Florida 4-H Environmental Education Activities

Activity Title

INTERPRETIVE ORIENTEERING

Grade Level

5-Adult

Sunshine State Standards

Physical Education : P.E. A. 1. 3. 1.

Major Instructional Goal

To give individuals map and compass skills which will help them in traveling across unfamiliar areas and to locate areas of natural interest.

Associated Concepts

A. Self confidence
B. Environmental sensitivity
C. Various ecological concepts associated with the interpretive points.
D. Map reading
E. Taking compass bearings

Educational/ Instructional Objectives

Upon completion of this activity, students should be able to:

1. Interpret the various symbols and explanations on the topographic map.
2. Use a compass accurately in order to take bearings for a location of interpretive points.
3. Use a combination of compass and topographic map to locate points in the field.
4. Define declination.
5. Explain the parts of a compass and their use.
6. Explain how contour lines on the map relate to features on the field.
7. Map a small area.
8. Locate themselves on a map.

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Background Information

Orienteering is finding your way across familiar or unfamiliar territory by imaginative and intelligent use of a map and compass. All that is needed to start an orienteering program is a compass, a map, controls, or simple markers, and writing materials.

Topographical maps are the best for orienteering. Most people are not aware of the information available on a topographical map. Therefore, it is necessary to spend some time in the early stages on a map to become acquainted with the mechanisms through which they provide information. The four edges of the map tell the user where the map lies in relation to the rest of the earth and in relation to other maps. The border lists the scale of the map, thus allowing the orienteer to measure distances accurately. Compass declination, the variation between magnetic north and true north is also listed.

The map itself contains a great deal of information, most of which is provided in the form of map symbols, or features. These symbols are simply a universal method of representing the features of an area in a simple precise manner. Map symbols are divided into two groups, man-made and natural, and are color coded.

The features of topographical maps that sets them apart from other types of maps is contour lines. These lines allow the map maker to provide the user with an accurate picture of the lay of the land. The key to understanding these lines is to realize that the lines are closed, that it is circular, and that each line is drawn on the incline which is 20 feet above the contour line immediately below it.

Gentle slopes are indicted by contour lines which are spaced relatively far apart. Where slopes are steep, as on bluffs, the contour lines are very close together because the elevation changes rapidly within a small distance. A conical hill would be shown by concentric contour lines with the innermost circle representing an elevation near the peak. A ridge is portrayed by roughly parallel contour lines which for a U pattern.

The Compass

Contrary to popular belief, there is no large lump somewhere in the far north that attracts all compass needles. Instead we can picture the Earth as having a bast magnetic field with lines of power running north and south and converging near the north and south poles. Rather than pointing anywhere, the needle of a compass merely lines with these lines of power making it appear to point north. The difference between magnetic north and true north is know as declination and is noted on all topographical maps so that it may be accounted for in setting one's compass.

The logical place to start when learning the use of a compass is to become

familiar with the parts of a compass and the means by which the compass is set. The direction of travel arrow intersects the compass housing which is marked off in degrees by two. It is this point that the compass is set. In other words, if one wanted to set a compass for 140 degrees, the housing would be turned until the 140 degrees mark lines up with the direction of the travel arrow. The compass is then set. The orienting needle on the housing point to north and the direction of travel arrow points 140 degrees from north. If the entire compass is turned until the magnetic needle aligns with the orienting needle, the compass is "oriented" and the direction of travel arrow points 140 degrees from magnetic north. At this point one could travel from the compass providing that an adjustment has been made for declination. To travel from the compass one simply walks in the direction indicated by the direction of the travel arrow.

Once a bearing is set and the orienteer begins to follow it, it will be found that it is quite easy to deviate from the intended course without one's knowledge. For this reason it is quite helpful to take repeated sightings on prominent land marks while walking. One simply orients the compass which has been properly set, sights along the direction of travel arrow, picks out a landmark along the line of travel and walks to that landmark. This process is simply repeated until one's destination has been reached. If this precaution is not taken it is very likely that the traveler will move totally when avoiding obstacles and still appear to be following the correct bearing. Even when the orienteer is taking sightings on visible landmarks and traveling to them it is often possible to be thrown off course by impassable obstacles. Should the orienteer find himself/herself face to face with an obstacle he may pass around it in a service of measured right angles until he is back on course. Each leg of the detour must be long enough to clear the obstacle, and the leg that first deviates from the long of travel must be measured so that the third leg of the detour may cover the same distance and return the orienteer to the original line of travel.

Map and Compass

Declination has been discussed but now that map and compass are to be combined, declination becomes an important factor. Declination is only about three and one half degrees in southern Illinois, so it will not mean that much corrections in the field. Students should be made aware of the affects of declination.

The difference or variation between true north and magnetic north is known as declination and noted on all topographic maps so that it may be accounted for in setting one's compass. Thus, if one is a far distance to the east or west of the isogonic line, his deviation from true north could be of considerable amount. It is important to allow for declination in these conditions or the orienteer or traveler will deviate considerably from the intended course. To do so one will add the degrees listed on the topographic

maps to the compass if one is east of the agonic line, or will subtract if one is west on the agonic line from the compass.

Topographical maps come with lines on them which extend from north to south. They are known as meridians and are used for reference when setting a compass from a map.

It is often difficult when looking at an area to make the features on the map correspond with the features that lay at hand. One can partially alleviate this problem by orienting the map with the terrain. This is easily done by placing the compass on the map and turning the map until the compass needle aligns with the magnetic meridians on the map. At this point north on the map is the same as north in the field and the map is said to be oriented.

Three Steps in Orienteering:

1. Place the compass on the map with the baseplate edge along the desired line of travel.

2. With the compass still on the map, rotate the housing until the compass grid lines are parallel and in the same direction as the orienting grid lines on the map.

3. Remove the compass from the map, don't move the housing, and place the compass in front of you with the direction ar row pointing out. Turn your whole body until the north end of the magnetic needle is parallel and in the same direction as the orienting lines. Follow the direction arrow keeping you compass oriented.

The Activity

A. Information

1. Learning Site – Large area with many diverse form of land and plant features. The size of the area can vary but should be at least one-fourth of a mile square for younger students and larger for more experienced or older students. It is important that the perimeter of the area which the course is set up should be made up of such features as roads, stream, lake, etc., so that an individual or group will not leave the area if they become lost. This is especially important for beginners or younger students.

2. Materials – topographic maps, compasses, paper, pencils, wooden blocks or empty plastic mil contain

ers (controls) each marked with a different letter, rope to tie markers in trees, potato, knife, indoor orienteering handout, interpretive cards for con trol sites.

3. Preparation by Instructor – The interpretive orienteer ing course should form a loop from start to finish. The controls should be placed at obvious map fea tures and where they are visible from about twenty yards. Mark the location of each control on the map as accurately as possible. It is better to make the con trols too east rather than too hard for beginners.

   At each control site you should write a short paragraph on a card which interprets the natural features at the site. This is to make sure that the students stop and take notice of the particular site. End the paragraph with a question pertaining to the prominent natural feature of the site.

4. Critical Vocabulary – Declination, contour, bearing, meridian, magnetic north, true north, direction of travel, orienting the map.

5. References:
   a. Kjelistrom, Bjorn, Be an Expert With Map and Compass: The Complete Orienteering Handbook. Scribner, N.Y. 1976.
   b. Disley, John. Orienteering. Stackpole Books, Harrisburg, Pennsylvania. 1967.

B. Directions for Actual Activity

1. Focus – 1-2 hours. Pass out the maps to the students. First explain what a topographic map is, its features, and how to read a map. The map is integral part of the orienteer. It is important that the student understands all the symbols. Contours seem to be difficult to conceptualize. A simple illustration is useful in explaining contour lines. It can be done with a large potato, a knife, a sheet of paper, and a pencil. Simply slice the end of the potato at intervals of one-half inch or less, lay each slice on the paper with the newly cut side down and draw around each slice. This will yield a set of concentric rings that will show that shape of the potato much as contour lines show the shape or a hill.

It is often useful to have a simple means of measuring distances while travelling across country. The length of one's pace can serve as a measuring tool. The method is to set up a pacing course. The students start with the left foot and count each time the right foot touches the ground. It is wise to walk the course several times and average the results.

Another activity to relate to maps involves making a map of a small area. In its simplest form the students pick a small area, perhaps twenty feet square, and produce a map that possesses the four basic map requirements, direction, distances on scales, features of symbols, and border information with a key. If they know the length of their pace they can make a map with a compass, paper, and a pencil.

Next, explain the difference between magnetic north and true north (declination). Distribute a compass to each student (or group) and point out the parts of a compass. Instruction on use of compass should include practice with setting the compass on a bearing and determining the direction of travel. The handout on Indoor Orienteering is a good exercise for this purpose. Another exercise which emphasizes accuracy in pacing and use of the compass is the three-legged walk. Each participant places a marker on the ground at his feet, sets his compass at a bearing between 0 degrees and 120 degrees and paces off 100 feet. At this point, 120 degrees are added to the original bearing and 100 feet are again measured off. When this has been accomplished the process is repeated. The marker should be at the feet of the orienteer at this point if done correctly because he should have walked in a triangle back to his original starting place.

Beginners may experience some difficulty in following a bearing for a prolonged period of time. The following exercise offers practice in this technique. The starting point of this course will be along the road that is assumed to border one side of the woods. A marker for each participant is set along the road at intervals of about 50 feet. Each participant sets their compass at a bearing that will establish a line of travel that enters the woods at an angle of 90

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degrees to the road. This bearing is followed until the section of the woods has been traversed and the far boundary attained such as a road crossing or pond. At this point, each person turns around and follows his back bearing (by either adding or subtracting 180 degrees from the original bearing. To the starting point. The object is to come as close to the starting marker as possible.)

Now combine the use of the map and compass together. Explain the three steps in orienteering and have the students practice the three steps.

2. The Activity – Upon reaching the orienteering course hand out the maps and compasses. Explain that they are to use the skills they have learned to find the controls; they are to write the control letter and the answer to the interpretive question on a sheet of paper.

   Stagger start the students (so that they don't merely follow one another) on the course. Follow the last student or (team) to make sure that no one strays too far off course. Be careful not to give away the location of any of the controls.

3. Synthesizing Strategy – After the activity, collect the students' recordings of the control letters and see which controls were missed. You may need to review with the students how to use the map and compass. Discuss the answers to the interpretive questions. Some suggestions for topics of discussion for synthesis are:
   a. How does topography affect the plant life at each site?
   b. How is the actual topography depicted on the map?
   c. How do man-made features affect the topography?

4. Suggestions on Time and Problems – It may be nec essary for large groups to break up into teams or pairs to shorten the time required to complete the ac tivity. For younger students you will need to have an adult who knows how to find they way back accom pany each team to make sure that no one gets lost. Try to use an area that is bordered by reads or a

stream or pond. Tell the students that if they end up at one of these spots to stay where they are at because they have gotten off of the course. It will be easier to find them along the boundary of the area rather than searching within it. It may also be helpful to five each person or team a whistle to use if they get lost. Make sure everyone understands what they are to do if they find themselves lost.

INTERPRETIVE ORIENTEERING WORKSHEET

INDOOR ORIENTEERING

As an orientation to the orienteering and/or as an inclement weather exercise, it is useful to have some indoor orienteering exercises at hand. The following self-scoring one lets the student demonstrate skills required in making a map; namely properly handling azimuth, distance and scale.

In order to test your skills use an 81/2' x 11 inch sheet of (cross sectional) paper, orient it using the directional arrow on this sheet, start at a point in the same position as X on this sheet and use a scale of 1/10 inch equals 10 feet. A less desirable but workable alternative is to use 1/8 inch equals 10 feet. The object is merely to plot the trail which the data represents and see if your understanding of orienteering is okay.

Aximuths (degrees)	Distances (feet)
245	75
190	80
130	80
70	80
10	80
310	80
215	80
134	70
83	120
34	120
358	140
213	100
195	290
25	100
70	65
125	30
240	45
260	50
155	30
110	95