

STEAMBOAT SPRINGS EDUCATION FUND BOARD
GRANT COMMISSION MEETING
April 18, 2012; 5:30 PM
Human Service Center Board Room
Agenda

1. 5:30 Call to Order
2. 5:31 Changes to the Agenda
2. 5:32 Public Comment

In order to assure public awareness of and involvement in the activities of the Steamboat Springs Education Fund, this portion of the Board meeting is available to discuss any item related to the Fund. The maximum time allowed for the discussion of any single subject will be three minutes. If more time is required, the topic may be placed on the agenda of a future Education Fund Board meeting.

3. 5:35 Board and Commission Member Reports
4. 5:40 Approval of Meeting Minutes from Marc 21, 2012
6. 5:45 1st Reading Follow-Up Discussion (continued)
7. 6:15 2nd Reading Discussion – further information discussed
8. 6:45 Commission Vacancies expiring June 30, 2012
9. 7:55 Other Business
10. 7:30 Adjourn

4/18/12

Steamboat Springs Education Fund Board
Grant Commission
Wednesday, March 21, 2012; 6:00 PM
Human Service Center Board Room

Grant Commission members present included Glen Airoidi, Stuart Handloff, Mark Fitzgerald, Dean Massey, Susie Amsden, CJ Berg, Patrick Delaney, Kris Rowse, Paul Barry and Valerie McCarthy. Also present were Brad Meeks (SBS School District Superintendent), Dale Mellor (SBS Dir. of Financing), Colleen Poole (Director North Routt Community Charter School), Tim Miles (SBS and SR Dir. of Tech.), Jim Early (Hayden Dir. of Tech), Tracy Stoddard (Strawberry Park and Soda Creek Elem. Vice Principal), Marty Lamansky (Steamboat Springs High School), Michelle Miller (Soda Creek Principal), Celia Dunham (Principal Strawberry Park Elementary), Roger Good (EFB director), Judy Harris (Steamboat Springs Administration), Rhonda Sweetser (Hayden School District), Libby Foster (Partners in Mentoring) and Sonja Macys (Yampatika). Denise Brazier, Ski Town Executive Service, recorded the meeting and prepared the minutes.

Call to Order:

Glen Airoidi called the meeting to order at 6:05 pm.

Public comment:

Greg Kammerer, whose wife was part of the group that initially developed the ½ cent sales tax, encouraged the EFB to consider the original purpose of the tax was to provide funds for technology and to decrease class size for the Steamboat Springs public schools and objected to the EFB's lack of focus in that direction.

Board and Commission Member Reports:

Roger said challenges this year for the EFB include a new superintendent, 2 new school board members, the consolidation to 1 commission, requests greater than available funds and requests from more community groups. The EFB mission includes 4 basic tenants:

1. ballot language
2. fiduciary responsibility to the community
3. to document a body of evidence so taxpayers are encouraged to vote for the tax upon renewal and
4. EFB exists in a space that is constricted by tax law.

EFB needs to show that EFB hasn't contributed to any controversy. Glen added EFB's role is to remain neutral and to think about how EFB evaluates need, merit and what's best for the community.

Approval of Meeting Minutes from February 15, 2012

Mark Fitzgerald made a motion and Valerie McCarthy to approve the minutes from February 15, 2012 as written.

Vote: 10 Yes 0 No The motion passed unanimously.

1st Readings:

Hayden School District

Summer Intensive \$ 7,500 Rhonda Sweetser said the summer program helps students to maintain and close the gap in academic progress. One math tutor will be added this year and up to 60 students will attend the program. Hayden was asked to provide more specifics and numbers regarding student attendance. The program is a low priority for Hayden. *Patrick Delaney made a motion and Mark Fitzgerald seconded, to move to 1st reading Hayden's Summer Intensive Program an amount not to exceed \$ 7,500.* *Vote: 10 Yes 0 No The motion passed unanimously.*

South Routt's Summer Intensive \$ 7,500 - The request is a carbon copy of Hayden's request. The program is #2 priority for South Routt. *Patrick Delaney made a motion and Mark Fitzgerald seconded, to move to 1st reading South Routt's Summer Intensive Program an amount not to exceed \$ 7,500.*
Vote: 10 Yes 0 No The motion passed unanimously.

Steamboat Springs Effective Classroom: \$ 986,000

1. Small Class Size \$ 624,000 – Brad Meeks said the funding would provide 11 teachers and on the average reduces class size by 3. Titling funding and special education funding has been eliminated. Brad said the district respects the community's desires, a group who is willing to tax themselves to have technology and small class size in the district. Brad was asked to provide data regarding how Steamboat Springs is doing historically and comparatively for 2nd reading and for the efficacy for small class size. Brad prefers to not rank the line items as they are all equally important.

2. ELL: \$ 160,000 - The request would provide 4 teachers providing support for 164 students, K-12. The ELL population is steadily increasing. Federal funds provide \$ 23,000. The balance needed to run the program comes from EFB. Without EFB funds instruction would fall on the teachers.

3. Counseling - \$ 70,000 The request is changed from providing .5 to 1 FTE.

4. Gifted/Talented - \$ 132,000 There are 196 students in the program grades 4-12, with 2.25 G/T staff. Students identified include all areas of giftedness. Grades 2 & 3 will begin to be identified. The goal next year is implement a project based learning model. Federal funding totals \$ 23,000. EFB funds would provide over and above what is required.

Brad was asked to provide for the 4 components described above details on the number of students impacted, the grade level of service and what the programs would be without EFB funds to demonstrate what EFB gives back to the community.

A motion was made and seconded to move to first reading Steamboat Springs Effective Classrooms in an amount not to exceed a total of \$ 986,000 and broken down as described above.

Vote: 10 Yes 0 No The motion passed unanimously.

Literacy Coaches - \$ 118,000 The Steamboat Springs district was not awarded the Mile High Grant. The fund would provide 2 literacy coaches. *Valerie McCarthy made a motion and Mark Fitzgerald seconded, to move to 1st reading an amount not to exceed \$ 118,000 for Literacy Coaches.*

Vote: 10 Yes 0 No The motion passed unanimously.

Technology Staff - \$ 182,400 The request provides less than ½ the cost of the 6 member technology staff. The district funds \$ 300,000 of the technology budget. Glen asked for an articulation of the big technology picture to help the community understand the value the funds EFB provides. *Mark made a motion and Dean seconded, to move to 1st reading a request for Technology Staff for an amount not to exceed \$ 182,400.*

Vote: 10 Yes 0 No The motion passed unanimously.

Technology Hardware - \$ 350,000 The funding is to replace the Mac computers and to upgrade classroom phones. Computers purchased have at least a 7 yr. warranty. An amount of \$ 50,000 is for phones and the balance is for computer replacement. *CJ made a motion and Valerie seconded, to move to 1st reading a request for Technology Hardware an amount not to exceed \$ 350,000.*

Vote: 10 Yes 0 No The motion passed unanimously.

Technology Software - \$ 124,213 Software covers licensing and applications. Almost all software is renewable. A request was made for a breakdown of the software. The investment on software that may become obsolete is minimal. *Mark made a motion and Stuart seconded, to move to 1st reading Technology Software for an amount not to exceed \$ 124,213.*

Vote: 10 Yes 0 No *The motion passed unanimously.*

Network - \$ 155,000 The network is needed to make the technology work. The bulk of the funds would go to upgrade core switches, maintenance fees for switches, fiber network between buildings and upgrades at Soda Creek Elementary. *Stuart made a motion and Mark seconded, to move to 1st reading Technology Network for an amount not to exceed \$ 155,000.*

Vote: 10 Yes 0 No *The motion passed unanimously.*

Professional Development - \$ 40,000 Marty said teachers need to know the latest and most effective practices. An amount of 30% or less pays substitute teachers. Some conferences are only provided when school is in session. *Patrick made a motion and Kris seconded, to move to 1st reading Professional Development an amount not to exceed \$ 40,000.*

Vote: 10 Yes 0 No *The motion passed unanimously.*

The total amount for the Steamboat Spring's requests is \$ 2,073,613.

1st Reading Follow-Up Discussion:

Glen reviewed the 2012-2013 budget discussion attached to these minutes. The projected available budget is \$ 2,547,723. Requests total \$2,749,577 for a difference of \$ 201,854.

As the result of today's public comments and comments during the last EFB meeting, discussion ensued whether EFB should fund education outside the public schools. Glen suggests components that should be considered are accessibility, the reach and length of the benefit, alternative sources of funding, sustainability (impact to community when sales tax goes away) and state-mandated versus opportunity. All should be considered when EFB decides how to cut \$ 201,854. .

(Susie Amsden and Kris Rowse left the meeting).

Each line item was addressed to determine possible reductions. Jim Early's opinion for the Hayden requests was as follows:

Technology Support Staff – no flexibility

Infrastructure Elementary School – elimination of T-1 \$ 500/mo. lease could be factored in

Licensing – no flexibility per

PowerSchool Update and Servers – no flexibility per

MS Intervention Staff – request already reduced by 10% from last year

Computers Elementary Lab - painful to manage but would look for funds elsewhere

Peripherals – has room for flexibility

Theater/Auditorium Upgrades - has room for flexibility except need \$ 10,000 for lighting.

NRCCS – Colleen said NRCCS will make due with partial funding. Mark Fitzgerald commented the request is less per student than other district requests.

Yampatika – If EFB were to reduce the request to \$ 8,000, the number of classrooms would be decreased and Steamboat Springs would be the most impacted per Sonya Macys. Small donors were not approached this year due to the time required to go after small grants.

Yampa Valley Science School – The request is the same as last year with an expanded program.

Arts Council – Stuart Handloff said there is flexibility in both requests.

Partners Middle School Mentors – The request is the same as last year with an expanded program. The request is the minimum needed to run the program without cutting mentors.

Girls 2 Women – Very small request. Does EFB want to support a new program?

Innovation Grant – room for flexibility.

Tech Tower – Tim Miles said the request of \$ 40,000 is reasonable. There is a range and there could be a rescission.

South Routt Hardware Infrastructure – There is room for flexibility. Smartboard prices go up June 1.

Other Business:

The budgeting process will be continued at the April 18th, 2012 meeting to begin at 5:30 if a quorum is established. Commission vacancies will also be addressed.

Adjourn:

A motion was made to adjourn the meeting. The Education Fund Board Grant Commission meeting adjourned after 9:40 pm.

Questions Gleaned from EFB and Grant Commission March meetings for 2nd Reading:

Hayden:

Technology Infrastructure Elem. School \$ 47,721

How much bandwidth does a Steamboat student have compared to what the request for infrastructure will provide for a Hayden student?

PowerSchool Update & Server \$ 5,205

Grant Commission asked for more detail.

Auditorium/Theater \$ 25,000

A policy is requested from Hayden for community groups using the auditorium/theater.

Summer Intensives \$ 7,500

Hayden was asked to provide more specifics and numbers regarding student attendance.

South Routt:

Technology Hardware Infrastructure \$ 152,000

South Routt was asked to provide prioritization of the 3 components, which can be partially funded and which can be put off another year.

Summer Intensives \$ 7,500

South Routt was asked to provide more specifics and numbers regarding student attendance.

Steamboat Springs:

Small Class Size \$ 624,000

Provide data regarding how SBS is doing historically and comparatively and for the efficacy of small class size.

***Brad was asked to provide for the 4 components of the request (small class size, ELL -- 164 students, G/T -- 196 students, and Counseling) details on the number of students impacted, the grade level of service and what the programs would be without EFB funds to demonstrate what EFB gives back to the community.

Technology Staff \$ 182,400

Provide an articulation of the big technology picture to help the community understand the value the funds deliver.

Technology Software \$ 124,213

Provide a breakdown of the software.

Community Groups:

***Roger asked of all Community Groups to provide if any collaboration with the districts. The question was answered by the community groups.

SSAC Summer Arts Camp \$ 7,500

How does the program affect a student's education?

Middle School Production \$ 4,000

Provide further breakdown on the budget line items.

Girls to Women \$ 1,000

What do the boys do the day the girls are out of school attending G2W?

SSSD Software

Software	Primarily Facing
LogMeIn	Staff (Heat/AC)
Adobe Standard	Staff/Student
Apple (.MAC)	Staff/Student
File conversion	Staff/Student
GoDaddy	Staff/Student
PBWiki	Staff/Student
Scanning	Staff/Student
Vision	Staff/Student
Zoomerang	Staff/Student
Altiris	Staff/Student (Imaging Software)
*LunchByte	Staff/Student/Parent
Teacher Web?	Staff/Student/Parent
Rschoo1	Staff/Transportation
*APlus/E2020	Student/Staff
*Everyday Math?	Student/Staff
*Keyboarding	Student/Staff
*Lexia	Student/Staff
*LightSpeed	Student/Staff
*Microsoft	Student/Staff
*Orchard	Student/Staff
*Read Naturally	Student/Staff
*Renaissance Learning	Student/Staff
ABCTeach	Student/Staff
*Adobe Creative (Not Annually)	Student/Staff
BrainPop	Student/Staff
Enchanted Learning	Student/Staff
Learning A-Z	Student/Staff
Office 365 ?	Student/Staff
Safari Montage (portion)	Student/Staff
SpecialEd/ELL *	Student/Staff
Super Teacher Worksheets	Student/Staff
TumbleWeed Press	Student/Staff
Video Conversion	Student/Staff
VoiceThread	Student/Staff
BackupExec	Student/Staff (Local Backup Software)
Carbonite	Student/Staff (Offsite Backup Software)
Dartware	Tech Network Mapping
*Appsense	Student/Staff (Profile Mgmt)
*Citrix	Student/Staff (Remote Access/Virtuals)
Others that do not have renewals.. unless we Retire(Replace)/Upgrade	



			Variance	Change
	2010-2011	2011-2012		
Requested Amount	\$ 5,500	\$ 29,692	\$ 24,192	440%
Awarded Amount	\$ 4,950	\$ 8,000	\$ 3,050	62%
Percentage Awarded	90%	27%		
Total Project Cost	\$ 15,500	\$ 28,485	\$ 12,985	84%
Matching Funds Raised	\$ 10,550	\$ 20,485	\$ 9,935	94%
Match Ratio	2:1	3:1		
Number of Students Served	120	600	480	400%
Classrooms Served	6	30	24	400%
School Districts Served	1	3	2	200%
Per Student Cost	\$ 129.17	\$ 47.48	\$ (81.69)	-63%
Per Student EFB	\$ 41.25	\$ 13.33	\$ (27.92)	-68%
EFB Share	32%	28%	-4%	-4%
Per District Cost	\$ 15,500	\$ 9,495	\$ (6,005)	-39%
Number of Donors	64	8		
Education Fund Board		Education Fund Board		
Emily and Tony Seaver		Sleeping Giant Financial, LLC.		
Steve & Suzi McVoy		Ann & Hal Noyes		
Yampa Valley Community Fdn.		Jan & Carl Vail		
Kathleen Cline and Carl Steidtman		Wells Fargo Community		
Abacus Mechanical		Michael and Sara Craig		
		Yampa Valley Community		
		U.S. Forest Service		



			Variance	Change
	2011-2102	2012-2013		
Requested Amount	\$ 29,692	\$ 17,000	\$ (12,692)	-43%
Awarded Amount	\$ 8,000	\$ 17,000		
Percentage Awarded	27%			
Total Project Cost	\$ 28,485	\$ 53,000	\$ 24,515	86%
Matching Funds Raised	\$ 20,485	\$ 36,000	\$ 15,515	76%
Match Ratio	3:1	2:1		
Number of Students Served	600	714	114	19%
Classrooms Served	30	42	12	40%
School Districts Served	3	3	0	0%
Per Student Cost	\$ 47.48	\$ 55.85	\$ 8.38	18%
Per Student EFB	\$ 13.33			
EFB Share	28%			
Number of Donors	8	3		
Education Fund Board		Education Fund Board		
Sleeping Giant Financial, LLC.		U.S. Forest Service		
Ann & Hal Noyes		Bureau of Land Management		
Jan & Carl Vail				
Wells Fargo Community Assistance Fund				
Michael and Sara Craig Scheckman				
Yampa Valley Community Foundation				
U.S. Forest Service				

Student Feedback

“What was your favorite thing about your experience with Yampatika?”

- “Well the field trip was fun and it let me learn about the environment.” 4th grade, Soroco
- “Because we were outside and looking for wildlife.” 4th grade, Soroco
- “I liked it when we snowshoed and got to look at wildlife.” 4th grade, Soda Creek
- “My favorite experience was that I was able to learn the different types of energy.” 5th grade, Hayden
- “My favorite thing was the experiment, it was fun and exciting.” 5th grade, Hayden
- “The snowshoe hike!” 5th grade, Soroco
- “I liked the projects we did and how we worked together.” 5th grade, Soroco
- “How we learn about nature!” 3rd grade, Steamboat
- “When we sprayed the fish in front of the drain (drain stenciling community service project.)” 3rd grade, Steamboat



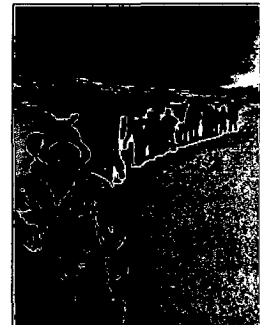
Hayden Kindergarten



Steamboat 5th Grade



Steamboat 3rd Grade



Steamboat 4th Grade

Teacher Feedback

“The program assisted us in integrating environmental education with our current curriculum. Also, due to the amount of standards we are currently teaching, this allowed us to focus on other standards, knowing students would be learning through the Yampatika program. The hands on approach really enables students to retain their learning in a memorable way.” K. Sowards, 4th Grade Soda Creek Elementary

“They [Yampatika] helped think about the standards more deeply and creatively teaching them.” King, 5th grade, Soda Creek Elementary

“Thanks so much for all the time and energy you put into my class. They learned so much!” S. Ogden, 2nd, Strawberry Park Elementary

“I liked the variety of activities that kept the student’s attention and engaged mentally or physically, or both! I really enjoyed the program and felt my students got a lot out of it.” G. Turner, K, Soda Creek Elementary

“Hands on application is a great opportunity for the kids to learn and they LOVE having someone to listen to other than their classroom teacher.” S. Forbes, 3rd Grade Soda Creek Elementary

Subject: Re: Revised Questions
From: Beth Wendler (bethwendler@gmail.com)
To: dobrazier@yahoo.com;
Date: Wednesday, April 11, 2012 12:51 PM

Hello Denise

Thanks for forwarding me further questions from the Board.

Historically, the boys have not done anything while the girls attended this workshop. At some point in the past, the school attempted to organize something....and it wasn't received well.

Last year a group of Moms organized an event called "It's Your Choice." The event was held on a different day. Several men from the community spoke about different topics from making choices to create your own future to bullying. The boys had very positive feedback. This year the boys event will be held the same day as Girls to Women. It will be called, "Journey" this year. I would actually encourage any of the men involved in the Fund Board to contact Mary Jenkins at 846-3397 if they are interested in getting involved with the boys workshop. I think everyone was pleasantly surprised how much the boys enjoyed it and seemingly got from the day.

We are talking about collaborating more in the next few years. We will be applying for funding together in the future.

Please feel free to contact me with other questions or concerns. We appreciate your consideration for supporting Girls to Women.

Beth Wendler
970-846-0746

On Mon, Apr 9, 2012 at 5:14 AM, Denise Brazier <dobrazier@yahoo.com> wrote:

Answers to questions can be submitted in writing to me by 4/14 to be included in the commission meeting or questions can be responded verbally at the meeting on 4/18.

Denise Brazier
Ski Town Executive Service
970-846-5979

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Beth Wendler
846-0746
www.musictogethersteamboat.com

Subject: RE: Revised Questions
From: Scott Mader (smader@southroutt.k12.co.us)
To: dobrazier@yahoo.com;
Date: Tuesday, April 17, 2012 4:18 PM

Denise,

Sorry this is late but here are my answers to the South Routt questions.

South Routt:

Technology Hardware Infrastructure \$ 152,000 South Routt was asked to provide prioritization of the 3 components, which can be partially funded and which can be put off another year.

1. Prioritization would be: #1 SmartBoards (not to exceed \$75,000) #2 Infrastructure #3 Computers and Peripherals

Number three (Computers and Peripherals) could be partially funded or put off another year.

Summer Intensives \$ 7,500 South Routt was asked to provide more specifics and numbers regarding student attendance.

1. South Routt Elementary had 26 children attend summer school in 2011 with 23 of those children attending all three week-long sessions. The children were split into two classrooms with two teachers in each (K-2 and 3-5). Students who completed all three sessions received 36 hours of instruction over the course of the summer. In each classroom, students worked in small leveled groups on reading and writing. Additionally, students were given reading assignments to do at home in the time period between each session. Student progress was monitored with the ECAW rubric as well as Dibels Next. In general, there wasn't the typical student summer achievement regression and in many cases there was an increase in 3rd through 5th grade Rit spring to fall NWEA tests scores. Ed. Fund Board money paid the salary for each teacher in the program.
2. Soroco Middle School served 14 students in two two week summer school sessions in 2011. Two instructors delivered small group instruction in math and reading for 16 days. Each day students were exposed to one and a half hours of math and one and a half hours of reading. Math growth was monitored with Prentiss Hall Workshop pre test to identify math skill levels and post tested with the same instrument. Growth in math varied from outstanding to flat. Reading achievement was pre and post measured using Renaissance Learning Star Reading and achievement proved to be mixed with some student scores being raised and some declining.

Thanks,

Scott Mader

From: Denise Brazier [mailto:dobrazier@yahoo.com]

Sent: Monday, April 09, 2012 5:15 AM

To: Airoidi Glenn; wscottberry@gmail.com; Dean Massey; Ann Henderson; Kristi Brown; Roger Good; Paige Boucher; Jill Boyd; kkhwilson@msn.com; Summer Johnston; btksurvey@comcast.net; Stuart Handloff; Denise Connelly; Vance Fulton; gena@nwgprint.com; Tammy; Mark Fitzgerald; CJ Berg; Jody Patten; Patrick Delaney; Paul Barry; Kris Rowse; Sue Amsden; Valerie McCarthy; bmeeks@sssd.k12.co.us; Dale Mellor; Tim Miles; Scott Mader; mluppess@haydenschools.org; rsweetser@haydenschools.org; Jim; Sonja Macys; Gretchen Van De Carr; Teresa Wright; bethwendler@gmail.com

Subject: Revised Questions

Answers to questions can be submitted in writing to me by 4/14 to be included in the commission meeting
or questions can be responded verbally at the meeting on 4/18.

*Denise Brazier
Ski Town Executive Service
970-846-5979*



Expeditionary Learning
Learning Expedition Documentation Project

Colorado's Changing Forest

The Mountain Pine Beetle Infestation and Global Climate Change

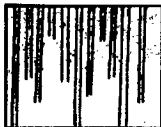
Fifth and Sixth Grade

Explore Elementary School
Thornton, CO

Expedition authors
Anna Orton-Boyd
Chris Occhiuto

With support from Sharon Forbes and Barron Steffen





Expeditionary Learning Learning Expedition Documentation Project

Summary

The Mountain Pine Beetle has devastated the forests of Colorado. Temperate winters have led to widespread infestations of the tiny beetle, which targets Lodge-pole and Ponderosa pine trees, the most prevalent tree species in Colorado. In response to this crisis in their state's forest ecosystem, fifth and sixth graders at Explore Elementary School in Thornton, Colorado embarked on a twelve-week learning expedition to understand and educate the public about the Mountain Pine Beetle infestation, its role in the Rocky Mountain ecosystem, and its connection to global climate change. They created field guides to the ecosystem of the Mountain Pine Beetle and began a campaign to educate their community about the issue.

The expedition was built around two major projects that helped students educate the public about the Mountain Pine Beetle, the effects of climate change, and the impact of human behavior on the environment. The expedition addressed key fifth and sixth grade standards in earth science and life science, including natural processes that alter the earth's ecosystems, weather patterns, and the interactions of organisms within ecosystems. Each class in the fifth and sixth grades created a field guide of the ecosystem of the Mountain Pine Beetle, which included concerns related to its infestation of the Rocky Mountain forests today and in the future, the benefits and risks of various kinds of management techniques, and the role of global warming. Students also wrote persuasive speeches and letters to influential community members about Mountain Pine Beetle infestations and climate change.

To prepare for creating their field guides and writing their persuasive speeches and letters, students studied the Mountain Pine Beetle's life cycle, its role in the forest, and the interrelationship between an ecosystem and a living organism. Students analyzed maps and aerial photos of areas in the Rocky Mountains that are affected by Mountain Pine Beetle infestations and they visited the forests to see and document the devastation. They developed hypotheses, searched for patterns, and drew conclusions about changes seen in the forest over time.

In addition to meeting key science standards, the major projects in this learning expedition honed student research, non-fiction reading, data analysis, photography, scientific drawing, and expository and persuasive writing skills. Students also had the opportunity to educate the public on a pressing state and national issue and address the health of an important natural resource. Students emerged from this expedition as advocates for responsible choices and stewardship of the land. They learned that their voices truly mattered and could make a difference.

Guiding questions

- How do human choices impact the earth?
- How does global climate change impact ecosystems?
- How do species infestations impact ecosystems?
 - How do humans contribute to the problems?
 - Should humans attempt to control species infestations?
- How can we make a positive contribution to stop the Mountain Pine Beetle infestation and climate change?





Case study

Beetlemania: The Mountain Pine Beetle

The Mountain Pine Beetle case study had two parts. The first part focused on the Rocky Mountain ecosystem and the Mountain Pine Beetle's role in it. Students studied the trees most impacted by the beetle – the Ponderosa and Lodge-Pole pines – as well as the range of plants and animals in the Rocky Mountain forests that are secondarily influenced by Mountain Pine Beetle infestations. They learned about the forest's CO₂ cycle and the impacts of natural processes (e.g. erosion and earthquakes) and human-caused processes (e.g. logging and global warming) on the ecosystem. Students analyzed maps and aerial photos and then visited Golden Gate Canyon State Park to map and document infected trees for the forest service. This fieldwork gave students first-hand experience with the devastation that Mountain Pine Beetle infestations cause in the forest.

The second part of the case study focused students more sharply on global warming. They learned that climate change has contributed to Mountain Pine Beetle infestations and that the infestations, in turn, contribute to global warming by impacting the ability of forests to remove greenhouse gases from the atmosphere. Students studied weather patterns in the Rocky Mountain ecosystem and looked for trends over the past ten years. They were able to identify patterns by examining data from snow pack, drought, and temperature. The major projects of the learning expedition culminated in students creating field guides to the Rocky Mountain forests and the impact of the Mountain Pine Beetle. Field guides reflected extensive research and fieldwork and included student photographs, scientific drawings, and descriptive writing. Students also drafted and presented persuasive speeches during the unveiling of their field guides at a local bookstore and wrote persuasive letters to local businesses.



Major projects

Project one: Creating a field guide

Introduction to field guide writing

With the end in mind, students used exemplar models and several rounds of “noticing and wondering” about the genre of field guides. They analyzed the purpose and audience for field guides as well as the organizational structures used in the models. Rather than creating traditional species identification field guides, the students created informational field guides to the Rocky Mountain ecosystem. Teachers and students worked together to identify the criteria of what their field guides would include. This was then used to create a rubric, which teachers used to assess the final field guides.



Expeditionary Learning Learning Expedition Documentation Project

Mountain Pine Beetle

By: Mariah

Who knew that such little bugs could cause such huge problems? The Rocky Mountain Pine Beetle, or *Dendroctonus ponderosae*, are only about the size of a piece of rice. Although so small, this little beetle leaves its imprint on the pine trees in the Colorado forests – you can tell where it's been by the dying pine trees it leaves behind.

Mountain pine beetles are one of the most significant insects of the Western pine forests in Colorado. Mountain pine beetles primarily attack Ponderosa pine and lodge pole pine. In the late summer or early fall the female pine beetle finds a tree she likes. She burrows in through the bark and makes a J-shaped gallery to lay her eggs. Female beetles release pheromones to attract males. The beetles hatch as white larvae and dig into the tree's bark where they spend the winter. The larvae have a natural kind of antifreeze which protects them from freezing in the winter. As long as it doesn't get too cold or stay cold for too long, in the spring the pupae eats more of the inner bark before it burrows out of the tree as an adult. The life span of the beetle is about one year.

Mountain pine beetles have predators just like other animals do. Here are three of their predators: a woodpecker, a predatorial wasp, and other species of beetles. Just because pine beetles live under the bark, that doesn't mean predators can't hear them. In fact, woodpecker activity on the tree is one sign that the tree is infected.

Mountain pine beetles have little grooves on their bodies called mycetangium. These grooves carry the blue stain fungus. As they enter a tree, the fungus spreads to the phloem of the tree which carries the water through out the tree. Once infected, the tree can't transport the water and nutrients that it needs and so it dies within one year of being attacked. Mountain pine beetles play a very important role in our forests. They infest and kill older and larger stressed trees. Mountain pine beetles are native to our forest ecosystem.



The beetles hatch as white larvae and dig into the tree's bark where they spend the winter. The larvae have a natural kind of antifreeze which protects them from freezing in the winter.

Artwork by Mariah

A tree tries to defend itself against the attacking beetles by releasing sap at the boring site. These pitch tubes are a sign of MPB attack in a forest stand.



Building background knowledge about the Mountain Pine Beetle

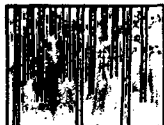
Once students knew where they were headed with regard to the final product – informational field guides to educate the public about the Mountain Pine Beetle infestation – they began to delve into the content. They began this work with map analyses focused on change over time in Colorado forest ecosystems. At the same time, they researched the Mountain Pine Beetle – its life cycle, habitat, and diet – and conducted fieldwork to better understand the key role that this tiny insect plays in a larger system. Witnessing first-hand the transformation and destruction of their “back-yard” forests gave the issue a great deal of urgency for students.

Throughout this project, students were engaged in a series of reader's workshops using nonfiction resources that would help them become experts on the forest ecosystem and the Mountain Pine Beetle. During these workshops, students utilized the comprehension strategies *asking questions* and *making inferences* to gain a deeper understanding of foundational content knowledge.

Research topics and teams

In order to truly become experts and articulate the complexities of the Mountain Pine Beetle infestation, students were divided into research teams to tackle one aspect of this larger issue. Field guide chapter topics were differentiated among students based on writing ability. Student authors embraced every component and perspective of the Mountain Pine Beetle infestation with chapter sections that included:

- Mountain Pine Beetle – What is it?
- Concerns
- Future forests
- Balancing risks
- The role of global warming



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Structured peer critique allowed students to conduct research and write in teams with strong support from each other. Students were fact checkers and editors for one another throughout the field guide writing.

Photography study

Students studied photography as a mode of communication. Before getting their hands on cameras, students were familiarized with the art and visual skills of subject, composition and focal point. Learning to communicate a message without words presented new challenges for students while offering a very powerful experience with a new art form.

Scientific drawings

Capturing the effects of the Mountain Pine Beetle on Colorado forests could not be completed solely via photography. Therefore, students created scientific drawings to compliment their expository writing and photographs. Structured peer critique again offered a powerful method for producing high quality final products.

Final publication

The final product of this investigation was a class field guide including an expository writing piece, photograph, and scientific drawing from each student. Students participated in designing the overall layout of the book as well as contributed to additional pages such as the dedication and glossary. In celebration of the completion of this major project, students, families, and teachers held a book party at a local bookstore. Students answered questions from audience members about the experience from start to finish.

The Natural Cycle of the Forest

By: Mariah

Everything in nature has a natural cycle—a usual way that things are born, live and then die. A forest, a group of trees, has a cycle too. Trees grow into maturity from a seed, and then die a natural death of old age or sometimes die from fire, extreme weather or bugs and pests. Trees are usually different ages in a forest and of different kinds. The Mountain Pine Beetle is one factor that has altered the natural cycle of the forests in the Rocky Mountain ecosystem.

Even though the Mountain Pine Beetle is mostly despised by Coloradans and Canadians alike, the little bugs (the size of a grain of rice) have an imperative role to play in our forests. They help our forests when they invade old and dying trees, leaving behind blue stain fungus. In about a year, the old tree dies and a new tree takes its place starting another generation. There are so many beetles (for many reasons) that the trees can't defend themselves from thousands of attacks in one season from these little pesky insects. Since the Mountain Pine Beetles are so out of hand, all of the trees are dying—young and old—one by one.

Humans have affected the cycle of the forest in a few ways too. One is our management of the forest and its resources. We have stopped letting nature run its course—as in forest fires that help to destroy old trees and allow new trees to come in. Another is global warming which is changing the climate and stressing the trees out, making them an easy target for the beetles. There are so many stressed trees in the forest, the beetles have a feast, an all you can eat buffet!

Once a natural cycle has been interrupted or altered, everything else in the ecosystem changes too. Millions of pine trees have died in the Rocky Mountains so far. That means animals, insects, reptiles, amphibians and bird species will be impacted. Their habitats and food sources changed or even disappear completely. Some animals will be destitute without tall, mature pine trees. During the current cycle, the pine beetle is out of control which throws off the natural cycle of the forest. Hopefully in the future, the forest cycle will be more in balance and be allowed to run its natural course without humans interrupting it.



The life cycle of a pine tree, from sapling through maturity and finally, death.
Artwork by Mariah



Photograph by Daron



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Project two: Persuasive writing

After completing the field guide, fifth-grade students wrote persuasive speeches and sixth-grade students wrote persuasive business letters to synthesize their knowledge and opinion of the interrelationship between the Mountain Pine Beetle and global warming, and to make a difference in their community. While fifth-grade students read their persuasive speeches to an audience at a local bookstore, sixth-grade students mailed their letters to local businesses requesting a place to display their field guides and spread their message about the relationship of the Mountain Pine Beetle infestation to global warming.

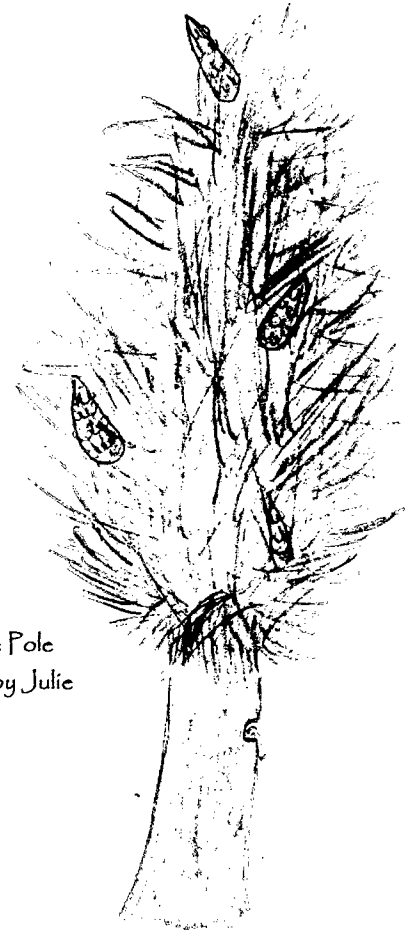
Synthesis of learning

In order for students to synthesize their understanding of the role global warming plays in the Mountain Pine Beetle infestation, they participated in a Socratic seminar where they were assigned a variety of human roles/perspectives. They researched and defended their assigned perspective in the open discussion format. After completing the seminar, students reflected upon what they had learned and if their original opinions or beliefs had changed or solidified in any way.

Final product

Once students decided upon their position, they developed formal speeches and business letters to support their beliefs. During this process, students examined exemplars of persuasive speeches and persuasive business letters in order to mold their writing. Students focused on the 6+1 writing traits of *organization*, *voice*, and *presentation*. Below are the scaffolded steps they followed to complete their letters and speeches:

- Synthesis of learning about global warming (written in teams)
- Readers' workshop of synthesis and *determining importance*
- Socratic seminar and synthesis of thoughts and beliefs
- RAFTS prompt and fine-tuning of thoughts and beliefs
- Organization workshop: Persuasive outline letter and paragraph
- Multiple written drafts
- Revision workshop on voice
- Peer critique and teacher conferences
- Editing
- Final revisions and editing before printing/publishing



The Lodge Pole
Pine Tree by Julie



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Standards, learning targets, and assessments

State standards

Earth science

- Understand complex interrelationships between Earth's structure, (landforms, rocks, minerals, soils) and natural processes over time that are constructive (mountain building, volcanic activity, decomposition) and destructive (landslides, weathering, earthquakes, erosion).
- Understand earth's surface is constantly changing through a variety of processes and forces.
- Understand weather conditions change because of the uneven heating of Earth's surface by the Sun's energy. Weather changes are measured by differences in temperature, air pressure, wind, and water as it cycles through the atmosphere.
- Understand how water on Earth is distributed and circulated through oceans, glaciers, rivers, ground water, and the atmosphere.
- Understand how earth's natural resources provide the foundation for all of the physical needs of human society. Soil, rocks, and minerals provide essential metals and other materials for agriculture, manufacturing, and building. These natural resources are finite. Most resources are non-renewable on human time-scales.

Life science

- Understand how changes in environmental conditions can affect the survival of individual organisms, populations, and entire species.
- Understand how organisms interact with one another in various ways providing a flow of energy and matter in an ecosystem.

Reading

- Read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources.
- Read and understand a variety of materials.
- Use a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels.
- Apply thinking skills to reading, writing, speaking, listening, and viewing.
- Use reading, writing, speaking, listening, and viewing skills to solve problems and answer questions.
- Make predictions, draw conclusions, and analyze what is read, heard, and seen.

Writing

- Write and speak for a variety of purposes and audiences.
- Write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.
- Recognize, express, and defend points of view orally and in writing.
- Plan, draft, revise, proofread, and edit written communications.
- Organize written and oral presentations using strategies such as lists, outlining, cause/effect relationships, comparison/contrast, problem/solution, and narration.
- Discriminate between fact and opinion in writing, reading, speaking, listening, and viewing.
- Understand the structure, organization, and use of various media, reference, and technological sources.



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- Write informational and persuasive genres for intended audiences and purposes.

Visual arts

- Identify and discuss how and why visual images, themes, and ideas communicate.
- Select, organize, and employ visual images, themes, and ideas in works of art to express an intended meaning.
- Evaluate meaning and communication in works of art.
- Know and apply elements of art, principles of design, and sensory and expressive features of visual arts.
- Describe and discuss characteristics of elements of art, principles of design, and styles of art.
- Use elements of art, principles of design, and styles of art to communicate ideas and experiences.
- Analyze and evaluate the use of elements of art, principles of design, and styles of art that express ideas and experiences.

Learning targets

Science

- I can analyze the relationship between the Mountain Pine Beetle and pine trees in the Rocky Mountain forest ecosystem.
- I can identify the impact of Mountain Pine Beetle on the resources of the Colorado Rocky Mountains.
- I can analyze how the Mountain Pine Beetle has interacted with the forest in ways that no longer allow the natural flow of energy and matter in the ecosystem.
- I can explain the relationship between climate changes/ global warming (natural process) and the Mountain Pine Beetle infestation (destructive process) on the rocky mountain ecosystem.
- I can evaluate changes in precipitation and temperature in the rocky mountain ecosystem based on weather data.
- I can analyze global warming data to make generalizations about the weather patterns (snow pack and drought) of the Rocky Mountain ecosystem.

Reading

- I can ask probing questions about how the Mountain Pine Beetle affects the forest ecosystem.
- I can make inferences about the relationship between the Mountain Pine Beetle infestation and the changes in the Rocky Mountain forest ecosystem.

Writing

- I can describe how the Mountain Pine Beetle impacts the forest ecosystem in the Rocky Mountain region.
- I can write a persuasive business letter to synthesize my knowledge and opinion of the interrelationship between the Mountain Pine Beetle epidemic and global warming.
- I can write a persuasive speech to synthesize my knowledge and opinion of the interrelationship between the Mountain Pine Beetle epidemic and global warming.

Technology and craftsmanship

- I can identify and demonstrate my knowledge of the components of a field guide.



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Visual arts

- I can use a camera to take pictures that communicate and document the impact of the Mountain Pine Beetle on Colorado forests.
- I can use the element of framing to take meaningful photos that document the resources of Colorado forests, and the natural population levels versus infestation levels of the Mountain Pine Beetle.

Character

- I can respect the natural world.
- I can show compassion toward my peers during critique protocols.



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Connections to the community and larger world

Fieldwork

- Golden Gate Canyon State Park, Golden, CO
- Chautauqua Park, Boulder, CO

Experts

- Ranger Molly, Golden Gate Canyon State Park
- Colorado State Forest Service
- Colorado State University Cooperative Extension Service

Service learning

- Local bookstores
- Businesses affiliated with outdoor pursuits



Calendar

September	October	November	December
• “Beetlemania” case study, gallery walk, and map analysis • Making inferences and asking questions • Strategy study introduction (literacy) • Photography study – communicating, composition, and focal point • Introduction to the field guide • Learning target reflection and self-assessment	• Fieldwork to Golden Gate Canyon State Park • Planning and drafting of field guide sections (expository writing) • Making inferences and asking questions • Strategy study continued (literacy) • Learning target reflection and self - assessment	• Socratic seminar – synthesis of “Beetlemania” case study • BBK – global warming • Fieldwork to Chautauqua Park • Series of science labs – living in the greenhouse • Final revision and editing work on field guide sections • Draft and revise scientific drawings • Select photograph for field guide	• Format field guide books • Publish field guide books (including expository writing, scientific drawings, photographs) • Write persuasive speeches and letters • Field guide book release at Boulder Bookstore (select students share persuasive speeches) • Send persuasive letters to prospective businesses