Lab 08a: sky: star walk lab

Star Walk lab:

Make sure you can use star walk properly:

1. Set your location (you may have to go into privacy settings to do this)
2. Set the proper time
3. Locate the camera icon for night use
4. Try looking at the floor to see stars that will be visible tonight
5. pick out three constellations and three stars that you will share with the class

Part 1: Your latitude and Polaris

1. set the starwalk location to Waimea
2. go forward on the clock to midnight
3. find polaris and look on the info screen for the altitude (degrees above the horizon)
4. compare this with our latitude on the globe
5. take your astrolabe and ipad home and locate polaris using the camera function on at least two nights (it is at the end of the little dipper constellation)
6. also at home, verify the angle for polaris using your astrolabe, bring this angle into class
7. in class, compare your angle with what you find on the GPS from your phone
8. question: if we sailed north 10 degrees, where would polaris be?
9. question: what would be the angle to polaris on the equator?
10. question: could you see polaris from Brazil?
11. question: what do mariners in the southern hemisphere use to determine latitude?

Part 2: Polaris around the globe

1. pick a random place on the globe where you are "lost"
2. set this location on starwalk
3. measure the elevation of Polaris
4. compare with the latitude of your location on the globe

Part 3: Star walk and longitude

1. Longitude is the time difference between Greenwich (near London) and your location
2. Earth rotates 360° in 24 hours, so every 15° longitude on the globe is 1 hour
3. If your local time is ahead of GMT (Greenwich mean time) you are east
4. If you are behind, you are west of GMT.
5. Hawaii is about 155°W longitude, so 155/15 =10.333 10.3 hours behind

Part 4: finding "local noon"

1. ideally solar noon should be at 12:00 but only on a longitude line
2. using star walk, track where the sun is at the highest today using the angle info (it will be around noon, but not exactly)
3. note this time
4. if it is after 12:00, multiply the number of hours by 15° to get our true longitude (30 minutes =0.5 hours 0.5 hours)
5. where are we really? what is our longitude?

Part 5: Challenge: Find me!

1. pick three places on the planet that you are "lost"
2. challenge your classmates to find you based on hours from GMT (time of day at noon GMT) and position of Polaris

Part 5: Mapping the stars

1. Create a large star map on a double folder in three languages: English, Hawaiian and your native language including constellations and their names
2. Make sure to include sirius, orion and the pleiades
3. Make sure to include polaris, and the angle from the horizon we would see it
4. Your map should be from this location, around sunset, so you can compare with what you see live at night

Questions: email for credit

1. what stays the same through the night?
2. what changes?
3. what is the angle of Polaris above the horizon?
4. how does this compare to our latitude?
5. how could you use sunrise and sunset constellations to navigate?
6. when is this impossible (think of our guest)
7. how do waves fit into navigation?
8. on your star walk simulator, change the location to your home town
9. draw a map on the other side of your folder with that star map
10. what is different and same about this? what is missing?
11. change the date on your star walk to your birthday
12. what do you see that is different? same?
13. where is your zodiac sign at midnight on your birthday?
14. why?

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