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INTD255, Safe Return Doubtful: Midterm 1

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1 Early Antarctic and Oceanographic Exploration

1. Who was Captain James Cook? List several notable achievements of his three main expeditions.

Circumnavigated globe 1768-69
Viewed parallax shift of Venus from Tahiti
Publicly, astronomer. Also was for politics, land claims etc.

2. What was the significance of the *venus transit* on one of the Cook expeditions? What other, more secret, mission did Capt. Cook have in the Southern Ocean?

It helped calculate the distance from Earth, but also were looking for more land/resources to claim

3. **Kepler's Laws:** If the units of orbital radius r are AU, and the units of orbital period T are years, then $T^2 = r^3$. (a) If the orbital radius of Uranus is 19.22 AU, what is its orbital period in years? (b) If the orbital period of Mars is 1.88 years, what is its orbital radius? (c) What parameter in orbital mechanics was fixed by the observations of the *venus transit* in the late 18th Century by scientists who accompanied the Cook expedition?

a) $19.22^3 = 7100$ $\sqrt{7100} = 84.26 \text{ yr}$
b) $1.88^2 = 3.53$ $\sqrt[3]{3.53} = 1.52 \text{ AU}$

c) distance to the sun

4. List some of the achievements in early polar exploration attained on the following expeditions:

- *The Belgica* First major antarctic exp.
- *The Fram*, with Nansen Exp. arctic, Amundsen's
- *The Gjoa* 1st to traverse NW passage 2nd antarctic
- *The Discovery*, with Scott
Marine & whale data, geology

5. Who were the *Dorset* and the *Thule*? How did they survive in their environment?

Dorset - ancient civilization of tribes along NW Pass.
Thule - in-between ancestors of Dorset & Inuit
Ate whales & seals, sled tech, for coats

6. Who are the Chinook? Where did Capt. Cook approach their territory?

Tribe whose territory is now Portland. On the Pacific coast, they lived near the mouth of the Columbia. Salmon named after them.
Cook met the Siletz, NOT Chinook, at Cape Foulweather.

7. Discuss the risks and rewards of cultural exchange, in light of the writings of Barry Lopez in *Horizon*. As examples, consider the stories of Ranald MacDonald, Captain James Cook, Captain Amundsen and the Netsilik.

If you're aggressive or there's miscommunication, you could die (if one ever makes it in the first place) like Cook. But you could learn lots, particularly how to survive the environment, like food and transport etc. Sometimes there were issues with land rights and this foreshadowed LOTS which most explorers ignored. Besides, native people usually knew the best routes of navigation which they often learned from migratory animals.

2 Survival Skills: Work, Energy, Food, and Physics

1. How many kcal of energy is stored in 2 kg of pemmican? (Treat this as a fatty food, not a protein).

$9 \text{ kcal/g} \cdot 2000 \text{ g} = 18,000 \text{ kcal}$

- How many kg of wheat biscuits are required for 500 kcal of energy? (Treat this as mostly carbohydrates).

$500 \text{ kcal} / 4 \text{ kcal/g} = 0.125 \text{ kg}$

3. How many Joules of energy are required to pull 1000 kg across 5 km of snowy tundra, if the relevant coefficient of friction is 0.1?

$$W = (0.1)(1000 \text{ kg})(9.81 \text{ m/s}^2)(5000 \text{ m}) = 454,050,000 \text{ J} \text{ or } \boxed{4.54 \cdot 10^8 \text{ J}}$$

4. Take your result from the previous exercise, and divide the energy among 10 sled dogs. How much energy is required of each dog? Now feed each dog that much pemmican. How many kg of food, per dog, is required?

Well, $(4.54 \cdot 10^8)/10$ is of course $4.54 \cdot 10^7$.

$4.54 \cdot 10^7$	Kcal	kg	= $\boxed{1.21 \text{ kg}}$
4194 J	9000 Kcal		

5. What food related health risk is associated with spending long durations at sea and in polar regions?

apart from not enough diversity in general,
SCURVY! and its haunting smile.

3 Navigation: Distance, Time, Speed, Longitude and Latitude

1. How many nautical miles correspond to travelling 2.5 degrees directly South?

Since $1^\circ = 60 \text{ nm}$, $60 \cdot 2.5 = \boxed{150 \text{ nm}}$

2. If we travel due North by 400 km, what is our change in latitude?

$$400 / 1.852 = 216 \text{ nm} / 60 = \boxed{3.6^\circ}$$

3. If we are travelling due West at a latitude of 60 deg North, what distance corresponds to a change of 1.5 degrees longitude?

oh boy. $60^\circ = \frac{1}{3}\pi = \frac{\pi}{3} \text{ rad}$

$$1.5^\circ = \frac{\pi}{120} \text{ rad}$$

$$s = \left(\frac{\pi}{120}\right)(6371) \left(\cos \frac{\pi}{3}\right) = \boxed{83.40 \text{ km}}$$

4. If a ship sails East at 10 knots, how many nautical miles are travelled in 48 hours?

$$10 \cdot 48 = \boxed{480 \text{ nm}}$$

4 The British, The Norwegians, and Cultural Exchanges

1. Having read the first part of the story of the race for the South Pole, describe the differences in style between the Norwegian/Scandinavian expeditions and the British ones. **Bonus:** Connect your ideas to indigenous cultural exchange, or our reading in *Deep Survival*.

Brits relied on what they were used to, like horses. Scandinavians learned from Inuit: dog sleds, fur coats, seal nutrients, ice on sled blades, & igloos

2. List five technologies for polar survival that the Norwegians learned from the Netsilik.

- Dog sleds
- Ice on sleds
- Seal nutrients
- Fur coats
- Igloo construction

3. What was the primary role of the Royal Geographic Society in British Antarctic exploration?

Scientific expeditions, research, and mapping

4. (a) How did the British travel and move gear in the polar regions, before motorized craft were developed?
(b) How did this differ from the Norwegians?

a) horses, or pure human grunt

b) sleds w/dogs,

5. In your view, what are the major risks to ships and explorers when exploring the polar regions in this period?

- The crossing! The Southern Ocean is the most nasty!
- Ice in the wooden hull
- Idiocy and lack of understanding the truth

6. When American ambassadors first arrived in Japan, after a period of intense isolationism in Japan, they found the Imperial court already knew how to speak English? How did this happen? Who helped them to learn English, and of the desire of Western nations to trade?

- That one weirdo had gone first and kissed up to the Dutch in Okinawa
- Real explorer was Matthew Perry, often miscredited to Robert Shaw

7. Consider the following quote "Whether the change facing a people comes on swiftly ... or slowly ... the responsibility of the wisdom keeper is to recognize the early signs of significant change, to look into the past, and locate, again, a through line to the future." Apply this idea to a story we have encountered in the course, or a problem facing our community today.

Some topics are particularly wishy-washy, like abortion and gay marriage. Some say they happened too early, and one (possibly soon both) has reversed. This is an example of the failure of this wisdom keeper person.

5 Exploration Achievements

1. Discuss the cultural significance of Nansen's first crossing of Greenland to the nation of Norway.

It was for Norway to learn skills for harsh environments. Set them up for Antarctica

2. Was Roald Amundsen the first leader to cross the North-West Passage? On whose progress did he build?

Well he was the first to make it through. Robert McClure had been to parts. Lewis & Clark thought they had, but they were WAY off.

3. What were the highlights of Robert Falcon Scott's "furthest South" on the *Discovery* expedition?

They found dry valleys and almost made the pole. Also learned about marine biology and geology.

4. Scientifically, why was important for explorers in the early 20th century to locate the magnetic North and South poles?

To find the difference between the magnetic and geographic locations.

6 Survival and Psychology

1. Using the terminology found in *Deep Survival*, what is the difference between a *primary emotion*, and a *secondary emotion*?

Primary is the raw initial reaction, like a threat, while secondary is how one responds to said threat. Interpretation.

2. Using the terminology of emotional bookmarks, how are secondary emotions formed, and how do they protect you?

Usually formed by isolation, contemplation. They can be a shortcut to make a decision faster, bypassing primary emotions.

7 Reflections

1. While on Skraeling Island, the write Barry Lopez interacts with a research team responsible for finding artifacts from Dorset, Thule, and Norse cultures in Northern Canada. What is the significance of these diverse finds, in your view?

Particularly that Europeans had been to visit natives & the new world... without destroying it or killing everybody!

Also general learning about native cultures and ways of internal function.

2. While reflecting on the Pacific Ocean in Cape Foulweather, Lopez notices that you can never see the entire Pacific, because the Southern Ocean covers more than one hemisphere of area of our planet. What an area of life or academic topic that you wish you understood, but might not ever fully understand?

Engineering! I like the design aspect, and while it's nice to avoid nitty-gritty tedious work, I wish I understood more so I can plan ahead better.