9. Would you listen at home to aid in studying?

10. Do you think that podcasting in the classroom would make class more fun/interesting?

11. Is there anything else you would like me to know?

APPENDIX B

EARTH-MOON SYSTEM PODCASTED VOCABULARY WORDS

Earth-Moon System Podcasted Vocabulary Words

Copernicus

Brahe

rotation

revolution

satellite

phase

Newton

lunar eclipse

waxing

waning

Hubble

solar eclipse

orbit

inertia

day

year

Ptolemy

Kepler

Galileo

gibbous

crescent

month

APPENDIX C

EARTH-MOON SYSTEM BLOG

Earth-Moon System Blog

Please respond to the following questions.

What is the Earth-Moon system? Why is it called a system? What have you learned so far about this system from the investigations we've conducted in class?

APPENDIX D

EARTH-MOON SYSTEM QUIZ

Name _____
Mrs. Wilczak

Date _____
Period # _____

Earth-Moon System
Vocabulary Quiz

Word Bank				
Copernicus	Brahe	rotation	revolution	satellite
phase	Newton	lunar eclipse	waxing	waning
Hubble	solar eclipse	orbit	inertia	day
year	Ptolemy	Kepler	Galileo	gibbous
crescent	month			

- Natural or artificial bodies that revolve around larger bodies such as planets are called _____.
- The spinning of a body, such as a planet, on its axis is called _____.
- One complete trip along an orbit is called a _____.
- The different appearances of the moon due to its changing position are called _____.
- When the shadow of the moon falls on the Earth, a _____ occurs.
- When the moon is _____, the sunlit fraction that we can see from Earth is getting larger.
- When the shadow of the Earth falls on the moon, a _____ occurs.
- The path that a body follows as it travels around another body in space is called an _____.
- _____ means almost full.
- When the moon is _____, the sunlit fraction that we can see from Earth is getting smaller.
- A(n) _____ moon occurs when only a little sliver of light is visible.

- 12.A(n) _____ is the time required for the Earth to rotate once on its axis.
- 13.A(n) _____ is the time required for the Earth to orbit once around the sun.
- 14.A(n) _____ is roughly the amount of time required for the moon to orbit once around the Earth.
15. _____ believed that the sun was at the center of the universe.
16. _____ believed that the Earth was at the center of the universe.
17. _____ proved that other galaxies existed beyond the edge of the Milky Way.
18. _____ is an object's resistance in speed or direction until an outside force acts on the object.
19. _____ became one of the 1st people to use a telescope to observe objects in space.
20. _____ announced that all of the planets revolve around the sun in elliptical orbits and that the sun is not in the exact center of the orbits.
21. _____ used several tools, like the mural quadrant, to make the most detailed astronomical observations that had been recorded during his time.
22. _____ showed that all objects in the universe attract each other through gravitational force.

APPENDIX E

EARTH-MOON SYSTEM TEST

Earth-Moon System Test

Multiple Choice (3 points each)

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. What evidence supports the current theory about our moon's origin?
- The lunar Maria was formed from old lava flows.
 - Lunar rocks are similar to Earth's mantle.
 - The moon is covered with impact craters.
 - We have identified the impacting body.
- _____ 2. What causes the phases of the moon?
- the relative positions of the moon, Earth, and the sun
 - the tilted orbit of the moon
 - the moon's period of revolution just equals its period of rotation
 - sunlight reflecting off Earth's surface
- _____ 3. Why do we always see the same side of the moon from Earth?
- because its phases are constantly changing
 - because its period of rotation equals its period of revolution
 - because half of the moon is always in sunlight
 - because the moon changes its position relative to Earth
- _____ 4. Why don't solar and lunar eclipses occur every month?
- The moon's orbit is an ellipse.
 - The moon's distance from Earth changes.
 - The moon's period of rotation is equal to its period of revolution.
 - The moon's orbit is tilted.
- _____ 5. The closer a planet is to the sun,
- | | |
|--|---------------------------------------|
| a. the slower it travels around the sun. | c. the smaller the angle of its axis. |
| b. the faster it travels around the sun. | d. the greater the angle of its axis. |
- _____ 6. The gravitational attraction between two objects increases if
- | | |
|----------------------------|---|
| a. their volumes increase. | c. the distance between them increases. |
| b. their volumes decrease. | d. the distance between them decreases. |
- _____ 7. The gravitational attraction between two objects decreases if
- | | |
|---------------------------|--------------------------------|
| a. their masses decrease. | c. their total area decreases. |
| b. their masses increase. | d. their total area increases. |
- _____ 8. What is an object's resistance to change in speed or direction?
- | | |
|-------------------|-------------|
| a. gravity | c. pressure |
| b. kinetic energy | d. inertia |
- _____ 9. What two factors affect the gravitational attraction between two objects?
- | | |
|-------------------------------|----------------------|
| a. surface area and mass | c. volume and mass |
| b. distance and circumference | d. distance and mass |

- ___ 10. Earth's period of revolution is about
- a. one day.
 - b. one week.
 - c. one year.
 - d. three months.
- ___ 11. A planet with a large orbit has a
- a. slow rotation.
 - b. large gas ring.
 - c. long period of revolution.
 - d. large surface area.
- ___ 12. Which statement describes what is happening at high tide?
- a. The moon is revolving more quickly than the Earth is rotating.
 - b. The moon's gravity is dragging water away from the equator.
 - c. The moon's gravity is pulling ocean water into a bulge.
 - d. The sun's gravity pulls with more force than the moon's gravity.
- ___ 13. When do the greatest tidal ranges occur?
- a. spring tides
 - b. neap tides
 - c. high tides
 - d. low tides
- ___ 14. How often do tides rise and fall?
- a. once a day
 - b. twice a day
 - c. every 14 days
 - d. every 24 h, 50 m
- ___ 15. Which of these would be shorter if Earth rotated faster?
- a. years
 - b. months
 - c. weeks
 - d. days

Short Answer (9 points each)

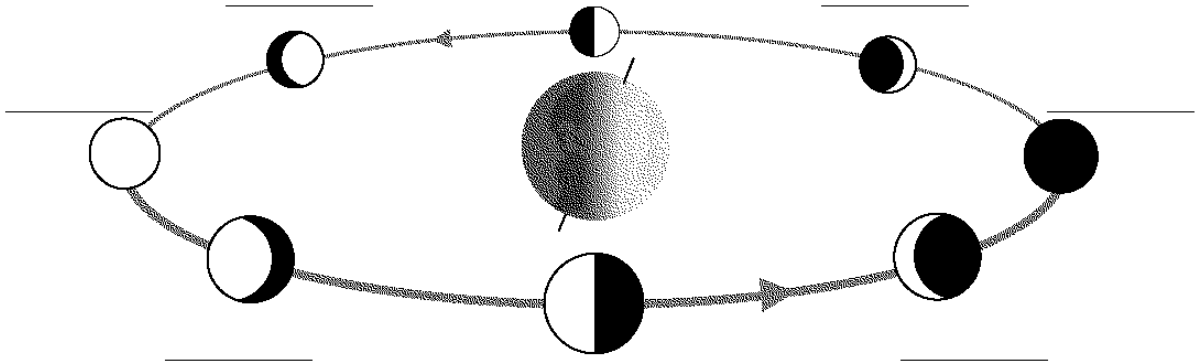
16. Contrast solar eclipses and lunar eclipses.

17. Describe the current theory of how the Earth's moon formed.

18. Contrast neap tides and spring tides.

Other (8 points)

Use the image below to answer the following questions.



20. Look at the moon chart shown above. Label each lunar phase with the correct phase name from the following list: new moon, full moon, first quarter, last quarter, waxing gibbous, waning gibbous, waxing crescent, waning crescent.

APPENDIX F
ROCK CYCLE QUIZ

Name _____
Mrs. Wilczak

Date _____
Period # _____

Rocks and Weathering Vocabulary Quiz

Directions: Use the word bank to fill in the blanks.

rock	rock cycle	erosion	deposition
intrusive	extrusive	foliated	nonfoliated
strata	mechanical weathering	chemical weathering	oxidation
ice wedging	differential weathering		

1. _____ igneous rock forms from the cooling and solidification of magma beneath the Earth's surface.
2. _____ igneous rock forms from the cooling of lava at Earth's surface.
3. A(n) _____ is a naturally occurring solid mixture of minerals and organic matter.
4. The continual process by which new rock forms from old rock material is called the _____.
5. The process by which sediment is removed from its source is called _____.
6. The process in which sediment moved by erosion is dropped and comes to rest is called _____.
7. _____ are layers of sedimentary rock.
8. The texture of metamorphic rock in which the mineral grains are arranged in planes or bands is called _____.
9. The texture of metamorphic rock in which mineral grains are not arranged in planes or bands is called _____.
10. _____ is a chemical reaction in which an element, such as iron, combines with oxygen to form an oxide, such as rust.
11. The process by which rocks break down as a result of chemical reactions is called _____.

12. _____ is the breakdown of rock into smaller pieces by physical means, such as ice wind, water, gravity, plants and even animals.
13. _____ happens when water seeps into cracks during warm weather and then freezes during cold weather.
14. _____ is the process by which softer, less weather resistant rocks wear away and leave harder, more weather resistant rocks behind.

APPENDIX G

ROCK CYCLE TEST

The Rock Cycle Test

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- ___ 1. What kind of rock is formed from lava that cools on the Earth's surface?
 a. organic sedimentary rock c. intrusive igneous rock
 b. metamorphic rock d. extrusive igneous rock
- ___ 2. Which process forms sediment?
 a. weathering c. compaction
 b. cementation d. deposition
- ___ 3. What are strata?
 a. mineral fragments c. layers in sedimentary rock
 b. minerals crystallized out of solution d. fossils in sedimentary rock
- ___ 4. What forces change a sedimentary rock into a metamorphic rock?
 a. heat and pressure c. melting
 b. weathering and erosion d. cooling
- ___ 5. How do lichens slowly break down a rock?
 a. by abrasion c. by ice wedging
 b. by mechanical weathering d. by chemical weathering
- ___ 6. Chemical weathering is most rapid in areas that are
 a. hot and dry. c. cold and dry.
 b. warm and wet. d. cool and wet.
- ___ 7. Ice, wind, water, gravity, plants, and animals are all agents of
 a. differential weathering. c. oxidation.
 b. mechanical weathering. d. desertification.
- ___ 8. Which soil conservation technique helps restore nutrients to the soil?
 a. contour plowing c. no-till farming
 b. terracing d. cover crop
- ___ 9. Which of water's properties directly causes mechanical weathering?
 a. Water dissolves many minerals.
 b. Water can hold heat longer than soil.
 c. Water expands when it freezes.
 d. Water can form an acid when combined with some gases.
- ___ 10. What is the soil's ability to hold nutrients and to supply nutrients to a plant called?
 a. humus c. soil fertility
 b. soil texture d. soil structure
- ___ 11. What is the practice of leaving old stalks to provide cover from the rain called?
 a. contour plowing c. no-till farming
 b. terracing d. covering
- ___ 12. What is it called when farmers plant different crops because they will use different soil nutrients?
 a. crop rotation c. crop contouring
 b. root cropping d. cover cropping

Short Answer

13. What will a foliated rock look like under a microscope?

14. You are walking on land where a volcano was once active. You pick up a rock that is smooth and appears to have no crystals. What kind of rock would this be? How do you think this rock was formed? Do you think it formed quickly or slowly? Why do you think so?

15. Describe four processes that change rock from one type to another.

16. Explain two ways in which weak acids can cause chemical weathering of rock.

17. Explain the mechanical weathering process called ice wedging.

18. Why is crop rotation important?

Essay

19. Why is sedimentary rock more common on Earth's surface than metamorphic rock or igneous rock?

20. Explain how deforestation can lead to erosion.

APPENDIX H

METEOROLOGY QUIZ

Name _____
Mrs. Wilczak

Date _____
Period # _____

Meteorology Quiz

cumulus	thermometer	wind vane	cumulonimbus
anemometer	barometer	cloud	air mass
front	cyclone	anticyclone	rain gauge
atmosphere	air pressure	troposphere	stratosphere
mesosphere	thermosphere	cirrus	stratus
nimbostratus			

1. A(n) _____ is an instrument used to measure air pressure.
2. A tool used to measure air temperature is called a(n) _____.
3. An instrument used to measure wind speed is called a(n) _____.
4. An instrument used to measure wind direction is called a(n) _____.
5. A(n) _____ is an instrument used to measure the amount of precipitation.
6. A(n) _____ is a collection of millions of tiny water droplets or ice crystals.
7. A(n) _____ is a large body of air where temperature and moisture content are similar throughout.
8. The area in which two types of air masses meet is called a(n) _____.
9. Areas that have high pressure are called _____.
10. Areas that have lower pressure than the surrounding areas do are called _____.
11. _____ is the measure of the force with which air molecules push on a surface.
12. The _____ is a mixture of gases that surrounds Earth.
13. The uppermost atmospheric layer is called the _____.

14. The lowest layer of the atmosphere, which lies next to the Earth's surface, is called the _____.
15. The atmospheric layer that contains the ozone layer is called the _____.
16. The _____ is the middle layer of the atmosphere. It is the coldest layer.
17. _____ are thin, feathery, white clouds found at high altitudes.
18. Clouds called _____ are clouds that form in layers.
19. Puffy, white clouds that tend to have flat bottoms are called _____.
20. Thunderstorms come from a _____ cloud.
21. _____ are dark, stratus clouds that usually produce precipitation.

APPENDIX I

METEOROLOGY TEST

Meteorology Test

- ___ 1. What kind of weather will nimbostratus clouds likely bring?
 - a. sunny
 - b. warm
 - c. rainy
 - d. thunderstorms
- ___ 2. How does a warm front form?
 - a. Warm air becomes caught between cold air masses.
 - b. Two air masses meet and stay separated.
 - c. Warm air moves over cold air and replaces it.
 - d. Cold air moves under warm air and pushes it up.
- ___ 3. What kind of weather does a stationary front bring?
 - a. drizzly rain followed by clear weather
 - b. severe storms
 - c. many days of cloudy, wet weather
 - d. cold, dry weather
- ___ 4. Which describes an altocumulus cloud?
 - a. high, feathery cloud
 - b. puffy mid-level cloud
 - c. low storm cloud
 - d. high cloud made of ice crystals
- ___ 5. What causes changes in weather?
 - a. Air masses move and meet.
 - b. The air gets more humid.
 - c. Water evaporates.
 - d. Clouds form.
- ___ 6. Which answer best describes Earth's atmosphere?
 - a. mostly oxygen with about 21% nitrogen
 - b. mostly nitrogen with about 21% oxygen
 - c. mostly carbon dioxide with about 21% oxygen
 - d. mostly nitrogen with about 21% carbon dioxide
- ___ 7. Why is air pressure greatest at the Earth's surface?
 - a. due to the pressure of oxygen
 - b. gravity pulls gas molecules toward the surface
 - c. because of the weight of ice crystals
 - d. because of pollution
- ___ 8. The protective ozone layer is found in the
 - a. thermosphere.
 - b. mesosphere.
 - c. troposphere.
 - d. stratosphere.
- ___ 9. Air pressure decreases as what increases?
 - a. altitude
 - b. radiation
 - c. water vapor
 - d. pollution
- ___ 10. What pulls gas molecules in the air toward the Earth?
 - a. air pressure
 - b. gravity
 - c. water
 - d. solar energy
- ___ 11. What kind of weather would cumulonimbus clouds likely bring?
 - a. clear and sunny
 - b. hurricane
 - c. light rain
 - d. thunderstorm

Completion

Complete each sentence or statement.

Use the terms from the following list to complete the sentences below.

maritime tropical	continental tropical
continental polar	maritime polar

12. An air mass bringing dry air to the southwestern United States from Mexico is a _____ air mass.
13. An air mass bringing dry, frigid winds to North Dakota in the winter is a _____ air mass.
14. An air mass bringing humid weather to Florida in summer is a _____ air mass.
15. An air mass bringing wet weather to the Pacific Northwest is a _____ air mass.

Matching

Match each item with the correct statement.

a. radar	d. barometer
b. thermometer	e. wind vane
c. anemometer	

- _____ 16. measures air pressure
- _____ 17. measures wind speed
- _____ 18. measures wind direction
- _____ 19. locates precipitation
- _____ 20. measures air temperature

Match each item with the correct statement.

a. cumulus	c. stratus
b. fog	d. cirrus

- _____ 21. a cloud that forms near the ground
- _____ 22. a thin, wispy cloud found at high altitudes
- _____ 23. a puffy white cloud with a flat bottom
- _____ 24. clouds that cover a large area

Short Answer

25. Suppose you hear a weather forecaster say a front is forming over your area. However, you don't hear what kind of front it is. What conclusion can you draw about the coming weather?

26. Explain how a cold front develops.

27. List the layers of the atmosphere, starting with the one closest to Earth.

28. On a weather map, a large H appears over the area in which you live. What kind of weather can you expect?

29. Explain how cyclones and anticyclones affect the weather.

30. Use the formula $^{\circ}\text{C} = 5/9 \times (^{\circ}\text{F} - 32)$ to convert 72°F to $^{\circ}\text{C}$.

APPENDIX J

THE SUN VOCABULARY PODCASTS

THE SUN VOCABULARY

Sun
Electromagnetic spectrum
Nuclear fusion
Core
Radiative zone
Convective zone
Photosphere
Chromospheres
Corona
Sun spots
Solar flares

APPENDIX K

THE SUN BLOG

THE SUN BLOG

We are currently studying the sun in science class. Feel free to add any information or pictures about our sun. Let's use this blog to enhance our knowledge of the sun.

APPENDIX L

THE SOLAR SYSTEM VOCABULARY PODCASTS

SOLAR SYSTEM VOCABULARY

cosmology

big bang theory

nebula

solar nebula

astronomical unit

light-year

terrestrial planets

prograde rotation

retrograde rotation

gas giant

comet

asteroid

asteroid belt

meteoroid

meteorite

meteor

APPENDIX M

THE SOLAR SYSTEM TEST REVIEW BLOG

The Solar System Test Review Blog

Let's use this space to review for the test. Feel free to post questions you have while studying, answer questions other students have posted, and post explanations of concepts and vocabulary.

APPENDIX N

THE SOLAR SYSTEM VOCABULARY QUIZ

Name _____
Mrs. Wilczak

Date _____
Period # _____

The Solar System
Vocabulary Quiz

cosmology	big bang theory	nuclear fusion	nebula
solar nebula	astronomical unit	light-year	terrestrial planets
prograde rotation	retrograde rotation	gas giant	comet
asteroid	asteroid belt	meteoroid	meteorite
meteor			

1. A(n) _____ is the bright streak of light caused by a meteoroid or comet dust burning up in the atmosphere.
2. A meteoroid that enters Earth's atmosphere and strikes the ground is called a _____.
3. A(n) _____ is a small, rocky body that revolves around the sun. This rocky body is smaller than an asteroid.
4. Small, rocky bodies that revolve around the sun are called _____.
5. The _____ is a wide region between the orbits of Mars and Jupiter in which most asteroids orbit.
6. A small body of ice, rock, and cosmic dust loosely packed together is called a _____.
7. _____ are planets that have deep, massive atmospheres rather than hard and rocky surfaces.
8. The inner planets are also called _____ because, like Earth, they are very dense and rocky.
9. If a planet rotates in a counterclockwise direction, the planet is said to have a _____ rotation.
10. If a planet rotates in a clockwise direction, the planet is said to have _____ rotation.

11. One _____ is the average distance between the sun and Earth, or approximately 150,000,000 km.

12. A(n) _____ is the average distance light travels in one year.

13. _____ is the process by which hydrogen atoms join together to form helium atoms. This is how the sun gets its energy.

14. The _____ is the cloud of gas and dust that formed our solar system.

15. _____ are mixtures of gases and dust.

16. The study of the origin, structure, and future of the universe is called _____.

17. The theory that the universe began with a tremendous explosion is called the _____.

APPENDIX O

THE SOLAR SYSTEM TEST

Solar System Test

Multiple Choice (3 points each)

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. Planets began to form as
- planetesimals collided and combined.
 - planetesimals flattened into rotating disks.
 - temperatures in the solar nebula fell.
 - gravity held together the solar nebula.
- _____ 2. The extra matter at the center of the solar nebula became the
- inner planets.
 - moon.
 - sun.
 - super nova.
- _____ 3. What caused the solar system to form?
- the birth of a nearby star
 - the collapse of the solar nebula
 - nuclear fusion in the sun
 - continuous inertia of the solar
- _____ 4. What happens during nuclear fusion in the sun?
- Oxygen nuclei combine to form helium.
 - Helium nuclei combine to form oxygen.
 - Helium nuclei combine to form hydrogen.
 - Hydrogen nuclei combine to form helium.
- _____ 5. What process gives the sun its energy?
- photosynthesis
 - cellular regeneration
 - cellular fission
 - nuclear fusion
- _____ 6. How are objects organized in the universe?
- Objects are scattered through space according to a random pattern.
 - Objects are organized according to a loosely repeated pattern and are part of a larger system.
 - Objects are organized according to a loosely repeated pattern but are not part of any other system.
 - Objects are not organized in any particular way.
- _____ 7. Scientists think that the universe will
- end someday.
 - expand forever.
 - eventually shrink.
 - expand and shrink on a regular basis.
- _____ 8. According to the big bang theory, the universe is about
- 470 billion years old.
 - 500 billion years old.
 - 4.7 billion years old.
 - 13.7 billion years old.
- _____ 9. A common method for scientists use to measure distances within the solar system is to use
- the speed of sound.
 - the English system.
 - the speed of light.
 - parallax angles.

- ___ 10. What causes a high surface temperature on Venus?
- a. The acid content of its atmosphere. c. The planet's retrograde spin on its axis.
- b. The planet's fast period of rotation. d. The greenhouse effect of its atmosphere.
- ___ 11. Use the data table below to determine which terrestrial planet has a day that is over two Earth months long.

Planet	Period of Rotation	Period of Revolution
Mercury	58 days, 19 h	88 days
Venus	243 days, 16h	224 days, 17 h
Mars	24 h, 40 min	1 year, 322 days
Jupiter	9 h, 54 min	11 years, 313 days
Saturn	10 h, 42 min	29 years, 155 days
Uranus	17 h, 12 min	83 years, 273 days
Neptune	16 h, 6 min	163 years, 263 days

- a. Mars c. Pluto
- b. Mercury d. Venus
- ___ 12. Why are the inner planets called terrestrial planets?
- a. because they are very hot c. because most are gas giants
- b. because they resemble Earth d. because they can support life
- ___ 13. Which of the following bodies is most likely to have many craters?
- a. a gas giant located near the asteroid belt
- b. a moon with ice caps and a thin atmosphere
- c. a terrestrial planet without any atmosphere
- d. a terrestrial planet with a thick atmosphere
- ___ 14. An astronomical unit (AU) is the average distance
- a. between Mercury and the sun. c. light travels in 1 minute.
- b. between Mercury and Pluto. d. between Earth and the sun.
- ___ 15. What is each color of light on the electromagnetic spectrum?
- a. different magnetic element
- b. a different electrical element
- c. a different atmosphere
- d. a different wavelength of electromagnetic radiation
- ___ 16. Why do astronomers put telescopes in space?
- a. to reduce air pollution
- b. to get closer to objects in space
- c. to avoid interference from the Earth's atmosphere
- d. to avoid noise pollution
- ___ 17. What evidence shows that the universe is expanding?
- a. Galaxies are moving closer together. c. The number of galaxies is growing.
- b. Galaxies are moving apart. d. Galaxies are getting bigger.

- ____ 18. What does the Earth's atmosphere do to most types of electromagnetic radiation?
 - a. blocks them
 - b. absorbs them
 - c. stretches them
 - d. freezes them
- ____ 19. Which of the following is NOT found on the electromagnetic spectrum?
 - a. gamma ray
 - b. X ray
 - c. ultraviolet light
 - d. black hole

Short Answer

- 20. Describe the characteristics that make Earth suitable for life as compared with its nearest neighbors in space, Mars and Venus. (6 points)

- 21. In what three ways do the inner planets differ from the outer planets? (5 points)

- 22. What would it mean about the size of the universe if the galaxies were moving toward each other instead of apart from each other? (4 points)

- 23. How does energy produced by nuclear fusion move from the sun's core to space? Describe the layers that the energy will move through in the correct order and state how long the energy will take to reach the Earth once it leaves the sun's surface. (6 points)

24. How can studying comets, asteroids, and meteorites help us learn about the history of the solar system? (4 points)

25. Imagine you were planning to purchase a telescope so that you could more closely observe constellations in the night sky. Would you buy a radio telescope, a refracting telescope, or a reflecting telescope? Explain your answer. (4 points)

Other

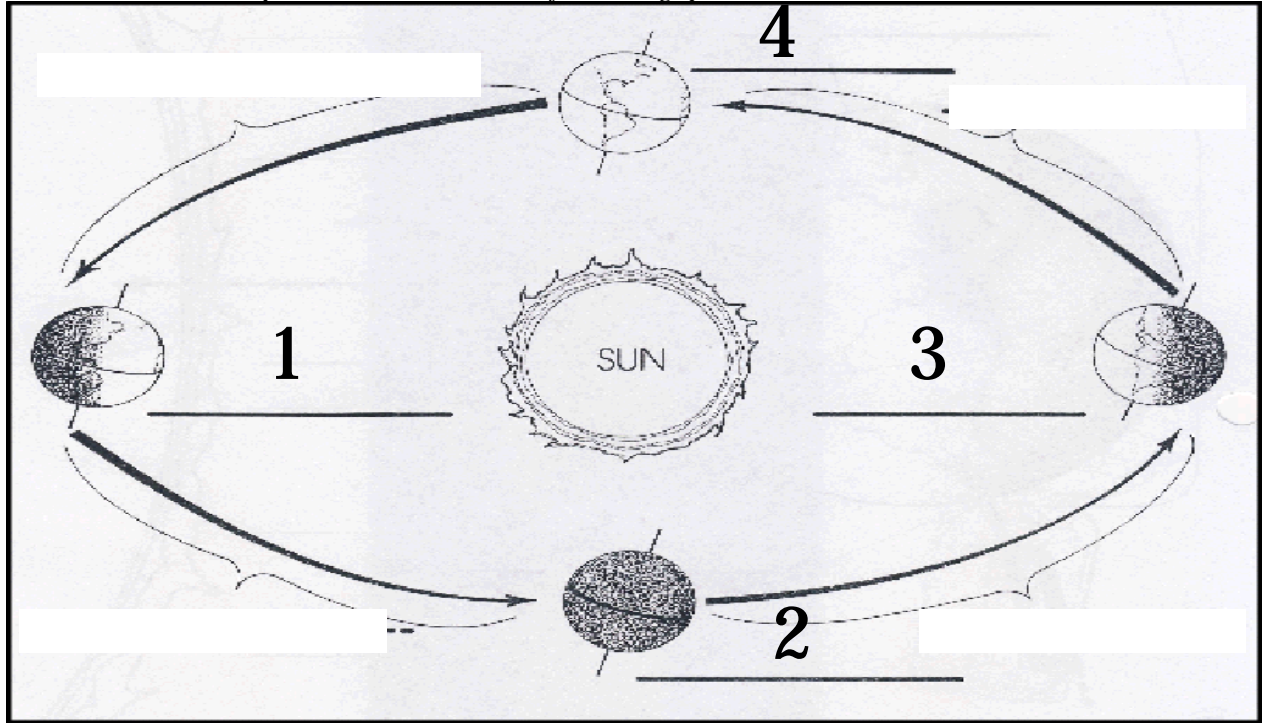
26. Imagine that a new planet has been discovered in another solar system. Use the data given below. Describe two ways you would expect this planet to be different from Earth, and explain the causes of these differences. (5 points)

DATA FOR EARTH AND A NEW PLANET

	Earth	New Planet
Farthest distance from parent star (AU)	1.017	1.033
Nearest distance to parent star (AU)	0.983	1.013
Orbital period (Earth year)	1.000	1.035
Rotational period (hour)	23.9	72.4
Tilt of axis (degree)	23	0
Direction of rotation	east to west	west to east

INTERPRETING GRAPHICS (3 points each)

Use the map below to answer the following questions.



27. Which of the following is the cause of the change of seasons?
- the distance of the Earth from the Sun
 - prevailing winds blowing across land or water
 - the tilt of the Earth's axis
 - the rotation of the Earth
28. At what position will the Southern hemisphere have the first day of spring?
- 1
 - 2
 - 3
 - 4
29. At what position does the North Pole receive 24 hours of daylight?
- 1
 - 2
 - 3
 - 4

APPENDIX P

BLOGGING AND PODCASTING POST-SURVEY

Blogging and Podcasting Post-Survey

1. What do you think is the purpose of a blog?

2. Do you feel that you benefited from using the science blog? If so, how?

3. Besides the blog questions that I created, what other information would you want to find in our science blogs?

4. Did the science blog make class more fun/interesting? Why or why not?

5. What do you think is the purpose of a podcast?

6. Besides vocabulary, can you think of any other ways that we can use podcasting in the classroom?

7. Did you enjoy podcasting in science class? Did you find it beneficial? Why or why not?

8. Did you listen to them at home as a study aid? How frequently did you listen to them at home?

9. Did podcasting in the classroom make class more fun/interesting?

10. Is there anything else you would like me to know?

APPENDIX Q
IRB APPROVAL



INSTITUTIONAL REVIEW BOARD
 For the Protection of Human Subjects
 FWA 0000165

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MEMORANDUM

TO: Danielle Wilczak

FROM: Mark Quinn, Ph.D. Chair *Mark Quinn*
 Institutional Review Board for the Protection of Human Subjects

DATE: December 1, 2011

SUBJECT: "Examining the Effects of Blogging and Podcasting on Student Achievement and Attitude"
 [DW120111-EX]

The above research, described in your submission of December 1, 2011, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal Regulations, Part 46, section 101. The specific paragraph which applies to your research is:

- (b)(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- (b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.
- (b)(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- (b)(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.
- (b)(5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- (b)(6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.