

## Final Report: Physical Geography in Happy Valley

### Introduction

Over the course of the semester, you will examine a variety of physical systems in all four spheres of the Earth system. You will learn about geology, weather and climate, soils, ecosystems, and the many interactions of human beings with these systems. For your final report, you will apply this knowledge, combining your own field observations and library research in a report that explains the physical geography of the State College area.

Central to this project is the collection of your own data. Two times in the semester, you will visit a natural setting near campus and record observations (see Study Site sheet for possible sites). You will also record observations of the weather conditions for the week prior to your visit to the natural site. In your paper, you will present the results of your observations.

The other major component of this project is conducting online and library research on the physical geography of central Pennsylvania. Combining this research with what you have learned in class lectures, labs, and field trips, you will describe the geomorphology, climate, soils, and vegetation of the State College area.

### Objectives

1. To learn about the natural environments of the State College area by making repeated on-site observations in a natural setting near the Penn State campus.
2. To use library and online resources to conduct research on the physical geography of a region.
3. To apply course concepts in constructing an integrated description of local physical geography.
4. To practice and demonstrate skills in written communication of scientific material.

### Assignment

This assignment has four parts.

#### Part 1: Study Site

**DUE: 2/22**  
**5 Points (6.7% of report grade)**

Your first task is to select a study site (see Study Site sheet) and plan your two visits. You must complete the site selection form and upload it to the ANGEL dropbox by midnight **Monday, February 22.**

#### Part 2: Observations

**First Set DUE: Week of 3/1**  
**Second Set & Summary DUE: Week of 4/5**  
**5 points each (10 points total)**

Choose two 5-day periods in the semester, roughly 4 weeks apart, as your study periods. Take weather observations for each day in this period. See the Detailed Instructions Sheet for tips on taking weather observations. On the fifth day of each study period, visit the natural site

that you have selected. The instruction sheet has detailed instructions for your observations at this site.

Your first visit to your study site (and set of weather observations) must be complete **by the week of 3/1**. Turn in your observation sheets for those first observations to your TA by **the week of 3/1** for 5 points.

You must complete your second set of observations **by the week of 4/5**.

After you have completed both sets of observations, write a brief (1 page) summary of your observations, and turn this summary in to your TA by **the week of 4/5**. You will then revise and expand on this summary for the section of the final report where you report on your observations.

### Part 3: Research

The other major component of the project is to conduct library research that will allow you to put your observations in context. You need to research both your specific site, as well as the physical geography of the State College area in general.

This part has 3 steps:

1. Find background information on your site. Using geologic maps and the soil survey, identify the bedrock and soil type at your study tract. Using the Penn Pilot historical aerial photographs (<http://www.pennpilot.psu.edu/>), describe the 1930s-2000s land use/cover history of your site. Old topographic maps from the library may also help to reconstruct this history.
2. Second, using library and online resources as well as course material, assemble a comprehensive picture of the climate, geology, geomorphology, vegetation, soils, and water resources of the area.
3. Based on this research, you should be able to compare your site to other common natural environments in the State College area. What factors (e.g., bedrock, microclimate, slope position, land-use history) account for the particular characteristics (e.g., plant species composition, vegetation structure, topography) of your site?

### Part 4: Report

**DUE: 05/03**

Write a 4-6 page report presenting the results of these activities. See detailed instructions for more information. Your report must include three sections:

1. **Regional Physical Geography:** an overview of the physical geography of the State College area, including the climate, geology, landforms, soils, vegetation, and land uses.
2. **Observations:** a presentation of your weather observations and your ecological observations at the study site.
3. **Analysis & Interpretation:** an explanation of how your study site and study periods fit into the regional geography.

## Final Report: Study Sites

Choose one of the following study sites for your class project. All of these sites will work for your project, so select one that either strikes your interest or will be convenient for you to visit. Especially note which ones are on bus lines, if you do not have access to a car.

If you know of another location that you would like to use, talk to your TA about whether it would be appropriate.

1. Sunset Park (at the end of McKee St. in College Heights, the neighborhood just uphill from campus)  
[http://maps.google.com/maps?f=q&source=s\\_q&hl=en&geocode=&q=sunset+park&sll=40.803,-77.86903&ssp=0.011581,0.01929&ie=UTF8&hq=sunset+park&hnear=&ll=40.805429,-77.871351&spn=0.011581,0.01929&t=h&z=16&iwloc=A&cid=1340144765976949915](http://maps.google.com/maps?f=q&source=s_q&hl=en&geocode=&q=sunset+park&sll=40.803,-77.86903&ssp=0.011581,0.01929&ie=UTF8&hq=sunset+park&hnear=&ll=40.805429,-77.871351&spn=0.011581,0.01929&t=h&z=16&iwloc=A&cid=1340144765976949915)
2. Lederer Park (corner of University Drive and Easterly Parkway in State College; on the B bus line)  
[http://maps.google.com/maps?f=q&source=s\\_q&hl=en&geocode=&q=Lederer+Park&sll=40.805429,-77.871351&ssp=0.011581,0.01929&ie=UTF8&hq=Lederer+Park&hnear=&ll=40.798477,-77.839723&spn=0.011582,0.01929&t=h&z=16&iwloc=A&cid=16181940158815845979](http://maps.google.com/maps?f=q&source=s_q&hl=en&geocode=&q=Lederer+Park&sll=40.805429,-77.871351&ssp=0.011581,0.01929&ie=UTF8&hq=Lederer+Park&hnear=&ll=40.798477,-77.839723&spn=0.011582,0.01929&t=h&z=16&iwloc=A&cid=16181940158815845979)
3. Thompson Woods (access from Walnut Springs Lane, close to Lederer Park)  
[http://maps.google.com/maps?f=d&source=s\\_d&saddr=40.800946,-77.838607&daddr=&hl=en&geocode=&mra=dme&mrcr=0&mrsp=0&sz=15&sll=40.801921,-77.844787&ssp=0.014554,0.027595&ie=UTF8&z=15](http://maps.google.com/maps?f=d&source=s_d&saddr=40.800946,-77.838607&daddr=&hl=en&geocode=&mra=dme&mrcr=0&mrsp=0&sz=15&sll=40.801921,-77.844787&ssp=0.014554,0.027595&ie=UTF8&z=15)
4. Millbrook Marsh (on Puddintown Rd., off E. College; close to M and C bus lines)  
<http://maps.google.com/maps?q=40.812487,-77.835996&sll=40.774212,-77.859522&ssp=0.006295,0.006295&ie=UTF8&ll=40.812023,-77.836161&spn=0.014551,0.027595&z=15>  
 Note: if you choose Millbrook Marsh, go to a forested section of the park
5. Mt. Nittany (parking lot on Mt. Nittany Rd. in Lemont; close to M bus line)  
[http://maps.google.com/maps?f=d&source=s\\_d&saddr=40.811058,-77.807071&daddr=&hl=en&geocode=&mra=mi&mrsp=0&sz=15&sll=40.809847,-77.814274&ssp=0.014552,0.027595&ie=UTF8&t=p&z=15](http://maps.google.com/maps?f=d&source=s_d&saddr=40.811058,-77.807071&daddr=&hl=en&geocode=&mra=mi&mrsp=0&sz=15&sll=40.809847,-77.814274&ssp=0.014552,0.027595&ie=UTF8&t=p&z=15)
6. State Game Lands 176 / Patton Woods (two entrances: off Circleville Rd. near Carogin Dr., and off Sleepy Hollow Rd. at the end of the Tudek Park bike path)  
[http://maps.google.com/maps?f=d&source=s\\_d&saddr=40.785026,-77.914782&daddr=Circleville+Rd&hl=en&geocode=%3BFQx-bgldWvBaw&mra=dme&mrcr=0&mrsp=0&sz=14&sll=40.793019,-77.924395&ssp=0.029111,0.055189&ie=UTF8&ll=40.792564,-77.907915&spn=0.029111,0.055189&t=p&z=14](http://maps.google.com/maps?f=d&source=s_d&saddr=40.785026,-77.914782&daddr=Circleville+Rd&hl=en&geocode=%3BFQx-bgldWvBaw&mra=dme&mrcr=0&mrsp=0&sz=14&sll=40.793019,-77.924395&ssp=0.029111,0.055189&ie=UTF8&ll=40.792564,-77.907915&spn=0.029111,0.055189&t=p&z=14)

## Final Report: Detailed Observation Instructions

### Direct Weather Observations

Choose a place from which to make observations at the same time every day. Pick a spot from which you can see a good amount of the sky. Before you begin your observation period, use a compass or a map and landmarks to determine the cardinal directions (N, E, S, and W) from this spot. Record for your reference the compass bearings to various landmarks. Each day when you take observations, record the following on the Weather Observation Chart:

- 1. Cloud cover:** Scan the whole sky and notice what kinds of clouds are present. Use the cloud identification chart to help you identify them by type. Also, estimate the percentage of the sky that is covered by clouds, using four categories: 0-25%, 25-50%, 50-75%, 75-100%.
- 2. Apparent Temperature:** how hot or cold does it feel? Record on a five-point scale: hot, warm, mild, cool, cold (add extreme categories if needed). For precise measurement of the temperature, you would need a shielded thermometer, but with practice you can estimate fairly well without any instrumentation.
- 3. Apparent humidity:** how humid does it feel? Again, use a five-point scale: very humid, somewhat humid, neither dry nor humid, somewhat dry, very dry.
- 4. Wind speed & direction:** you can estimate wind speed and direction in two ways. First, you can toss something light into the air (grass, leaves) and watch which direction how far it flies before hitting the ground. Second, if there are clouds in the sky, you can watch their movement. If they are moving slowly, find a stationary object, such as a tree, building, or antenna to gauge their movement against. Also note if there are noticeable gusts of wind. For direction, use an 8-point schema; for wind speed, use the following categories: light (barely perceptible at ground level, no apparent cloud motion); moderate (clouds moving slowly, hard to detect without a reference point); heavy (clouds moving perceptibly, steady wind at ground level); extreme.
- 5. Position of sun:** If you can see the sun, determine its direction and angle above the horizon. Record its direction as precisely as possible, in terms of the cardinal directions. For your own reference, note what landmarks are below or immediately to the right or left of the sun. To determine the angle above the horizon, hold one arm straight out toward the horizon, and using your other hand, measure up from the horizon in fists, till you reach the sun. Each fist is about 5°.
- 6. Precipitation:** Record if any precipitation is currently falling, and if so, what kind, and how heavy it is. Also note if there is evidence of recent precipitation (e.g., puddles or snow on the ground).

### Obtaining Weather Data

Each day, retrieve observed weather data from an online source. Good sources include the Pennsylvania State Climatologist ([http://climate.met.psu.edu/www\\_prod/data/current/](http://climate.met.psu.edu/www_prod/data/current/)), the National Weather Service (<http://www.nws.noaa.gov/>), AccuWeather (<http://www.accuweather.com/>), or the Weather Channel (<http://www.weather.com/>).

Record the following:

1. High and low temperature

2. Precipitation totals
3. Average high and low temperature for that date
4. Atmospheric conditions (capture a screenshot of the map of fronts and pressure systems)

### **Ecosystem Observations**

Select a site that you will be able to visit two times in the semester. If you will be relying on bus transportation, check the weekday and weekend schedules, as some routes have limited service. Be aware of weather conditions and be prepared for rain and cold. If the weather is wet, a ziplock bag for your notebook might be very helpful. Bring your Ecosystem Observation Chart with you and plan to spend at least 30 minutes at your site.

When you arrive at your site, take a walk around the area and select one particular tract of no more than 3-5 acres to study (for reference, a football field is about 1.5 acres). As a general rule, this is about the area you can survey from one spot, turning in all directions.

On each visit, make careful observations and record them in detail. On your first visit to the site, make thorough notes about your tract as a whole. Your notes should include all of the following:

1. Description of the setting: topography, aspect, vegetation type, evidence of human impact.
2. Evidence of geologic features (rock fragments in soil, bedrock outcrops, sinkholes / closed depressions, erosional features). Try to identify any visible rocks.
3. Any animals or evidence of their presence that you observe.

Next, define a 10'x10' plot to examine more thoroughly. Describe its location in sufficient detail that you will be able to find it again (even if the site looks different, due to changing seasons) and locate it on a map / aerial photograph. Within this study plot:

1. Inventory all trees, recording their species and diameter at breast height (dbh). If you cannot identify a tree, record it as unknown. To get diameter, take circumference and divide by  $\pi$  (pi). Breast height  $\approx$  4.5 ft.
2. Describe other vegetation (forbs, grasses, shrubs - don't need to ID species or quantify)
3. Describe ground surface / cover (e.g., dead leaves, fallen trees, grass, rocks, etc.)
4. If trees have leaves, estimate canopy cover % (i.e., how much of the sky is blocked by leaves).
5. Examine the soil surface (do not dig a pit!) and describe its moisture, rockiness, and other visible characteristics.

Finally, make general notes on how this plot compares to the rest of the tract. Are there differences in tree species, understory, topography / aspect, canopy cover, or other features?

On your second visit, review your notes from the first visit and record detailed notes of all changes you see. Record both general observations of the tract as a whole, and specific observations of your study plot.

NAME: \_\_\_\_\_

DUE: 2/22

SECTION: \_\_\_\_\_

5 points

## Final Report: Site Selection Form

Use this form to plan your site visits for your final report. Look carefully at the calendar and your schedule for the semester, and decide on the dates that you will complete your field observations. *Because your weather observations go together with your ecosystem observations, it is essential that you complete your visit as planned.* List of approved sites can be found on page 3 of this document.

Submit this form to the ANGEL dropbox by **February 22**.

- 1) Which site will you be visiting for your field observations?

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- 2) On which two dates will you visit the site?

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- 3) For your weather observations, what time of day will you make your observations (must be the same time, +/- 15 minutes, each day)?

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## Final Report: Detailed instructions for written report

Your written report must be a coherent, carefully-written and edited academic paper of **four to six pages**, which reports and interprets the findings from your field observations and library research. The grade for the paper has four components, three on content and one on presentation and polish. *Each component has 15 possible points.*

1. **Regional Physical Geography:** In about 1-2 pages, describe the physical geography of the State College area. Be sure you discuss the following:
  - **Climate & typical weather patterns:** climate type, seasonal patterns of precipitation and temperature, typical weather for study period.
  - **Geology & landforms:** bedrock types, landform types, geologic history.
  - **Water Resources:** Seasonal water balance, hydrology.
  - **Soils:** Common types, parent materials, connections with vegetation and land use.
  - **Vegetation & Ecosystems:** main ecosystem types, connections with landforms, bedrock, soils, and human land uses.
2. **Reporting your observations:** This section is a thorough report of your weather and ecosystem observations, in 2-3 pages. Tables or other graphics might be very helpful in this section. Your reader should know exactly when, where, and how you made your observations, as well as what you observed. Depending on how detailed your notes are, you may have to select the most important pieces of information to highlight.
 

*\*\*note: when you reach this point in your report, you definitely want to have too much data recorded, rather than too little. You will have a much easier time if your field notes are very detailed and extensive!\*\**
3. **Analysis and Interpretation:** The final section of your report is an interpretation of your observations, in light of the regional patterns you have identified in section 1. In other words, how does your study site (and your study periods for weather observations) fit into the climatic, geologic, and ecological scheme of the region? Is it typical, or extraordinary?
4. **Presentation and polish:** Your paper must meet the usual standards for college-level work. In particular, be sure to address the following areas:
  - **Mechanics:** Your paper must have 1 inch margins (top, bottom, & sides), be double spaced, typed in 12 pt Times New Roman font, and not exceed **6 pages**.
  - **Writing quality:** Your paper must be written in complete sentences and paragraphs with no spelling, grammatical, or usage errors. You must have an introduction, conclusion, and transitions between sections.

*\*\*NOTE: the Undergraduate Writing Center (<http://www.psu.edu/dept/cew/writingcenter/UWC/index2.htm>) is a great resource for helping improve your writing. You are *highly encouraged* to visit the Center with a draft of this paper. When you meet with a tutor, a report is sent to your TA, so that your efforts may be taken into account when the paper is graded.\*\**

- **Sources:** You must cite your source for *any* information you gather from library or Internet resources. Your sources must be trustworthy—ask your TA if you have questions about any of your sources. You may use any style for your citations, as long as you use it correctly and it is clear and unambiguous. APA

style is common in Geography, but if you are more familiar with a different style from your discipline, you may use that instead. The links below have guidance for using various citation styles.

- Style for Students Online: <https://www.e-education.psu.edu/styleforstudents/>
- PSU Citation Guide:  
<http://www.de2.psu.edu/faculty/saw4/reference/CitationGuides.html>

**A note on using sources in scientific writing:** unlike in humanities disciplines like English or History, in scientific writing you seldom quote directly from a source. Instead of quoting, you should be synthesizing the information from your sources and presenting it in your own words.

**Submission:** Submit your paper, in Microsoft Word format, to the ANGEL dropbox for your section, by **May 3**.