

## **Arctic Survival in Alaska**

**Arctic Survival in Alaska**  
**Project Director: Bob Adkins**  
**Requested Grant Amount: \$ 10,000**

### **Project Summary**

Learn to survive in some of the most extreme conditions on earth through a three month hands-on Arctic survival class at S.A.V.E. High School in Anchorage, Alaska! Arctic Survival in Alaska builds on a trailblazing hands-on science class for at-risk students. The project takes students from classroom science to an inescapable real world survival application of the principles they have learned. The project also integrates Arctic survival topics into our school's core curriculum of Social Studies, English and Technology taught by our project team. It is a powerful motivator for students to attend school every day, to experience and do real science that culminates in a life-changing adventure.

The science content is rigorous and relevant. Students learn how to use a global positioning system, compass and map, make three dimensional topography maps, understand the fluid dynamics of avalanches, use beacons to find an avalanche victim, gain practical knowledge in the biological concepts of hypothermia and frostbite, examine the molecular science behind high tech outdoor clothing fabrics, discover how to signal with limited resources, and learn how to build a fire and shelter in extreme conditions with just one match and shovel. Community experts will instruct students on how to survive Alaska's winter wilderness as well as explain the science behind such topics as Orienteering, Avalanches, the Psychology of Survival, Cold Injuries, Outdoor Clothing, Signaling and Shelter/Fire Building.

The culmination of this project is an overnight wilderness trip via snowmobiles to the foothills of North America's highest mountain, Mt. McKinley, on the boundary of Denali National Park. Here students will demonstrate what they have learned during three months of classroom science instruction by spending a winter night in their own hand-built snow shelter.

After completing the overnight trip, students will learn how to make a DVD presentation of this project using digital camera footage and iMovie technology and software. Students will then present their video to our school and to project supporters and sponsors. It will also be used to elicit support for the next year's Arctic survival trip. Finally, this video will be used to present the project at an upcoming NSTA conference.

### Project Description

S.A.V.E. High School stands for Specialized Academic and Vocational Education.

Students who attend this school are behind in their credits and are at high risk of dropping out and not graduating. Our students typically come from a diverse ethnic background (37% minority) and low socioeconomic status. Many have little practical knowledge of nature and environmental science and few opportunities to learn about Alaska outside the classroom walls. The intent of this project is to motivate students back onto the path of graduation, to promote interest in science and to instill in them an appreciation of Alaska's outdoor opportunities.

Student learning will be based on both traditional and constructivist models. Classroom work will consist of some lectures, textbooks, quizzes and a pre/post test, but the majority of the information will be presented through discussions, hands-on activities, experts from the Anchorage area and outdoor skill evaluations. We are very fortunate to have a forest and creek within steps of our school for outdoor activities and alternative assessment methods.

The curriculum consists of six major survival topics. These include the Psychology of Survival, Orienteering, Avalanches, Outdoor Clothing, Cold Injuries and Fire/Shelter building. **Psychology of Survival:** Students begin by watching the film *Alive*, the true survival story of a Brazilian soccer team's 72 day survival story in the Andes mountains of South America. Students will participate in discussions and activities concerning leadership traits and teamwork dynamics in high stress survival situations. The English curriculum at this time will focus on Alaskan survival stories such as *Two Old Women*, *The Old Koyokon Ways*, *Deep Cold*, *Anna*, and *To Build a Fire*. Students will be expected to apply their knowledge of leadership and teamwork into their English assignments.

**-Orienteering:** Students will supplement textbook study on the earth's magnetic fields, Alaskan geography and weather, and global and local wind and ocean currents with outdoor applications of orienteering. Students will use compasses and maps as well as GPS technology to navigate a preset orienteering course, and The Anchorage Orienteering Club will give a presentation to our class. The social studies curriculum at this time will focus on South Central Alaska geography. Students will make 3-D maps of the Denali National Park area. Students will also research historical information on each of the six communities along the Parks Highway and act as tour guides for students and staff during the trip to Denali.

## Arctic Survival in Alaska

**-Avalanches:** Students will study ice crystals, the physical properties of a snowflake, the fluid dynamics of an avalanche, causes of an avalanche, how to travel in avalanche prone country and what to do if caught in an avalanche. Students will learn how to use an avalanche beacon and probe and participate in a beacon competition in our adjacent greenbelt. In this activity a student is buried in the snow with a breathing apparatus and student teams compete to find the “avalanche victim” in the shortest amount of time.

**-Outdoor Clothing:** Students will study the newest outdoor clothing and the scientific concepts that these fabrics integrate. Students will study the five main types of thermal transfer and how these science concepts are employed in the development of high tech fabrics such as Gore-tex, fleece and polypropylene. Comparisons between cotton, wool and fleece will be demonstrated and concepts of hydrophobic and hydrophilic will be addressed. Students will have an opportunity to design a new article of clothing or improve on a particular clothing feature.

**-Cold Injuries:** Students will study the biology of hypothermia and frostbite, understanding how to prevent, detect and treat these injuries. Dr. O’Mally from Alaska Regional Hospital will provide us with a class presentation including slides of local victims and their stories. Students will get first aid certified through the American Red Cross.

**-Shelter/Fire Construction:** Experts from Elmendorf Air Force Base’s Arctic Survival Unit and an elder from the Alaska Native Heritage center will instruct students on various types of thermal and non-thermal shelters as well as the art and science of building a fire in extreme weather.

The culminating experience will be an overnight stay in the foothills of Mt. McKinley. The use of a nearby cabin will be donated to be used as a emergency back-up. Due to the limitations in transportation to this remote site, 12 students will be chosen based on attendance, grades, attitude, responsibility, and enthusiasm. Four teachers, our principal, counselor, a doctor and a parent volunteer will accompany the group. Students will travel by bus 150 miles to Talkeetna, Alaska. Eleven snowmobiles with freight sleds will then transport the group 15 miles into the wilderness to a small cabin. Upon arrival, students will build their shelters and fires. Students will only have a shovel and one match to complete these tasks. Jack London’s *To Build a Fire* will be read at the campfire at the end of the first day. The next day, students will compete in a preset orienteering course using a compass, map and snowshoes, and a snowshoe race. Upon leaving the foothills, students will eat lunch at the historic landmark, The Forks Roadhouse.

## **Arctic Survival in Alaska**

### **Project Rationale**

Alaska is known to have two seasons: winter and summer. Winters can typically last nearly nine months. As a community we are constantly encouraging our young people to become active, but rarely do we give them the knowledge of how to enjoy Alaska's winter activities safely and responsibly. Technological advances in how we travel on snowmobiles, skis, snowshoes and ATV's have enabled experienced and inexperienced, young and old alike, to travel farther into the back country into more and more unforgiving situations. The majority of our residents have moved here from other parts of the United States and each year numerous people in Alaska die from hypothermia and avalanches. The academic, teamwork and outdoor skills students will learn in this project are intended to be useful for a lifetime, regardless of where they choose to call home.

The need for this project is threefold: 1. to provide an innovative, meaningful, hands-on way to teach at-risk students physical science; 2. to help energize and enthuse students into attending school on a regular basis and getting back on track to graduate; 3. to promote the safe participation in Alaskan outdoor activities while incorporating the use of Science, English and Social Studies curriculum.

As a high school teacher at one of the Anchorage School District's largest schools with 1,800 students, I often heard complaints about the cold winters and lack of meaningful or fun activities. Many, but not all, of these students were military kids from around the country with little experience living in a cold weather climate. As a lifelong Alaskan who enjoys snowmobiling and skiing, I decided that an Arctic survival unit would be a great way to teach hands-on science and learn more about the subject myself. By the end of the unit, however, students always wanted to try out their new skills on an overnight trip. The problem was that I had such large numbers of students and so few resources in terms of gear. Now, I am at a smaller school called S.A.V.E. High School (230 students) which has a much more flexible program. Due to the nature of the program it is also much more supportive of unique and innovative ways to motivate students and teach science. Here, we are not only able to propose a culminating overnight stay, but also with the help of English teacher Holly Adkins, Social Studies teacher Ben Coison and our Technology teacher Dan Retzinger we are able to incorporate an Arctic survival theme into their core curriculum, making this a cross-disciplinary project as well.

### **Potential Impact**

#### **Goal:**

1. To make science interesting, challenging and fun.
2. To provide students with the knowledge to participate in exciting, safe and responsible outdoor winter activities for young people.
3. To motivate 60 at-risk students to graduate from high school.

#### **Student Benefits:**

1. Due to the students competing for a spot on the culminating experience, students will have better attendance, grades and attitudes which will contribute towards their goal of graduation.
2. Students will gain interest in school due to added interest in Arctic survival activities in science, English and social studies.
3. Students will develop independent, creative thinking skills.
4. Students will practice problem solving skills.
5. Students will demonstrate teamwork skills and trust.
6. Students will gain an understanding and appreciation of ways in which Native Alaskans used science to develop survival techniques.
7. Students will gain practical experience and knowledge with the use of technology such as digital cameras, digital video recorder, iMovie software, GPS, avalanche beacons.

This project will initially impact approximately 230 at-risk students at S.A.V.E. High School by providing the motivation to increase their academic performance in order to participate in this cross-curricular science project. The project will directly impact approximately 60 students, including a significant number with learning disabilities, that participate in the Arctic survival science project. Many of these individuals are minority students who have failed in a regular classroom setting and will gain a sense of pride and increased self-esteem in their accomplishment.

Our future intent is to not only increase our number of participants but to offer this project as an annual experience for S.A.V.E. High Students. We will also encourage active student investigation into developing a web page and DVD to share student experiences with others across the country.

### Project Evaluation Plan

This project will be evaluated by a number of traditional and alternative assessment tools. The majority of the objectives are performance based and will be assessed using student/teacher developed rubrics. These assessments will be a very valuable source of motivation for S.A.V.E. students because we have a high transient rate and students are required to provide their own transportation and consequently are often in attendance jeopardy. The assessment tools include:

#### **Traditional Assessment:**

1. Students will take pre and post written Arctic survival exams.
2. Students will take written quizzes to measure understanding on a variety of topics including orienteering, cold injuries, outdoor clothing, the history and socioeconomic concerns of the Mt. McKinley area and Arctic survival novels.
3. Students will keep a daily notebook for lectures, presentations and discussion responses.

#### **Alternative Assessment:**

1. We will keep track of each student's attendance and monthly ratings (grades) in each of their core classes of science, English, history and technology to determine their eligibility to participate in the project.
2. We will expect all students to complete all components of the Arctic survival project in order to be eligible to participate in the culminating overnight wilderness experience at Mt. McKinley.
3. We will use student/teacher developed rubrics to assess knowledge and process skills concerning avalanche beacon/probe use, fire/shelter construction, thermal transfer, orienteering with compass/GPS and 3-D mapping.
4. Journals and portfolios will provide insight into student understanding of different concepts and enthusiasm for the project.
5. We will determine proficiency of writing skills through the completion of a student's Arctic survival manual which we will allow to be used during the culminating experience in Talkeetna.
6. We will collect feedback from parents on student portfolios during third quarter parent conferences.
7. We will use a survey to gauge student attitude and enthusiasm for science and school in general.
8. We will be able to determine the effectiveness of our web page by keeping track of the number of visits to our school web site.

## Arctic Survival in Alaska

### Project Calendar

In order to plan a realistic project calendar, the people and organizations listed in the project description have been contacted and are supportive of the project.

#### June 2006

- Order equipment.

#### December 2006

- Present project to student body at S.A.V.E. High School general meeting.

#### January 2007

1. Arctic Survival Pretest.
2. Psychology of Survival - video "Alive" (concepts: leadership, teamwork, trust)
3. Orienteering - learn how to use a compass, map, gps (concepts: topography, scale, declination)
4. Cold Injuries - presentation by Dr. James O'Mally, Alaska Regional Hospital  
(concepts: physiology, prevention and treatment of frostbite/hypothermia)
5. 3-D Mapping- learn how to make 3-D topographic maps of the Denali area in history classes.
6. Arctic Survival Literature - begin reading "The Old Koyukon Ways", "Two Old Women", "Deep Freeze" and "Anna" in the English classes.

#### February 2007

1. Avalanches - learn how to use beacons/probes/shovels. Practice the "victim extraction game" using teams.
2. Outdoor Clothing/Gear - inspect the newest technology in outdoor clothing and survival gear.
3. Shelters/Fires - presentation by Elmendorf Air Force Base Arctic Survival Unit instructors. Make thermal/non-thermal shelters and fires in greenbelt.
4. Posttest
5. Research papers for the history and socio-economic concerns of the Denali area communities.
6. Technical writing in journals/portfolios and for Arctic survival instructional manuals.

#### March 2007

1. Issue gear to the 12 students chosen for the culminating experience.
2. Participate in the culminating experience in the foothills of Denali National Park.

#### April 2007

1. Develop an iMovie DVD of the project from digital pictures and movies.
2. Develop a S.A.V.E. High School Arctic Survival web site.

#### May 2007

1. Present DVD to S.A.V.E. High School student body and sponsors/supporters in appreciation of their support.

**Budget Arctic Simulation Alaska**

All items purchased with grant money will be limited so that all money received can ultimately be used on grant equipment. ASD grant coordinators will disburse grant money to our school for purchase orders.

	Description	Grant	ASD	Final Grant Value	Source of Funds
Survival Gear	Sleeping bags: 9 @\$300	2,700			
	Snowshoes: 8@\$150	1,200			
	Backpacks: 8@\$150	1,200			
	GPS Rino Garmin: 3@\$300	900			
	Avalanche Beacons: 2@\$300	600			
	Avalanche Shovels: 6@\$70	420			
	Laser Signal: 2@\$45	90			
	2-way Radios	690			
	Misc. equipment (fiars, strobe, etc.)	200			
Video	Digital cameras 2@\$1000	1,000			
	Digital Video Camera	1,000			
Transport	Bus		500		
	Fuel for tow vehicles & Snowmobiles		400		
	Snowmobiles/sleds for 11 students/gear @ \$400/2days			4,400	Team members and volunteers
Personel	Substitute Teachers: 12 days @ \$110/day		1,320		
	TSgt Chris Vandeman (USAF) 6hr @ \$30/hr			180	United States Air Force
	Dr. James O'Malley (Ak.Regional) 6hr @ \$200/hr			1,200	Alaska Regional Hospital
	Dr. Joel Adkins (accompany on trip) 48hr @ \$70/hr			3,360	Adkins Chiropractic
	ASD Science/Grant Oversight 100hr @ \$40/hr		4,000		
	Grant Developers 50hr @ 40/hr		2,000		
Other Expenses	REI (snowshoes, backpacks)			2,000	REI
	McKinley overnight trip volunteer @ 48hrs x \$10/hr			480	
	Insurance coverage for snowmobiles for student transport 11 snowmobiles @ \$50 each			550	Team members and volunteers
	Emergency cabin (Cat-Balou)		200		Dr. Robinson
	Volunteer appreciation placks		60		
	Food (2 days for 18 people)		500		
<b>Total</b>		<b>10,000</b>	<b>8980</b>	<b>12,170</b>	

# **SAVE High School**

*Educating Students For Success In Life*

December 7, 2005

**410 E 56th Avenue  
Anchorage, Alaska**

(907) 742-1250 Fax (907) 742-1266  
[www.asd.k12.ak.us/Schools/Save-Weico](http://www.asd.k12.ak.us/Schools/Save-Weico)

Dear Grant Proposal Selection Committee,

After reviewing the grant proposal being submitted by Mr. Robert Adkins, I offer my full support for this project. This outstanding project will bring together Science, English, and History for at-risk students in a way that will maintain high student interest. Using our arctic survival science curriculum as the focus of this project will provide students with lifelong skills as well as valuable academic instruction in science. This project also deals with the use of current technology and will help students enhance their technology skills through media work, mapping/GPS, word processing, data collection and presentation.

As principal of SAVE High School, I will provide my support for the professional leave requirements of this project by funding substitutes for the four members of the project team. Along this line, the school also offers financial support for the bus transport to and from the event, food, and a fuel stipend for the volunteers who transport equipment in their private vehicles. In addition, I will support this project with my presence as an observer/worker who is there to help make this a successful event for all involved.

There will also be volunteers from other schools, the medical profession, and private business participating in this activity. Some will attend the event, while others will donate materials and food. It is our belief the school community and businesses should work closely to ensure that students have the best possible education allowed. Arctic Survival is an event which provides a life altering experience for many of our at-risk students. These students become more mature overnight and learn to trust others, form bonds, and seek help when needed. It is an amazing metamorphosis.

I appreciate the task before you in selecting the winning proposal. Thank you for your consideration in reviewing this proposal.

Sincerely,



Chuck Nygard  
Principal  
SAVE High School