Teaching Note

The Race to the South Pole: Lessons in Problem Solving, Planning, and Teamwork

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Critical Incident Overview

Antarctica lies at the bottom of the world encircled by the Southern Ocean and isolated from the shores of South America, South Africa, Australia, and New Zealand. To date, little was known about Antarctica's mysterious interior. Mankind has always been fascinated by being first to set foot on distant lands, e.g., Viking and Columbus' expeditions to America and the first humans to land on the moon. In 1912, Amundsen and Scott were both preparing separate expeditions to conquer the South Pole. Success precariously hinged on numerous small decisions. The brave leaders of these expeditions would have to schedule and chart their course as well as select appropriate, food, clothing, shelter and transportation, not to mention equipment and supplies. These decisions were based on how each team defined success, and every element of the teams' preparation needed to serve their strategic objectives. What decisions promised the best chance of success and what were the implications of these decisions?

This narrative describes a decision-based critical incident. It was designed to be used in various graduate and undergraduate courses that involve problem solving, planning, and teamwork. We have used this CI at the beginning of the semester in an undergraduate capstone strategic management class to prepare students to work on these skills throughout the course. Instructors can use the CI in the first weeks of a strategic management class to help organize teams and promote thinking about planning and problem solving. Other courses that also make use of or build on these skills may also find uses for the CI since it promotes thinking about these issues without being heavily focused on a particular business functional area.

Research Methods

This CI was intended to be used as a problem-based learning (PBL) activity for promoting strategic planning and team building. The PBL format is an instructional pedagogy that encourages student participation and learning through an inherently engaging problem or activity (Gallagher, 1997). PBL was found to be effective in K-12 settings (Torp & Sage, 1998), medical schools (Barrows, 1994), and business education (Stinson & Milter, 1996). The effectiveness of

PBL hinges on the quality of the problem and the associated learning outcomes (Duch, 2001). This CI was developed using Hung's (2006) 3C3R PBL problem design framework, which fosters student achievement through a dual channel cognition approach involving three core components (content, context, and connection) and three processing components (research, reasoning, and reflecting).

This CI addressed the core components of the 3C3R framework by ensuring the sufficiency of content knowledge, information contextualization, and autonomous connection development. ***Subject matter content*** on Antarctic exploration was included to provide a knowledge base for engagement and analysis. ***Contextual information*** regarding the external environment was given to make the problem authentic and enable students to make evidence-based recommendations. ***Connection development*** was supported by integration of strategic thinking and planning skills, common to many disciplines.

This CI fulfilled the processing components of the 3C3R framework by encouraging meaningful engagement through self-directed research, critical reasoning, and mindful reflection. The ***research*** component required students to investigate factors such as clothing, supplies, transportation, and geography. In term of ***reasoning*** ability, this CI challenged students to determine relevant situational factors, develop appropriate planning criteria, and analyze possible outcomes based on group decisions. Lastly, the ***reflecting*** component, operationalized through oral and written reports, served to optimize student learning by developing team building and critical thinking skills that could be broadly used in many achievement settings.

The 3C3R framework has implications for student performance. In particular, the 3C3R framework is designed to help students simultaneously develop problem-solving and self-directed learning skills. Accordingly, the South Pole exploration case was selected as it provides students a realistic context within which to engage in problem solving, planning, and teamwork. Specifically, this CI was designed to have students complete a team building activity based on the following four steps: (1.) identify the objective, (2.) identify the relevant variables, (3.) gather data, and (4.) make a decision. These four steps reflect the levels of cognitive engagement that authors of PBL activities seek to insight in students, not the particular learning objectives, as these can change from case to case.

The factual information reported in this CI was obtained using secondary library resources. This information included the background of the explorers, the chronology of exploration, and the Antarctic geography, climate, fauna, and flora. This CI was rigorously classroom tested in undergraduate Strategic Management capstone courses offered at a large Midwestern research University. To this end, the CI has been successfully implemented each semester since 2010 as a joint case analysis and teambuilding exercise. This CI could be used in any class associated with leadership studies or those that require teamwork.

Learning Outcomes

Students will be able to:

1. Analyze a problem solving situation to identify relevant situational factors and decision objectives.

2. Engage in planning a group's activity to solve the challenges it faces.

3. Work as a team in problem solving and planning situations.

Discussion Questions

1. What is the objective of the expedition to the South Pole? (LO1)
2. What factors would you consider in creating your own expedition to the South Pole? (LO 2)

3. Working as a team, how would you plan an expedition to the South Pole? (LO3)

Answers to Discussion Questions

1. What is the objective of the expedition to the South Pole?(LO 1)

The general guidelines for this activity are given in Optional Student Material – Handout 1. This question is designed to address step 1 listed in the Research Methods section, identifying the team's objective by reaching the South Pole. Students should first consider what the true objective of the expedition should be. The competition between Amundsen and Scott was characterized as a "race" to the South Pole. However, when confronting the problem of designing the expedition, students should recognize that its objective must be specified in greater detail in order to make a sensible plan.

The expedition has a number of possible objectives that students should consider. The one that emerges from the characterization as a race is being the first to reach the South Pole. The payoff from this objective is the personal satisfaction of achieving something rare and significant, but also includes the reputation of reaching this location before any other human being. National pride would also accrue to the team.

The second objective could be scientific, since the Antarctic continent was largely unexplored and scientific investigations there could produce any number of insights, including meteorological, geographical, geological, and biological. Crossing the continent and gathering data in these scientific areas could lead to the team making significant contributions to understanding the natural world.

A third objective could be imperialistic. Since the continent was largely unexplored and unoccupied at the time of the expeditions, crossing the territory of the South Pole could establish a claim by the national sponsors of the teams to colonization and resource rights on Antarctica.

Finally, another objective, albeit one that might be taken-for-granted by students, is the survival of the team. Students might consider that the accolades that might be bestowed, the territorial

rights that might be achieved, and the scientific knowledge that would be produced by the team that reached the South Pole first might not be worth much if the team perished in the process!

Instructors should consider asking students the following related questions that supplement the more general question of objectives:

- What may have motivated explorers such as Amundsen and Scott to attempt the journey to the South Pole in 1912?
- How might such motivations influence planning?

These two questions are even more useful if instructors ask students to conduct their own outside research on planning their expedition. The motivations of explorers at the turn of the twentieth century will certainly have an influence on the ultimate objectives of the expedition. For instance, the context in which Amundsen and Scott made their plans favored competition and national pride over scientific objectives. Students may feel their plans are constrained to a certain degree by the historical and social context of the time.

2. What factors would you consider in creating your own expedition to the South Pole? (LO 2)

Once students have established what they feel the objective of the expedition should be, they must then address steps 2 and 3 in the problem solving process identified in the Research Methods section: identifying the relevant variables in the problem, and gathering data. Students could be tasked with learning all they can about the continent of Antarctica, including size, climate, and flora and fauna before beginning the exercise. The maps in Optional Student Material – Handout 2 can be distributed to facilitate the activity. It is recommended that students investigate the details surrounding historic expeditions in Antarctica. The instructor is encouraged to assign students additional readings on Antarctica exploration (Brewster, 1982; Doomed expedition to the South Pole, 1999; McKay & McKay, 2012; Panama Pacific International Exposition, 1915; Ponting, 1975; South Pole, n.d.; Taylor, 1930; The Journey to the Pole, n.d.; Wilson, 2011).

Instructors should guide student discussion and the interpretation of their research so that students recognize that the crucial factors in the expedition will be transportation, food, clothing, gear/equipment, shelter, and fuel. These factors are further influenced by two additional factors in the external environment: the weather and the geography that the team might encounter during the expedition. Depending on how the instructor wants to use the CI and the level of preparation of students, students may benefit from additional optional materials available in this teaching note. If students require additional scaffolding, the categorized item list given in Optional Student Materials – Handout 3 can be distributed to serve as a menu to guide their decision making. To this end, students should be required to gather evidence to support their choice for each category. The reading list in Optional Student Materials – Handout 4 can be used to guide students during the data gathering phase. This activity was designed so that students could craft responses based solely on problem solving and creativity; however, in order to prompt a more vibrant classroom discussion, it is strongly recommended that both the students and the instructor perform outside research. The following table was compiled from reference material cited in

optional Handout 4. This table can be used at the instructor's discretion to facilitate class discussion. A blank version of the table can also be distributed to guide students' in their research efforts.

Table TN-1: Planning Criteria for Amundsen and Scott's South Pole Expeditions

Planning Criteria	**Amundsen**	**Scott**
Transportation	Skis, sledges, dogs	Skis, ponies, sledges powered by internal combustion engines
Food	Biscuits, tin fruit, seals, penguins, ponies	Biscuits, seal meat and blubber
Clothing	Seal skins, fur	Wool
Gear/Equipment	Sextant, compass, anemometer	Sextant, compass, anemometer, balloons
Shelter/Lodging	Construction tools (for building ice cave shelters)	Portable huts
Fuel	Kerosene	Kerosene, hydrogen

Based on these crucial factors and the additional issues noted above, as well as the planning criteria provided in the table, we also provide some additional guiding questions throughout this section that instructors can use to help guide student discussion of the CI, although instructors should be cautious not to do all the planning for the students.

It has been observed during classroom testing that students often miss the following items. First, estimates of distance and the time required for travel are nearly always inaccurate. Accordingly, students typically forget to budget days for possible weather-related delays. It is also common for student not to know the function of a sextant or anemometer (these are explained below). Footwear and shelter are frequently overlooked as well. Therefore, the instructor may wish to encourage students' to perform outside research in these areas.

More advanced students could also be asked to schedule and chart their course to the South Pole. This would involve selecting a departure port, Antarctic landing site, and overland route. Students should be challenged to estimate the total travel distance for each leg of their journey. To this end, students must also consider how they would navigate past major landforms such as mountains. Discussion on this matter should address the tradeoff between a shorter, more treacherous passage versus a longer but safer route. In reconciling these two approaches, students should be advised to select the option that best aligns with how they defined success for their voyage. For example, if the team decided that their objective was to be the first to reach the South Pole at all costs, a direct route would be the logical choice. In contrast, a longer overland route would be more appropriate for a team that defined success as a safe return for all of the members involved. In terms of their expedition schedule, students must carefully choose a departure date that would allow them to avoid the perpetual night of the Antarctic winter months.

- **Supplemental discussion question:** What time of the year should the expedition begin? What factors should be considered when establishing the timeline of the expedition?

- **Supplemental discussion question:** Where on the Antarctic continent should the expedition land and begin the expedition? What geographic/terrain factors should be considered? How important are those factors?

Previous classroom testing has also generated dynamic discussion on the topic of transportation. Student comments have varied from sled **dogs** to **ponies** and from **Clydesdales** to **hot air balloons**. Student estimates in terms of the distance covered in one day will also vary. Teams will have to know about the geography of the land in order to develop an accurate estimate. Some teams will optimistically try to cover 30 miles in a day; however, 10 miles per day is a more realistic pace. Teams also often underestimated how weather could slow their progress. It would not be uncommon for a blizzard to delay a team for eight to ten days at a time. The formula, Distance = Rate x Time, can be used to estimate the total time needed for the journey. The total duration must be less than or equal to the 150 available travel days in which there is sunlight available. Students should consider bringing an **anemometer**, a meteorological device that measures wind speed and pressure, to help better understand the weather conditions the expedition will face.

- **Supplemental discussion question:** What are the potential transportation options available to the expedition?
- **Supplemental discussion question:** What are the advantages and disadvantages of each transportation option? How do they each contribute to or distract from the objectives established for the expedition?
- **Supplemental discussion question:** What weather conditions should the expedition participants expect to encounter? How can the expedition plan for changes in the weather?
- **Supplemental discussion question:** How will expedition members shelter during nights and storms?
- **Supplemental discussion question:** How do weather conditions affect the choice of transportation methods?

After all of the teams present their work, the instructor may want to give a summation of what really was effective for Antarctic expeditions. The hollow fibers of animal hair make **fur** a good choice for clothing. In contrast, **wool** does not wick sweat and is slow to dry. Careful judgment had to be made regarding which garments were suitable in terms of insulation, waterproofing, and durability.

A practical food source was also critical. Consuming **seal** meat and blubber was useful in preventing scurvy. Caloric intake could also be supplemented with pemmican, a concentrated mixture of fat and protein. While the importance of nutrition was not disputed, the effort required to store and haul food remained a significant burden.

If provisions were brought to sustain animals, **ponies** or **dogs** can be used for a reliable source of food once they are no longer useful in term of transportation. As seen in Scott's expeditions, however, the British did not like to eat dog.

> Amundsen discussed the matter of dogs versus ponies in the early pages of *The South Pole*, listing the advantages of the dogs. One of those he mentions is 'that dog can be fed

> on dog. One can reduce one's pack little by little, slaughtering the feebler ones and feeding the chosen with them. In this way, they get fresh meat.' Scott's grim experiences during the Southern Journey of the *Discovery* expiation led him to the opposite view. He devoted several pages of his narrative to an impartial consideration of the matter and concluded with these words: 'This method of using dogs is one which can only be adopted with reluctance. One cannot calmly contemplate the murder of animals which possess such intelligence and individuality, which have frequently such enduring qualities, and very possibly one has learnt to regard as friends and companions (Ponting, 1975, p. 105).

Scott claimed that his crew had, "an unconquerable aversion of the employment of dogs in this ruthless fashion. We all knew they had served their end, that they had carried us much further than we could have got by our own exertions" (Ponting, 1975, p. 105).

- **Supplemental discussion question:** What food items should be brought on the expedition? What are the advantages and disadvantages of each option?
- **Supplemental discussion question:** How much food will be consumed during the course of the expedition (i.e., how fast will food be consumed?)? How much food should be brought on the expedition? How much can members expect to hunt or forage for?
- **Supplemental discussion question:** What kinds of clothing should expedition members use? What are the advantages and disadvantages of each option?
- **Supplemental discussion question:** How much equipment and food can be carried by the expedition? How much can each member of the expedition be expected to carry?

Regardless whether ponies or dogs are used, teams need to think about how to feed them. Vegetation is extremely limited and higher order animals are nearly nonexistent in the further inland regions. Teams will likely see the need for a **compass** for determining direction, but will also need to bring a **sextant** in order to determine their global position by latitude and longitude, and thus, when they have reached the South Pole. In the Northern Hemisphere Polaris, the North Star, is used to gauge longitude and latitude. In the Southern Hemisphere, the position of the south celestial pole can be found using pointer stars, the most famous of which is the Southern Cross.

- **Supplemental discussion question:** How will expedition members know where they are going as they travel?
- **Supplemental discussion question:** How will expedition members know they have reached the South Pole?
- **Supplemental discussion question:** The expedition can be expected to last an extended period of time in a hazardous environment. What other types of equipment and supplies should be carried on such an expedition? What other factors affect this question (e.g., when would supplies be used, can expedition members forage for supplies, etc.?)?
- **Supplemental discussion question:** How does the Antarctic environment affect the types of equipment and supplies that are required
- **Supplemental discussion question:** What skills or experience are needed by expedition members? What factors should be considered when choosing members?

3. Working as a team, how would you plan an expedition to the South Pole? (LO 3)

This CI involves problem solving, planning, and teamwork. This question addresses step 4 in the problem solving process identified in the Research Methods section: making the decision. Students will work in teams in order to design their expedition to the South Pole. Instructors should begin by randomly placing students into strategic management teams using a card pull (e.g., the Aces, Kings, Queens, etc. are on the same team). Throughout the semester, the teams can be tasked with analyses of organizations. Once the teams are selected (3 to 5 teams), they are presented with this CI. The goal is to improve their planning skills and promote teamwork. Students are provided a handout outlining the instructions for the simulation exercise (see "Optional Student Material – Handout 1" in the appendix). Each team is required to designate a leader to present an oral synopsis of the team's written report. This presentation is made the following session after the teams are selected. Students work on the planning and preparation tasks as homework between sessions. The presentations are timed to ensure that students stay on topic. Three to five minutes are allocated to each presentation. The teams discuss topics such as clothing, modes of transportation, equipment used, navigation tools (sextant and compasses), etc.

The instructor may wish to evaluate students' performance in these areas using the teamwork assessment rubric provided under Optional Instructor Material. This rubric can be used as a self-assessment instrument in which students rate themselves on various dimensions of teamwork. These dimensions include the following: Attendance, Attitude, Team Member Support, Preparation and Reliability, Quality/Contribution, Leadership, Conflict Management, Managing Expectations, and Team Dynamics. It should be noted, however, that not all of the criteria may be applicable based on how the instructor chooses to implement and maintain team relationships used in this activity. That is, metrics such as Attendance, Preparation and Reliability, and Conflict Management may be difficult to assess after just one or two group meetings. Alternatively, if the instructor chooses to use the Antarctica teams for other projects throughout the course, he or she may have higher expectations for student engagement. To this end, the attached rubric provides a comprehensive tool for both formative and summative assessment of student teamwork.

General Discussion

This Cl was classroom tested Fall and Spring semesters between 2010 and 2015 in an undergraduate Strategic Management capstone course taught at a large Midwestern research University. The classes were taught to approximately 25 to 33 seniors majoring in business administration. After randomly selecting eight teams composed of students with a variety of majors, each team was assigned the task of simulating a landing on the shore of Antarctica, in 1912 at a site of their choice. Their mission was to reach the geographic South Pole first and bring all members back alive. The instructor's objective was to promote teamwork and camaraderie amongst the team members, hoping that it would carry over into the preparation of case study written and oral presentations.

Several days later, all eight teams were required to submit a one page written report to the instructor and selected a team member to present the adventure. Each team was given a handout

with a rough map of Antarctica and asked to discuss the team's planning for provisions, (e.g. food, lodging, clothing, shelter, transportation, navigation and survival equipment). A member of the class, not presenting the team report, was selected as a timer. This was important to remain within the constraints of the class periods.

The teams seemed to enjoy the exercise as it was orally presented in class by each team and they bantered with the instructor over bringing whiskey along and using Clydesdale horses for transport. The instructor responded and asked the teams "Why not elephants? Hannibal used them when crossing the Italian Alps." Team members cited the Antarctica discussion as an important element of their team building early in the semester, affecting their performance later in the course. While much discussion centered on food, clothing, rifles, dogs vs. ponies, discussions often did not include the following:

1. The estimated time to accomplish the mission varied widely amongst the teams. Frequently the severe blizzards curtailed travel for days by Scott and Amundsen.
2. The distance to the Geographic South Pole was often miscalculated.
3. The use of weaker dogs for fresh meat (dog food) and human consumption was not contemplated.
4. Seal blubber was not mentioned for consumption to curb scurvy. Scott and Shackleton in the 1907 Nimrod expedition came within approximately 100 miles of the geographic pole but had to withdraw as they nearly starved to death, contracted scurvy, and were exhausted.
5. The difference between fur clothing and wool was not considered. Fur would dry quickly and wick perspiration whereas the British wool remained moist.
6. Navigation equipment especially the sextant to accurately fix locations using the sun and stars generally was ignored. These omissions were rectified at the end of the classroom sessions by the instructor.
7. This CI was intended to be used as a problem-based learning (PBL) activity for promoting strategic planning and team building. The PBL format is an instructional pedagogy that encourages student participation and learning through an inherently engaging problem or activity (Gallagher, 1997). PBL was found to be effective in K-12 settings (Torp & Sage, 1998), medical schools (Barrows, 1994), and business education (Stinson & Milter, 1996). The effectiveness of PBL hinges on the quality of the problem and the associated learning outcomes (Duch, 2001). This CI was developed using Hung's (2006) 3C3R PBL problem design framework, which fosters student achievement through a dual channel cognition approach involving three core components (content, context, and connection) and three processing components (research, reasoning, and reflecting).

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Epilogue

Amundsen arrived first at the South Pole on December 16, 1911, and left a cairn with the Norwegian flag. Scott and his men discovered the flag on January 16, 1912. “This told us the whole story,” Scott wrote, “The Norwegians have forestalled us and are first at the Pole. It is a terrible disappointment and I am very sorry for my loyal companions. Many thoughts come and much discussion we have had. To-morrow we must march on the Pole, and then hasten home with all the speed we can compass. All the day-dreams must go; it will be a wearisome return." (The Journey to the Pole, n.d., para. 10). Scott and his men followed the Norwegian sledge tracks and on January 18, 1912, they arrived at the South Pole.

On the return trip, Scott and his crew were hampered by extreme cold weather and dwindling supplies. Moreover, they were exhausted from man-hauling their sledges. After, three years surmounting hardships, they froze to death in their tent, only 9 or 10 miles away from their food cache. Amundsen brought back all members of the expedition, exhausted but alive.

Amundsen succeeded because his crew members were not squeamish about killing and eating the dogs. Similarly, they did not have to worry about taking forage for the ponies. On the other hand, Scott’s men did not want to kill and eat the dogs, “man’s best friend.” Scott thought this was akin to murder. Scott used ponies, whose hooves would break through the ice crust. Scott brought six sledges with internal combustion engines. However, the fuel was not corked very well, and it evaporated. Furthermore, the motorized sledges sometimes needed to be fitted with skis to traverse the ice. This procedure wasted precious time and energy.

Amundsen took bamboo poles along to mark the location of their food caches. They were placed perpendicular to their route at ten mile intervals so that the explorers could find their way to their supply stores even if they ventured slightly off course.

Scott had a very physically strong explorer who suffered a concussion and caring for him slowed the team down. There was another explorer who had the most experience with internal combustion engines; however, he was outranked and left on the ship.

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Optional Student Material – Handout 1

Team Trip to Antarctica's South Pole: Directions

Background: Mankind has always been fascinated by being first to set foot on distant lands (e.g., Viking expeditions, Christopher Columbus, the first humans to land on the moon).

Scenario: In 1912, Norwegian explorer Roald Amundsen and Britain's Robert F. Scott each became aware that the other intended to journey to the Antarctic. This triggered a competition between the two explorers over who would be the first to conquer the South Pole. Taking on the role of Amundsen or Scott, students will work in teams to assess the situation confronting Amundsen and Scott, solve the problems involved in operating in the inhospitable Antarctic environment, and design a successful expedition.

Information:

- Funding the expedition is not a problem as it has been secured from international academies of science and exploration
- Transportation by ship has already be paid
- Your team has been involved with polar exploration (Arctic) in the past
- A map of Antarctica can be used for planning purposes by your team

Directions:

1. All team members will be required to meet and develop strategies for this assignment.
2. All members of your team must land on the coast of Antarctica and be involved in the expedition.
3. Write a one-page paper detailing the strategies to be used to support the trek from Antarctica's coast to the South Pole and the return trip. The logistics involved must be addressed. For example, you must consider the transportation on the continent of the team members and all of the items you identify as being necessary to support your quest. Distances to be traversed should be considered.
4. Pick a leader to present strategies used and any other information required to successfully accomplish the mission.

Due date: The exercise will be due at the beginning of the next class period.

Optional Student Material – Handout 2

Team Trip to Antarctica's South Pole: Map

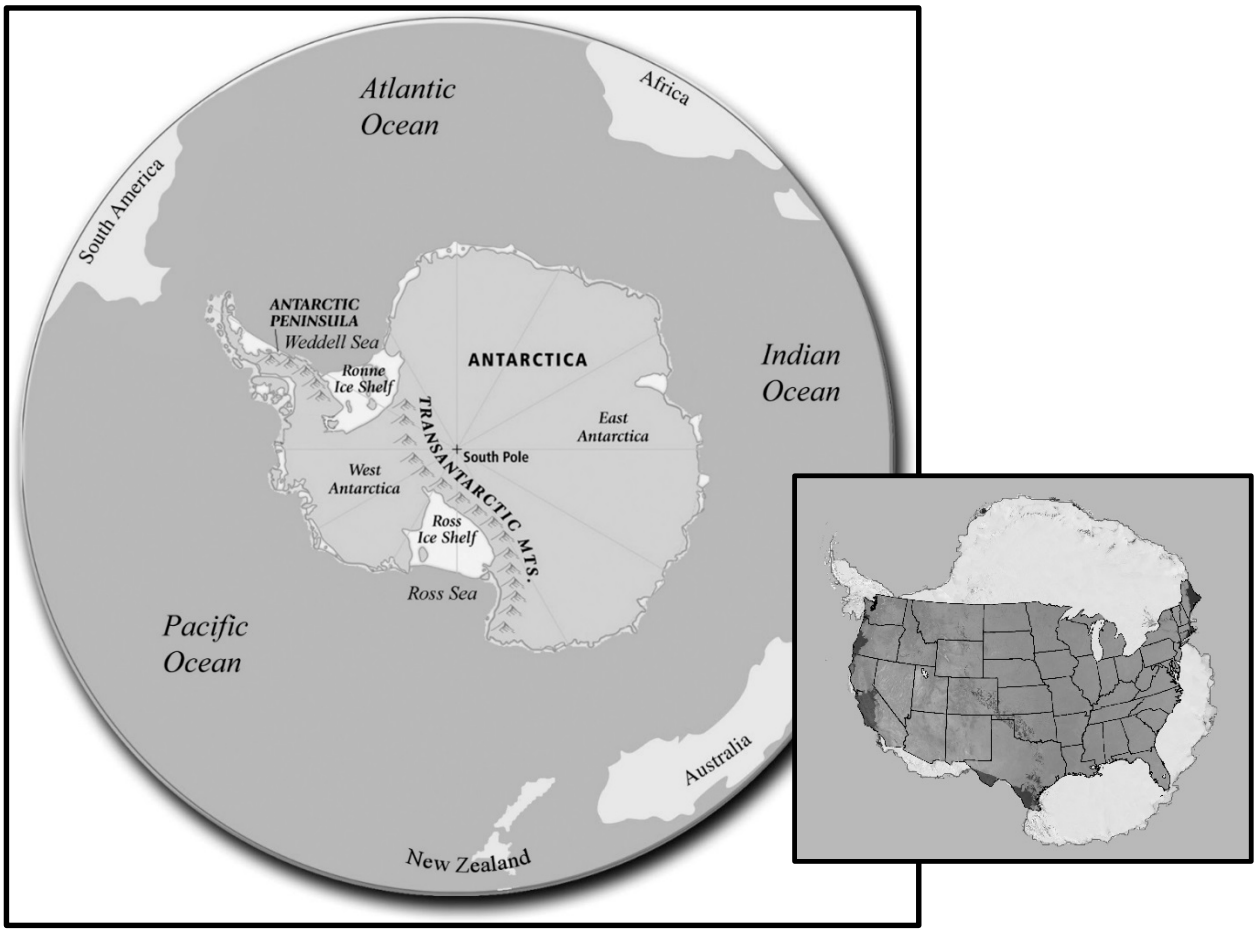

Figure 1. Map of Antarctica with insert showing size comparison to the U.S.

Optional Student Material – Handout 3

Team Trip to Antarctica's South Pole: Equipment List

Transportation

- Skis
- Sledges
- Hot air balloons
- Dogs
- Ponies

Food

- Biscuits
- Tins of fruit
- Dogs
- Ponies
- Seal meat and blubber
- Penguins

Clothing

- Animal skins
- Fur clothing
- Woolen sweaters

Gear/Equipment needed

- Compass
- Sextant
- Anemometer
- Axes
- Matches
- Rifles and pistols

Shelter/Lodging

- Construction tools
- Portable huts

Fuel

- Hydrogen
- Kerosene
- Coal

Optional Student Material – Handout 4

Team Trip to Antarctica's South Pole: Reading List

Amundsen, Roald (1872–1928). (2010). In N. Hamilton (Ed.), *Scientific exploration and expeditions: From the age of discovery to the twenty-first century*. London: Routledge. Retrieved from http://search.credoreference.com/content/entry/sharpesci/amundsen_roald_1872_1928/0

Scott, Robert Falcon (1868–1912). (2010). In N. Hamilton (Ed.), *Scientific exploration and expeditions: From the age of discovery to the twenty-first century*. London: Routledge. Retrieved from http://search.credoreference.com/content/entry/sharpesci/scott_robert_falcon_1868_1912/0

Shackleton, Ernest (1874–1922). (2010). In N. Hamilton (Ed.), *Scientific exploration and expeditions: From the age of discovery to the twenty-first century*. London: Routledge. Retrieved from http://search.credoreference.com/content/entry/sharpesci/shackleton_ernest_1874_1922/0

Optional Instructor Material – Team Evaluation Criteria

Criteria	Level 5	Level 4	Level 3	Level 2	Level 1
Attendance	Always attended scheduled group meetings.	Frequently attended scheduled group meetings; when absent, he/she informed and/or sought the agreement of the team.	Sometimes attended scheduled group meetings; when absent, he/she sometimes informed and/or sought the agreement of the team.	Rarely attended group meetings; when absent, he/she did not inform and/or seek the agreement of the team.	Never attended group meetings and made no attempt to contact team members regarding the absence and/or project.
Attitude	Always had a positive attitude regarding the project and assigned tasks. Always was optimistic and enthusiastic during group meetings.	Frequently had a positive attitude regarding the project and assigned tasks. Frequently was optimistic and enthusiastic during group meetings.	Sometimes had a positive attitude regarding the project and assigned tasks. Sometimes was optimistic and enthusiastic during group meetings.	Rarely had a positive attitude regarding the project and assigned tasks. Rarely was optimistic and enthusiastic during group meetings.	Never had a positive attitude toward the project and assigned tasks. This negative attitude disrupted the productivity of the group and created tension among members.
Team Member Support	Always provided and received feedback and criticism in an insightful, constructive manner. Member always provided encouragement to all team members and was eager to help team members.	Frequently provided and received feedback and criticism in an insightful, constructive manner. Member frequently provided encouragement to all team members and was eager to help team members.	Sometimes provided and received feedback and criticism in an insightful, constructive manner. Member sometimes provided encouragement to all team members. When asked, the team member would help other team members.	Rarely provided and received feedback and criticism in an insightful, constructive manner. Member rarely provided encouragement to team members and was rarely willing to help others.	Never provided or received feedback and criticism in an insightful, constructive manner. Member took all feedback personally and created a hostile team dynamic. Member would not help or encourage others.
Preparation and Reliability	Always prepared for group meetings and greatly contributed to group discussion. Always was reliable and had assigned work completed on time.	Frequently prepared for group meetings and contributed to group discussion. Almost always was reliable and had assigned work completed on time.	Sometimes prepared for group meetings and occasionally contributed to group discussion. Usually was reliable and had assigned work completed on time.	Rarely prepared for group meeting and rarely contributed to group discussion. Member was unreliable and rarely had assigned work completed on time.	Never prepared for group meetings and never contributed to group discussion. Member was unreliable and never had assigned work completed on time.
Quality/ Contribution	Always provided high quality work. Member's work and ideas greatly contributed to the success of the project.	Frequently provided high quality work. Member's work and idea contributed to the success of the project.	Sometimes provided quality work, but the work was not above expectations of the group. Member contributed to the success of the project.	Rarely provided satisfactory work. Some submitted work had to be checked/redone by other group members to ensure quality. Member contributed little to the success of the project.	Never provided satisfactory work. All work needed to be checked/redone by other members of the group to ensure quality. Member did not contribute to the success of the project.

Criteria	Level 5	Level 4	Level 3	Level 2	Level 1
Leadership	Within the team, a strong leader arose. All other group members assumed respective roles. Group meetings were always focused and productive. All group members contributed to group discussion during meetings.	Within the team, a leader arose. Other group members assumed respective roles. Group meetings were frequently focused and productive. For the most part, all group members contributed to discussion during meetings.	No distinctive leader arose in the group, but the group was still usually productive. Group meetings were unfocused yet helpful. Some members did not contribute to group discussion.	No distinctive leader arose in the group, which lead to lack of organization and direction during meetings. Group members rarely actively contributed to the group discussion.	No distinctive leader arose in the group, which lead to chaos and a dysfunctional team. Group meetings were unstructured and unfocused, which lead to little group discussion.
Conflict Management	Team demonstrated conflict management skills that were effective and increased productivity. Resolutions were reached quickly and fairly, enabling the team to move forward.	Team frequently used conflict management skills. Fair resolutions were usually reached in a fairly timely manner, enabling the team to move forward.	Team sometimes displayed conflict management skills, but resolutions were not reached quickly and fairly. As a result, this delayed the progress of the project.	Team displayed poor conflict management skills and resolutions were rarely reached. As a result, the team had a difficult time moving forward with the project.	When conflicts arose within the team, they were not dealt with and/or could not be resolved. As a result, the team had a difficult time moving forward with the project.
Managing Expectations	All team members had defined their expectations of the project and work of others. Clear decision-making procedures were established and documented. Tasks and workloads were strategically distributed evenly based on members' expertise.	All team members informally agreed upon the expectations of the project and work of others. Decision-making procedures and division of labor were discussed. Tasks and workloads were evenly distributed among group members.	Team members did not discuss the expectations of the project and/or the work of others. All team members agreed upon the division of labor. Team members used their own discretion as to the quality of work performed. Tasks and workloads were slightly unbalanced.	Team members distributed workloads without strong consideration or discussing quality expectations. Decisions were not made with the input of all members. Work performed was not of high quality and was not divided fairly.	Team members did not discuss quality expectations. The decision-making process was not defined; therefore, decisions were made by individuals and did not reflect the desires of the team. There was little understanding of who does what.
Team Dynamic	Overall, every team member was treated with respect. All members listened to all ideas. All members contributed to an excellent and productive group dynamic.	Overall, every team member was almost always treated with respect. Team members were open to listening to ideas. The group dynamic was productive and focused.	Overall, there was a general level of respect for team members, although some members may not have been heard as much as others. For the most part, the team worked together effectively.	Overall, the team atmosphere was uncomfortable and tense. The group had difficulty functioning as a team. Sometimes the group members could not work together effectively.	Overall, the team atmosphere was competitive and individualistic rather than cooperative and supportive. Group members did not share ideas at all. The group dynamic was unproductive.

Sources: Jiles, H., & Huba, M. E. (2000); Saunders, K. P. (2003); and University of North Dakota (2005)