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**Minnesota School Forest Program**

**Lesson Title: GPS/GIS Grouse Management Assignment**

Note: if you are using Garmin eTrex20’s, you will need to convert latitude/longitude to UTM coordinates.

Press **Menu**

Select **Setup**

Select **Position Format**

Select position format **hddd.mm.mmm’**

Scroll down to **UTM UPS**

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**School Forest:** Pillager School Forest

**Grade(s):** High School

**Overview:** The following 4 assignments include lessons that build students’ knowledge of GPS and GIS in order to complete a Grouse Management assignment. The lessons that follow include:

1. GPS assignment 1
2. GPS assignment 2
3. GPS/GIS Forest assignment 1
4. GIS mapping Grouse Management Assignment

These assignments use Garmin GPS units, Garmin online, and Arcview GIS.

Edit the attached worksheet to best meet your classroom needs.

**Lesson: GPS Assignment 1**

**Overview:** Students use the football field and buildings and other waypoints to practice navigating to various points using the GPS unit.

**Objective:** Students will be able to mark, navigate to, and delete waypoints on their GPS unit. Students will be able use the menu of the GPS unit to change units to UTM coordinates and meters.

**Materials:** GPS units

**Procedure:** Use the worksheet below to have students complete the assignment.

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GPS Assignment 1

Obtain the GPS unit and its quick guide.

1. Turn unit on. Switch unit default setting WGS (latitude/longitude) to record in UTM coordinates, NAD 83
2. Set the measurement unit to meters. You are ready to read UTM.
3. Use the far football goalpost. Go there and mark this spot as waypoint 1.
4. Go to the front of the building. Choose a navigation screen, using the navigation screen practice going back to your way point.
5. Pick different objects. Mark them as waypoints. Navigate to them.
6. Delete all waypoints from the unit when finished.

**Lesson: GPS Assignment 2**

**Overview:** Students use a map and UTM grid to determine coordinates of an object off school grounds. After having students determine their pace in the school hallway, students will use a compass to pace to their object and record notes as they go. Students then do it again with a GPS unit and compare accuracy.

**Objective:** Students will use a map and UTM grid to find coordinates and measure distance. Students will be able to use a compass and their pace to navigate to an object. Students will be able to use UTM coordinates in a GPS unit to navigate to an object. Students will compare/contrast the two experiences.

**Materials:** Map of township, UTM grid, compass for each student or group, GPS unit for each student or group, tape measure.

**Procedure:** Use the worksheet below to have students complete the assignment.

Consider using the [pacing lesson](http://files.dnr.state.mn.us/education_safety/education/schoolforests/4_6/4_6_Pacing.pdf) to have students determine their pace.

**GPS Assignment 2**

1. Use the metric tape measure. In the hallway, mark out 20 meters. Determine your pace factor. Next, calculate how many paces you would make in 100 meters.
2. Obtain the map photo of Sylvan Township. Locate the school grounds and the fair grounds. Pick an object on the fairgrounds.
3. Using the UTM grid, determine the coordinates of the object.
4. Pick a starting point on school property, using the measuring scale determine the distance (in meters) from your starting point to your fairground location.
5. Mark your starting point in the field. Use a compass to get an azimuth. Pace to your finishing spot on the fairgrounds. Mark the spot. (Note: each line you create between a starting and terminal point is called a “traverse.”) Create and keep field notes each time you do this.
6. Now, using your GPS unit, do it again to check your accuracy using just compass and pace.
7. Repeat making traverses several times using new starting and finishing locations.
8. Turn in your field notes with this sheet.
9. Conclusion: Comment on your experience. (Which method feels most comfortable/accurate, etc.)

**Lesson: GPS/GIS Forest Assignment 1**

**Overview:** Students perform a closed traverse in the forest marking waypoints on their GPS unit at each turn. Students also find azimuths and distance using a compass and pacing, recording in their field notes as they go. Students then use Garmin online and generate a map using Arcview GIS.

**Objective:** Students will perform a closed traverse using a compass, pace, and a GPS unit. Students will compare both types in a field report. Students will be able to use Garmin online and Arcview GIS to create a map of their traverse. Students will create a field report.

**Materials:** Compass, GPS unit, access to Garmin online and Arcview GIS

**Procedure:** Students will follow the worksheet below to complete the assignment. Students should also be completing field notes as they go to create a field report at the end of the assignment.

**GPS/GIS Forest Assignment 1**

1. Select a timbered area. Perform a closed traverse. (A “closed traverse” is a series of linked traverse lines where your terminal point closes at your starting point.)
2. Mark each turn in the traverse on your GPS unit as a waypoint.

## Record azimuths and distances for a comparison to your GPS traverse.

1. Keep and record good field notes
2. Back in the room.
* Run your traditional traverse on the Traverse program.
* Download your GPS data using Garmin program…generate your own map using Arcview GIS
1. Compare your data. Write up your field report. Attach your traverse, field notes, and Arcview GIS map to your field report. Turn everything in together.

**Lesson: Grouse Management Assignment-GIS Mapping**

**Overview:** Students use their GPS/GIS skills to traverse the forest, marking location of any drumming logs and flushed grouse. Students will also mark location of male aspen trees, which denote prime ruffed grouse habitat. Using Arcview GIS, students will create a custom map with their data.

**Objective:** Students will use previous skills to complete a mapping assignment. Students will use a GPS unit to mark locations and then transfer the data to Arcview GIS to create a custom map. Students will use observation skills and collect samples to make field notes.

**Materials:** Handout-“Hints for Working Drumming Grouse,” GPS unit, access to Arcview GIS

**Procedure:** Students use the worksheet below to complete the assignment.

**Grouse Management Assignment**

**GIS Mapping**

1. Move quietly! and slowly!
* Record
	+ How many times you hear grouse drum.
	+ Try to locate and mark the UTM coordinates of the drumming log
	+ Mark the log’s location on your map.
	+ Mark on your map the location of any grouse you flush—stop and **LOOK**, why was the bird there?
1. Gather and label these samples:
* Male aspen catkin
* Birch catkin
* Hazel catkin
* Ironwood catkin
1. Mark on your map the location of male aspen trees.
2. Using Arcview GIS, create a custom map of our forest. Locate and mark drumming log data, male aspen tree locations, other important food sources and/or bird sightings.
3. Turn in field notes along with your GIS map.

**Hints for Working Drumming Grouse**

1. Even if you have never heard a drummer before, you should have no trouble recognizing the sound when you hear it for the first time. After you’ve had some experience you may even “feel” drumming which is so far distant you can’t really hear it. When you do, go on that “feel.”
2. Each drum lasts about 2 seconds, so as soon as you realize you are hearing drumming, stop dead in your tracks and try to get a directional hearing in reference to trees, or some other distant feature which you can “home” on. Also, try to classify the drumming as loud (within 100 yards), moderate, or faint (which may be from 1/8 to 3/8 mile away). Note the time of when you heard the drumming, then remain quiet for another 4 or 5 minutes. Most birds drum at 4 minute intervals. (If you don’t hear him at this interval, then remain in place for another 6 minutes or so, because some birds may miss the first 4-minute drum, but will drum again after 8 to 10 minutes.) If you still don’t hear drumming, move slowly and alertly in the direction you thought the drumming was coming from. Sometimes you will have been close to the bird when he drummed the first time and he may flush after you have moved only a few dozen or hundred feet.
3. Once you have a hearing, move rapidly, quietly and alertly in the direction of the bird, but stop after about 3 minutes, so that you can fix his position and distance the next time he drums. Keep a record of the time of each drum, so you can establish the interval between drums. As you get closer you should slow down, and become as quiet as possible, and examine as thoroughly as possible all likely looking logs ahead of you. (When you are within 100 feet or so of a drummer you can hear the air whistling through his wings on the up-stroke.) When you hear this you are very nearly in sight of the bird. Usually when grouse see you, they will “freeze” on their log, (although older birds may run-off), and stop drumming. So if you thought you were quite close the last time you heard a bird drum, and he doesn’t drum at his next scheduled time, it is very probable that he sees you, even though you can’t see him. Few birds respond to noise alone, since squirrels, rabbits, etc. all make for a noisy forest anyhow, so when they cease drumming it is usually because they have seen suspicious motion. On their logs, ruffed grouse are extremely well concealed, and even with binoculars you need to know the bird’s exact location because it is often very difficult to detect the motionless bird. So it is necessary to approach the suspected log very slowly but not necessarily quietly. (Watch for motion on the log, very often birds will flick their tail before flushing.) If you don’t flush a bird from the suspected area then start a systematic search, examining every suitable looking log, stump, root, rock or other object in the area for an accumulation of free droppings. Generally it is worthwhile to work an area within a 100 to 200 foot radius of where you suspected the drummer to be.
4. If you know the bird’s location and want to get a better look without flushing him out, you can walk all the way around a bird “frozen” on a log, so long as you don’t approach closer than about 12 to 14 paces (about 60 to 80 feet). Don’t disappear from the bird’s view, even for a moment. As long as they can see you and you don’t approach any closer, they will remain stationary.

Don’t wear bright colored or white clothing or hats. Don’t wave your arms, and move slowly and steadily when working close to birds on drumming logs.

Grouse have good color vision so colors contrasting with those of the forest will give you away while you’re still too far away to see the bird, and any sudden motion will alarm birds. Silence is not nearly as important as steady motion and dull colors.