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ABSTRACT

The concept of experiential education has gained increasing popularity among many types of institutions and organizations. Experiential education is an interactive learning process between student, instructor, subject, and environment where the student becomes actively involved with the subject at hand through discussion, activity, and creative thinking. It combines direct experience that is meaningful to the student, with guided reflection and analysis. This report describes a course of study, Integrated Field Study-The John Wesley Powell Journey, that incorporates experiential learning in its design. This 15 credit course was offered through Prescott College's Outdoor Action and Environmental Studies programs during the months of October, November, and December of 1992. The course offered a unique opportunity to integrate wilderness expedition skills and white water rafting with intensive earth sciences and scientific research. Appendices include: course proposal, course application, faculty resumes, promotional material, permit processes, equipment lists and menus, curriculum planning, itineraries, student projects, and the learning contract. (JRH)

POWELL'S JOURNEY: CANYON AS TEACHER MODEL FOR EXPERIENTIAL EDUCATION

by

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BY

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This report is submitted as part of the required work in the course Educational Leadership, 694 (1), Alternate Plan Paper, at Mankato State University and has been supervised, examined and accepted by the Professor.

Under the Alternate Plan for the Master of Science degree, this report may be presented to the student's examining committee as a study offered in lieu of a thesis.

Professor James S. Hunt Jr.

(Signature)

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Introduction

Experiential Education can happen anywhere.The concept of Experiential Education has gained increasing popularity amongst many types of institutions and organizations. Grade schools, high schools, colleges, outdoor adventure programs and summer camps alike have all found their own way of defining and incorporating experiential education into their philosophies and activities. Each finds value in the role that experiential education plays in their learning environment. One common belief that all of these educators embrace is that experiential education enhances the learning process through being student-centered and emotionally engaging. It can happen in the classroom , the forest , or the home. It certainly doesn't have to happen out-of-doors, but whenever possible it should present a subject within a context the student can identify with.

The course of study described in the following pages, Integrated Field Study - The John Wesley Powell Journey, also embraced this belief in its design.This 15 credit course was offered through Prescott College's Outdoor Action and Environmental Studies programs during the months of October, November, and December of 1992. Prescott College is a four year Liberal Arts school that emphasizes experiential learning and field studies. A three month course in the outdoors is not uncommon for

Prescott College. Powell's Journey, however, offered a unique opportunity to integrate wilderness expedition skills and white water rafting with intensive earth sciences and scientific research. We realize not every institution can offer a three month river trip to their studen's. However, this document presents our learning adventure as a *model* for experiential education. By making a written document of our learning process we have created a practical tool that can be used by anyone. In describing our experiences, we offer specific methodologies and techniques for the reader to apply to their own teaching situations. The concepts, ideas, and logistical considerations can be adapted and modified to compliment any learning environment. We hope that others can learn from our successes and mistakes just as we have.

The purpose of this document is three-fold. It will examine the following;

THE WHAT - What did we do?

THE SO WHAT - So what did we learn?

AND NOW WHAT - Now what do we do with this new knowledge?

Chapter I

The What

WHAT was the intent?

Perhaps it began with the simple desire for a long river journey, but quickly the academic and educational potential of such a trip emerged. The intent of this course was to immerse students in the subject at hand and to inspire learning through daily connections with the course material. What better way to study the Colorado Plateau than to live on it, breath it , and get it under your fingernails. This course offered three important aspects for successful learning; integration of multiple subject areas, continuity of time and place and a truly student-centered environment. The course area and course format lent themselves naturally to these criteria.

Integration - Major John Wesley Powell first descended the Green and Colorado Rivers in 1869. His was a scientific exploration meant to map the "Great Unknown" and collect numerous facts on geology ,geography, and human relationships to these arid lands. Prescott College's Powell Journey reexplored this region in a new light of protection, conservation and research. Building on the historic theme of retracing Powell's oar strokes we studied Geology, Paleontology, Archeology, water politics, and research methods. Inherent to the experience was the integration of expedition planning, whitewater boating and group processing. From a wholistic view, this experience integrated body, mind and spirit. The

physical and mental aspects of the trip were very tangible in the group's daily experience. Spiritual enhancement evolved with time spent day after day in these incredible surroundings. A deeper level of understanding evolved as the group developed a greater connection to the area studied.

Continuity -The continuity of our trip existed in living with the same group of people, following a continual river system, while working towards a common goal for three months. This enabled us to link together several individual lessons and experiences to form a greater whole. Ideally, Experiential Ed. should be a gradual process, building up momentum and motivation towards understanding something bigger. Students could become familiar with individual rock types, the formations made up of these rock types, and the geologic events shaping the landscape, while observing the bigger picture of sequence and change along the river corridor. The continuity of related experiences provides greater motivation and incentive to learn. Ultimately, the continual success of this experience must be credited to the students committed investment in making this course work.

Student-centered - Three months is a long time to be involved in a single project. It has its draw backs, but it can also flourish if the investment of all parties is there. The students on this course defined what it was going to take to make this trip work. By being involved in all aspects of the journey they were able to take ownership for academic, logistical

and processing phases. These students made things happen . They created personal goals and objectives, they were task-oriented, took responsibility for teaching through individual projects, and gave substantial time to problem solving and decision making. Their roles were many, not the least of which was rowing the boats downstream through increasingly difficult whitewater. The teachers for this course provided some structure and some facilitation. However the key to their role was to guide students towards a greater and greater level of self-propelled learning. In the best of education situations, the teacher will set the stage for the students to perform.

WHAT is Experiential Education?

Our working definition of experiential education grew out of the Powell Course. Although it draws on theory, it is primarily based on our experiences. This definition is meant to be a catalyst for thought, not the end of discussion. It was the process - the asking of the question, What is Experiential Education? - rather than the definition itself, that encouraged learning.

Experiential education is an interactive learning process between student, instructor, subject , and environment. The student becomes actively engaged with the subject at hand through discussion, activity and creative thinking. Experiential education combines direct experience, that is meaningful to the student, with guided reflection and analysis. It allows for flexibility and takes advantage of teachable moments that may present

themselves spontaneously.

Experiential education takes place in a wide range of settings, from the field to the classroom. It encompasses outdoor activities such as backpacking, rockclimbing, raft trips and ropes courses, as well as, cross-cultural homestays, community service projects, urban adventure programs, cooperative learning in the classroom, and much more. "Whatever is being studied, the point is to place students into a more direct relationship with the material. Students are actively engaged- exploring things for themselves- rather than being told the answers to questions " (Chapman, 1992, p.17).

Experiential education is defined by the learning process, rather than the setting or content. It makes the subject pertinent by studying it in context and/or drawing connections between the subject, the students, and their world. The student who learns experientially is motivated by the immediate application of new knowledge or some incentive for understanding. Experiential education " is an approach that has students actively engaged in exploring questions they find relevant and meaningful, and has them trusting that feeling as well as thinking it can lead to knowledge " (Chapman, 1992, p.18).

Although experiential learning does not have to take place in the outdoors, the educational setting should provide a pertinent context for the topic studied. On the Powell course, we were able to learn about Fremont

and Anasazi culture and rock art in the environment in which those people lived. We looked out onto the same landscape as they did. This helped us try and see the world as they saw it. We learned about geology through the rock that surrounded us. The same erosional processes that shaped them, worked on us as well. The subject of paleontology came alive through the discovery of fossils and the reconstruction of depositional environments by rock types. Limestones and marine fossils conjured up images of ancient, shallow seas. Petrified logs, now buried in shale, once grew in a broad , meandering flood plain. We learned about geologic history through the reconstruction of depositional environments and visual evidence of major earth movements seen in faults, unconformities and dikes.

River rafting became more than an adrenalin pursuit; it was our means of transportation around which our everyday life revolved. Our safety, and ultimately the success of the trip, depended on the seriousness with which everyone applied themselves to learning rafting and river living skills.

What is experiential education - it is the canyon as teacher.

WHAT was the process?

Putting together a trip of this nature is an organizational giant. The logistical considerations and administrative steps are numerous and must be thought of well in advance. Powell's Journey required one year of planning and preparation. The preparations became more concentrated as the course

start approached. During the two months prior to departure it was nearly a full-time job for a few people. All fourteen participants spent the final week preparing to go. Developing appropriate curriculum was on going throughout the preceding year; where as, some of the logistical and administrative work had to be done in a specific order. The following section identifies a sequence of events taking place over a years time to make this trip possible. In both text and appendices, we will describe exactly what we did , step by step.

The Steps - Preparations and Procedures

May 1991

The seed is planted. The idea is born for an extended river trip that follows the path of John Wesley Powell. Many thoughts surface and the concept of a multi-discinplinary course begins to take shape. Enthusiasm is high.

Summer 1991

Soon to be trip leader and course instructor,Julie Munsell takes steps in proposing this new course idea to Prescott College administration. Before presenting the idea to Program Council the following needed to be considered:

-Course description / General curriculum

-Time of course offering*

-Who should teach the course

-Who should be enrolled in the course

-Course budget / equipment needs

-Outline approximate student expense

-General Itinerary

* It was determined that the best time frame for this course would be the fall quarter (October-December) as opposed to either spring quarter (February-April) or the summer months (June-August). Weather, permits, crowds, and the school calender were all factors. Because the trip was to start as far north as the Wyoming/Utah border, the time of year was important as far as temperature and run-off. This made the summer months attractive, February an impossibility, and October a viable option. Three months were considered necessary to complete the trip, based on a ten mile per day average. Permits for this stretch of water are acquired through a lottery system during the "high-use " period (May-September). The lottery is quite competitive for any one section of river, let alone trying to link up several sections with just the right permit dates. The "high-use" period means just that as well and it finally seemed more favorable to live with slightly cooler weather conditions and much less human contact.

Fall 1991

-Sharing ideas with other Prescott College faculty and experienced boatmen helped to round out the package presented to Program Council in November '91 (see appendix A). The course titled An Integrated Field Study : Powell's Journey , was approved by December '91 and added to the curriculum for the following fall quarter. Student interest had already been generated through the rumor mill and now there was truly something to get excited about.

January 1992

-The course is officially advertised to the student body and a meeting date is set for interested persons.

-Applications are designed for prospective students.The application emphasized "individual student projects" as a key factor in selecting participants (see appendix B).

_The trip itinerary was planned more specifically so permit needs could be specified.

-Additional faculty had not yet been determined at this point as there were no interested or available faculty within the Prescott community. Munsell researched outside possibilities.

February 1992

-Ideal adjunct faculty for this course would be both environmental scientists and white water rafters. Andre Potochnik and Christa Sadler fit

this description as well as being experienced educators, intimately familiar with the Colorado Plateau. After learning more about Prescott College and the Powell course specifically, each decided to join the team and teach the environmental studies portion of this class (see appendix C).

-On February 13, 1992 a preliminary meeting was held at Prescott College for all interested students. The meeting was publicized in the student bulletin, posters around the college and by word of mouth. The meeting attracted over 30 students and a high level of interest was generated around campus. Creative ideas for individual student projects were already being discussed. Julie Munsell directed the one hour meeting. The agenda include an explanation of the course, dates involved, and the student commitment required. The importance of students generating individual project ideas was emphasized as a critical component to the application process.

March 1992

-The instructors reviewed student applications and selected 11 students for the trip, along with a wait list of five. One of these students was to serve as Teaching Assistant for the course as well as a primary boatman. In choosing participants the emphasis was not so much on background and experience, but more so on how well a student articulated their personal commitment to the trip and their understanding of group mentality. They looked for creative student projects that fit well in the

scope of the course and added overall diversity to the group experience.

-Students were notified of their acceptance in the class and everyone chose to enroll.

-One student , Eric Howard , took on the task of creating promotional material for the trip and began to solicit sponsorship of all kinds. He traveled to Washington D.C. at his own expense and established a relationship with both The Grand Canyon Trust and the Smithsonian Institute. More promotional work was to follow (see appendix D).

-Permits were being processed at this time for the four sections of river that require special boating permits (Canyon of Lodore, Dinosaur Ntl'. Monument; Desolation and Gray canyons, B.L.M.; Cataract Canyon, Canyonlands Ntl'. Park; Grand Canyon, Grand Canyon Ntl'. Park). The specifics of the permit systems affecting this trip are explained in detail (see appendix E).

April 1992

Students all participated in collecting addresses and phone numbers of potential sponsors. A long list of equipment manufacturers was generated to send promotional material (see appendix D).

May 1992

-Environmental studies faculty made a reconnaissance trip to Utah to gather written material and make contacts with other people that might serve as useful resources to the trip. They purchased a great number of

books and maps that contributed to a very extensive library collection carried on the trip. They met with some people that would later participate in the course, giving guest lectures and the like.

-Trip leader Munsell also visited Utah that month to teach a shorter river course for Prescott College. Connections were made for resupply caches and shuttles necessary along the 750 mile river journey.

June - August 1992

-Equipment lists generated (see appendix F).

-Extra effort was given to promotional work at this time. Brochures and cover letters were designed to present the essence of the trip as well as specify sponsorship needs. Promotional brochures were mailed out to potential sponsors and the overall response was very favorable (see appendix D).

-Instructors put a great deal of energy into creating the scope and sequence of the course and doing curriculum planning for specific presentations. Having never run this course before it was difficult to know exactly what teaching opportunities would present themselves on a daily basis and how much material we could realistically expect to cover in three months. As expected, we over planned (see appendix G).

September 1992

-As the trip departure approached we all became increasingly busy. Several students were able to dedicate their free time to preparation and

help with the numerous errands, large and small.

*Equipment inspection and maintenance.

*Receive shipments from equipment sponsors.

*Keep up with correspondence to sponsors.

*Preliminary menu planning, determining number of river days between resupplies and numbers of off-river days during resupplies.

*Coordinating with the college's logistics manager on equip. check-out.

-It was also during this time that a special connection was made with the Glen Canyon Environmental Studies project. Efforts on behalf of Sadler and Potochnik made it possible for our class to serve as volunteer researchers for the G.C.E.S. Our permit in Grand Canyon was issued under the auspices of G.C.E.S. and was an official research permit. This not only assured our ability to float the Grand Canyon but more importantly provided the students with a valuable hands-on experience of doing field research and collecting scientific data. This was a major highlight for us all.

October 1992

-The class officially begins and the expedition is underway through December (see appendix H). The majority of student projects are determined pre-departure and carried out throughout the trip (see

appendix I).

- Menu planning was critical to the success of the trip and group morale. The students were responsible for devising the entire food plan (see appendix F).

System Rotations

Although we wanted to allow for spontaneity and flexibility in our daily lives, we decided to incorporate structure into some of our regular group chores and the sharing out of the different boats. By adding structure we felt we were gaining freedom. Rotating daily work tasks assured that each student would learn the various living skills and take responsibility for all aspects of the trip at some point or other. We set up a rotational system that included three work categories including a "free" day. This insured that a student had justified time off from group responsibilities and was able to feel comfortable tending to personal needs. Some jobs were more demanding than others, with cooking and clean up being the most time consuming. We decide to try our rotation system for work crews for the first ten days and see if we liked it or preferred to be less structured. After ten days we decided that we wanted to keep a rotation system, but that we could modify what we had been doing in order to have more designated free time per person. The initial crews were four and five people with an instructor in each group. This was useful to start with, as people were just becoming familiar with the various tasks, but after a week everyone became very efficient and less hands were needed for a given chore. Our preferred rotation system for daily work evolved into the following:

* Cook crew - Responsible for kitchen set up, food preparation, and

clean up.

* Miscellaneous - Rinsed out the boats, gathered wood, set up the toilet system,settled river water, pumped purified water, and other assorted odd jobs.

* Free day - Personal time for studies, hikes, napping... No obligation to the group unless voluntary. This group did however help in loading and unloading the boats.

*The rotation would change with each new camp. In other words when the group would get off river and derig at a new camp then work crew "x" would be responsible for dinner that night, breakfast the following day and packing a lunch for that river day. At the next camp crew "y" would be the cooks, etc.

*The sequence for jobs was 1) cook crew 2) free day 3) misc. 4) free day

Each crew would cook every fourth day. Not bad.

*We had 14 people, so each crew had either three or four people. This seemed to be more than enough to get the job done.

*Our group opted to change crews around every ten days so that

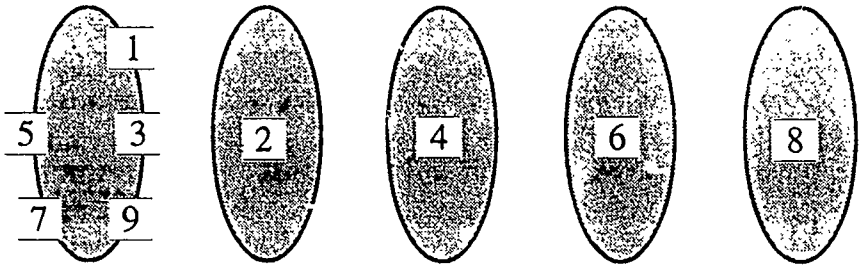
everyone had a chance to work with all the people in the group. Good idea for a long trip.

*The students could have opted to do away with the rotation after a few weeks, but decided this system was pretty agreeable to all involved and seemed to allow for the most clearly defined personal time. The rotation also insured that everyone would work with everyone else at some point or other.

Other rotations:

We found that this idea of rotating crews carried over well into other aspects of the trip. We used it in both the raft rigging procedure and to determine who would be in what boat on a given day. We had five rafts on the trip and five primary boatmen. Each boatmen had responsibility for a given craft that they stayed with for the most part. (This definitely varied some along the way, especially during long stretches of flat water.) The remaining nine people would rotate daily through the five boats, one of which was a paddle boat. The paddle boat had six total persons and each of the four oar boats had two. Students would alternate being in the paddle boat one day and an oar boat the next. They would also rotate from one oar boat to the next so as to experience not only different boat set-ups, boat

also the different teaching styles of the five primary boat persons. We kept track of this system on paper because it did get difficult to remember. We diagramed the boats as shown and then the student names were rotated through the numbered positions.



Example: 1) Marc 2) Jhala 4) Jim 6) Marya 8) Eric

3) Kim

5) Matt

7) Kirsten

9) Andy

The following day each person would move ahead one number. Marc would be 2, Jhala would be 3, etc. Number 9 would rotate to the top again and this resulted in back to back paddling days.

The boat rigging rotation was quite simple. The primary boatmen would oversee the rigging of their boat and have the help of two others. Once the students became familiar with their rigging system we would

switch one person out to learn a new system and one person would stay in to teach the newcomer their system. We did this for a while until students developed alot of versatility and creativity in their rigging style. Eventually people just started helping rig the boat they would be in that day.

REFERENCES

Chapman, Steve (1992) . What is the Question? Journal of Experiential Education,15, 16-18.

Chapter II

The So What

The canyon as teacher encouraged unstructured time for observing and absorbing . Being mindful and cognizant of our immediate surroundings allowed for the purest form of experiential education. The teachable moment presents itself continuously if you take the time to notice.

"Experiential education is a joyful awakening of body, mind and spirit."

We are not advocating a total lack of structure, nor are we discounting the value of lesson plans, curricular sequence, or even formal lecture. However, the canyon as teacher reminded us daily to be spontaneous. Their is great educational value in simply connecting with your surroundings either through an adventurous pursuit or quiet reflection. By being intimately familiar with the environment , our wilderness classroom, the students developed an incentive to learn. They desire a greater understanding of the environment, because they know it in a personal context. Knowledge and understanding begin with appreciation and result in a positive stewardship for the earth.

So What Did We Learn?

This section evaluates the success of this experience as an educational journey. We did some things right. We could have done some things better. Below we will address the following questions as they relate to our three month river course.

- What did we do right ?

  Identify some of our greatest experiential education successes.

  Describe the most effective methodologies for teaching.

- How well did we function as a group ?
- How well did we use our time ?
- What would we do differently the next time around ?

Methodologies

Immersion - The course worked because the students were surrounded by the subjects studied. Seeing it, touching it, breathing it and getting it under your fingernails allows the student to put the subject into context. Attaching personal experiences to learning, provides the intrinsic motivation that makes new material retainable.

" I'm able to recall much of what I learned on this trip, because I have a visual record of it in my mind. " Rob Noonan

The students may not have emerged from this trip as text book geologists, but they also will never forget the hike they made up a side canyon to see and touch "The Great Unconformity" for the first time. That geology lesson is etched in their minds.

" It becomes apart of you. It's in your bones...and makes me more of who I am."

Jhala French

On the Powell course we learned about the Fremont culture and rock art in the environment in which they had lived. We looked out on the same landscape and tried to see the world as they had. We learned geology from the rocks that made up the canyon walls and realized the same erosional processes that shaped them were working on us as well. The subject of Paleontology came alive through the discovery of fossils and the reconstruction of depositional environments now locked in rock formations. Limestones and marine fossils conjured up images of ancient, shallow seas. Petrified logs, now buried in shale, were once growing abundantly in a broad, meandering flood plain. Visual evidence of major

earth movements were seen traveling through fault zones or past intrusive dikes. Similarly, the student's white water boating skills improved by virtue of dealing with the subject at hand and learning to maneuver their crafts to avoid great natural consequence. Their is no greater teacher than the canyon itself.

Combined Methods - Our most effective teaching strategy was to combine various methodologies either in a single lesson or, at the very least, through the course of a single day. Doing so had three distinct advantages: 1) Diversity keeps the attention of the class. 2) Each lesson can be assessed for what methods are best suited towards the goal. 3) Using multiple strategies for teaching addresses the greatest number of learning styles.

Examples:

- 30 minute lecture preceding an on sight visit to a dinosaur quarry.
- 1 hour discussion on the pro's and con's of hydroelectric power followed by a 1-2 hour role-play debating differing views over a proposed dam site.
- A presentation on paddling skills was applied to a student paddle team using cooperative learning to get safely downstream.

Everyone learns differently. Our group exemplified this in that some were avid readers, others excelled in writing, some were strong contributors to discussion and two students had technical "learning disabilities" . One of our students excelled in a way different than any of

the standard forms of learning, yet it was clear to the instructors that he was gaining new information.

Jack was known in the group for his adventurous wanderings. He took long walks, found himself on steep hillsides and collected things as he went. Being a photographer, Jack always paid careful attention to detail. Given the opportunity to roam around and explore, Jack developed his intrinsic motivation to understand his surroundings and ask questions. He would bring his findings back to the group as a source of curiosity and wonder; a unique rock type or fossil, bones , pottery chards or a story. He became familiar with the landscape and key landmarks through his discoveries and was able to make connections and piece together information for a greater understanding of the whole. By virtue of his questions it was evident he was learning.

Discovery - Some of the best learning happened by accident. The things you can not plan for, those teachable moments, often present the most valuable learning experiences. This is the canyon as teacher. Although we find this to be an area of needed improvement, we know of its value because of the significant times the canyon reminded us to be alert and be available to its teachings. One story depicts this best:

Off on a side hike we came across some indian petroglyphs. We took the opportunity to sit down and talk about what we were seeing on this particular panel. As the discussion waned and became less formal students

started wandering around to explore. One student commented that this might be the perfect place to find a basket. Speaking only in jest the student was beside himself when he and another came across an old basket. This raised quite a stir in the group and everyone gathered around to have a look. The basket was far from accessible, being tucked down in a crack and partially covered in dirt, but was clearly a basket. What should we do now? It seemed obvious to some, we leave it where it is. Yet it made sense to others that we try and dig it out to better examine it. A third opinion explained that the appropriate thing to do would be to report it, so it is properly excavated by experts. Each opinion held deep reasoning and as everyone made their point the matter became emotional and somewhat heated. We returned to camp for lunch and further discussion. On the walk back people clearly paired up with who they seemed to be in agreement with. The debate continued, now in a somewhat formal fashion of circling up and making sure everyone had an opportunity to express themselves. It became a very serious topic as all sides of the coin were explored and came to a difficult point of trying to make an agreeable decision. One person proposed that, although some people wanted to see the basket removed, it was probably more important to honor the feelings of those who wanted to leave it alone and just be glad for the joy we had in discovering it. More importantly we recognized the extreme value in dedicating ourselves to the past five hours of discussion. This stood out as

the most honorable and notable part of the whole experience. It wasn't so much that we had found a basket , but that we took the opportunity to explore values, express ourselves, ask questions, and try and put ourselves in others shoes. The discovery of that basket opened the door to experiential learning and personal growth that we all could embrace.

Discovery learning also occurred on a daily basis through the use of boating skills and the challenges of day to day living. Putting up a kitchen tarp in strong up canyon winds is cause to "discover" improved shelter techniques. An oarsman that runs a boat broadside onto a rock quickly "discovers" why that should be avoided and how that needs to be dealt with, once it has happened. Natural consequence is a great teacher. More discussion on the Discovery method is given in the section exploring ways to improve upon our course .

Journalling - On the Powell course, as is true with most any Prescott College course, journalling accompanies all other teaching/learning methodologies. A great deal of emphasis is placed on the importance of documenting your learning. No matter how the material is presented or what a student chooses to study, the journal can be used as a way of expressing your understanding of the topic. Recording information and doing original writing demonstrates that the material was heard , or read, and that the student has given their own thoughts and ideas to the subject matter. The "field notebook" held this role on the Powell trip. It was used

primarily to record daily field observations (is. weather, rock I.D., significant landform changes, petroglyph sites), as well as lecture notes, answers to study questions, diagrams, and personal writings. The use of study questions became an effective tool for journalling and discussions. One or two study questions were presented each morning. They could almost always be answered by making observations of the area traveled through that day or by doing a small amount of research. Ideas were recorded in the field notebook and then shared in discussion.

The Learning Contract - The Learning Contract is used for virtually all classes at Prescott College (see appendix J). It is an opportunity for the student to direct their own learning by setting individual, obtainable goals for a given class. The course content and the instructor will certainly influence what each student contracts to do. However, the contract also allows for creativity in determining how certain goals will be reached and can be used to identify the student's areas of special interest.

Contracts are written in three parts; goals, objectives, and evaluation. The goal describes, in general, what a student wants to get out of the course. Objectives list specific things the student will know at the course end and by what means they will fulfill these objectives. Objectives are measurable and should be written so that the instructor can clearly judge, at the course finish, whether this thing has been accomplished. For example: Bad objective - I will know about the plants that grow along the river.

Good objective - I will be able to identify 10 new riparian plant species and will keep a log of where these species were predominately seen.

The instructors on the Powell course identified some perimeters for student contracts. They described what they intended to cover as base knowledge and listed some academic expectations. The students chose individual topics of study for both a short presentation as well as a more extensive presentation/paper. The student may chose to place more emphasis on one aspect of the course than another, but ultimately the instructor decides whether a student's contract represents enough work to constitute full credit.

At the end of the course, both the student and the faculty person write narrative evaluations of the student's work and each appears on their official transcript. The evaluation compares the student's completed work with their original objectives and describes to what degree the objectives have been met. An evaluation gives an overall impression of student performance and may point out areas the student excelled in and areas they could stand to develop. A letter grade accompanies the evaluation at the student's request.

Student Projects - Probably our single most significant educational success was the use of student projects. Partially because they required self-direction from the student, but more importantly, the caliber of student projects erased the distinct line between student and teacher. This course

was not meant to be an experience where the teacher did the teaching and the student did the learning. The roles were to be more equally shared than that. Everyone was a teacher and everyone was a student. Certainly the instructors played a guiding role, but gradually that role became less influential and the course evolved into a shared teaching/learning experience for all involved.

From the onset, an emphasis was placed on the role of student projects. The application process for the course encouraged that students be creative in developing an independent project idea. Student projects would contribute several different topics, of related areas, to the course curriculum and be an important part of the student's final evaluation. The students could focus their study on any area they chose as long as it could be related to the overall theme of the course. Their application for the course included an explanation their project idea and how it fit into the scope of the journey. About 50% of the students chosen for the course stuck with their original project idea. Others switched topics, but identified what they would study before the trip began and only a few chose an area of interest after the first week of the trip.

Self-direction was demonstrated through all phases of a student's project: selecting a topic, pulling together useful resources to bring along on the trip, make the time throughout the trip to read, collect information and prepare their work into presentation form, as well as a 5-10 page

paper. Along with the primary project , each student was asked to do a short presentation on geology or another topic of their choice.

Students were encouraged to make their presentations as experiential as possible. This was a notable success. All the students found ways to make their teaching more participatory or in some way engaging. They drew diagrams, built sand models, told stories, facilitated imagery, presented their topics in appropriate settings to put their subject in context or even resorted to bringing sticks and marshmallows to the fire for a lecture.

Giving students some choice in what they are studying and allowing for self-directed achievements provides them empowerment. It tells the student that what they want to study is as valuable as what the instructors want them to know . Choosing their own research topic gives a sense of ownership to the study, which again, is self -motivating. The opportunity to teach and share information about their topic enhanced the students learning and solidified their understanding of the subject.

The G.C.E.S. research project, undertaken during the Grand Canyon phase of the course, was yet another opportunity for teachers and students to equally contribute effort towards a common goal. Everyone had significant roles in the data collection and writing the final technical report. The opportunity to work as volunteer researchers for G.C.E.S., provided both an excellent "hands-on" learning scenario and a practical situation where teachers and students could help each other succeed.

How well did we Function as a Group?

The group dynamic was in many ways the highlight of the course. From the onset we established a tone of "positive expedition behavior". As a group we defined this as being a balance between one's commitment to the group and taking adequate personal space. "Time out" was equally as important as "time on", especially for a trip of this length. Part of this success was inherent to the personalities on the trip. There were individuals with many varied backgrounds working towards a common goal. This group of students was motivated and invested in making this trip work. There were, however, ways that we knew we needed to consciously operate in order to keep that balance between group and individual. Things we considered important to living in an extended group setting are as follows: Who are the players? Choosing students appropriate for the course was key. Be it academic suitability or simply knowing that a person can handle the rigors of the experience, it is important to closely evaluate who is chosen to go. Balance the males and females as best possible without being too discriminatory. Consider what effect a "couple" may have on the group dynamic. Is their relationship mature enough to resolve conflicts or have intimacy without being exclusive to the group? Are the student's reasons for wanting to participate congruent with what the course will offer? Check references and be selective in forming your group.

Communication - Talk alot! Make group meetings a regular part of your daily lives.Call people together in a circle even for brief announcements to make sure everyone is getting the same message. People appreciate knowing what to expect. Circles are especially important for long discussions or academic sessions. Circles create equality with no front, back, or ends. Plan debriefs for key points in your course. Review with your group how to give and receive feedback. Coming together in a circle creates a safe environment for people to bring up ideas, issues and conflicts. Talk often as a group, but avoid trying to communicate if people are too tired, cold or hungry. Meet basic needs before long group discussions. Set up a couple of one to one sessions with each student in the group throughout the course. Individuals respond well to personal feedback and knowing that the instructor cares about them as a unique part of the group. The setting of an expedition naturally creates cohesion in a group. Group members depend upon one another, work together as a team, build trust, share joy, fear and exhaustion. Creating time for spoken, or written, reflection can only enhance these experiences. Talk alot and listen carefully.

Develop rotations of responsibility - As discussed in the "What" section, rotations structure in "on time" and "off time" . Group members know when they can take personal space. Rotations are best when they have people working with everyone in the group at some point in the trip. Boat

rotations worked well as people would be a part of the six person paddle team one day and a two person oar team the next. One setting was very social and the other more relaxed and private.

Consider Holidays - At some point on an expedition everyone feels a longing for home. This can be especially true at holiday times. Give special attention to peoples birthdays and other events that occur during the trip. Plan ahead so you are prepared for holidays with things that will make that day unique and memorable. Celebrating Christmas was especially important to our group as it is not only a major holiday for most people, but it was also within the last week of our trip when everyone was beginning to really miss home.

How well did we Use our Time?

An ongoing theme for us was "too much to do and too little time". Daylight hours were scarce, because of the winter season. Moving downstream and everyday chores left little time for academics and even less for personal time. It was difficult to work at night in the cold, with limited light, after long strenuous days. In considering future changes and improvements for this course, we would certainly look at ways to better focus our use of time. However, with as much as we may have learned about managing our time, we can certainly identify some clear indications of good time management.

- We stayed on our schedule. In general, we were able to very closely follow our preplanned itinerary. We made our permitted launch dates without difficulty and were able to have some layover days without travel.
- We were logistically organized. Resupplies were efficient and well thought out. Virtually no time was lost to flaws in logistical preparation and procedures.
- We covered a great deal of academic material. Perhaps too much in too little time, but we were impressed at the level at which students were able to recall things learned on the trip. On the last day, of this 75 day course, we retraced the entire route from a geologic perspective. Instructors facilitated a mile by mile review of the route's geologic history and students were all able to contribute to an amazingly thorough debrief of the information learned.
- Rotations made for well defined free time and work load expectations. Boat rotations allowed for everyone to become equally skilled oarsmen and paddle boat captains.

Probably the best ways for us to have improved upon our time management, would be to narrow the academic focus and cover less ground in the same amount of time. The primary reason for doing either of these things would be to increase the amount of time we had for off-river exploration.

How could this Trip be Improved?

This question really serves as a leading to the "Now What" section of this document. How we see this trip being improved upon, answers the question "Now what do we do with all the experience and learning acquired during this three month journey?" Various suggestions have been made throughout this document as to how we could make this course an even greater success in the future. One key point that is continually referred to, or eluded to, is that a trip of this nature needs to allow for more opportunity for the canyon itself to do the teaching. This can be achieved simply by structuring less and experiencing more. In no way do we wish to imply that structured academics don't have a place in this setting - indeed they do have an important role to play. But time and again we were reminded that the most valuable lessons and memorable teachings we had, were unplanned. They came to us through the spontaneous experiences we had when we made room for "discovery" and took time to explore our immediate surroundings. At times we would be so involved in a planned progression or predetermined objectives that we would lose sight of the teachable moment and the questions the canyon was presenting right before our eyes. The final section of this document addresses ideas for further building on the educational potential of this type of experience.

Chapter III

The Now What

Now What do we do with the knowledge gained on Powell's Journey ?
How do we make the Canyon as Teacher accessible to others?
How can the concept of "learning by doing" be adapted to any educational setting?

This section explores possible modifications for a subsequent Powell course, as well as transitioning our experiential journey to suit more traditional educational environments.

Powell's Journey is a successful model for experiential education. However, it is a rare opportunity to have a 3-month river trip as your class room. On the Powell course, while the river was our vehicle, it was really the methodologies that made the learning experiential. This section identifies the concepts and strategies that made Powell's Journey impactful and describes how they can be modified to fit use in the classroom.

"One of the most valuable things this form of education has taught me is how to learn... I wish that I had come upon this method for learning a long time ago." (Student quote)

The essential factor in making the Powell course a success was giving the academic subject pertinence, by putting it into context. We were studying the Colorado Plateau, so we went to the Colorado Plateau. The

students absorbed information and developed academic understanding, because the subject was personal and meaningful to our daily lives. When there is a tangible reason to obtain new knowledge and the subject is relevant to the student's life, there is an intrinsic motivation to learn. Any teacher can engage students in the learning process by drawing connections between the subject, the student and the world they live in. The use of local resources, local environments, and students' individual curiosities, gives pertinence to academics. Students will learn and retain more knowledge, through practical application of new skills, examples of how the subject relates to their personal lives, and the freedom to spontaneously ask about things of interest to them.

Remember struggling over 9th grade Algebra and asking yourself, "Why do I need to know this?" "When will I ever use this again?". The lack of pertinence formed a mental block to learning. Most people have the desire to learn and grow. As educators we must bring the subject to life by giving it meaning for the student, or better yet, guiding the student towards discovering meaning in it for themselves.

"Experiential education just kind of wakes you up!"

"There are alot of motivated children out there who deserve this type of education, but don't have the access to it... they are special people, but the kind of education they get is not special." (Student quotes)

Applying the Methodologies

Let's reflect on the teaching methodologies found to be most effective on the Powell course: Lecture / Presentation, Inquiry / Discovery, Cooperative Learning, Research, Journalling, Discussion, and Role Play We identified them to be most effective in combination with one another throughout a given day or even in a single lesson plan. Listed below are the methodologies, as we defined them earlier, paired with sample activities for classroom application. In order to distinguish between methodologies, we used the same two topics throughout the examples; the two topics are "paper" and "community". Our examples are written as though intended for Jr. High use, but can certainly be geared towards almost any age group. The specific role of the teacher is include in some of the examples.

Lecture / Presentation

* Keep lectures short . (15 - 20 minutes)

*Follow-up lectures with a more engaging activity, or begin them that way.

* A lecture itself can be more engaging when given with visual aids or in a setting that directly relates to the lecture. We have termed this "on-sight" lecture as a presentation.

*Engaging lectures / presentations invite the listener to think or hypothesize. Lectures can ask questions not necessarily meant to be answered at that immediate time.

*A lecture can also be broken up with "turn to your partner" mini-discussions. Every 5-10 minutes during the lecture, the teacher can propose a question for brief discussion. Each student will have a partner that they spend a few minutes talking with to share their own ideas about the lecture topic.

ACTIVITY: A presentation on How Paper is Made can be given during a trip to an actual paper mill. Mini-lectures can be given as the mill is toured and different paper making stages are viewed. A guest lecturer might be appropriate for this presentation. Having a new personality, and someone who is closely involved with the paper making process, will add significance to the presentation.

ACTIVITY: A lecture on community can be organized around a series of questions that the lecture will answer. (i.e. What is community? What are the essential parts of a community? Who lives in your community? Are you a member of more than one community?) Preceding the lecture, present the series of questions to the students. Once the students have read the questions, allow them to choose partners for the mini-discussions. The teacher will lecture 10-15 minutes around each one of the questions and then break up the lecture by having students turn to their partners to summarize what the teacher has been presenting.

Inquiry / Discovery / Research

*Inquiry / Discovery allows the student to formulate questions, hypothesize, explore and research answers.

*The teacher sets the stage for learning by presenting a topic, but provides limited structure for the initial exploration of it. The students are encouraged to experiment and think about a topic in their own way.

ACTIVITY: Students are given the task of considering how many people are involved in the process of making and distributing paper. They are asked to specifically consider their own notebooks and what processes made their availability possible. Students are then given the freedom to approach this in any way they chose. This activity lends itself quite naturally to working in Cooperative Learning groups. Once students have explored this topic on their own and have viewed it from their unique perspective, the teacher can offer more guidance on how to research factual information related to the paper making process.

ACTIVITY: Students can learn about community by conducting a "community search". Begin by brainstorming on "scientific" research. What is research? What makes it scientific? How can you document your data systematically? Write these answers on the board and then break students into small groups to develop a chart to record the data they'll be collecting. The students are going to explore and record the parts of their school community. With pencil and paper in hand, send the students out of

the classroom to look for all the living members of their community at school. They should record things like numbers of a given type of community member and where that type is found.

Cooperative Learning

*Cooperative Learning groups give students the opportunity to work in small clusters. (preferably 4 individuals)

*Ideally, students engage in small group activities where the success of each individual is reliant upon the success of the group as a whole.

*Each group member can be assigned a role in the group to assure their involvement in some way. (i. e. activity coordinator, materials person, recorder, reporter)

*Groups can be formed by student choice, randomly by the teacher or deliberately by the teacher. A deliberate goal might be to balance strengths and weaknesses or place students of like learning styles together.

ACTIVITY: Given the activity for Inquiry / Discovery, split students into groups of four to brainstorm together. As a team they can explore all the possible steps of paper making. They can begin by compiling a list of all the steps, from tree to notepaper, and what human jobs are involved in the steps. Once the groups have all compiled a list, they can come together and share ideas. With everyone's ideas put together, the activity can be further assigned by splitting the paper process into stages and identifying each group with one of the stages. Each Cooperative Learning group

becomes an expert on their stage of the process. Further activities will describe ways to carry out this exercise.

ACTIVITY: Cooperative Learning groups will engage in community service. Begin by discussing what community service is, its purpose, and whether students have been involved with it before. Divide into groups of four with each student assigned a role (i.e. coordinator, recorder, materials, liaison). Each group will choose their own community service project at the school. Possible projects would be to organize a school clean-up, develop a school recycling program, plant trees on campus, start a school garden, or work in the cafeteria. Following the experience students should be given the opportunity to share their projects with the class and discuss what they learned.

Journalling

* Journalling can be used to get students thinking about a new topic, reflect on an activity or some aspect of the student's life, or explore a topic further.

* Students should be told whether a given journal exercise is to be shared with the class, has the option of being shared or is purely for personal reflection.

ACTIVITY: As a follow up activity, after a visit to a clear cut forest, have students do a 5 minute free write on their impressions. Encourage students to describe how the clear cut looked and how it made

them feel to stand in it. Give students the option to draw, write poetry, or simply do a free form writing. Perhaps allow this to be a private entry.

ACTIVITY: As an introduction to the topic of community students could be asked to create their own definition of community and write about their own community and their role in it. This topic could be further explored by asking students to list ways they felt their community had shaped their lives and the person they had become.

Discussion

* A discussion involves the whole group or class.

* It can be used to introduce a new topic, to further explore a topic, or to wrap-up a topic or activity.

* The role of the teacher is to guide the discussion; to keep it from straying too far from the central question and to provide additional questions to keep the discussion going.

ACTIVITY: There are endless possibilities for discussion with any topic. A discussion on paper could be revolved around how the use of paper, or waste of paper, could be reduced with in the students daily lives. The group could identify wasteful or inefficient uses of paper visible to them and talk about simple ways to cut back on paper usage.

ACTIVITY: In order to facilitate a discussion on community, present a question such as; What is the ideal community? What are important roles in a community? What way would you like to contribute to

an ideal community? This discussion is good follow-up to the Lecture Activity given earlier.

Role Play

*Students are given a mock scenario and are assigned roles of players within that scenario. Their role may or may not represent a view point congruent with their own. Students may even need help understanding what the view point of their character is. Presumably , earlier class discussions will provide students with some of this background.

*Set the scenario up with plenty of detail and specifics, so that there is a common understanding of the scene amongst the players.

*Students are given 10 - 15 minutes to consider their role or ask questions individually.

* Either a debate is held amongst the players or some situation is acted out improvisationally. Role play is most effective when the scenario revolves around some local issue or controversy that affects the daily lives of the students.

ACTIVITY: Given a state or town with an active logging industry, the students will hold a formal debate over the pro's and con's of clear cutting timber for the paper industry. The roles might include a logger, the logger's wife, a Forest Service superintendent, city council member, a conservative environmentalist, an Earth First! advocate, a local school

teacher, local store owner, an owner of private property adjacent to the forest and a spotted owl.

ACTIVITY: Assign each student a role as a community member. Give them time to think about their role. Present the situation to the students. They are on a sinking ship and there is not enough room on the life boat for all of them. The life boat will allow some people to get to a deserted island and begin a new community. Each community member must argue why their role is important enough to be let on the life boat . Roles could include: doctor, farmer, nurse, teenage boy, teenage girl, pregnant woman, school teacher, biologist, car mechanic who also is a deer hunter, minister, carpenter... Choose the community members randomly out of a hat. Have the student introduce their role and why it is important that they be allowed on the life boat to start this new community. When everyone has finished you can either announce that another ship is coming so they are all saved or make it more competitive by having them decide which eight members get to go on the life boat. At the end of the activity have the students share what they have learned.

Chapter IV

The Transference

Although we jokingly refer to the Powell Course as the "never ending class", this is actually an appropriate title. The experience will remain with the members of the course throughout their lives. Experiential learning becomes a part of the the student because the subject is studied in context and made relevant to the student's life.

What I hear I forget
What I see I remember
What I do I know

The Powell Course has had a significant effect on the lives of virtually every member of the class. Ten out of eleven students have gone on to pursue various projects and employment as a direct result of the Powell Course. Five students are working directly with Glen Canyon Environmental Studies (GCES).

-Rob Noonan works as a River Guide in the Grand Canyon and does research on migratory water fowl for GCES.

-Eric Howard works for Grand Canyon Trust. He did his senior project for Prescott College at the Washington D.C. branch and was

subsequently given a full time position in Flagstaff, Arizona.

-Jim Donovan works part time for Grand Canyon Trust in Flagstaff and has continued to do research for GCES.

-Kim Buck conducts research and compiles data for Larry Stevens the chief biologist for GCES.

-Kirsten Rowell did a twenty six day research trip in the Grand Canyon for GCES focusing on Peregrine Falcons.

-Matthew Turner did a two week revegetation project in the Grand Canyon for GCES.

- Jhala French was the teacher's assistant for a Prescott College course, White Water Rafting and Environmental Perspectives in the Grand Canyon, works as a river guide in the Grand Canyon and will be co-teaching a course similar to the Powell Course for Prescott College in the Fall of 94.

-Marc Claussen rowed raft support for a Prescott College Kayaking course on which he continued to do work on his research project from the Powell Course.

-Jack Collins was the teacher's assistant for the White Water Rafting and Environmental Perspectives course in the Grand Canyon and has submitted photographs from the trip for publication.

The Never Ending Course will have a life-long influence on the members of Powell's Journey, students and instructors alike. The Powell

Course experience will continue to inspire and motivate our stewardship for the Colorado Plateau and our dedication to Experiential Education.

Future Modifications for the Powell Course

Ultimately, the shortcomings of the Powell course revolved around too much to do, in too little time. Our expectations were high for both academic content and daily activity. When the reality of cold, short days and the demands of basic river living set in, we quickly recognized the need to pare down our goals and objectives. Personal time was accommodated least. Although the group handled this fine, there was always an expressed desire for more personal space to study, explore, or relax. A less intensive itinerary would allow individuals to pace themselves more realistically in all respects. The trip could easily be modified to demonstrate that "less is more". Three possible modifications, to strengthen this course, include:

1) Spend more time covering the same distance on the river.

2) Shorten the overall distance of the trip.

3) Narrow the academic focus and cut down the curricular content.

Participants on the Powell trip identified that the most workable modification would be to shorten the overall distance covered on the trip. Although Grand Canyon was a marvelous part of our journey, it could easily be eliminated from the final portion of the itinerary. The 450 river miles, between Flaming Gorge Dam and Lake Powell, provide an excellent

survey of the Colorado Plateau, as well as a beautiful and diverse river trip.

Covering the shorter distance simplifies logistics, allows for more academic focus, and more time to get to know the area by land. It would also be extremely beneficial for the course to end at the official termination of the quarter. Our extension into Christmas break was a difficult push for everyone even though it was a holiday to remember. If the trip were to cover less distance, but continue straight through the Thanksgiving holiday, then ample time would be allowed for both a successful river itinerary and valuable return time to spend a week in town finishing up academic projects during the last week of the quarter.

This portion of the text is most beneficial to those repeating an identical type of trip.

Appendix A

Course Proposal

COURSE ITINERARY

October 1-5	Pre-trip preparation, in town.
Oct. 6	Depart to Flaming Gorge Dam
Oct. 8 - 17	Launch Flaming Gorge to Split Mtn. (90 miles)
Oct. 21 -29	Split Mtn. to Ouray, Utah (69 miles)
Oct. 30	Resupply in Ouray, Utah.
Oct. 31 - Nov. 9	Ouray to Green River, Utah (128 miles)
Nov. 10	Resupply in Green River, Utah.
Nov. 11 - 25	Green River to Hite, Utah (165 miles)
Nov. 26 - 29	Off time in Prescott.
Nov. 30 - Dec. 1	Preparation for Grand Canyon.
Dec. 2 - 30	Grand Canyon, Colorado River trip. (280 miles)

Total river miles = 735
Total river days = 73

COURSE BUDGET

The following course budget supports a 3-month field course for eight student participants and two faculty persons. All participants will share the costs for food and general supplies. An additional $150 course fee is charged to cover the expenses outlined below.

Student Fee ($150 x 8 =)	$1200
Launch fees	$250
Camp fees	$300
Course texts/readers	$400
Miscellaneous	$250

Course Budget	$3600
Gas (school vehicle)	$400-500
Mileage (second vehicle)	$450-500
Shuttle fees	$500
Raft rental	$750
Raft supplies	$250
Phone / postage	$100
Guest speakers	$500
Miscellaneous	$500

TRAVEL BREAKDOWN

Total vehicle miles traveled - (approx.) 4225 miles*

*This distance to be covered over a period of 3 months. It is the combined distance traveled by 2 separate vehicles. It includes all river shuttles, repeating some sections of road 2-4 times.

School van - (approx.) 2600 miles / $400-500 in gas expense.

Private vehicle - (approx.) 1625 miles @ $.30 per mile = $487.50

Repair / Maintenance -$250

Shuttles* - $500

*Shuttles will either be handled independently, with the use of a hired driver or by airplane shuttle for school drivers.

STUDENT REQUIREMENTS

Students enrolling in this course must be willing to adhere to the following requirements and fulfill the specified prerequisites outlined below:

_This course is a three month commitment beginning October 1 and running through the Christmas holiday until December 31. There will be only four official "days off" over Thanksgiving.

-The prerequisites for this course are as follows;

*(academic background TBA)

*Whitewater boating experience is required. Students with minimal boating background, having other expedition experience, may still qualify.

*Sound goals for an Independent Project must be defined as part of the application process.

*Each interested student will complete an application for the course and must receive permission of the instructor to enroll.

-Equipment Requirements:

*Wet suit is mandatory, with heavy duty raingear or paddle jacket. (A drysuit may be the preferred option.)

*Neoprene socks or wetsuit booties.

*Cold weather sleeping bag. (5 degrees)

-Student Expenses:

*$150 Course fee.

*$150 per month for food. (150 x 3 = $450)

*$100 recommended pocket cash. (minimum)

*Total of $700 for a three month period.

Appendix B

Course Application

J.W. Powell Journey
Course Application

Name:_____ Age:_____
Competence:_____ Advisor:_____
1st Breadth:_____ 2nd Breadth:_____
Years In School:_____ Semesters at P.C.:_____
Intended date of Graduation:_____
Describe your whitewater or paddling experience:_____

Describe your swimming ability:_____
What other trips have you done of 3 weeks or longer?:_____

Do you have problems in the cold?:_____
Specify your dietary preferences and how you'd work with them on a 3-Month expedition:_____

What is your science background(course work or other experiences)?:

How does this course fit into your academic program?:_____

Why do you want to take this course?:_____

What are your ideas for an individual project? Who might sponsor this study?:_____

Do you understand the time commitment involved in enrolling in this course?_____
Do you understand the specific gear requirements and student fees?

Do you understand there are inherent risks in going whitewater rafting (in remoteness from medical care, cold water immersion, flipped boats, drowning):_____
What do you anticipate a trip like this to be like?:_____

Is it your first choice for fall quarter '92?: _____
Any additional comments: _____

Please return to Julie Hunsell's faculty mailbox. Thank you!!

Appendix C

Faculty Resumes

CURRICULUM VITAE

ANDRE POTOCHNIK

PO Box 22130
Flagstaff, Arizona 86002
(602) 774-8436

EDUCATION

M.S., Geology (May, 1989) G.P.A. 3.81
University of Arizona, Tucson, Arizona.

B.S., Geology (January, 1983) Cum Laude, G.P.A. 3.65
Sonoma State University, Rohnert Park, California.

A.A., General Education (June, 1980) President's List, G.P.A. 3.82
Columbia College, Columbia, California.

AREAS OF TRAINING

* stratigraphy
* field geology
* structural geology
* regional geology
* tectonics
* hydrogeology
* geomorphology
* technical report writing
* computer programming: Fortran and Pascal

TEACHING EXPERIENCE

INSTRUCTOR: Prescott College; Prescott, Arizona; The J.W.Powell Journey: An Integrated Field Study. 1992.

INSTRUCTOR and RESEARCH ASSOCIATE: Northern Arizona University, Flagstaff, Arizona; Introductory Geology, Physical Geology, Historical Geology, Summer Field Camp, Field Geology for Teachers, Elderhostel geology courses. 1990 to present.

INSTRUCTOR: Yavapai College; Prescott, Arizona; Physical Geolcgy, Concepts in Geology, Geology of the Verde Valley, 1989.

INSTRUCTOR: University of Arizona; Elderhostel geology course, Summer Field Camp (geomorphology). 1984-1988.

TEACHING ASSISTANT: University of Arizona; Physical Geology, Geology of Arizona, Summer Field Camp. 1984-1988.

GEOLOGIC INTERPRETER, TRIP LEADER AND GUIDE: Grand Canyon Dories, Angels Camp, CA., 1973-present.

PROFESSIONAL EXPERIENCE

GEOLOGIC CONSULTANT: Dept. of Geology, Northern Arizona University, Flagstaff, AZ. Provided an inventory and assessment of rock formations and geologic history of the new Tonto Natural Bridge State Park to the Arizona State Parks Department, 1992.

PETROLEUM GEOLOGIST: BP Exploration, Houston, TX. Completed an analog field study of a recognized oil field in east Texas. Summer intern position, 1989.

GEOPHYSICAL CONSULTANT: Bond Gold, Inc., Tucson, AZ. Part of a three member crew doing induced polarity and magnetic surveys near an active gold mine, 1988.

GEOLOGIC CONSULTANT: Los Alamos National Laboratories, Los Alamos, NM. One of a five member remote crew conducting a reconnaissance geochemical survey of Costa Rica funded by Agency for International Development, 1986.

ASSISTANT GEOLOGIST: Union Geothermal Division, Santa Rosa, CA. Conducted geochemical survey project and geothermal drilling program. Followed through with data analysis and report preparation, 1983.

GEOTECHNICIAN: Applied Earth Sciences, Inc., Sebastopol, CA. Supervised building site soil sampling and drilling. Conducted sediment analyses and assisted in report preparation, 1983.

GEOLOGIC CONSULTANT: Retaining Walls, Inc., Orinda, CA. Performed sediment analyses of soils used behind a failing retaining wal Lake Tahoe. Testified in a litigation proceeding before the American Arbitration Association, 1982.

PUBLICATIONS

Dickinson, W.R, A.R. Fiorello, D.L. Hall, R.M. Monreal, A.R. Potochnik, and P.N. Swift, 1989, Cretaceous strata of the Basin and Range Province of Arizona: Arizona Geological Society Digest 17.

Nations, J.D. and Potochnik, A.R., 1992, Tectonic / Physiographic evolution of the southern margin of the Colorado Plateau, central Arizona: GSA Abstracts with Programs, in press.

Potochnik, A.R., 1989, Depositional style and tectonic implications of the Mogollon Rim formation (Eocene), east-central Arizona: New Mexico Geological Society 40th Annual Field Conference.

Potochnik, A.R., 1988 Late Mesozoic and Paleogene structural features and sedimentation along the southern boundary of the Colorado Plateau, Fort Apache Indian Reservation, east-central Arizona: GSA Abstracts with Programs, v. 20, no. 3.

Potochnik, A.R.,1987, Fluvial response to the Laramide-mid Tertiary tectonic transition along the southeastern margin of the Colorado Plateau: GSA Abstracts with Programs, v. 18, p.809.

Potochnik, A.R. and P.E. Damon, 1986, Tectonic and geomorphic implications of post-Laramide erosion: GSA Abstracts with Programs, v. 18, no. 5, p. 403.

Potochnik, A.R. and S.J. Reynolds, 1986, Geology of side canyons of the Colorado, Grand Canyon National Park: Fieldnotes, Arizona Bur. of Geol. and Min. Tech., v. 16, no. 1, p.1-8.

Potochnik, A.R. and S.J. Reynolds, 1990, Side canyons of the Grand Canyon, in S.S. Beus and M. Morales (eds.), Geology of the Grand Canyon: Museum of Northern Arizona Press and Oxford University Press.

Young, R.A. and Potochnik, A.R., 1990, Late Mesozoic-Early Cenozoic uplift, erosion, and landscape development along the southern Colorado Plateau margin: Abstract, Symposium on Southwestern Geology and Paleontology, Museum of Northern Arizona, Flagstaff, Arizona.

AWARDS AND GRANTS

Geological Society of America
Standard Oil of California
Chevron Research Fund

PROFESSIONAL ORGANIZATIONS

Geological Society of America
Sigma Gamma Epsilon, Vice President, 1985-1986.
Grand Canyon River Guides

PERSONAL

Born: October 5, 1951. Health: excellent. Interests: running, whitewater kayaking and rowing, tennis, skiing, wood-working, travel.

REFERENCES AVAILABLE UPON REQUEST.

Julie Munsell

1608 Idylwild, Prescott, AZ. 86301 (602) 445-9549

Personal goal statement : Seeking a position in Outdoor Education and Program Administration, with challenging experiential education components.

EDUCATION

Mankato State University, Mankato, Minnesota
Masters of Science, Experiential Education, (in progress)

Prescott College, Prescott, Arizona
Bachelor of Arts, May 1985, Outdoor Education and Administration

Arizona Teacher's Certification
Secondary General Science, September '93

Edinboro State College, Edinboro, Pennsylvania, 1980 -1981

TEACHING AND ADMINISTRATIVE EXPERIENCE

PRESCOTT COLLEGE
Program Coordinator for the new student, Wilderness Orientation program, August '94 through present
Faculty Lecturer, August 1991 through Present.
Adjunct Faculty, May 1989 through August 1991.
Instructor of Wilderness Orientation Instructor's Course, Integrated Field Study: John Wesley Powell Journey, Outdoor Education and Recreation, Experiential Education, Environmental Perspectives and White Water Rafting.
Other responsibilities have included; student advising, service on student graduation committees, and service on a Faculty Search Committee for the Environmental Stuies program.
Summer Rafting Program Coordinator and boatmen, summer of 1983 and spring/summer of 1984.

MANKATO STATE UNIVERSITY
Graduate assistantship for the Department of Educational Leadership, September - November 1994. Ropes course and low initiatives facilitation. Served clientel ranging from school groups to corporate organizations.

PACIFIC CREST OUTWARD BOUND SCHOOL, Chief Instructor, 1986 - 1992
Instructed and Chief Instructed for nine seasons and over twenty-five courses ranging from four to twenty-eight days in length. Teaching experience with a wide variety of students: youth at risk, woman over 40, and professionals seeking outdoor leadership training. Course areas include: Central and Northern Cascades, Sierra Nevada, Joshua Tree and Deschuttes River.

PRESCOTT HIGH SCHOOL, Educational Consultant, April 1989
Created and implemented a pilot program for the "Drop-out Prevention" program at Prescott High School. Submitted grant proposal to The Arizona Children Foundation for support of wilderness programming. Led two groups of students on four-day wilderness outings, emphasizing stress and challenge activities and local natural history.

I.T.T. ANTARCTIC SERVICES,INC. McMurdo Station Antarctica, Field Processes Assistant, October 1986 -February 1987
Managed food warehouse supplying researchers for the National Science Foundation. Performed food issue for research groups and warehouse inventory and stock control. Resupplied remote field camps, cross-trained in equipment warehouse issuing field gear to research teams.

RELATED EXPERIENCE

CHADWICK HIGH SCHOOL - Wilderness Instructor
ATNENIAN HIGH SCOOL -Wilderness Instructor
SKY-Y CAMP (YMCA) - Environmental Education and Outdoor Recreation
PRESCOTT UNIFIED SCHOOLS - Substitute Teacher (k -12)
GLEN CANYON ENVIRONMENTAL STUDIES - Volunteer Researcher
U.S. FOREST SERVICE - Bradshaw Dist. Hot Shot Team (20 person fire crew)

SKI TOURING

BAFFIN ISLAND SLEDGING EXPEDITION, June - July 1989
Forty-day unresupplied ski-traverse of the Penny Ice Cap. Four person expedition, requiring load ferries, glacial travel, and extensive compass navigation.
AVALANCHE FORECASTING SEMINAR, January 1989
Three week course in snow-pack evaluation and avalanche rescue techniques.

RAFTING

Class IV boater, have led courses and excursions in Grand Canyon, several Colorado River tributaries and rivers of southern Oregon.

KAYAKING / SEA KAYAKING

Class III paddler, experience on rivers of central Arizona, northern California, and southern Oregon. Circumnavigation of Tiburon Island and Isla Carmen.

MOUNTAINEERING / ROCKCLIMBING

Experience in rock and snow ascents include Bugaboo Spires, volcanoes of Central and Northern Cascades, Mount Whitney, and lesser peaks of the Sierra Nevada, south San Juans, and the Southern Alps of New Zealand.
Leads at a 5.7 standard and can follow 5.9.

OTHER ACCOMPLISHMENTS

FIRST AID CERTIFICATION - Current Wilderness First Responder - exp. July 1995
GRANT RECIPIENT - Polartec Performance Challenge Team - Fall 1992. Awarded $4,000 cash grant and polartec garments for the support of Powell's Journey, a 735 mile river trip as an academic learning excursion.

REFERENCES AVAILABLE UPON REQUEST

18 E. Juniper Ave. 66
Flagstaff, AZ 86001
Christa J. Sadler, M.S. (602) 774-8436 (hm)

Education

M.S., Earth Sciences, 1991
Northern Arizona University, Flagstaff (GPA 4.0)

Graduate work, Geology/Paleontology, 1985 to 1987
University of California, Santa Cruz (GPA 4.0)

B.A., Physical Anthropology/Archeology, 1984
University of California, Berkeley (GPA 3.81)

Areas of Training

- *vertebrate paleontology
- *Quaternary paleontology and paleoecology
- *paleoichnology
- *sedimentology
- *physical geography/geomorphology
- *historical archeology
- *Quaternary archeology
- *southwestern archeology
- *environmental education
- *fossil preparation

Teaching Experience

1993 - present
ASSOCIATE FACULTY, Coconino County Community College, Introductory and Physical Geology (GLG 100 and 101).

1992 - present
INSTRUCTOR, Northern Arizona University, Ancient Life (GLG 201). Course was an overview of evolution of life on earth, basic geology and biology.

1992 **INSTRUCTOR**, Prescott College, John Wesley Powell Field Course - Natural and Human History of the Green and Colorado Rivers. Three month field course on the geology, geography and environmental issues of the Colorado Plateau.

1989 - present
NATURALIST/LECTURER, Special Expeditions, Inc. Lecture, and lead interpretive hikes on geology, archeology and anthropology of Baja California, Alaska and the southwestern US.

1989 - 1990
TEACHING ASSISTANT, Middle and Junior High School Math and Science Teacher Training Program, Northern Arizona University. Designed and taught physical geology labs for undergraduate physical science/education majors.

1987 - present
EDUCATOR, Department of Education, Museum of Northern Arizona, Flagstaff. Design and teach one to multi-day classes and field trips in geology, paleontology and archeology to children and adults. Design outreach programs on paleontology for students in the Flagstaff public schools.

1988 - present
GEOLOGIC/ARCHEOLOGIC INTERPRETER and GUIDE for Canyon Explorations, Inc. on the Colorado River in Grand Canyon.

1985 - 1986
TEACHING ASSISTANT, Department of Geology, University of California, Santa Cruz, Charles Darwin and The Origin of Species.

Field and Research Experience - Geology and Paleontology

1990 - 1991
PRINCIPLE INVESTIGATOR, research on Permian ichnofossils from Arizona and Utah. Described and analysed arthropod tracks, experimented with possible trace makers.

1989 - 1990
GRADUATE RESEARCH ASSOCIATE, Department of Geology, Museum of Northern Arizona, Flagstaff. Described and analysed ichnofossils from the Museum's collections.

1987 - 1988
PALEONTOLOGIST, Department of Geology, Museum of Northern Arizona. Surveyed and excavated Mesozoic paleontological remains on the Colorado Plateau under Dr. M. Morales.

1987 RESEARCH ASSISTANT, Department of Geology, University of California, Santa Cruz. Surveyed plant and intertidal communities in the Galapagos Islands, for taphonomic comparisons with ancient communities.

1985 RESEARCH ASSOCIATE, Museum of Paleontology, University of California, Berkeley . Studied tooth sizes of Purgatorius material in museum collection with Dr. W.A. Clemens.

1984 - 1985
ASSISTANT PALEONTOLOGIST, Department of Paleontology, University of California, Berkeley. Assisted in paleontological excavations of Late Cretaceous-Early Tertiary sediments, eastern Montana, under Dr. W.A. Clemens.

1984 FIELD ASSISTANT, Department of Anthropology, University of California, Berkeley. Excavated Miocene paleontological site, San Bernadino County, California, under Dr. N. Toth.

Field and Research Experience - Archeology

1988 SURVEYOR, SWCA, Inc. Environmental Consultants. Surveyed and recorded archeological remains of Archaic, Hohokam and Paiute sites in southern Arizona.

1987 FIELD ASSISTANT, Department of Anthropology, Museum of Northern Arizona. Surveyed, recorded and collected from Archaic, Paiute and Fremont sites in southern Utah. Project supervised by D. Keller, Museum of Northern Arizona.

1982 EXCAVATOR, Flowerdew Hundred Plantation, Virginia. Excavated and analysed 17th, 18th and 19th century archeological sites. Directed by Dr. J. Deetz, University of California, Berkeley.

1982 EXCAVATOR, Sommersville, California. Surveyed and excavated 19th century coal mining town under Dr. J. Deetz, Department of Anthropology, University of California, Berkeley.

Related Professional Experience

1987 - 1990

PREPARATOR OF VERTEBRATE PALEONTOLOGY, Department of Geology, Museum of Northern Arizona (Dr. M. Morales). Oversaw function of the lab, preparation of fossil material, lectures to docents and general public.

1984 - 1985

SENIOR MUSEUM PREPARATOR, Museum of Paleontology, University of California, Berkeley (Dr. W.A. Clemens). Curated and prepared fossil material, library research, editorial work.

1984 - 1985

RESEARCH ASSISTANT, Institute of Human Origins, Berkeley. (Dr. D.C. Johanson). Editorial work, casted fossil material, photo work, library research.

1982-1984

LABORATORY ASSISTANT and CURATOR, Laboratory of Human Osteology and Evolutionary Studies, University of California, Berkeley (Drs. T.D. White and F.C. Howell). Prepared and reconstructed human skeletons, curated fossil primate material.

Publications

Beus, S., J. Mead, C.J. Sadler, T. Rang, and L. Laughran, 1989, 1990. Laboratory Manual For Geology and Physics. Science and Mathematics Teacher Training Program, Northern Arizona University.

Sadler, C.J., 1992, The Colorado River Through Grand Canyon. Review for the **Journal of the Arizona-Nevada Academy of Sciences**, Voi. 26, p. 50.

Sadler, C.J., 1993, Arthropod trace fossils from the Permian De Chelly Formation, northeastern Arizona, **Journal of Paleontology**, Vol.67(2), pp. 240-249.

Sadler, C.J., 1993, Life in Stone: Fossils of the Southwest. **Plateau Magazine**, Vol. 64, No. 3. Museum of Northern Arizona, Flagstaff.

Awards and Grants

Honor Student, University of California, Berkeley (1980-1984)
Phi Beta Kappa, University of California, Berkeley (1983-1984)
Graduate Opportunity Program Fellowship, University of California, Santa Cruz (1985-1986)
E. Blois du Bois Foundation Scholarship, Northern Arizona University (1989-1991)
Geological Society of America (1990)

References available upon request

Appendix D

Promotional Material

Re-Exploring Powell's Journey

A VISIONARY APPROACH TO ENVIRONMENTAL EDUCATION

In 1869, Maj. John Wesley Powell set off on an exploratory journey down the Green and Colorado rivers. On October 6, 1992, Prescott College will embark on a 750-mile river trip re-exploring Powell's journey in a new light.

Powell was a man of great vision and courage whose contributions to the geological, geographical, and ethnological sciences remain profound in their impact today. Sponsored by the Grand Canyon Trust, eleven students and three faculty members will re-explore the rivers and canyons of the Colorado Plateau in a new light of protection, conservation, and research. The National Park Service has issued Prescott College, "For the Liberal Arts and the Environment," a research permit to assist the Glen Canyon Environmental Studies.

Focusing on resource conservation and protection, students will study the implications of further development of the Colorado Plateau. On the eve of the 21st century, we face very different considerations than those of Powell's day with regard to the use of natural resources. This "hands-on" course will provide an opportunity for college students to gain a deeper and more meaningful understanding of Colorado Plateau natural systems. Our study is a visionary approach to environmental education that asks the question: How do we protect these natural systems and preserve them for future generations? Your involvement will support us in our search for answers to this question. We encourage you to be a part of our expedition.

Course Description

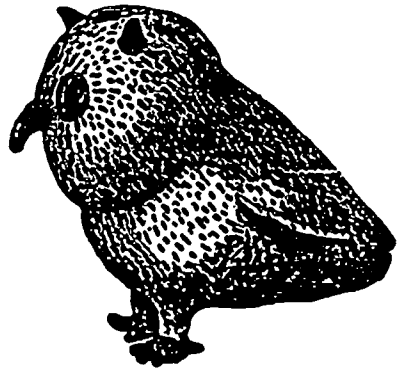
Prescott College's integrated field study retracing J.W. Powell's journey has four facets: natural history and prehistoric human history, outdoor skill development, environmental field methods, and social perspective development. A major goal of our expedition includes a contribution to the Grand Canyon Trust's visionary plan for resource allocation in the Colorado Plateau. Dr. Frank Talbot, Director of the Museum of Natural History, Smithsonian Institute, has personally endorsed our project as an example of innovative environmental education techniques. We will submit a document to him detailing the curriculum and methodology incorporated into this course. Part of the students' experience will center on environmental research field methods. Prescott College has obtained a research permit, the first of its kind allocated to a college or university, to assist in data collection for the Glen Canyon Environmental Studies. This ground-breaking achievement will allow students to get a firsthand look at the research methods employed by environmental scientists. Findings from our study will be incorporated into the Glen Canyon Environmental Studies which will help in the formation of new policy for the Colorado River.

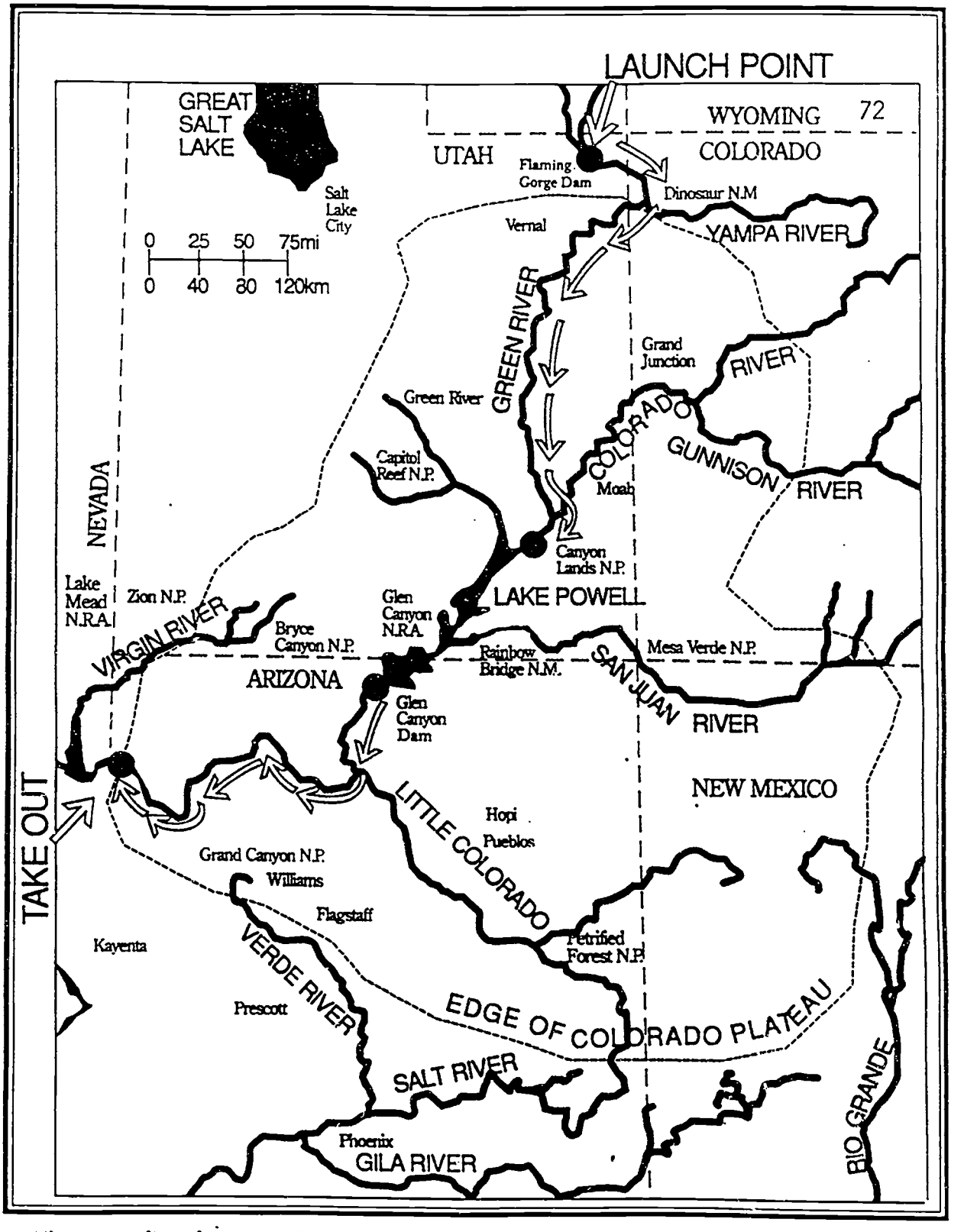
Ed Norton, President of the Grand Canyon Trust, recently announced sponsorship of the expedition:

"The Grand Canyon Trust supports Prescott College's mission to provide interdisciplinary, experiential, 'real world' learning. The Colorado River and the Grand Canyon are among this nation's most valuable natural resources; Prescott College's use of the Canyon as a classroom is an example of the innovative approach to education that sets Prescott College apart from traditional academia. The Grand Canyon Trust is proud to sponsor Prescott College's retracing of Maj. John Wesley Powell's 1869 journey down the Green and Colorado rivers. The Trust endorses the exploration of the rivers and canyons in a new light of protection, conservation, and research. The Grand Canyon Trust and Prescott College are committed to the stewardship of the Grand Canyon and enter into this project with high expectations and enthusiasm."

This fully credited, semester-long course will run from October 1, 1992 through January 1, 1993. The students were selected for the course through an extensive application process in February. Each student demonstrated a combination of a strong academic background, outdoor skills, and a personal investment in the success of the trip.

Faculty for the course is Andre Potochnik, Christa Sadler, and Julie Munsell. Potochnik is an instructor and research associate at Northern Arizona University. Christa Sadler is a naturalist lecturer for Special Expeditions, Inc. and has graduate level training in geology and paleontology. Julie Munsell is an expert field guide and faculty member at Prescott College.





The route indicated represents Prescott College's retracing of Powell's journey. The 750 river miles will be traveled in five oar-powered rafts in fall/winter conditions.

Prescott College

FOR THE LIBERAL ARTS AND THE ENVIRONMENT

220 Grove Avenue,
Prescott, Arizona 86301
(602)778-2090

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CONTRIBUTING SPONSORS

David Wegner
Glen Canyon Environmental Studies
P.O.Box 22459
Flagstaff, Az. 86002

Safeway
Manager, Don Fletcher
450 White Spar Rd.
Prescott, Az. 86301

Down River Equipment Co.
12100 W. 52nd
Wheatridge, Co 80033

Chums
Attn. Mike Tagget
Box 950
Hurricane, Utah 84743

Crazy Creek Products Inc.
Weezy Chandler
P.O.Box 1050
Red Lodge, MT. 59068

Wildcountry USA
Bill Supple
27 Whitelaw Dr.
Center Conway, N.H. 03813

Achilles, Inc.
Phyllis Hallmark
P.O.Box 2287
Everett, Washington 98208

Advanced Composites, Inc.
Dave Ericson
55 W. Louise Ave.
Salt Lake City, Utah 84115

Eveready Battery Company, Inc.
S. Michael Mazva, Manager
Checkerboard Square
St, Louis, MO 63164

Granite Mountain Outfitters
320 W. Gurley
Prescott, Az. 86301

Grey Owl Paddles
Vicki Dorfman
62 Cowansview Rd.
Cambridge, Ontario Canada NIR-7N3

Hyside
Box 2
Kernville, Calif. 93238

Polartec Performance Challenge
Attn. Jeanne Wallace
46 Stafford St.
Lawerence, MA 08141

Professional River Outfitters, Inc.
Bruce Heline
P.O. Box 635
Flagstaff, Az. 86002

Smith's Food and Drug
Eric Moore
950 W. Fair
Prescott, Az. 86301

Colorado Kayak
Jim Stolquist
P.O.Box 3059
Buena Vista, CO 81211

Barbara McDonald
Deckers Corp.
1132 Mark Ave.
Carpinteria, Ca 93013

Wal-Mart
Joel Peterson
1801 E. HWY. 69
Prescott, Az. 86301

Appendix E

Permit Processes

How To Obtain A Permit

Below are guidelines to obtaining permits for the southwest's most commonly run rivers. Application systems vary, as do their dead lines, so it is important to become familiar with the types of systems and plan ahead for any desired permits. The first of the new year is a good time to take action for permits. These guidelines will focus on Non-commercial permits for the high use season. Non-commercial essentially means that the trip is cost shared by all participants and no one is making a profit. "High use" refers to a specified time period, that varies from river to river, when permits are in highest demand and a special system is implemented for issuing permits.Information is given here for sections of the Green River and Colorado River.

When are the High-use periods?

DINOSAUR NTL' MONUMENT (Yampa and Lodore)
2nd Monday in May - 2nd Friday in September

B.L.M. RIVERS (San Juan, Desolation/Gray, Westwater)
April 1st - October 31st

CANYONLANDS NTL'PARK (Cataract Canyon)
April 15th - October 14th

GRAND CANYON NTL'PARK (Colorado River)

April 16th - October 15th	/ 18 day permit issued
March 1st - April 15th	/ 21 day permit
October 16th - November 30th	/ 21 day permit
December 1st - February 29th	/ 30 day permit

*When are High-use applications accepted?

-Permit applications for Dinosaur are accepted between December 1st and January 15th preceding that year's high-use season. Applications must be postmarked by January 30th or they will not be accepted. Applications may be obtained after November 20th. Only one application per person is allowed.

-A separate application must be filled out for each of the B.L.M. rivers. (San Juan, Deso/Gray, Westwater) These must be mailed in during the January or February preceding the high-use season. Only those received prior to Feb. 1 will be considered in the preseason drawing.

-Applications for Canyonlands are accepted any time after January first for

permits in the same year.

_The Colorado River through Grand Canyon issues permits through a wait list system (see below). If you are a new addition to the wait list then you apply in February. If you already have a wait list number then you reaffirm your interest in January only.

The Difference Between Lottery and Wait List

Most southwest river permit systems are done by lottery. The lottery is held at the beginning of each year for the upcoming high-use season. Each permit office operates slightly different from another but essentially it is like drawing names out of a hat and if your name comes up first for a specific date then you are granted a launch. With the increasing popularity in river running, it is more and more difficult to acquire a launch date through the lottery. However, it is still possible to get a launch date through cancellations. Grand Canyon operates its permit issue on a "wait list" basis. This means that your name goes on a long list of people waiting their turn for a permit. At this point ('93) there are currently over 4000 names on the Grand Canyon wait list for a river permit. The specifics for each river are described below beginning with the lottery rivers.

DINOSAUR LOTTERY (YAMPA/LODORE)

When you apply for a Dinosaur permit you must send a cashiers check or money order for ten dollars, specify which river you want a permit for (Yampa or Lodore) and choose only one launch date. If your name is drawn for that particular launch then you will be notified by March 1st. Also,beginning March 1st, permits may be obtained by a call-in basis.Cancellations typically occur 30 days prior to any given launch because that is the point at which confirmation notices are due holding a person's permit

B.L.M. LOTTERY (SAN JUAN / DESOLATION / WESTWATER)

The applications for these three rivers must be filed separately even though they are all managed by the same agency. When applying, you will specify your first, second and third choices for launch dates. If your name is drawn but your first choice has already been issued then you may still get either your second or third choice. If all of your dates are taken by other applicants then you will be notified that you did not draw a launch but that you do have an application number on file for calling on cancellations. Notifications on launch dates will be sent out the first week in March.To confirm a launch date you must send in your

fee payment (fee schedule sent with permit info) at least three weeks prior to your launch. If you do not receive a launch then you may call the correct B.L.M. office starting March 21 to put your name on a waitlist for a specific date. The B.L.M. will call you if that date opens up but you may also call them after March 21 to see if any other dates have come available by cancellation. The most likely time to get a cancellation date is three weeks prior to the desired date. People who fail to send in their fee money will lose their date to the cancellation pool.

Grand Canyon Wait List

The permit system for Grand Canyon is somewhat unique.You can expect that once you get your name on the wait list it will take about ten years for your name to be eligible for requesting a launch date. To get your name on the wait list initially you must send a cashier's check or money order for $25.00 to the National Park Service in Grand Canyon. Include a letter with your name, address, and social security number, expressing that you wish to be added to the wait list. This initial request can only be done in February! Once you are on the list you must confirm your interest every January, through mail, by sending in a letter or specialized form issued to you by Grand Canyon. The form will give your current wait list number and this will change each year you confirm your interest. You are given a grace period of one year to screw up and forget. After that if you forget then you will be taken off the list and go back to reapplying, paying $25.00, and starting at the bottom of the heap. However, once you are on the list you may call at any time to inquire about cancellations. The best time to call is between 30 and 60 days before your desired launch. Their is no difference between being wait listed for high use or low use dates. The system in Grand Canyon is consistent throughout the year and can only be done in the manner described.

Canyonlands (Cataract Canyon)

Permits for Cataract Canyon are issued on a first come first served basis. A check for $30 must accompany your application. They use neither a lottery nor a wait list because so far, they can meet the public demand with the current system. You can apply any time after January 1, but permits don't begin to be issued until March 1. Early applicants will use up allotted private spaces, but a pool of applicants is held until June 15 when unused dates (from cancellations) are then redistributed to remaining parties interested. If you are listed as a participant on another high use Cataract trip then you can not apply for your own permit.To hold an issued permit you must confirm your interest by phone or mail two weeks prior to your launch. No shows will not be able to apply for another permit that year or the following.

Low Use Permits

For permits during the specified "low use" season, a permit application may be submitted any time or a date can be reserved over the phone. These launch dates are issued first come first serve.

ADDRESSES

COLORADO RIVER / GRAND CANYON (DINOSAUR)
River Permit Office
Grand Canyon Nt'l Park
P.O.Box 129
Grand Canyon, Az.86023
81610
(602) 638 -7843
noon

SAN JUAN RIVER
B.L.M.
SanJuan River Resource Area
P.O.Box 7
Monticello, Utah 84535
(801) 587-2144

WESTWATER CANYON
B.L.M.
Grand Resource Area
P.O.Box M
Moab, Utah 84532
(801) 259-8193

RIVER FLOW INFORMATION
(801) 539-1311

YAMPA/LODORE

Dinosaur Nt'l Monument
att. River Office
P.O.Box 210
Dinosaur ,Colorado

(303) 374-2468 8 am -

DESOLATION / GREY
B.L.M.
Price River Resource Area
900 North 700 East
Price, Utah 84501
(801) 637-4584

CATARACT CANYON
Canyonlands Nt'l Park
att. River District
125 West Second South
Moab, Utah 84532
(801) 259 - 7164

Appendix F

Equipment Lists and Menus

Group Equipment

RAFTS:

___3 -15'6" Inflatable Achilles (to be rowed)
___2 -14' Inflatable Achilles (row 1, paddle 1)
___10 bow and stern lines
___4 rowing frames
___5 center floor boards
___4 stern boards
___3 cargo boards
___16 oars (8 graphite, 8 wooden)
___11 paddles
___20 life jackets
___2 rescue kits (150' static line, pulleys, caribiners, webbing)
___7 throw bags
___15 bail buckets
___4 barrel pumps (4" and 6")
___MANY ASSORTED STRAPS

CAMPING:

___ 6 tents with ground sheets
4 Wild Country Supernovas (3 person)
1 Moss Trillium (6 person)
1 North Face ShangraLa
___2 8' x 10' nylon tarps
___1 large Katadyn water filter
___human waste set-up(rocket box, heavy garbage bags, toilet seat, toilet paper, lime, and hand soap)
___Day tripper (small human waste set-up)
___1 trowel

KITCHEN:

___1 single burner cooker/fryer
___1 four burner Cook's Partner stove
___5 propane tanks
___2 Coleman Peak One stoves
___2 lanterns (trees and hoses)
___1 table
___firepan, grill, and charcoal
___1 folding shovel
___2 14" Dutch ovens
___4 pots with lids (assorted)
___cutting boards
___2 stainless steel buckets

___3 spoons, 2 spatulas, 1 ladle, knives, can opener, cheese grater, sump strainer, spoons, misc. bowls.

DRY STORAGE:

___35 black bags
___other assorted dry bags
___30 rocket boxes (food, libraries, human waste)
___1 large aluminum commissary box
___3 other water tight boxes
___5 coolers
___6 water jugs

OTHER:

___5 first aid kits
___3 raft repair kits
___1 large miscellaneous repair kit

PERSONAL GEAR LIST

Keep in mind that this gear is needed to keep you comfortable for three full months. The only opportunity to exchange your gear will be over Thanksgiving break.

* These items are highly recommended.
** These items are optional. All others are expected.

_ Sleeping bag warm to 5 degrees. (We will be sleeping in tents)
_ Sleeping pad
_ *Crazy Creek Chair (you won't be sorry)

River Wear	Camp Wear
wet suit ** or dry suit*	Rain gear (coat and pants)
wet suit booties or wet socks	Comfortable hiking shoes and socks
River sneakers for wet socks	Hat and gloves
Rubber wading boots* - good for flat water or camp wear.	
Hat and gloves	Sun hat for on and off river use.
Medium weight capilene top and bottom (2 pair for on and off river use).	
Additional synthetic layers	Other warm layers
Shorts and t-shirt	Shorts and t-shirt and bandanas
Sun glasses and retainer strap	Light wind jacket

The college will supply dry bags but each person might want their own 50 caliber ammo box for personal items like your journal, camera, toothbrush, treats, etc.

*If you own a river knife and/or you prefer to bring your own lifejacket, please include.

OTHER ITEMS

_Eating: favorite bowl, insulated mug and utensils. Tupperware w/ lids are great.
_Waterbottles: 2 quarts rigged w/ webbing to be easily clipped to boat.
_Carabiners: 2 or 3 for a variety of uses. Not climbing quality.
_Headlamp: Include plenty of spare batteries and a spare bulb.
_Personal hygiene stuff: toothbrush, comb, personal medication, tampons, soap...
_Journal and pens: Pick a notebook that easily fits into an ammo can.

**Library books will be included as group gear and will be selected collectively, but you may wish to bring a book of your own that has nothing to do with the trip.
**Camera and film

Also bring your I.D. along, as well as some extra cash for those unexpected shopping sprees.

Please ask if you have any questions about this list or questions about your own gear. Be well prepared.

LIBRARY I

The Dynamic Earth	Skinner, Porter
Geologic History of Utah	Hintze
Geology of Utah	Stokes
The Practical Paleontologist	Parker, etal
The Colorado Plateau - Geology	Baars
Collapse of Evolution	Huse
Dinosaur Herosies	Bakker
Pleistocene Extinctions	Martin, Wright
Packrat Middens	Betancourt, etal
Canons of the Colorado	Powell
Dictionary	Webster
Dictionary: geologic	
Audubon guide: weather	
Audubon guide: fossils	
Exploration of the Colorado River	Powell
A Canyon Voyage	Dellenbaugh
Geologic Time	Eicher
Geologic Story : Uinta Mtns.	Hansen
Canyonlands Country : geology	Baars
Red Sky, Red Water	Hood
Grand Canyon : An Anthology	Babbitt
Geology river guidebook I	Hamblin,Rigby
Geology river guidebook II	Hamblin, Rigby
Geology river guidebook III	Hamblin, Rigby

LIBRARY II

Environmental Perspectives/ Rafting	Prescott College
Birders Handbook	Ehrlich, etal
Encounters with the Archdruid	McPhee
Growing up Western	Backes
Sagebrush Country	Fradkin
Quiet Crisis and Next Generation	Udall
Gathering at Zion	Stegner
Beyond the Hundreth Meridian	Stegner
Cadillac Desert	Reisner
Trees and Shrubs of the SW Uplands	Elmore, Janish
EMT Manual	
River Rescue	Bechdel, Ray
Desolation Cyn guidebook (x3)	
Dinosaur guidebook (x3)	
Canyonlands guidebook	

LIBRARY III

The Only True People	Parker
Uinta Basin Field Guide-Paleontology	GSA
Prehistoric Southwestern Craft Arts	Tanner
The Anasazi	Ambler
Ancient Hunters of the Far West	Pourade
Anasazi Ruins of the Southwest	Ferguson, Rohm
Indian Art of the Southwest	Shaafsma
Legacy on Stone	Cole
Dictionary of Prehistoric Indian Artifacts	Barnett
Reconstructing Prehistoric Pueblo Societies:	Longacre

MAPS

1 : 100,000 G.S.

Seep Ridge	Utah/Colorado
Jones Hole	Utah
Clay Basin	Utah
Arches Ntl. Monument	Utah
Flaming Gorge	Utah/Wyoming
Island Park	Utah
Canyon of Lodore N.	Utah
Dinosaur Ntl. Monument	Utah/Colorado
Split Mountain	Utah
Stuntz Reservoir	Utah

Digital Shaded Relief of South Western United States
Digital Shaded Relief of Utah

SCIENCE EQUIPMENT LIST

Required for all students :

- Field notebook
- Field book pouch and belt
- Hand lens (10x)
- Acid bottle (HCl)
- Mechanical pencil
- Colored pencils
- Protractor / ruler
- Compass (Silva Ranger)
- Map boards (plexiglass)
- Binoculars (strongly recommended)

Additional gear supplied for students:

- Rock hammers
- Easel and writing board
- Graph paper
- Maps and map tubes (PVC - waterproof)
- Thermometers
- Spotting scope

MENU - FOR 15 PEOPLE

BREAKFAST

1) Cereal / Bagels
assorted cold cereal
20-22 bagels
2 8oz cream cheese
jam / peanut butter
milk

2) Oatmeal
2 lbs. oatmeal
1/3 lb dried fruit
brown sugar
butter

3) Pancakes
Krusteaz pancake mix
2 32oz canned fruit
2 lbs bacon
butter / syrup
milk

4) Scrambled Eggs
28 eggs
2 onions
1 8oz green chili
1 1/2 lbs. cheese
20 slices bread
butter / jam

5) French Toast
42 slices bread
12 -15 eggs
2 lbs bacon
butter / syrup
milk

6) Couscous
3 lbs. couscous
1/3 lb. dried fruit
butter / syrup
milk

7) Potatoe Madness
15 -18 potatoes
3 onions
garlic
bell peppers
mushrooms
1 1/2 lb cheese
20 -24 bagels
butter / jam

8) Egg variations

Chiliquiles
30 corn tortillas
24 -30 eggs
4 lbs refries
1 1/2 lb cheese
enchilada sauce
2 onions

Huevos
30 flour tortillas
24 -30 eggs
4lbs refried beans
1 lb. cheese
mild salsa
2 onions

LUNCH

1) Tabouli
2 lbs tabouli mix
1/4 lb tahini
7 tomatoes
parsley / olive oil
2 red onions
18 pitas

2) PB&J
2 loaves bread
1 1/2 lbs peanut butter
1 lb. jam
15 pcs. of fruit

3) Almond Butter
30 bagels
1 1/2 lbs almond but
1 lb. apple butter
15 pcs. of fruit

4) Hummus
20 pitas
1/4 lb tahini
6 16oz cans garbanzos
1 1/2 lbs cheese
3 cucumbers
2 red onions

5) Meat and Cheese
2 loaves of bread or 2 boxes of crackers
1 lb salami
32oz can tuna
1 lb cheese and *oz cream cheese
4 -6 avocados
carrots and raisins sometimes added

*one lunch goodie added for each day - candybars, cookies, trail mix

DINNER

1) Tofu Stirfry
1 broccoli, 1 cauliflower
1 cabbage,1 pepper
12 carrots
2 onions, garlic
6 lbs tofu
3 lbs quinoa
1/2 lb cashew
soy sauce, ginger

2) Curry Stew
12 potatoes
8 carrots
1 cauliflower
3 onions, garlic
2 16 oz coconut milk
3 packs soupmix
3 lbs couscous
curry powder

3) Lentils &Rice
2lbs lentils
3 1/2 lbs rice
2 bell peppers
5 carrots
2 onions, garlic
1 1/2 lb miso

4) Pesto Pasta
5 lbs pasta
8 -10 oz pesto mix
1/2 lb butter
1 onion, garlic
parmesian cheese
2 loaves fr. bread

5) Spaghetti
5 lbs pasta
1 #10 tomato sauce
1 32oz tomatoes
2 onions, garlic
2 bell peppers
2 loaves fr. bread

6) Mac-n-cheese
5 lbs macaroni
2 1/2 lbs cheese
4 carrots
2 onions, garlic
2 16oz can corn

7)Burritos
30 flour tortillas
6 lbs refried beans
3 1/2 lbs rice
1 1/2 lb cheese
vegie condiments
onion,pep,tomatoes,gar

8) Burgers
24 buns
30 tempeh / beef pats.
1 lb. cheese
condiments

9) Pesole Pie
36 corn tortillas
2 boxes cornbrd mix
2 lbs cheese, 1 lb beef
4 lbs canned pintos

Appendix G

Curriculum Planning

Curricular Activities / Rafting-Geology-Archeology

Date	Topic / Activity	Methodology
Pre-trip	Intro. to Colorado Plateau / Slide show	Lecture
	Basic Geological Principals / Slides	Lecture
	Fooc Planning(create menus, shop,pack for 3 different phases)	Cooperative
	Equipment organization	Cooperative
Day 1	Precambrian Quartzite / Observation	Presentation
	Boat rigging / loading for the first time	Cooperative
	Paddle skills / first day on the water	Discovery/Cooperative
	River camp systems / daily tasks	Presentation
Day 2	Scouting Rapids	Presentation
Day 3	Rock I.D. / Sedimentary Rocks	Discovery / Presentation
	Paleo-ecological reconstruction	Journalling / Inquiry
	Pack rat middens	Discovery / Inquiry
	Contracts	Discussion
Day 4	Hydrology	Presentation
	Throw Bags	Presentation / Discovery
	Boat repair / Patching a floor	Discovery
Day 5	Headward Erosion	Presentation
Day 6	Geologic Time / Dating	Lecture
	Dune migration / Deposition	Presentation
	Rock I.D. / Igneous Rocks	Discovery / Presentation
Day 7	Unconformities	Presentation
	Rock I.D. / Metamorphic	Discovery / Presentation
Day 8	Evolution of Life	Lecture
	Petroglyphs	Presentation / Inquiry
	Finding a Basket / Ethics of Science	Discovery / Discussion
	Faults (Drag faults - Mitten Park)	Presentation
Day 9	Petroglyph mapping-Deluge Shelter	Field Research
	Bighorn sheep encounter	Inquiry
Day 10	Geologic time scales	Student presentations
Day 11	Bird watching	Discovery
Day 13	Petroglyph Mapping - McKee Springs	Field Research / Inquiry
Day 14	Dinosaur Evolution / Physiology	Lecture
	Dinosaur Quarry	Guest lecturer
Day 15	Faults	Field Research /Sketching
Day 19	Mineralogy	Lecture
	Experiential Ed.	Discussion / Student led
Day 22	Permit systems	
	Fish fossils	
Day 24	History of American West	Student Presentation
Day 25	Raft Extrication/Z-drags	Student Presentation
	Sedimentary Classification	Lecture
Day 26	Laramide Orogeny	Presentation
Day 27	Sevier Orogeny	Presentation
Day 28	Weathering/Erosion	Student presentation
Day 29	Powell Museum visit	
Day 30	Little Grand Fault	Presentation

Day 31	Jurrasic Rock I.D. / Deposition	Inquiry / Journalling
Day 32	Jurrasic Environments	Discussion
Day 33	Paleo-ecological Reconstruction	Student Presentation
	Chinle formation	Discovery
Day 34	Fossilization	Presentation
Day 35	Erosional stream processes	Student Presentation
	Landform I.D./ Description	Discovery
Day 36	Geologic Mapping / Strike and Dip	Field Research
Day 38	Fremont Ruins	Discovery / Inquiry
	Petroglyphs	Student Presentation
Day 39	Umcompaghre Uplift	Presentation
	Fossil I.D.	Discovery
Day 40	Quarternary Geology	Student Presentation
	Pleisticene Megafauna Extinction	Student Presentation
Day 41	History of Scientific Exploration	Student Presentation

Sample Lesson Plan - Paddle Rafting

Goal of the Lesson - Students will learn techniques and commands necessary for effectively paddling and paddle captaining a raft. This lesson is a prerequisite to learning how to maneuveur the craft on moving water and making the boat respond efficiently with the current.

Teaching Method - Presentation / Discovery

Time needed - 30 minutes for introductory lesson.

Materials needed - one paddle for each student (a raft and a body of water are needed depending how far the lesson goes)

Lesson Objectives - Identify parts of the paddle.
- Learn basic paddle strokes and commands.
- Practice strokes and commands on the water.

Content of Lesson :
Teacher's role - With visual aid (paddle), identify the parts of a paddle and how it is held.
Students' role - observe, possible note taking.
Teacher - Introduces basic strokes (forward paddle and back paddle) and demonstrates each.
Students - Mimick teacher practicing each stroke.
Teacher - Explains the five basic commands (forward paddle, back paddle, left turn, right turn, stop).
Students - Practice responding to each command with the proper paddle stroke.
Teacher - Discusses the configuration of paddlers in a raft and identifies four roles in the boat (paddle captain, pace setter, bowman, and paddle crew).
Students - Line up on shore in a mock configuration and practice paddling as such. Work on timing and the use of proper strokes.

On the water:
Teacher - Getting into an actual raft, the teacher explains where to sit in the boat and how to brace yourself while paddling. The teacher captains initially to role model good voice projection and demonstrate timing. Student captains can be rotated in as people get the hang of it and if the water is an appropriate difficulty.
Students - Sit in the raft, in the proper configuration, and respond to paddle commands as given by the captain.

Sample Lesson Plan - Scouting Rapids

Goal of the Lesson - Students will learn how to look at a rapid objectively and determine the best run for their craft.

Teaching Method - Presentation / Inquiry

Time Needed - 45 minutes to an hour

Materials Needed - A rapid to study and describe (probably Class III or harder)

Lesson Objectives - Student will be able to:
Identify prominent features in a rapid (is. rocks, tongue, holes).
Chose the safest route for a craft to negotiate the rapid.
Describe the position of their boat while in the rapid and how it will be maneuvered.

Content of Lesson :
Teacher's role - Chose a rapid worthy of scouting and point out safety considerations when stopping to scout a rapid. Have students spend about 5 minutes observing the rapid on their own.
Student's role - Observe the rapid and pick out all significant features.
Teacher - Facilitate a short question and answer period allowing students to describe their observations of the rapid.
Student - Describe prominent hydrolic features and the rapids greatest hazards. Talk about things to avoid and preferred routes for the boats.
Teacher - Divide group into their respective boat teams and have them decide on a run and how they will execute it in their boats.
Students - Discuss in boat groups the best way to run the rapid and talk about specific maneuvers and possible paddle commands to position the boat.
Teacher - Have students draw sand diagrams of the rapid and, using a rock as their boat, demonstrate their run.
Students - Use sand diagram to demonstrate the position of the raft through the rapid, including angles to the current and what commands the paddle captain might be using.
Teacher - Presents some "what if" considerations and asks students to form a plan B.
Students - Demonstrate plan B.
Teacher - Final check to make sure all students understand what their boat team plans to do in the rapid.
Students - Execute their run on the water.*
*If an instructor runs the boat through the scouted rapid, students can still participate in determining the safest plan and describe their vision of the run.

Curriculm Goals
Scope and Sequence

Scope

The Outdoor Action curriculum is meant to teach the students specific skills and knowledge for organizing a river expedition and operating both paddle rafts and oar rafts safely through whitewater.

*A primary focus of the course will be to involve students in all aspects of Expedition Planning (i.e. group food, equipment, travel logistics and personal preparation).

*Students will discuss the concepts of "expedition behavior" and group mentality as it applies to the success of the trip.

*Students will gain significant experience,over 750 river miles, both rowing and paddle captaining rafts.

*Students will become familiar with river living skills and proper systems for cooking, setting shelter, disposing of human waste, rigging gear into the rafts, etc.

*Students will review and advance their understanding of river hydrology and flow dynamics.

*Students will learn and practice river safety and rescue techniques.

*Students will become familiar with the history of river running, with a special emphasis on John Wesley Powell's exploratory descent down the Green and Colorado Rivers.

*We will take advantage of other teachable moments as provided by the river and the canyon themselves.

Sequence

The intended sequence of curriculum was altered, to some extent, by daily events and teachable moments we could not plan for. This sequence is written from the perspective of a logical teaching progression and considers appropriate timing of lessons. It ensures that students understand one set of concepts before offering them more advanced material.

*Pre-departure -Personal equipment preparation; what to bring.
-Group equipment; what to bring, general maintenance and care.
-Menu planning and food buying.
-Packing of equipment and food for travel.
-Discuss "expedition behavior" and commitment.
-Lake session: flat water flip drill and man-overboard.

*First 2 days on the river -General campcraft and river systems. (cooking, dish wash, water purification and water settling, camp selection, and bathroom system.)

-Knots and tie downs for anchoring the boats and cargo.
-Rigging the rafts, including gear configuration and safety.
-How to paddle a raft, techniques and paddle commands.
-Paddle captaining, steering the boat and using commands.
-Rowing techniques to maneuver an oar boat .
-Practical experience on moving water.

*First week of the trip -Basic river hydrology and flow dynamics.
-Scouting rapids and planning your run.
-River signals and boating etiquette for spacing, eddies, etc.
-Using the river guide books to know location and land marks.
-Throw bag practice.

*Anytime during the trip -Dutch oven cooking.
-Permit systems.
-River runner history and other early explorers.
-River rescue in theory or in practice; situation assessment, haul systems and dealing with a wrapped or flipped boat.
-On going refinement of whitewater boating skills and progressing downstream.

Creating Lesson Plans - Take time to think out the progression of each lesson. A trick to making each lesson more experiential is to write out the roles of both the student and the teacher throughout a given lesson. If you find that the teacher's role is to talk and talk and talk some more, while the student does alot of listening, then your lesson could use some active student roles. Plan specific ways the student can be engaged during each lesson and write out a lesson plan that alternates active roles between the students and the teacher. An example of this is given within appendix G.

Appendix H

Itineraries

GENERAL TRIP ITINERARY

October 1-5	Pre-trip preparation, in Prescott.
October 6	Depart to Flaming Gorge Dam. Drop off non-perishable resupply at the J.W.Powell Museum, Green River, Utah. Camp G.R.S.Park.
October 7	Drive to launch at Flaming Gorge. Cache a non-perishable resupply at Split Mountain Farm, Jensen, Utah.
October 8-17	Flaming Gorge - Jensen, Utah. - 90 river miles.
October 18 -21	Resupply at Split Mtn. Farm. Off-river time.
Oct. 21 - Nov. 6	Jensen - Green River, Utah. - 200 river miles.
November 7&8	Resupply Green River.
Nov. 9 - 23	Green River - Hite Marina, Lake Powell. - 165 river miles. Take out Hite Marina and return to Prescott.
November 24	Unload gear and derig the trip.
Nov. 25 - 30	Off time in Prescott. Thanksgiving holiday.
December 1&2	Preparation in Flagstaff for Grand Canyon phase. G.C.E.S. orientation and warehouse load-up. Travel to Page.
December 3	Tour Glen Canyon Dam. Rig boats Lees Ferry.
Dec. 4- 30	Colorado River through Grand Canyon. - 280 river miles.
Dec. 30	Derig trip in Flagstaff and return to Prescott.
January 14	Deadline for G.C.E.S. technical report.

ACTUAL DAILY ITINERARY

Date	Camp / River mile	Activity
October 1-5	Prescott	In town preparation & logistics
Oct. 6	Green River State Park	Depart Prescott to launch point
Oct. 7	Flaming GorgeResevoir	Travel day
Oct.8	Little Hole / 283	*Launch below Flaming Gorge Dam
Oct. 9	Browns Park / 266	Scout Red Creek rapid
Oct. 10	Refuge / 252	Channel selection
Oct. 11	Lodore Ranger Station / 243.5	
Oct.12 and	Pot Creek / 235.2	Scout Winnies, Upper Disaster, Lower Disaster Rapids
Oct. 13	Pot Creek / 235.2	Layover
Oct. 14	Limestone / 228	Scout Triplet Falls and Hells Half Mile
Oct. 15	Jones Hole / 218.6	Hike in Echo Park
Oct. 16	Jones Hole / 218.6	Layover / Deluge Shelter
Oct. 17	Green River (closed)*	Scout S.O.B.
Oct. 18	Jensen(below bridge)	*Resupply
Oct. 19	Jensen	Food buy, laundry (Vernal)
Oct. 20	Jensen	a.m. personal time p.m. Petroglyphs / Rainbow Park
Oct. 21	Jensen	Dinosaur Quarry
Oct. 22	Jensen	Harper's Corner / Mid-course Debrief
Oct. 23	Rivermile 169	flat water day (channel selection)
Oct. 24	Horseshoe Bend / 156	flat
Oct. 25	River mile 146	half day layover-curricular
Oct. 26	"fecal point" / 135	flat
Oct. 27	River mile 123	*No services in Ouray
Oct. 28	Moon Bottom / 109	Petroglyphs up canyon
Oct. 29	Boat Bottom / 97	flat
Oct. 30	Gold Hole / 81	*Begin Desolation/Grey section
Oct. 31	Peters Point / 74	Short river day
Nov. 1	Rock Creek / 53	Scout Steer Ridge
Nov. 2	Rock Creek / 53	Layover
Nov. 3	Big Canyon / 42.5	Election Day
Nov. 4	Rabbit Valley / 28.5*	Scout Wire Fence, Three Fords
Nov. 5	River mile 7	Scout Coal Creek,* Diversion Dam
Nov. 6	Green River State Park	*Resupply-Green River ,Utah
Nov. 7	G.R.S.P.	Shop, laundry, mail, museum

Nov. 8	River mile109.5	Launch 1 p.m.
Nov. 9	Trin Alcove / 90	Long river day
Nov. 10	Trin Alcove / 90	Layover
Nov. 11	Hey Joe / 76	Hike Hey Joe mine
Nov. 12	Oak Bottom / 62	Hike up and over Bowknot Bend
Nov. 13	Upheaval Bottom / 44	Layover camp
Nov. 14	Upheaval / 44	Hike to Upheaval Dome
Nov. 15	Upheaval / 44	Day off
Nov. 16	River mile 29	*
Nov. 17	River mile 11	*
Nov. 18	Brown Betty / 212	Begin Cataract Canyon
Nov. 19	Brown Betty / 212	Layover / Dolls House
Nov. 20	Rapid 20 / 203	Scout Mile Long Rapid
Nov. 21	Dark Canyon / 183	*Scout Big Drops
Nov. 22	Take out Lake Powell	Return to Prescott
Nov. 23		Derig in Prescott
Nov. 24-29		Off time in Prescott
Nov. 30		*Town preparations for Grand
Canyon		
Dec. 1st	Flagstaff	*G.C.E.S. orientation w/ Dave
Wegner		
Dec. 2	Wahweap Marina	*Pack out at O.A.R.S. warehouse
Dec. 3	Lees Ferry	*a.m. Glen Canyon Dam tour /
p.m. rig		
Dec. 4	Jackass / 8	LAUNCH G.C. Scout Badger
Rapid		
Dec. 5	North Canyon / 20	Scout Soap Creek ,Houserock
Dec. 6	South Canyon / 31.5	Scout 24 mile, 25 mile
Dec. 7	Eminence Break / 44.5	Hike Stanton's, Redwall,
Nautiloid		
Dec. 8	Nankoweap / 53	Hike Eminence Break
Dec. 9	Nankoweap / 53	Layover
Dec. 10	L.C.R. / 61	Scout Kwagunt
Dec. 11-13	Basalt Canyon / 69.5	Hiked Carbon/Lava loop -
Layover		
Dec. 14	Grapevine / 81	Scout Hance, Sockdolager
Dec. 15	Granite Rapid / 93	*Phantom Ranch / Scout Horn
Creek		
Dec. 16	Little Ruby / 104	Scout Granite, Hermit, Crystal!
Dec. 17	Blacktail / 120	Hike Elves Chasm
Dec. 18	Panchos / 136	
Dec. 19	Panchos / 136	Layover
Dec. 20	Ledges / 151	Hike Kanab, Scout Upset
Dec. 21	Gateway / 171.5	Hike Havasu

Dec. 22	Whitmore Wash / 188	Scout Lava Falls!
Dec. 23-26	Granite Park / 209	*Christmas Layover
Dec. 27	Gneiss Canyon /236	Pass Diamond Cr./ Scout 232
Dec. 28	Night Float / 259-273	*Pulled over by 12:30 a.m. Tied up.
Dec. 29	Pierce Ferry / 280	*Take-out at 9:30 a.m. / Debrief
Dec. 30	Return to Prescott	Derig O.A.R.S. warehouse
Dec. 31	Wrap-up logistics	*Academics done by January 14th

* Asterisks denotes further comments on the course area and general itinerary considerations. Comments listed on following page with corresponding dates.

ADDITIONAL ITINERARY COMMENTS

October 8 - The launch at Flaming Gorge Dam is small and heavily used by boaters and fisherman. Rafts must be inflated before driving down to the launch point so it is worth while to pack them accessibly for a launch on this section.

Oct. 17 - Green River campground is closed during low-use season. All plumbing (toilets and drinking water) is shut off for the winter. If you camp just upstream at the Split Mountain campground there will be outhouses, but no running water. Human waste and other garbage may be disposed of at the Split Mtn. ramp.

Oct. 18 - Resupply in Jensen/Vernal. We were camped on the river as close to the road as possible. Much of the surrounding property is privately owned but we were able to get permission to camp and use small access roads. Jensen has limited facilities, so most of our resupply was done in Vernal. Jensen does have a gas station with propane available, a convenience store and cafe'. Showers can be arranged with the Colorado Outward Bound School in Jensen. Vernal is a fairly large town with major grocery stores, several restaurants, laundromats, post office, bars, thrift store, Public Library and a museum that is highly recommended. We also made use of the small airport as a part of our shuttle logistics. The Dinosaur Quarry of Dinosaur National Monument, is about a 15 minute drive from Jensen.

Oct. 27 - The town of Ouray has virtually no services what so ever. There are a few residents, so if you needed a phone in an emergency there would probably be one available.

Oct. 30 - Fewer days are needed, for the section between Jensen and Sand Wash , than we actually allowed. Six days would be sufficient if you wanted to buy yourself time to spend in Desolation/Grey.

Nov. 4 - There are many good camps in this area; Trail Canyon, Cow swim, Wire Fence, Three Canyon, Range Creek, Lion Hollow, Cedar Ridge, Rabbit Valley, and just below Rattlesnake.

Nov. 5 - The diversion dam above Green River is kind of a nasty thing to run in a raft. Always scout to see if it seems feasible and safe. The concrete structure has jagged rebar throughout and the water feature made by the dam is an oddly symmetrical recirculation. The rapid immediately below the dam is also worthy of caution. Camping in this area is marginal.

Nov. 6 - We arrived at the Powell Museum, right along the river, at noon to pick up the non-perishable resupply we cached there on our drive to the launch. Special arrangements were made, but the museum seems to have ample storage space for such things. The museum contact is JoAnne Wethington (801) 564-3427. We camped at Green River State Park for three nights. It is open year round and has hot running water and shower facilities. As a group you pay two dollars per person per night. The park is walking distance from town, but it was extremely helpful having a vehicle to do numerous errands. Green River is a small town but t has the essentials ; groceries, propane, laundry, cafes and Ray's Tavern. No facilities for dumping human waste are available during the off-season.

Nov.16 - Good camping at Anderson Bottom.

Nov. 17 - Good camping just below Turk's Head on right.

Nov. 21 - Last good camp before lake.

Nov. 30 - Dec.3 - During this time, we were coordinating logistics between our ongoing support from Prescott College and our new relationship with the G.C.E.S. From Prescott we brought only minimal gear, being primarily personal items. The Prescott van left us in Flagstaff to be looked after by those at the O.A.R.S. warehouse. The students were able to participate it in packing out the trip but this effort was organized entirely by O.A.R.S. Our one night in Flagstaff took advantage of friend's floorspace for accommodations. The following night we stayed at Waweap Marina near the Glen Canyon Dam. Early arrangements made it possible to camp at the marina for free as an educational group. We had also made prior arrangements with the dam supervisor to assure us a special lecture presentation and dam tour. Our tour lasted from 8 a.m. to almost 11 p.m. and had us at Lee's Ferry by 3 that afternoon. Although we were a

research group we arranged to see the slide presentation designed for private river runners to orient them to Grand Canyon systems.

Dec. 15 - Phantom Ranch is the only commercial concessionaire stop in the canyon . A kitchen is run for private overnight guests and so some food staples are available for purchase. We were able to buy assorted black teas, popcorn, and pancake mix. Also available in the snack shop are candy bars, gum... Mail is delivered to Phantom Ranch each day by mule so you may have things sent in to you or out going at Phantom. There are two pay phones at the ranch as well. Send mail to River Runner Mail, Phantom Ranch, P.O. Box 129, Grand Canyon, Az.

Dec.24 - Granite Park is not where you would want to layover in mid-July, but it made the perfect Christmas layover for us in the middle of some cold days. We had direct sunlight on our camp from 9 a.m. to 3 p.m. A record for this portion of the trip.

Dec. 28 - Doing a night float below Separation canyon has several variables to consider. The primary thing to be aware of is the level of Lake Mead. The lake level affects two things; how long you will have current through the night and what the take out will be like at Pearce Ferry. A low lake is good for night floats in that the current is strong further along downstream and so you are likely to make more miles. However , you might be so successful in floating that you go right past your take-out. It is important to have someone awake the whole time to keep track of where you are. A low lake does however bring out more obstacles to contend with in the dark (rocks, bushes, and sandbars). Full moon nights are great for floats, but so is a good strong flash light. Low water can also make the take-out tricky in that you can't simply beeline for the parking lot when you see it because of the severely sticky mud flats along the way Instead you must stay with the current right to the last minute before turning away from Pearce bay and then make a deliberate upstream pull into the bay and across some potentially very shallow water.

Shuttle Itinerary

Date	Vehicle Schedule / Resupply Caches
October 6	Depart Prescott with one van pulling a trailor and one pickup truck.The van and trailor are also equipped with roof racks for gear.One shuttle driver accompanies group. Resupply cache is off loaded in Green River, Utah.
October 7	Pickup truck with resupply items is left at prearranged location in Jensen, Utah. Shuttle driver continues with group to the launch in only the van pulling the trailor.
October 8	Shuttle driver takes van to Jensen and loads the resupply items from the pickup into the van. Trailer is hitched onto the pickup truck and the shuttle driver takes the truck and trailor to Prescott.
October 18	River trip arrives in Jensen to get resupply van. Resupply is carried out and the van is useful to the group during a five day layover.
October 21	Shuttle driver takes a flight from Prescott, Az. to Vernal, Utah. When the group launches again on Oct. 22 the shuttle driver returns to Prescott with the van.
November 7	Resupply in Green River, Utah requires no vehicle. However, a vehicle would be very useful. Non-perishable food had been previously cached and grocery store is a manageable walking distance.
November 22	Pickup trip at Hite Marina with a van and trailor, each with roof racks. A van for passengers and a duel axle cargo truck for easy loading, is also an excellent option.

Appendix I

Student Projects

Student Projects / Presentations

Student Name	Primary Project	Secondary Project
Jhala French	Fremont Rock Art	Colorado River Compact
Andy Persio	Paleo-ecological Reconstruction of Morrison fm.	Volcanism/Grand Canyon
Rob Noonan	Physiographic cross-section of Green and Colorado rivers	Stream Anatomy
Eric Howard	History of Westward Expansion	"Sense of Place"
Kim Buck	Pleistocene Extinctions	Weathering
Jack Collins	Photography	Stream Processes
Marya Felenchak	Literature of Science	Comparison of Three Geologic and Exploration Expeditions
Jim Donovan	Pleistocene Migration	Stanton's Cave
Marc Clausen	Affects of Lithology on Riparian Plant Communities	Colorado River Storage Project
Matthew Turner	Permian/Triassic Extinctions	Dinosaur Physiology
Kirsten Rowell	Hisatsinom Religion	Evolution of GrandCanyon

G.C.E.S. Projects

Jhala French and Julie Munsell - Water Temperatures

Marc Clausen and Kim Buck - Passerine Transect

Rob Noonan and Jim Donovan - Migratory Waterfowl Count

Jack Collins and Marya Felenchak - Beach Photography

Eric Howard - Trout Count

Kirsten Rowell - Eagle Count

Andy Persio - Mammal Count

Matthew Turner - Weather Observations

Appendix J

Learning Contracts

Fill in the front of this form at the beginning of the class
Make three copies: student, faculty and advisor.

COURSE CONTRACT FORM

110

(Not to be used for independent studies')

19___
___ FB
___ FC
___ WB
___ SC
___ SB
___ Summer

COURSE TITLE _____ FACULTY _____

STUDENT _____ ADVISOR _____

GOALS (Why are you taking this course? In what way is this course pertinent to your educational program?)

OBJECTIVES (What new knowledge and skills do you expect to gain in this course? What attitudes and values do you expect to examine? What procedures will you follow? Be as specific as possible.)

EVALUATION (What will you do or provide as a basis for final evaluation in this course? Relate these to the stated objectives.)

CHECK THIS BOX IF YOU WISH TO RECEIVE A LETTER GRADE FOR THIS COURSE!! ☐

Fill in this side of the form at the end of the class.

COURSE DESCRIPTION: The course description written for the course will be used unless a different description is attached here.

WHAT IS WRITTEN BELOW IS PART OF THE STUDENT'S PERMANENT RECORD AS IT APPEARS HERE, AND IS SENT OUT WITH ALL TRANSCRIPT REQUESTS IN THE FUTURE!

INSTRUCTIONS: 1) Student completes the self-evaluation portion when all class work and assignments are finished, then submits it to the faculty member.

2) Faculty member completes the faculty evaluation, number of credits, upper or lower division, dates and signs the form, and turns it in to the registrar within 2 weeks of the last day of class. Unsatisfactory work (grade of D or F) is not awarded credit at Prescott College.

DO NOT EXCEED THIS SPACE

Student's Self-Evaluation:

Faculty Evaluation:

Number of credits awarded ☐

Level of Credit: (Check one) Upper Division ☐ or Lower Division ☐

Faculty Signature _____

Date _____

Letter Grade (if requested on front) _____