

Incorporating Global Best Practices in the American Classroom

By

Chelsea Meyer

In

Education

A Thesis

Presented to the

Honors Program of

Missouri Southern State University

Dr. Susan Craig

Fall 2014

Teachers, students, policy makers, parents, and many people in the general population believe that the education system in the United States needs to improve. However, very few have specific ideas as to what exactly to do to change the system. In recent years, many education systems around the world have been recognized, praised, and marveled at for their extraordinary educational success. So, what does the United States have to do to be among the top performing countries of the world? What are some of the most practical ways to improve the education system in the United States? What steps can a teacher take to make his or her students comparable to the students in the world's top performing school systems? This is a complicated issue with many different suggestions. However, one of the most practical methods would be to incorporate global best practices into our schools.

Through my project, I will show realistic ways in which to incorporate global best practices into the classroom. After discussing the best practices, I will show how a teacher would be able to effectively implement the best practices into the everyday classroom. This will be done through a unit plan. Although the unit plan will only pertain to one grade, the best practices can be adjusted to fit into any grade level.

My research includes the cultural factors that impact education systems around the world. These are things I cannot personally change in my classroom. However, in order to truly compare education systems worldwide, these matters need to be compared. A few cultural factors I found (that are too broad in the United States to make assumptions for) are parental influence, student motivation, a nation's economy, and the funding of education. Although these things would be beneficial to compare between countries, it provided too much information to draw conclusions from. Instead, I found that teacher preparation and professional development

would have more of an impact on student achievement. Therefore, I just focused on teacher quality as a determining cultural factor.

Next, the bulk of my project focuses on best teaching practices worldwide. A best practice is simply the best way of accomplishing a task. In education, a best practice refers to the way(s) in which students learn best. After deciding on my topic, I started researching. Most of my research during the initial thesis class revolved around the book *The Smartest Kids in the World and How They Got That Way* by Amanda Ripley. Unfortunately, this book was very narrative-based and didn't contain a lot of research. Although it made for an interesting read, it didn't provide me with too many resources that I could apply to my project. However, I did find a few mentioned in the book that lead me to the following best practices: cross-curricular teaching, lesson collaboration, and rigor. Although these were useful practices, I now had to find research to back up Ripley's narrative. After doing extensive research using journal search engines, I realized there wasn't a list of "best practices" that will ALWAYS work. There are too many other factors that could impact the effectiveness of these practices. Because I was unable to find a resource with a list of transferrable "best practices," I had to seek out numerous resources in order to draw conclusions.

Furthermore, I was really lucky to find a book by Linda Darling-Hammond called *The Flat World and Education: How America's Commitment to Equity Will Determine Our Future*. This research-based book really helped me to further determine my best practices. Although Darling-Hammond focused a lot on the cultural factors, reading the book gave me a lot of insight into the overall picture of the American education system. It allowed me to see the main differences in education between countries. The author also referenced a lot of research in her book. From her resources, I was able to find resources that better pertained to my topic. Because

of her book, I was able to make my thesis a lot more research-based than I thought I would be able to before. Because my thesis revolved around the practices of other countries, I tried not to make too many assumptions. The research I used from her book allowed me to feel more confident about the education practices that I identified.

Her book led me to narrowing my best practices to “collaboration and rigor.” I chose these two best practices for a few different reasons. First, the element of “rigor” can be interpreted in many different ways. Although it was a relevant best practice, I felt that it was important to determine what “rigor” would look like in an American classroom. Next, “rigor” entailed promoting the use of higher order thinking skills in the classroom. I felt that this practice would help to improve students’ critical thinking capabilities. Additionally, I chose collaboration because I don’t feel like collaborative activities are being used in classrooms as often as they should be. I also chose “rigor” and “collaboration” because they appeared to be the most practical practices that I could actually apply in my future classroom. These practices were the ones that seemed the most transferrable from top-performing countries. These were also the practices most accessible for classroom teachers.

My thesis is significant because it will outline what practices I will be able to incorporate in my future classroom. Through this project, I gained a better understanding of both the U.S. education system and education systems worldwide. This knowledge will help me to understand how education can and should work. Finally, I hope to be able to incorporate my unit plan in my future classroom. Because my unit plan doesn’t follow the traditional unit plan format, it allowed me to practice with different types of lessons and have a better idea about how to teach more effectively. Additionally, I became more aware of the types of skills my students will need in

their future careers. With improved global skills (problem solving, higher order thinking, etc.), students will be better prepared for all future careers.

The following quotation by John F. Kennedy lays out what the purpose of education is for a nation: “our progress as a nation can be no swifter than our progress in education” (as cited by Rodarte, 2001, pg. 189). Education is an element of a nation that needs to be continually adjusted, investigated, and improved on in order for a country to adequately evolve along with the rest of the world. Based on the results of international achievement exams (the PISA), It is evident that the education system in the United States needs adjustment. The results of education systems around the world are often compared on the PISA test (Schneider, 2009). PISA stands for “Program for International Student Assessment.” This test is given to fifteen year-olds in sixty-five different countries (number of participating countries as of 2012) every three years. The first test was given in the year 2000. The 2012 test measured reading, mathematics, science, problem solving, and financial literacy. In order to compare the countries, a sample group was chosen from each country to take the test. The scores of these sample groups can then be compared between countries. The table below shows the most recent test results. As shown, the United States did not score exceptionally well in comparison to other countries. In 2012, the United States ranked 26th in math, 21st in science, and 17th in reading.

Snapshot of performance in mathematics, reading and science

Countries/economies with a mean performance/share of top performers above the OECD average
 Countries/economies with a share of low achievers below the OECD average
 Countries/economies with a mean performance/share of low achievers/share of top performers not statistically significantly different from the OECD average
 Countries/economies with a mean performance/share of top performers below the OECD average
 Countries/economies with a share of low achievers above the OECD average

	Mathematics				Reading		Science	
	Mean score in PISA 2012	Share of low achievers in mathematics (Below Level 2)	Share of top performers in mathematics (Level 5 or 6)	Annualised change in score points	Mean score in PISA 2012	Annualised change in score points	Mean score in PISA 2012	Annualised change in score points
OECD average	494	23.1	12.6	-0.3	496	0.3	501	0.5
Shanghai-China	613	3.8	55.4	4.2	570	4.6	580	1.8
Singapore	573	8.3	40.0	3.8	542	5.4	551	3.3
Hong Kong-China	561	8.5	33.7	1.3	545	2.3	555	2.1
Chinese Taipei	560	12.8	37.2	1.7	523	4.5	523	-1.5
Korea	554	9.1	30.9	1.1	536	0.9	538	2.6
Macao-China	538	10.8	24.3	1.0	509	0.8	521	1.6
Japan	536	11.1	23.7	0.4	538	1.5	547	2.6
Liechtenstein	535	14.1	24.8	0.3	516	1.3	525	0.4
Switzerland	531	12.4	21.4	0.6	509	1.0	515	0.6
Netherlands	523	14.8	19.3	-1.6	511	-0.1	522	-0.5
Estonia	521	10.5	14.6	0.9	516	2.4	541	1.5
Finland	519	12.3	15.3	-2.8	524	-1.7	545	-3.0
Canada	518	13.8	16.4	-1.4	523	-0.9	525	-1.5
Poland	518	14.4	16.7	2.6	518	2.8	526	4.6
Belgium	515	18.9	19.4	-1.6	509	0.1	505	-0.8
Germany	514	17.7	17.5	1.4	508	1.8	524	1.4
Viet Nam	511	14.2	13.3	m	508	m	528	m
Austria	506	18.7	14.3	0.0	490	-0.2	506	-0.8
Australia	504	19.7	14.8	-2.2	512	-1.4	521	-0.9
Ireland	501	16.9	10.7	-0.6	523	-0.9	522	-2.3
Slovenia	501	20.1	13.7	-0.6	481	-2.2	514	-0.8
Denmark	500	16.8	10.0	-1.8	496	0.1	498	0.4
New Zealand	500	22.6	15.0	-2.5	512	-1.1	516	-2.5
Czech Republic	499	21.0	12.9	-2.5	493	-0.5	508	-1.0
France	495	22.4	12.9	-1.5	505	0.0	499	0.6
United Kingdom	494	21.8	11.8	-0.3	499	0.7	514	-0.1
Iceland	493	21.5	11.2	-2.2	483	-1.3	478	-2.0
Latvia	491	19.9	8.0	0.5	489	1.9	502	2.0
Luxembourg	490	24.3	11.2	-0.3	488	0.7	491	0.9
Norway	489	22.3	9.4	-0.3	504	0.1	495	1.3
Portugal	487	24.9	10.6	2.8	488	1.6	489	2.5
Italy	485	24.7	9.9	2.7	490	0.5	494	3.0
Spain	484	23.6	8.0	0.1	488	-0.3	496	1.3
Russian Federation	482	24.0	7.8	1.1	475	1.1	486	1.0
Slovak Republic	482	27.5	11.0	-1.4	463	-0.1	471	-2.7
United States	481	25.8	8.8	0.3	498	-0.3	497	1.4
Lithuania	479	26.0	8.1	-1.4	477	1.1	496	1.3
Sweden	478	27.1	8.0	-3.3	483	-2.8	485	-3.1
Hungary	477	28.1	9.3	-1.3	488	1.0	494	-1.6
Croatia	471	29.9	7.0	0.6	485	1.2	491	-0.3
Israel	466	33.5	9.4	4.2	486	3.7	470	2.8
Greece	453	35.7	3.9	1.1	477	0.5	467	-1.1
Serbia	449	38.9	4.6	2.2	446	7.6	445	1.5
Turkey	448	42.0	5.9	3.2	475	4.1	463	6.4
Romania	445	40.8	3.2	4.9	438	1.1	439	3.4
Cyprus ^{1,2}	440	42.0	3.7	m	449	m	438	m
Bulgaria	439	43.8	4.1	4.2	436	0.4	446	2.0
United Arab Emirates	434	46.3	3.5	m	442	m	448	m
Kazakhstan	432	45.2	0.9	9.0	393	0.8	425	8.1
Thailand	427	49.7	2.6	1.0	441	1.1	444	3.9
Chile	423	51.5	1.6	1.9	441	3.1	445	1.1
Malaysia	421	51.8	1.3	8.1	398	-7.8	420	-1.4
Mexico	413	54.7	0.6	3.1	424	1.1	415	0.9
Montenegro	410	56.6	1.0	1.7	422	5.0	410	-0.3
Uruguay	409	55.8	1.4	-1.4	411	-1.8	416	-2.1
Costa Rica	407	59.9	0.6	-1.2	441	-1.0	429	-0.6
Albania	394	60.7	0.8	5.6	394	4.1	397	2.2
Brazil	391	67.1	0.8	4.1	410	1.2	405	2.3
Argentina	388	66.5	0.3	1.2	396	-1.6	406	2.4
Tunisia	388	67.7	0.8	3.1	404	3.8	398	2.2
Jordan	386	68.6	0.6	0.2	399	-0.3	409	-2.1
Colombia	376	73.8	0.3	1.1	403	3.0	399	1.8
Qatar	376	69.6	2.0	9.2	388	12.0	384	5.4
Indonesia	375	75.7	0.3	0.7	396	2.3	382	-1.9
Peru	368	74.6	0.6	1.0	384	5.2	373	1.3

1. Footnote by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

2. Footnote by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

The annualised change is the average annual change in PISA score points from a country's/economy's earliest participation in PISA to PISA 2012. It is calculated taking into account all of a country's/economy's participation in PISA.

(OECD, 2014)

The PISA test requires much more out of students than the traditional rote-oriented test.

Instead of answering questions that measure a student's memorization skills, the PISA requires students to think critically, apply knowledge, and analyze their responses (Stage, 2005). Because

of the intellectual skills that the test requires, it would be nearly impossible for students to prepare for the types of questions presented through memorizing facts. In Linda Darling-Hammond's book, *The Flat World and Education*, she addresses the extent to which high-performing countries (Singapore, South Korea, Finland, Japan, and the United Kingdom) are outperforming U.S. students in math and science (Darling-Hammond, 2010). Although there are many cultural factors that may contribute to the ultimate success or failure of an education system (parental influence, economy, school funding, student motivation, etc.), the most influential factor on student success is teacher quality. One of the main reasons that the United States is being outperformed is that top-performing countries are simply more efficient at producing the best quality teachers.

Without highly qualified teachers, students will not be able to learn the necessary skills they will need to flourish in the 21st century. Teacher training is the biggest difference between the United States and top performing countries. "The experience of high performing school systems suggests that three things matter most: 1) getting the right people to become teachers; 2) developing them into effective instructors and; 3) ensuring that the system is able to deliver the best possible instruction for every child" (Barber, 2007). Nations with improved student achievement (such as Finland, Korea, and Singapore) believe their success is linked to their increased levels of teacher preparation and development (Darling-Hammond, 2010). It is logical to assume that higher quality teachers will produce higher quality learning. However, it is evident that the United States (as a whole) hasn't always tried to follow the teacher training models of high performing countries.

Finland has a very different teacher selection system than that of the United States (Ripley, 2013). Finnish teacher training schools are highly selective. One author compared

getting accepted into a teacher education school in Finland to getting accepted into a medical school in the United States. All Finnish teachers receive two to three years of high-level graduate level preparation. Finnish teacher education is also research-based. Pre-service teachers study how to teach diverse learners higher-order thinking and problem solving skills. This is followed by at least a full year of clinical experience. Teachers are trained in research because they will be asked to “contribute to an increase in problem solving capacity of the education system” (Buchberger, 2004). Finnish teachers also complete a master’s thesis that requires them to develop “higher problem solving capacity.” This experience provides them with the knowledge and resources to continually improve and reflect on their teaching practices. Because the teachers are highly qualified, they are able to design their curriculum around national standards effectively (Darling-Hammond, 2010). One of the reasons that Finland can have a curriculum that is both rigorous and successful is because their teachers are adequately prepared to carry out the curriculum.

The country that scored the highest on problem solving in 2012, Singapore (PISA, 2012), also has a very competitive teacher education program. The only school for teacher preparation in Singapore teaches pre-service teachers how to teach curriculum focused on critical thinking, inquiry, and collaboration, in part by engaging teachers in inquiry themselves (Darling-Hammond, 2010). Because the teachers will have had first-hand experience in the inquiry process, they will be better able to anticipate possible problems that students will have, as well as how to address these problems.

Although there are very good teacher education programs in the United States, the quality and difficulty of the program (if a candidate even goes through a program) varies by state and by school. Because of this, the quality of instruction will differ within any given school district.

Unsurprisingly, uncertified or under-qualified teachers has been linked to a decrease in student achievement (Darling-Hammond, 2010). The most important measurable cause of increased student learning is teacher expertise. This is measured by “teacher performance on a statewide certification exam measuring academic skills and teaching knowledge, as well as teacher expertise and master’s degrees” (Ferguson, 1991). A study in New York City also showed that a teacher’s preparation, SAT scores, and experience were significant indicators of their students’ achievement (Boyd, 2006). Teacher quality is important and should be a central focus for schools moving forward (Ferguson, 1991). The more qualified and prepared a teacher is, the better the achievement outcome will be for her students.

Strong teacher education will result in the use of strategies that promote higher-order learning. Teachers that go through a strong teacher education program will also be better able to respond to students’ needs and adjust teaching practices accordingly (Darling-Hammond, 2005). In order to ensure the best quality teachers, we need to “fix teacher recruitment/retention, reinvent teacher preparation and professional development” (Darling-Hammond, 2010). Teachers won’t be able to effectively teach their students if they aren’t adequately trained to do so.

Also, “student learning will increase as the knowledge of educators grows” (Elmore, 1999). Teacher training needs to be adjusted and revised in order to help provide an adequate education for the children of the future. However, it would take years to replace all of the low-quality professionals that are in our school system in a timely (and responsible) manner. However, one way to make up for lack of teacher education is through effective professional development. “When combined with serious state efforts to develop strong preparation programs, systems of mentoring, and focused performance assessments for guiding professional

learning, it is possible to create classrooms in which all educators have the opportunity to become expert and all children have the opportunity to be well taught” (Darling-Hammond, 2010). Professional development is an accessible way for schools to make up for lack of teacher training.

Professional development is a common occurrence in top performing countries. Teachers in South Korea, for example, are required to partake in a certain amount of professional development hours each year. After four years of teaching, Korean (South Korean) teachers are required to complete ninety hours of professional development every three years. The teachers also enroll in a government-funded, five-week (180 hours) professional development program to gain an additional certification after they have completed their third year. South Korea, like Japan and Singapore, only spend about 35% of working time teaching. They spend their non-teaching time planning, grading, and collaborating with colleagues. In comparison, teachers in the United States spend 80% of working time teaching pupils (Kang, 2008). If teachers were given more opportunities to learn, plan, and collaborate, the quality of teaching would likely improve.

The government in Singapore pays for 100 hours of professional development for each teacher each year. This professional development is typically teacher-centered. Teachers lead the workshops that revolve around different teaching methods. The teachers are then given the opportunity to apply the teaching methods before meeting again to evaluate effectiveness (Tripp, 2004). Additionally, teachers are allotted twenty hours each week to visit each other’s classrooms and study teaching. This allows the teachers to examine teaching and learning problems and to find possible solutions.

Many schools in the United States offer professional development opportunities. However, the type of professional development may differ from workshop to workshop. This is not an effective approach because teachers do not receive feedback once they have applied the new practices. Professional development/professional learning time has to be intentional in order to be successful (Darling-Hammond, 2010). Instead of introducing an incoherent mixture of practices, each professional learning opportunity should have a central focus. The teachers can then better understand and apply the new technique they have learned in their classrooms. After applying the new technique, teachers should be given the opportunity to meet again and evaluate the effectiveness of the new practice.

Numerous states have been able to implement effective professional development programs. These professional development programs allow schools to diagnose teaching problems, objectively examine the learning systems, and create a plan to improve their educational outcomes (Ancess, 1995). By improving the practices of teachers through professional development, schools have been able to observe an increase in student achievement (NCTAF, 1996). In order for professional development to be successful, it needs to be high quality, linked to specific practices, and connected to coursework (Boyd, 2008). Professional development is a great tool to bridge the gap between qualified and unqualified teachers. If teachers are given high-quality training opportunities, then their expertise will grow. “The only way we can ensure that students will be well taught is by making sure that they have knowledgeable and committed teachers” (Darling-Hammond, 2010). Student performance will not improve unless the quality of teaching improves.

Professional development goes hand-in-hand with ongoing teacher collaboration. Teachers need to plan collaboratively and evaluate what works best at their school. This may

include lesson study, action research, and classroom observations (Darling-Hammond, 2010). Worldwide, teachers in top-performing countries are given time (during the school day) for professional development and action research (OECD, 2004). Because this is a common practice among all education powerhouses, it is evident that districts in the United States may need to take notice of and model after this practice.

Teachers in Finland meet once a week to jointly develop lessons and curriculum. This collaboration time also allows the teachers to address any instructional issues they are having in their classroom (OECD, 2004). Likewise, Korean teachers work together on a daily basis to share resources and ideas (Kang, 2008). It is very common for teachers in Asian nations to collaborate in a lesson study. This involves creating a lesson collectively, teaching the lesson, and reflecting on the lesson. Through this lesson experience, teachers are able to determine student engagement and to examine learning evidence. The lesson can then be adjusted to ensure the best lesson possible. Japanese teachers often take part in research lessons. They observe the lesson (through in-person, video tapes, narrative, etc.), discuss the lessons' strengths and weaknesses with colleagues, and make adjustments to the lessons accordingly (Fernandez, 2002). Lesson collaboration is a great way for teachers to work together to problem-solve within their schools.

In high achieving nations, teachers spend 40-60% of their time preparing and learning to teach well. In comparison, U.S. teachers have limited time to work with their peers. They typically have three to five hours to plan lessons on their own (OECD, 2007). U.S. teachers often work in isolation. There is little opportunity to plan lessons and collaborate with co-workers (Darling-Hammond, 2010). Because of the limited amount of planning time, teachers in

the U.S. may make instructional mistakes that they wouldn't have made if they had had time to work with a peer on the lesson.

A lesson study done in 2005 showed exactly how a collaborative learning situation could occur in the United States (Stewart, 2005). This study involved placing teachers in learning communities. The teachers worked together to create uniform lesson plans. They then gave the lessons, videotaped, reflected, and made changes. This allowed the teachers to work together to find the best way of teaching a topic. The reflection and adaptation process resulted in improved lesson planning and teaching methods. Although this may be done during university training, it is less common within schools.

“Schools in most high-achieving countries ensure that teachers have time for collaboration, collective planning, lesson study, peer coaching, developing curriculum and assessment, and joint examination of students work” (Darling-Hammond, 2010). Research has found that teacher collaboration (through a professional community) is a key element that leads to successful schools (McLaughlin, 2001). By allowing teachers time to work together to design curriculum and instruction, examine student learning evidence, and plan student supports, they can work together to ensure the best possible educational outcomes for their students (Darling-Hammond, 2010). When teachers are allotted time to work collaboratively, they may actually save valuable time in the long run because they won't be spending their classroom instruction time using methods that don't work.

When the best teachers are in place, then the best teaching methods can be applied. The most predominant difference between learning in the United States versus learning in top-performing countries is that the countries identified as “educational powerhouses” focus on teaching their students 21st century skills. In order for students in the United States to be

prepared for the globalized world, they need to possess the skills that students in foreign countries are learning. These skills are labeled as “21st century skills.” They need to know how to communicate and work collaboratively. They need to be able to think critically, construct knowledge, and problem solve. In reality, there isn’t an educational system in the world that the United States can follow exactly and produce the same achievement results. There are too many cultural factors that can and will impact student achievement. However, it is possible to take elements from the world’s education superpowers and infuse them into our education system.

These “elements” are best practices. What teaching method(s) lead to the most improvement in student learning? Among high performing countries, lesson collaboration (for teachers and students) and the development of a more “rigorous” classroom appear to be predominant best practices. A more “rigorous” classroom includes higher expectations, the use of higher order/ critical thinking skills, real-world applications, and problem solving skills. A “rigorous” classroom requires students to apply 21st century skills. Although these practices may be found in many classrooms nationwide, they are not the norm. Because students in the United States have been unable to apply these concepts on the PISA test, it is evident that students aren’t applying these practices in the classroom.

The application of the “best practices” of top performing countries is evident in their teaching of 21st century skills. Most people will agree that the purpose of schooling is to prepare students for their future careers. However, we live in a “flat world.” This means that American students will be competing with students from countries around the world for their future jobs. Employers of the future will be looking for candidates who are “competent, creative, and innovative.” In addition to strong English skills, the candidates will need to be capable of coming up with new ideas, communicating these ideas to others, and collaborating to find solutions

(Wagner, 2008). Unfortunately, many U.S. students will not possess these capabilities. Rote learning is still a leading learning method used in the United States. When tests and teaching methods focus on low-cognitive skills, students won't have the capability of adapting for the 21st century (Darling-Hammond, 2010). Because students are receiving an education system geared towards the 20th century, many will not be prepared for the type of work employers will be expecting.

We live in a knowledge-based society. The amount of information in the world is constantly expanding. It is estimated that five exabytes of new information (500,000 times the volume of the Library of Congress print collection) was generated in 2002, more than three times the amount that was generated in 1999. The amount of new technical information is doubled every two years (Jukes, 2002). Additionally, tomorrow's jobs may not exist today. "The top 10 in-demand jobs for 2010 did not exist in 2004" (Gunderson, 2004). This means that education's new mission should be to prepare students to adapt to new information and to prepare them for jobs that may not exist today.

Education can no longer rely on transmitting pieces of information to students. This will not prepare students for success. Instead, they will need to possess the ability to synthesize information, adapt to new situations, think critically, and create new ideas. In order to promote 21st century learning, it is necessary to motivate through collaboration, to structure work that connects to the next piece of work (as opposed to disconnected lessons in an assembly line), and to create information-rich environments that promote self-assessment (Darling-Hammond, 2010). These are all skills that students will need in order to compete globally for the same jobs.

In addition to revised teacher education and preparation methods, teachers can help to improve the public education system of the United States by incorporating "best practices" of

top-performing countries into the classroom. The ability to collaborate is an imperative 21st century skill. It is unreasonable to ask students to effectively collaborate with their peers when they haven't received adequate practice and preparation on how to collaborate successfully.

Collaboration is a common element among high-performing countries. It is very common for students in Asian nations (in this case-Japan, Hong Kong, and China) to work in pairs or small groups to solve problems in a real world context. The students are then asked to explain how they arrived at their conclusion. This may require them to do research, derive formulas, or apply other mathematical concepts (Tsuneyoshi, 2005). Likewise, students in Singapore can also be found collaborating on projects on any given school day. As students in Singapore work on group projects, the teacher acts as a facilitator (Darling-Hammond, 2010). Younger students also participate in "action research." This allows them to find solutions to scientific questions, present their findings, and formulate a plan of action for further experimentation.

Finland is also renowned for encouraging collaboration in the classroom. A study by Yann Algan and Pierre Cahuc measured the amount of collaboration that was used in classrooms worldwide (Pantovic, 2012). This was done by asking teachers how often students work in groups, how often students work on projects, how often students participate in role-play, and how often the teacher includes discussion in the classroom. The study concluded that Nordic countries (namely Finland) often used student-centered approaches. They were frequently involved in collaborative activities, projects, and asking the teacher questions through open discussion.

Collaborative learning structures have been shown to produce higher achievement gains (Lee, 1995). Although implementing group work may seem overwhelming at times, it can become more structured through the use of activity guides and teacher-selected resources

(Darling-Hammond, 2010). In order to make group work authentic, it is important to have students work in heterogeneous teams on projects that will require each student to provide her own expertise for the benefit of the group. This will prepare them for collaborative work in the real world.

Most students will cringe at the mention of group work. This doesn't have to be the case. There are many things a teacher can do to ensure group work is productive and worthwhile (Miller, 2014). First, the group work needs to have a clear intention. It is vital that the students don't feel they are just doing "busy work." If they feel there isn't a purpose to their task, then they will not put in their best effort. By establishing a clear goal, it is also easier to determine whether the learning objective is being met by the group project.

Group work also needs to be supported in the classroom. The skills that students are supposed to use during group work need to be explicitly taught first. In order to do this, students need to be taught how to listen to other group members, how to ask good questions that will promote discussion, and how to negotiate with group members (Alber, 2012). For younger students, it will be necessary to teach how to be a good listener. This involves eye contact, intently listening/empathizing, and refraining from interrupting fellow group members. To promote the asking of good questions, it may be necessary to provide sentence stems for students to work from. These involve providing questions like: "When you think about...what comes to mind?" By providing question stems, the students will be able to formulate their own questions to support further discussion. In order to teach students to negotiate during group work, they need to learn the meaning of "consensus." This means that some students may have to learn how to give up their own idea in favor of an idea that better suits the rest of the group. This is an

imperative life skill for students to learn. After explicitly teaching and practicing these skills, the students will then be able to go and apply the skills in their individual groups.

Finally, each student needs to be held accountable for the work he or she does during group work. By assigning authentic roles or tasks, teachers are able to ensure that all students are participating. When students are responsible for individual tasks within a group, they become more involved and engaged in the group work. Establishing individual tasks may also help to relieve group anxiety. One easy way to do this is through “establishing group contracts” (Alber, 2012). These group contracts may include anything from “every student contributes to group” to “one person talks at a time.” It is most beneficial when students create these contracts for themselves. However, the teacher should be able to “suggest” an addition should he or she deem it necessary.

Collaboration will only be successful if students learn how to work effectively within a group. In order to encourage worthwhile collaboration, the students will need lots of practice doing group activities. One of the easiest ways for a teacher to incorporate group activities on a daily basis is through the use of “cooperative activities” (McGuire, 2010). Cooperative activities are short activities (usually five to twenty minutes in length, depending on the subject) that allow students to discuss topics, explore reading, and practice writing. Cooperative activities are a great classroom addition because they can be adjusted to fit any subject, they are easy to implement, and they provide great practice for students to get some experience with collaborative activities.

The best practice that is the most pertinent and necessary in our schools is the injection of “rigor” into our school system. This entails incorporating 21st century skills into the everyday classroom. Nations around the world are transforming their school systems to meet the needs of the 21st century. Beginning in the 1980’s, Finland started replacing state-mandated tests with

highly trained teachers. These teachers use curriculum and assessments that focus on problem solving, creativity, independent learning, and student reflection. Inquiry is also a major focus of learning. Finnish teachers use inquiry through the introduction of an open-ended question. The students then address the problem presented in the question. This is accomplished through scientific investigations, reading and writing a variety of materials, and designing solutions (Lavonen, 2008). “A typical feature of teaching and learning in Finland is encouraging teachers and students to try new ideas and methods, learn about and through innovations, and cultivate creativity in schools, while respecting schools’ pedagogic legacies” (Sahlberg, 2007). Through inquiry and research methods, students will be able to apply what they have learned in future situations.

Likewise, Singapore has transformed itself into an education powerhouse through ensuring students access to strong teaching, an inquiry-driven curriculum, and innovative technology (Borja, 2004). Singapore has turned itself into a “thinking nation.” Their education system is geared to the needs of the 21st century (Singapore Ministry of Education, 2007). The schools in these nations engage students and teachers in “experiential and cooperative learning, action research, scientific investigations, entrepreneurial activities, and discussion and debate.” After practicing these types of activities, students will be better prepared for more difficult subject matter. They will better be able to adjust what they have learned to situations that don’t have one right and one wrong answer.

Singapore, along with many other Asian nations, cover content at a more in-depth level, do more hands-on activities to support learning, use classroom collaboration, and require more knowledge application than U.S. schools (Stevenson, 1992). Students in Singapore are frequently engaged in project work and higher order thinking activities that promote creativity (Ng, 2008).

Singapore schools embrace the concept of “teach less, learn more.” Because of this, their students become engaged learners. They discover through experiences (Tharman, 2005a). When students are learning through experiences, they are more engaged and enjoy the learning experience more thoroughly.

Authentic pedagogy is an essential component of integrating rigor in the classroom. Authentic pedagogy involves requiring students to apply knowledge in real-world contexts, consider alternatives, use knowledge to engage in research/inquiry/writing, and communicate what they have learned to different audiences. Authentic instruction focuses on active learning, higher-order thinking, extended writing, and products that enable students to know how knowledge will be applied outside of the school setting (Lee, 1995). The main benefit of applying authentic pedagogy techniques is that it provides relevance for students. Students will be more interested in a subject if they see how the subject is pertinent to their lives.

In order to promote the development of 21st century skills, students need to learn how to become critical thinkers. This is done through the use of higher-order questions to promote higher-order thinking. Higher-order thinking refers to teaching students to think critically. This involves learning new concepts, correcting old ideas, and applying these improved ideas to real situations. A public junior high school in a recent study implemented an element that it referred to as “authentic instruction” (Preus, 2012). This is synonymous with “authentic pedagogy.” This instruction emphasized higher-order thinking, deep knowledge, substantive conversation, and value beyond school. By using strong leadership and teacher collaboration, the school was able to implement the authentic instruction effectively. After implementing the authentic instruction procedures, the students were scored. The results showed that a moderate amount of the students’

work showed interpretation, analysis, synthesis, or evaluation. These are skills that will be imperative for the careers of the 21st century.

Problem solving is a core concept of authentic pedagogy. The area of problem solving is most applicable to the subjects of science and mathematics. The basis of problem solving is a problem that requires multiple steps to find a solution (Fung, 2004). After solving a math problem, students will need to be able to explain how they reached their answer. This can be done through writing a narrative explanation or by verbally explaining how they reached the conclusion. The most important aspect is that the students are able to solve problems and communicate how they reached their conclusions. After learning how to problem solve in the school setting, students will be able to apply problem-solving techniques in their everyday lives and future careers.

By incorporating 21st century skills in the classroom, students will be better prepared to compete globally for jobs. Educational opportunity through improved teaching and learning methods is the most practical way to bridge the gap between the United States and high-performing countries around the world (Darling-Hammond, 2010). Improving teaching techniques now will allow students to be better prepared for the careers of the future.

How can the practices of these high-performing countries be adapted to fit the layout and needs of American schools? One of my biggest obstacles was determining how to effectively combine my two best practices (collaboration and rigor) in a way that made sense. Once I started researching the practices individually, one instructional strategy kept popping up. This strategy was project-based learning. In order to keep students engaged in learning, they need to be “active learners.” Active learning occurs when students are involved in hands-on activities that allow them to explore, ask questions, apply background knowledge, and openly discuss topics (Public

Schools of North Carolina, 2006). Active learning often involves direct instruction followed by discussion, guided inquiry, small-group work, and the coaching of independent research, projects, and experiments. This model allows students to become active learners and become responsible for their own learning. Through projects, students are more engaged and more active in the learning process. When students are involved in long-term projects, they are given the opportunity to synthesize information, communicate effectively, collaborate, and develop their own capacity to be “rigorous thinkers” (McComb, 2014). Project-based learning uses active learning to allow students to develop 21st century skills.

Upon further research, I discovered that project-based learning uses the 21st century skills that make up my “rigor” component as well as continuous collaboration. Unfortunately, I had had no experience making Project-based learning-type lessons. Nearly all of the lessons I have prepared in the education program thus far have been “teacher-directed.” This means that the teacher is the one responsible for the student’s learning a majority of the time. Project-based learning is just the opposite. Because I had no experience with the student-centered, project-based approach, I had to do extensive research on what a project-based learning lesson entails.

So, what exactly is Project-based learning? According to the Buck Institute for Education (BIE, 2014), project-based learning is when students “work over an extended period of time to investigate and respond to a complex question, problem, or challenge.” In order to be considered project-based learning, a project needs to contain the following components: “significant content, 21st century competencies, in-depth inquiry, driving questions, need to know, voice and choice, critique and revision, and public audience.” Understanding the components of project-based learning allows a teacher to integrate project-based learning into her classroom.

The main component of a project in this model is that the project is significant to the students' lives. It has to have real-world applications in order for students to feel connected to and learn from the topic. Through the project, students will continually be learning, involved in a collaborative process with peers, and required to apply new knowledge to clarify understanding. Project-based learning is an outlet for students to learn and apply 21st century skills they will need for the rest of their lives.

Project-based learning is essentially the use of worthwhile projects. A school project entails assigning a task for students to complete. The students then “create a proposal, plan, and execute the project with varying levels of success” (Dunn, 2014). Project-based learning differs from normal “projects” in a few ways. First, the teacher acts more as a guide than an “all-knowing sage.” This allows students to choose the outcome of their projects. When students are in charge of the outcome of their projects, the project will become more relevant. In order for a project in the project-based learning model to be successful, students need to be responsible for their own learning. In my unit plan, the students got to choose the specifics of their projects. In “Harrowing Habitats,” the students chose an ecological problem to research and find a solution to. Because the students were asked to find a real-world example, the project became relevant to their lives.

Additionally, the project revolves around “driving questions.” These “driving questions” are designed to set students up for discovery. In my unit plan, I used “driving questions” to “drive” students' projects. The driving questions served as the basis for the project. The questions showed students what they needed to accomplish through the project. In the project entitled “Trash to Treasure,” students were given the following driving question: Many people do not recycle today. What are some obstacles to recycling? Why do you think people don't

recycle? What can you make out of recycled materials?” The students then used the question to determine what they could make out of recycled materials. By providing this question, students were given direction on their project.

Finally, the project is going to include a great amount of collaboration. By working in teams, students are able to process information, present different viewpoints, and gain vital communication skills. In my unit plan, the students work together during all three projects. The groups were teacher-selected and student-chosen. The class worked in teams of two, three, or four to complete their projects. The collaborative projects allow the students to learn how to work together more efficiently and to make group compromises.

Although project-based learning is a fairly new term, this type of learning has been applied in classrooms around the world for many years. There has also been some research on the effectiveness of it in the classroom (Chen, 2014). A recent student showed that students could learn more in a science classroom that uses a project-focused approach. This study used a curriculum called “Project-Based Inquiry Science.” The curriculum revolved around emphasizing core practices: conducting investigations, creating experiments, and developing/using models. This curriculum was then implemented in sixth grade science classrooms in an urban, ethnically diverse area. After professional development sessions instructed teachers on how to implement the curriculum, the teachers used the curriculum in their classroom.

The results concluded that the students in the projects-based science class (as opposed to the traditional methods class) scored about eight percent better on an end of unit assessment. An eight percent increase in achievement is a pretty significant improvement for an educational intervention (Chen, 2014). Additionally, research has shown that students remember what they

have learned during a project-based learning experience longer than with traditional teaching methods because they are asked to apply what they have learned (Boss, 2014). In order for students to be successful year after year, they need to retain information they have learned in the previous year. When traditional teaching methods are used, students often forget the content after they are tested over it. With project-based learning, students are able to learn more content, retain the information for longer, and apply more 21st century skills.

Because students act like scientists (they do activities that revolve around “driving questions”), a project-based approach could help to close the gaps in science education. Complementing the new K-12 science education standards presented by the U.S. National Research Council in 2011, project-based learning promotes involving students in projects that use the “core thought processes and practices that scientists and engineers use to investigate natural phenomena and to solve problems” (Chen, 2014). By implementing a projects-based approach, students will become more comfortable with the scientific process.

One of the primary advantages of integrating project-based learning is that it strengthens STEM concepts for Elementary students (Hanover Research, 2012). STEM stands for Science, Technology, Engineering, and Mathematics. In education, STEM involves teaching students the basic critical thinking and processing skills they will need in order to successfully contribute to the STEM professions.

Many students currently have a predisposition to be afraid of STEM subjects. This is especially true among girls and ethnic minorities (Hanover Research, 2012). One way to help remedy this is through early and repeated experience with STEM subjects. By introducing and exploring these concepts with students in Elementary school, they will feel more capable of pursuing those subjects in the future. It will also help to ease the transition to more advanced

Sciences in secondary school. Furthermore, STEM-infused projects allow students to practice experimenting and to realize that failure is part of the problem-solving process. The concept of necessary failure to find solutions is a difficult one for students to learn. However, in order to succeed in STEM, students need to have experience adapting to and learning from mistakes.

“Students engaged in problem-based learning, project-based learning, and activity-based learning will exhibit increased performance in their academic achievement, higher-order thinking skills, and cooperative learning abilities (Brenner, 2009).” Project-based learning is an excellent channel for students to practice critical thinking skills, develop problem-solving strategies, and learn how to effectively collaborate with peers.

There are numerous benefits to using a project-based learning approach. However, designing project-based learning lessons from scratch may prove to be overwhelming. There are a lot of resources available to help teachers design and implement a project-based learning approach. I was able to use these resources to determine the essential components of a project-based learning lesson. I then created a lesson plan template that I could use to create my projects. By creating a template, I was better able to ensure that I included all of the essential project-based learning components. I was then able to adapt sample lessons (found on a project-based learning project database) in order to fit my topic. After finding and adapting two sample lessons to fit within a 4th grade curriculum, I created an additional project that would incorporate Language Arts. Because most projects that fit the project-based learning model are science based, creating a Language Arts project was a little difficult. However, I found that I could use a common classroom book as a basis for the project. After I determined to use the book *Hoot*, I was able to create a project that fit all of the project-based learning components.

According to Edutopia, there are five keys to rigorous project-based learning: real world connection, core to learning, structured collaboration, student driven, and multifaceted assessment (Jarvis, 2014). “Real world connection” applies to introducing a real world problem and having students find a possible solution. By incorporating real-world problems, students will begin to understand the relevance of the topic area. In all three of the projects I used, the topic was related to environmental problems and conservation. In the *Hoot* “Action Plan Project,” students were asked to decide what they would do in the main character’s footsteps. The main character of this story had to do multiple things in order to save the owls on a construction site. Although this was a Language Arts (fictional) example, the situation could occur in the real world. Because students will have had experience with nature and conservation, they will understand the importance of each project to their everyday lives. The students were also asked to provide a solution to a real-world problem. Instead of presenting students with imaginary scenarios, a project under the project-based learning model allows students to solve an actual problem (or a problem that may actually occur in the real world). The presentation of actual problems provides learning relevance for students.

“Core to learning” involves incorporating the standards within the project-based learning unit. This means that students are learning the content throughout the project. The content is integral to learning; it isn’t just added on to the end. It is entirely possible (and common) to create a “fun” project that doesn’t teach students anything. It is very beneficial for teachers to look back over the project to make sure the students are actually learning what he or she intended for them to learn. In the content and the projects I incorporated in my unit, the students were completing projects while meeting state standards. As outlined in my unit plan, the projects allowed students to learn the objectives in an indirect way. However, they were still learning the

content mandated by state and national standards. Because the students completed worthwhile projects, they learned the content as the project progressed.

“Structured collaboration” entails promoting collaboration, but providing a structure for which students should follow. This could involve providing student roles to follow or providing a graphic organizer for which to organize thoughts throughout the project. Although this varies between grades, students of any grade will be able to collaborate effectively if they are taught how to do so. It is necessary to provide ample opportunities to practice working collaboratively. Through short cooperative activities, students will gain a better understanding of how to work efficiently with peers. Throughout my unit plan, students are asked to keep reflective journals for each project. Within these journals, students reflect on project details, group dynamics, and the collaborative process. Because students are asked to describe how their group is working together, this ensures that all group members are contributing to the project. It also keeps students individually responsible for their role within the group.

“Student driven” refers to the teacher acting as a facilitator. As the facilitator, the teacher guides using questions. He or she will give “hints, but not answers.” However, it is imperative that the students determine the overall outcome of the project. When students are given choice on project outcome, they become more involved and dedicated to the project. In my unit plan, the students were asked to generate their own project ideas. They were also allowed to determine how they presented their information. Each of the projects ended in a culminating presentation. The students would be able to determine what methods they would use to present. For example, the students could use a multimedia presentation, a diorama, or a poster to demonstrate their understanding. By permitting different types of presentations, students would be able to apply their various strengths.

“Multifaceted assessment” occurs when assessment is formative and ongoing. The students should be assessed through progress checks (teacher-directed) and self-assessment (student-directed). Project-based learning can be assessed in multiple ways. Unlike typical instruction, project-based learning permits the use of authentic assessment. This means that students can be assessed through writing prompts, presentations, and the completion of worthwhile projects. In my unit plan, my students will be assessed through reflective journal writing and project rubrics. Reflective journals allow students to explain their project, reflect on steps, evaluate group dynamics, self-assess their progress, and communicate their ideas. Rubrics are also a great form of assessment for projects because they show students what they will be assessed on while also ensuring that projects are student-driven. Additionally, the use of rubrics in projects allows students to guide their own learning and allows the teacher to provide an accurate assessment. By incorporating authentic assessment and project-based learning, students will be assessed in a way that will be relevant to their future. Determining an assessment that would accurately measure a student-driven project was one of the most difficult components of my unit plan. Because project-based learning focuses on developing students’ 21st century skills, a standard test wouldn’t be able to measure this accurately. Instead, I created open-ended rubrics that would allow students to determine the project outcome while still producing an accurate assessment.

Through writing and research, I was able to learn a lot about project-based learning. I firmly believe that incorporating project-based learning in the classroom is the best way to promote rigor and collaboration in the classroom. Project-based learning is also the most practical way to promote the development of 21st century skills. When students are given the

opportunities to experiment, explore, and discover, they will receive more enjoyment from the learning process.

Through my project, I was also able to learn how different education systems around the world educate their students. This allowed me to better understand the country comparisons that are discussed in education regularly. I was also able to better understand how imperative it is to teach my students 21st century skills. Although I may not get the opportunity to use my exact unit plan in my classroom (depending on what grade I teach), I will be able to apply project-based learning in my classroom. Because I created a unit plan template that incorporates the essential elements of a project-based learning project, I will be able to use it to design a project-based learning project in any grade.

There are many aspects of global education systems that schools in the United States should acknowledge and apply. However, it would be nearly impossible to replicate any single education system. The teacher preparation levels, cultural factors, and economic conditions vary too much between countries. However, a teacher may be able to better prepare students for the globalized world through the incorporation of rigor and collaboration. By using project-based learning, students will gain essential 21st century skills.

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Unit Plan

Unit Plan Template:

Project Title/Topic: Grade Level: Duration:	Learning Objectives:	Standards:
Driving Questions:	21st Century Skills:	
Real World Application:	Engagement	
Project Details:		

Student Resources:	Evidence of Success:
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Unit Plan Template with Descriptions:

<p>Project Title/Topic: Grade Level: Duration:</p>	<p>Learning Objectives:</p> <p>These objectives describe what students should learn throughout the project.</p>	<p>Standards:</p> <p>This lists the state and/or national standards that are met through the project.</p>
<p>Driving Questions:</p> <p>This question drives the project. It shows students what they are to accomplish.</p>	<p>21st Century Skills:</p> <p>This entails outlining the 21st century skills that the students will apply (Collaboration, Communication, Critical Thinking, Creativity and Innovation, Other).</p>	
<p>Real World Application:</p> <p>This explains the relevance of the project to students' lives.</p>	<p>Engagement:</p> <p>This is the activity that engages the student in the topic.</p>	
<p>Project Details:</p> <p>This section explains the project in detail. This includes the students' job, the problem they are trying to solve, the possible steps to take, etc. It may also include the collaborative grouping arrangement. It could also include the students' "need to knows" before they start their project. This is the content and skills that the students will need to have a grasp on before the project.</p>		
<p>Student Resources:</p> <p>This includes any resources that they students will need in order to be successful (materials, online resources, etc.).</p>	<p>Evidence of Success:</p> <p>This explains how students will be assessed. This could be through journal reflections, presentations, portfolios, quizzes, or standard tests.</p>	

Unit Plan Schedule:

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00-9:00	Science: Intro. to Habitats	L.A.: Writing Activity 1 &	Science (Harrowing Habitats)	L.A.: Writing Activity 2 &	Science: Habitat Presentations
9:00-10:00		Read Chs. 4-6 of Hoot		Read Chs. 10-12 of Hoot	
10:00-11:00	L.A.: Read chs. 1-3 of Hoot	Science: Harrowing Habitats	L.A.: Read Chs. 7-9 of Hoot	Science: Harrowing Habitats	L.A.: Read Chs. 13-15 of Hoot
11:00-12:00	Lunch & Recess	Lunch & Recess	Lunch & Recess	Lunch & Recess	Lunch & Recess
12:00-1:00	Math	Math	Math	Math	Math
1:00-2:00	Specials	Specials	Specials	Specials	Specials
2:00-3:00	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations
	Monday	Tuesday	Wednesday	Thursday	Friday
8:00-9:00	L.A.: Writing Activity 3 &	Science: Recycling Cont. &	L.A.: Writing Activity 4, Read	Science: Trash to Treasure	L.A.: Project Presentations
9:00-10:00	Read Chs. 16-18 of Hoot	Begin Trash to Treasure	Epilogue of Hoot, Project		
10:00-11:00	Science: Intro. to Recycling	L.A.: Read Chs. 19-21 of Hoot	Science: Trash to Treasure	L.A.: Continue Project	Math
11:00-12:00	Lunch & Recess	Lunch & Recess	Lunch & Recess	Lunch & Recess	Lunch & Recess
12:00-1:00	Math	Math	Math	Math	Science: Product Presentations
1:00-2:00	Specials	Specials	Specials	Specials	Specials
2:00-3:00	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations	Free Time/Catch-up/Stations

Supplementary Lessons:

1. Introduction to habitats

<p>Objectives/Learning Goals:</p> <ul style="list-style-type: none"> • After class discussion, students will be able to label essential elements of a habitat on a graphic organizer. • After reading and an activity, students will match animals to their appropriate environments through a matching game. • After watching a habitat video, students will demonstrate their understanding of the various habitats through a class discussion. 	<p>Standards:</p> <ul style="list-style-type: none"> • Science. Changes in Ecosystems and Interactions of Organisms with their Environment. 3. C. 4th grade. c. <ul style="list-style-type: none"> ○ Identify internal cues (e.g., hunger) and external cues (e.g., changes in the environment) that cause organisms to behave in certain ways (e.g., hunting, migration, hibernation) • Science. Changes in Ecosystems and Interactions of Organisms with their Environment. 3. C. 4th grade. d. <ul style="list-style-type: none"> ○ Predict which plant or animal will be able to survive in a specific environment based on its special structures or behaviors.
<p>Student Engagement: We will start the unit by reading “<i>I See A Kookaburra! Discovering Animal Habitats Around the World.</i>” This nonfiction book will introduce students to the topic through a fun and interesting story.</p>	<p>Materials used in Lesson:</p> <ul style="list-style-type: none"> • <i>I See a Kookaburra!</i> • Animal habitat matching game • Habitat video (Nat’l Geographic)
<p>Technology Used:</p> <ul style="list-style-type: none"> • Video • Smartboard • Habitat cards • Textbook 	<p>Assessment:</p> <ul style="list-style-type: none"> • Graphic organizer depicting essential elements of a habitat (food, water, shelter, and space) • Correct match-ups in habitat matching game • Class discussion over various habitats.

2. Introduction to Recycling and Recycling Continued:

<p>Objectives/Learning Goals:</p> <ul style="list-style-type: none"> • After a video and class discussion, students will be able to explain how humans impact the environment through a writing prompt. • After class discussion, students will demonstrate their understanding of how to recycle through a recycling sort. 	<p>Standards:</p> <ul style="list-style-type: none"> • Science. Processes and Interactions of the Earth's Systems. 3. A. 4th grade. a. <ul style="list-style-type: none"> ○ Identify the ways humans affect the erosion and deposition of Earth's materials (e.g., clearing of land, planting vegetation, paving land construction of new buildings) • Science. Processes and Interactions of the Earth's Systems. 3. A. 4th grade. b. <ul style="list-style-type: none"> ○ Propose ways to solve simple environmental problems (e.g., recycling, composting, ways to decrease soil erosion) that result from human activity
<p>Student Engagement: We will start the unit by watching a video about how people have impacted the environment (clearing of land, farming, construction, etc.). We will then discuss what people can do to help reverse the effects (recycling, composting, decrease soil erosion, etc.).</p>	<p>Materials used in Lesson:</p> <ul style="list-style-type: none"> • Video about how humans have impacted the environment (National Geographic) • Recycling Sort • Recycling Video
<p>Technology Used:</p> <ul style="list-style-type: none"> • Videos • Smartboard • Recycling Sort 	<p>Assessment:</p> <ul style="list-style-type: none"> • Writing prompt to evaluate how humans have impacted the environment • Written record of recycling sort (a log)

Writing Activities for *Hoot*:

- Standard for Writing Prompts:
 - Common Core: Reading Standards for Literature K-5. Key Ideas and Details.
Grade 4. 3.
 - Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g. character’s thoughts, words, or actions).
- Writing Activity 1 (chapters 1-6):
 - On page 32 of the book, Roy had to write an apology letter to Dana for punching his nose. Do you think that it was fair that Roy had to write this letter? Was it the right thing to do? Write about a time when you had to do something that you didn’t want to do, but it was the right thing to do.
- Writing Activity 2 (chapters 7-12):
 - On page 93 of the book “Hoot,” Roy talks about how amazed he is that the same species of bird could prosper in Montana and in Florida. He then says, “If they can do it, then maybe I can, too.” In this situation, Roy is talking about how he will have to adapt, but he can flourish in his new home too. Write about a time when you had to adapt, but you were able to flourish too!
- Writing Activity 3 (chapters 13-18)-:
 - On page 248 of the book, Roy makes a speech to the class and says, “every day we’ve been reading about regular, ordinary American who made history ‘cause they got up and fought for something they believed in.” Roy then went on to fight for the owls. Write about a time (that you have experienced or that you have

learned about) where an “ordinary American” made a difference for standing up for something.

- Writing Activity 4 (chapters 19-Epilogue):
 - Now that we have finished the book, we are going to write about the story.
 - Choose one of the following elements of the story to write a short essay on:
 - Describe a character in depth (thoughts, appearance, goals, text-self reflections, etc.)
 - Describe the setting of the story (details about the setting, how did the setting impact the story?)
 - Describe an event in the story (specific details, how did the event impact the characters and story?)

Harrowing Habitats:

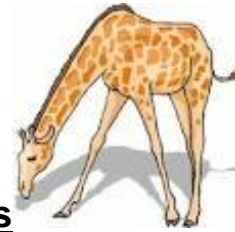
<p>Project Title/Topic: Harrowing Habitats</p> <p>Grade Level: 4th</p> <p>Duration: 1 week</p>	<p>Learning Objectives:</p> <ul style="list-style-type: none"> • After class discussion, students will be able to describe habitat features through a reflective journal entry. • After research, students will be able to explain how humans impact the Earth through a presentation. • After research, students will be able to use and evaluate sources through their use on a project. 	<p>Standards:</p> <ul style="list-style-type: none"> • Science. Changes in Ecosystems and Interactions of Organisms with their Environment. 3. C. 4th grade. d. -Predict which plant or animal will be able to survive in a specific environment based on its special structures or behaviors. • Science. Processes and Interactions of the Earth's Systems. 3. A. 4th grade. a. -Identify the ways humans affect the erosion and deposition of Earth's materials (e.g., clearing of land, planting vegetation, paving land construction of new buildings) • Social Studies. Tools of Science Inquiry. &. A. 4th grade. -Use and evaluate primary and secondary sources (diaries, letters, people, interviews, journals, and photos.
<p>Driving Questions:</p> <p>What are some problems leading to habitat destruction? What can be done to save these ecosystems?</p>	<p>21st Century Skills:</p> <ul style="list-style-type: none"> • Collaboration: Students will collaborate in groups during this project. • Communication: Students will communicate their findings in the form of a presentation. • Critical Thinking: Students will have to synthesize information in order to find the solution to a problem. 	
<p>Real World Application:</p> <ul style="list-style-type: none"> • This project will involve students choosing a topic that they are interested in. Because the topic pertains to the world 	<p>Engagement:</p> <ul style="list-style-type: none"> • We will start this project by reading <i>I See a Kookaburra: Discovering Animal Habitats Around the World</i>. This nonfiction book by Steve Jenkins and Robin Page takes students through the world of different habitats around the world through the eyes of animals. After reading this picture book, students will have a better idea about the importance of preserving these habitats. 	

<p>around them, students will better be able to connect and learn from the project.</p>	
<p>Project Details:</p> <ul style="list-style-type: none"> ▪ This project will entail studying various habitats around the world. After learning about various ecosystems around the world, students will research an ecological problem in a particular habitat in the world (this could be a local problem or a global problem). ▪ They will complete a brainstorming portion in order to ensure that they don't just choose the first problem that they come across. ▪ Students will then use various resources (I have provided a list of credible sources for students to reference, but they are free to do other research if they can't find what they are looking for). ▪ Students will then work in groups of four (determined by drawing cards from a deck and grouping by number) to come up with a possible solution to this problem. ▪ This will be followed by a class presentation that may include: a video, a PowerPoint, a diorama, etc. ▪ Although I will be available to provide assistance, this project is student-driven. ▪ The students will determine: topic, resources, and type of presentation. 	
<p>Student Resources:</p> <ul style="list-style-type: none"> • See Handout #1 	<p>Evidence of Success (Assessment):</p> <ul style="list-style-type: none"> • The students will be assessed throughout the project through a reflective journal. • The end of the project will result in a presentation assessed by a rubric (See Handout #2)

Lesson Plan adapted from:

<http://wveis.k12.wv.us/teach21/public/project/Guide.cfm?upid=3515&tsele1=3&tsele2=103>

Student Resources for Harrowing Habitats:



Habitat Resources

1. <http://www.cheetahspot.com/> (Grasslands)
2. <http://www.pbs.org/edens/manu/index.htm> (Tropical rain forest)
3. <http://www.desertusa.com/animals.html> (Desert)
4. <http://octopus.gma.org/surfing/antarctica/penguin.html> (Antarctica)
5. <http://learn.fi.edu/tfi/units/life/habitat/> (Ecosystems)
6. <http://environment.nationalgeographic.com/environment/habitats/>
(Habitats)
7. <http://www.nwf.org/what-we-do/protect-wildlife/endangered-species.aspx>
(Protecting Endangered Species)
8. <http://www.uen.org/themepark/habitat/endhab.shtml> (Endangered Habitats)
9. <http://www.worldwildlife.org/> (Endangered Species Conservation)
10. <http://mdc.mo.gov/discover-nature/field-guide/endangered-species>
(Missouri Endangered Animals)

11. <http://www.kidsplanet.org/factsheets/map.html> (Information on numerous Endangered Species)

Harrowing Habitats Rubric:

Harrowing Habitats Rubric

Student Name: _____

CATEGORY	20	15	10	5
Brainstorming - Problems	Students identify more than 3 reasonable, insightful barriers/problems that need to change.	Students identify at least 2 reasonable, insightful barriers/problems that need to change.	Students identify at least 1 reasonable, insightful barriers/problems that need to change.	Students don't identify reasonable, insightful barriers/problems that need to change.
Research/Statistical Data	Students include 3 or more high-quality examples or pieces of data to support their campaign.	Students include at least 3 high-quality examples or pieces of data to support their campaign.	Students include at least 2 high-quality examples or pieces of data to support their campaign.	Students include fewer than 2 high-quality examples or pieces of data to support their campaign.
Brainstorming - Solutions	Students identify more than 3 reasonable, insightful possible solutions/strategies to encourage change.	Students identify at least 3 reasonable, insightful possible solutions/strategies to encourage change.	Students identify at least 2 reasonable, insightful possible solutions/strategies to encourage change.	Students identify fewer than 2 reasonable, insightful possible solutions/strategies to encourage change.
Campaign/Product	Students create an original, accurate and interesting product that adequately addresses the issue.	Students create an accurate product that adequately addresses the issue.	Students create an accurate product but it does not adequately address the issue.	The product is not accurate.
Presentation	Students present the information accurately, within the allotted time of 10 minutes, and in a creative and organized manner.	Students present the information accurately and within the allotted time of 10 minutes, but the presentation is not creative or well organized.	Students present the information accurately, but the presentation is less than five minutes or over 10 minutes, and is not creative or well organized.	The information is inaccurate, the students did not complete the presentation within time credentials, and it is not creative or well organized.

Trash to Treasure Project:

<p>Project Title/Topic: Trash to Treasure Grade Level: 4th Duration: 3 days</p>	<p>Learning Objectives:</p> <ul style="list-style-type: none"> • After learning about different environmental problems, students will propose different ways to reduce effects of human activity through writing in a reflective journal. • After learning about various problems associated with waste and trash worldwide, students will complete a project about recycling. 	<p>Standards:</p> <ul style="list-style-type: none"> • Science. Processes and Interactions of the Earth's Systems. 3. A. 4th grade. b. -Propose ways to solve simple environmental problems (e.g., recycling, composting, ways to decrease soil erosion) that result from human activity • Social Studies. Elements of Geographical Study and Analysis. 5. D. 4th Grade. -Describe how people are affected by, depend on, adapt to, and change their environments.
<p>Driving Questions:</p> <p>Many people do not recycle today. What are some obstacles to recycling? Why do you think people don't recycle? What can you make out of recycled materials?</p>	<p>21st Century Skills:</p> <ul style="list-style-type: none"> • Collaboration: Students will work in collaborative groups to complete this project. • Communication: Students will be responsible for communicating the concept/ purpose of their product to the rest of the class. • Creativity and Innovation: Students will be responsible for creating a new useful good out of recycled materials. 	
<p>Real World Application:</p> <p>-During this project, students will create a recycled product that they will actually be able to use. This project will introduce them to the idea of recycling. Recycling will likely be a part of their future lives.</p>	<p>Engagement:</p> <ul style="list-style-type: none"> • We are going to start by watching the following video: http://www.youtube.com/watch?v=629c1J5VZFc -This video (for kids) shows the importance of recycling and how the recycling process works through the narrator "Mr. Cool Can." 	
<p>Project Details:</p> <ul style="list-style-type: none"> • This project will entail students finding items that could be recycled and coming up with new uses for these items. • They will create new products in groups of 3 (determined through a random draw) using at least 50% recycled materials. • They will start by creating a brainstorming worksheet about their project. (See Handout #3) • The students will then "market" the new product through a class presentation. Their goal is to convince their fellow students to either a) buy their product or b) recreate their product in 		




<p>order to recycle.</p> <ul style="list-style-type: none">• In addition to the actual project, students will need to include a PowerPoint, poster, flier, or other visual aid in their presentation.	
Student Resources: <ul style="list-style-type: none">• See Handout #4	Evidence of Success: <ul style="list-style-type: none">• The students will be assessed throughout the project through a reflective journal.• The students will also be assessed through their final product, presentation, and reflection through the use of rubrics (See handout #5)

Lesson Plan adapted from:

<http://wveis.k12.wv.us/teach21/public/project/Guide.cfm?upid=3512&tsele1=1&tsele2=102>

Trash to Treasure Brainstorm Sheet

Name _____

		
<p>Recycled materials needed</p>	<p>How materials will be recycled</p>	<p>Finished product</p>

Student Resources for Trash to Treasure:



Recycling Resources

1. <http://pbskids.org/eeekoworld/index.html> (Interactive Recycling Website)
2. <http://www.meetthegreens.org/> (Interactive website about the "Green's")
3. <http://www.recyclezone.org.uk/> (All about recycling, creating new products, and the facts!)
4. <http://www.kidsbegreen.org/> (Recycling Game)
5. <http://www2.epa.gov/recycle> (Lots if information on recycling)
6. <http://www.earth911.com/> (Recycling-related current events and news articles)
7. <http://kids.niehs.nih.gov/explore/reduce/> (Reduce, Reuse, Recycle)
8. <http://www.nrdc.org/thisgreenlife/0802.asp> (This Green Life)
9. <http://www.education.com/activity/recycled-crafts/> (Recycled Product Ideas)
10. <http://www.mora.org/elementary.html> (Missouri Recycling Association)

Trash to Treasure Rubric:

Trash to Treasure Rubric

Student Name: _____

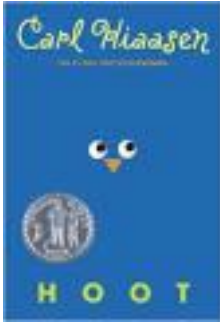
CATEGORY	25	20	15	10
Brainstorming	Students completed all of the Trash to Treasure Brainstorm Sheet with at least 4 ideas.	Students completed the Trash to Treasure Brainstorm Sheet with 3 ideas.	Students completed the Trash to Treasure Brainstorm Sheet with 2 ideas.	Students completed the Trash to Treasure Brainstorm Sheet with 1 idea.
Journal/Log - Content	Journal provides a complete record of planning, construction, modifications, and reflection of strategies used.	Journal provides a complete record of planning, modifications, and reflection.	Journal provides quite a bit of detail about planning, construction, and modifications, but doesn't contain reflection.	Journal provides very little detail about several aspects of the planning, construction, and testing process. It also contains little to no student reflection.
Product	The product uses at least 50% recycled materials and is practical.	The product uses at least 50% recycled materials, but isn't practical.	The product uses less than 50% recycled materials and isn't practical.	The product uses no recycled materials and isn't practical.
Presentation	The presentation accurately markets the product, is within the 5-minute time frame, and is well-organized.	The presentation accurately markets the product and is well-organized, but it is less than 2 minutes or more than 7 minutes.	The presentation accurately markets the product, but isn't well-organized. It also lasts for less than 2 minutes or more than 7 minutes.	The presentation does not accurately market the product and it isn't well-organized. It also doesn't fit within the allotted time credentials.

Hoot Project:

<p>Project Title/Topic: Hoot Action Plan Grade Level: 4th Duration: 3 days</p>	<p>Learning Objectives:</p> <ul style="list-style-type: none"> • After reading and class discussion, students will reiterate the actions of a character through a writing activity. • After reading and collaborative work, students will explain their understanding of the concept of “stepping in to save the environment” through a “plan of action.” 	<p>Standards:</p> <ul style="list-style-type: none"> • Common Core: Reading Standards for Literature K-5. Key Ideas and Details. Grade 4. 1. -Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. • Social Studies. Elements of Geographical Study and Analysis. 5. D. 4th Grade. -Describe how people are affected by, depend on, adapt to, and change their environments.
<p>Driving Questions:</p> <p>Roy was able to protest destroying the owl’s home (pg. 259). In small groups, determine a plan of action for saving the owls. What would you have done in Roy’s footsteps? Create a presentation outlining what steps you will take to appeal to your community and save the owls!</p>	<p>21st Century Skills:</p> <ul style="list-style-type: none"> • Collaboration: Students will work in groups of 2 to complete this project. • Communication: Students will have to communicate their plan of action to the rest of the class. • Critical Thinking: Students will examine a character’s actions to determine if they were the most appropriate in a situation. • Creativity and Innovation: Students will create their own plan of action using prior knowledge, text connections, and research. 	

<p>Real World Application:</p> <p>The goal of this project is to show students that things can be done to prevent habitat destruction (or other problems in society). Through this project, students will gain understanding of the steps that can be taken to appeal to a community. After this project, students would know what to do if such a situation were to arise in the future.</p>	<p>Engagement</p> <p>We are going to start this project by doing a brainstorming activity based on the book “Hoot.” Through this activity, we will revisit what the main character did to save the owls.</p>
<p>Project Details:</p> <ul style="list-style-type: none"> • For this project, students will create a plan of action for saving the owls. They will be in groups of 2 (student-selected) to complete the project. • They need to determine what they could do in Roy’s situation to save the owls. They could write a letter to their governor, research whether owls were legally protected, write a petition, hold a protest, or do all of the above. • The plan of action will entail them creating a product that relates to their plan of action. For example, if they said that they would write a letter, then they will need to write a letter to show in their presentation. • Although they don’t need to create everything that they suggested in their plan, they need at least one artifact. • The students will then present their plan of action to the rest of the class. This could be done through a poster, multimedia presentation, or diorama. • If time allows, then we will create a “Class Plan of Action.” This will likely combine the best elements from many of the presentations. 	
<p>Student Resources:</p> <ul style="list-style-type: none"> • See Handout #6 	<p>Evidence of Success:</p> <ul style="list-style-type: none"> • This will be assessed through a reflective journal throughout the project. • The students will also be assessed on the artifact that they and their final presentation (through a rubric). (See Handout #7)

Hoot Resources for Students:



Hoot Action Plan Student References

1. *Hoot* by Carl Hiaasen

2.

http://montanakids.com/plants_and_animals/animal_er/Things_Kids_Can_Do.htm (Provides practical things that kids can do to save the environment)

3. <http://www.columbia-center.org/recycling/webpages/schools.htm>

(Practical things that students can do to save the environment)

4. <http://www.defenders.org/habitat-conservation/defending-habitat>

(Importance of habitat Conservation)

5.

[http://www.nacdnet.org/resources/reports/conservation_habitats=healty_habitats\(winter09\).pdf](http://www.nacdnet.org/resources/reports/conservation_habitats=healty_habitats(winter09).pdf) (Conservation Habits)

Hoot Action Plan Rubric:

Hoot Action Plan

Student Name: _____

CATEGORY	20	15	10	5
Pre-Project Activity	The students participate in the pre-project activity by contributing to group discussion, referencing the book, and taking notes.	The students participate in the pre-project activity by contributing to group discussion and referencing the book.	The students participate in pre-project activity by contributing to group discussion.	The students don't participate in the pre-project activity.
Brainstorming	Students identify more than 4 reasonable, insightful, possible strategies to encourage change.	Students identify at least 4 reasonable, insightful, possible strategies to encourage change.	Students identify at least 3 reasonable, insightful, possible strategies to encourage change.	Students identify fewer than 3 reasonable, insightful, possible strategies to encourage change.
Reflective Journal	Students reflect on the overall project, the research, and the collaboration of the group throughout the process.	Students reflect on the overall project and the research throughout the process.	Students reflect on the overall project throughout the process.	Students do not reflect throughout the process.
Project Artifact	The artifact is done neatly, contains valid information, accurately represents an artifact that would be used in Roy's situation.	The artifact is done neatly and contains valid information, but it wouldn't apply to Roy's situation.	The artifact is done, but it doesn't contain valid information. It also wouldn't apply to Roy's situation.	The artifact was not completed.
Presentation	The presentation is well-organized, accurately represents the goal of the project, and lasts for approximately eight minutes.	The presentation is well-organized and accurately represents the goal of the project. However, it lasts for less than 5 minutes or more than 10 minutes.	The presentation accurately represents the goal of the project. However, it is unorganized and lasts for less than 5 minutes or more than 10 minutes.	The presentation doesn't accurately represent the goal of the project, it is unorganized, and it lasts for less than 5 minutes or more than 10 minutes.

Prezi Presentation:

Incorporating Global Best Practices in the American Classroom

Link: http://prezi.com/qzfmtrxtom/?utm_campaign=share&utm_medium=copy&rc=ex0share