Minnesota Orienteering Club
Setter-Vetter Handbook
Revised: February 8, 2023

Important Notes:

- There have been many changes and additions to the handbook since the 2012 revision. Please read it all. The material will guide both novice and experienced Course Setters. It allows both setters and vetters to know current procedures and what is expected of each of them. It is easy to forget the details.
- Some of the instructions in this packet are designed to protect you and the club from being held responsible if an orienteer is injured in any way. The Club has event liability insurance through USOF but the goal is not to have to use it.
- Following instructions in this booklet will help to ensure that orienteering events go smoothly and are enjoyable for all involved (setter, vetter, volunteers, orienteers, park personnel and other park visitors).
- The Course Setter and Course Vetter should work together closely as a team. If you have questions or problems, call each other early.
- Current volunteers for club positions referred to in this handbook are listed below. Updated volunteers and other contacts are shown on the MNOC Event Calendar (Setter/Vetter sign-up) and at MNOC.ORG.
    - President — Pete Wentzel — pwentz3l@gmail.com
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    - Setter/Vetter Coordinator — Jim Mullin — mullin@umn.edu
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If you have suggestions or questions about this document, contact the Handbook Editor, currently Jim Mullin mullin@umn.edu. Current version is at: tinyurl.com/MNOC-SettersHandbook

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Setter vs. Vetter - Who Does What?

The Setter is the one with the major responsibility to design the course. He or she is the one who creates the event and should be given the bulk of the kudos for producing a fun and challenging event. The bulk of this handbook is designed to guide the setter through the process. It may seem strange that volunteers are generally asked to set before they vet, but even though vetting requires less time and effort, it's hard to guide someone else before you have done it yourself.

The Vetter's most obvious responsibility is make sure the controls will be set exactly as they are on the map. In the weeks before the meet he or she must visit the taped control locations and check that they are where they should be. Bring a copy of the 'All Controls' Description sheet to make comments on as you visit sites. The Vetter also helps set out the controls the day of the meet. Less obvious but just as important for a quality meet, the vetter should review the courses with the setter, checking to make sure course difficulties are appropriate for the intended level. A new setter may never have noticed how or why courses they have run were designed the way they were. The Vetter should be available for technical questions and help keep things on schedule.

A. Equipment and Supplies for the Setter/Vetter Team

All of our meets use electronic punching. Course design is done using the Purple Pen program for Windows.

Equipment to Design and Flag the Event

- To draw your courses, you will need access to a computer with Purple Pen installed. It is a Windows program available for free at http://purplepen.golde.org/. Instructions for using Purple Pen are below. Using Purple Pen If you can't get access to a Windows machine, we may have a laptop you could borrow. It is possible to run Windows on a Mac by installing a virtual machine emulator. This is not a simple task but instructions are available at https://purplepen.golde.org/virtualbox.htm
- Latest map file in OCAD format downloadable from: https://tinyurl.com/MNOC-Maps
- A printer for your work copies. (maps for the meet will be printed by the club) Ideally the printer would be a color printer to make your work easier but it does not need to be as big as the maps we use for the meet. Purple Pen can either scale the print or preferably print it in tiles.
- Flagging tape (available in most hardware stores). We have tried using biodegradable tape with mixed results. It sometimes degrades before the meet. Whatever tape is used; it normally should be removed as controls are set unless the control is placed in a spot where you expect some passerby might remove the control. If you leave it up, it should not be so high or visible that the tape is the first thing that orienteers see. As a backup tape must be removed when controls are retrieved. Any taped control points you decide not to use should have the tape removed during the vetting process.

Equipment for Meet Day

Equipment to be set in the forest on the day of the event is listed below. It should be in your possession well before the day of the meet so you can check that you have all you need. The best way to get the equipment is to pick it up at the end of the preceding event. If that is not possible you will have to work with the previous event's director, your event's director and/or the equipment manager to coordinate getting the control boxes, flags and stakes.

Be sure to get these items:

- **Gray control box case.** This box should contain controls from 201 to 245 however sometimes a control box needs to be repaired or have its battery replaced. So check that the controls you will use for the meet are actually in the control box case. If not change the control number in Purple Pen before sending courses to be printed or contact the equipment manager to see what can be done. The case includes an inventory and a log book that contains information about missing control boxes, changes in numbering and when their clocks were last synchronized.

- **Control Flag Bin** with 50 control flags bundled in groups of 10. This bin should also contain a gray bag with 5 control set/retrieval bags.

- **Set of Control Stakes** The standard complement is 5 stakes for our small control boxes and 5 for our large control boxes. Be sure to bring the right size for the controls you are putting out. If more stakes are needed of one or both type of stakes, be sure to get them from the equipment manager.

Control Box Synchronization:

Normally setters and vetters can assume that the control box clocks are good to go and to not need synchronization. But if any of the conditions below apply, either contact the Equipment Manager or Race Computer Manager or if desired, follow the instructions in Appendix II

- The log book indicates it's been a couple months since last sync.
- Daylight savings/standard time has changed.
- You are setting a meet where time to run between controls is very short, such as a Sprint or the Corn Maze meet.
- You plan to use multiple control boxes at some control points or at the finish.

B. Course Setters Suggested Schedule

8 Weeks Before

Confirm that you have:

- The .OCD map file. It is required for Purple Pen course design. See https://tinyurl.com/MNOC-Maps
- It is also recommended that you install the app, Avenza on your smart phone. Compatible map files for each park will be in the sub-folder /Maps for Apps of https://tinyurl.com/MNOC-Maps. This app enables you to see real time where you are in a park on our orienteering maps.
- Two copies of permit for us to have event in park. Especially in parks like Three Rivers which do not allow off trail hiking, you should have one copy with you and if you park in an odd location leave one on the dashboard.
- Setter/Vetter Schedule which includes contact info for the park and current setting notes.
- Purple Pen program installed on your computer.

Our Park Liaison is in charge of getting permits and determining any restrictions the park has. It is usually best to address questions about restrictions, out of bounds areas and start locations through the Liaison. But the following are points you should be aware of.

- Know what building/shelters we are permitted to use. Some parks allow MNOC to use a shelter free of charge since we are offering a program to the public. Some parks rent out their shelters and surrounding areas to groups (e.g. weddings, church groups), and in some cases MNOC reserves and pays for the picnic areas/shelters. It is important to understand what the arrangement is.
- Know about any parts of the park we are not allowed to use or should avoid due to environmental or other considerations.
- Know whether there are single use trails (e.g. horse trails, mountain bike trails) that orienteers must stay off or avoid.
- Know about any restrictions as to where cars can park. (both for you during setting and for competitors at the meet)
- In some cases parks require that they approve course design. (e.g. Dakota County for Lebanon Hills). Ask whether the park needs to see and approve course plans before the meet.
- Know whether there are any prescribed burns being planned. A burn can change vegetation boundaries and effect how you might design the course. They can also burn away your taped control points.

Contact your partner. Talk about your plans and each of your schedules. Often it is both useful and fun to set up times to meet at the park. If you are new to setting, now is the time to start asking questions.

If you are the setter, begin planning your courses.

6 Weeks or More Before

When the schedule for the year is planned, meets are usually designated as Regular, Members Only, Night-O etc. Make sure you know what courses of what type are required. For meets like Members Only meets and Adventure Runs, there is room for creativity. Discuss your ideas with your vetter.

- Decide jointly with your vetter after consulting with our Park Liaison:
    - The location of finish area (should be near parking and toilets)
    - The location of the start. Remote starts are acceptable if they add significantly to the quality of the courses but you will need to take responsibility to organize the start. Talk to the meet Director if you plan to use a remote start. To avoid confusing newcomers and for teaching purposes, starts for the White, Yellow, and Orange courses should be at the registration/finish location.
    - Make clear to each other what your schedules are and when you will be available to work out courses and meet details. Don't wait until your vetter is on vacation to give him or her your courses.
- With your course ideas in hand VISIT THE PARK. Setting is not an arm chair activity. What seems fun on the map can feel gruesome in the field. Conversely, some very enjoyable ridgelines or contour runs can jump out at you when you see them. Especially if you are new to setting or to the park, it is likely you will have to make several visits.

    - Check the map for accuracy near each control.
    - Mark map corrections and get them to the Map Coordinator. Do not place a control on or near areas where the map is in error.
    - Move controls on your map if the vegetation is too thick.
    - Verify accurate control placement and map accuracy by approaching each control from more than one direction. Use the Avenza smart phone app to verify any non-obvious placements.
    - Tape control locations exactly where you will hang the controls. Mark on the tape the control number and label MNOC. (as of the 2022 season control numbers for control boxes will be 201 through 245)
    - Be generous with tape length and tie high enough to be easily found while vetting and setting out controls.
    - During the flagging procedure note which controls will need to be mounted on stakes. Normally only will get 5 stakes each for our small and large control boxes. Be sure that if you need a lot of controls on stakes that you have enough stakes for each size box you will be setting out. You may need to change the control box used at a particular control point if you run out of stakes for a that size control box.
- In Purple Pen's Report menu, review each report. Fix reported problems.
- E-mail Purple Pen files including all courses and clue descriptions to vetter. If map corrections will be made, send them as well.
- Meet with the course vetter to discuss your course plans. Some things can be discussed on the phone or through email but nothing can replace a meeting with maps in hand. Review with your vetter each course keeping in mind points covered in Course Setting Principles discussed below. Course Setting Principles

Between 6 and 3 Weeks Before Meet

- Revise your courses. If new control locations are chosen, visit the park to re-tape them. Make sure they are appropriate for the course level and that the map is accurate in and around the new location.
- Although encouraged, pre-running all courses is not required for regular club meets. However, you should run legs that go through areas where vegetation density or boundaries have likely changed or where the map is of questionable quality. In particular, legs you may not yet have approached from the direction runners will, should be checked.
- Update Purple Pen's courses and clues.
- Again from Purple Pen's Report menu, review each report. Fix reported problems.
- E-mail updated files to vetter.
- Vetter should start to check the control locations. If problems are found let the setter know early, especially if they require course reworking.

By 2 Weeks Before Meet

- Vetter should have visited all controls and discussed any problems with control locations.
- If no problems are found the setter should finalize courses. If problems are found you have just enough time to fix them and have them vet.

- E-mail any updated files to vetter.
- Let MNOC VP of Promotion know where the course start will be so an announcement can be sent out ahead of the meet.

By 5 Days Before Meet

- Make sure you have or have arranged to get the control flags and control boxes. Check that you have each of the control boxes that are designated on the Purple Pen map. (sometimes a control box is missing)
- If you will be putting some control boxes on stakes, be sure you have enough of the correct size stake for the controls you will be using.
- E-mail Purple Pen files to Map Coordinator or the designated map print volunteer for printing. Although ideally corrections should have been submitted prior to now, include descriptions of any last minute corrections as required.
- Also email the Purple Pen file to the Race Computer Operator so they can set up the computer ahead of the meet.
- Let the Meet's Director know where the start and finish will be so they know where to set up.
- So you and your vetter can work quickly the morning of the meet make sure you have two master maps ready along with the master control list and hints. Either print these yourself or work out with Map Coordinator to have them get you a couple copies before the meet.
- Work out a logical order you will put out controls (by area, not course by course). Divide up which each person will do.

Early the Day of the Event

If required, some deep woods controls may be set the day before. Never set controls out ahead of time where prescribed burns are planned or along busy paths.

- Set out the control flags and control boxes in the order you worked out earlier.
- If you will be placing some control boxes on stakes, make sure you bring out stakes that fit the control box size you are using.
- Normally you should remove the flagging tape as you go.
- Allow at least 10 minutes per flag for putting them out. 40 flags = 400 minutes or 200 minutes each for 2 people assuming 1 min hanging time and ~12 min/km. So a 8:30 AM start time + 3:20 hanging time gets you done at 11:50.
- Aim to get controls out an hour before start time so there is time to deal with any unforeseen problems.

Hanging Controls

Controls bags should be hung between 12” and 36” off the ground so that they are visible from 15 to 20 meters away. If the vegetation is thick in the area, the flag itself may need to be hung higher, say 48”. Stakes and control box stands are available for sites which have nothing to tie to. Be careful to bring the correct size stake with you, we have two different size control boxes. If an anchor is available, tie the control boxes through their punch hole to the same anchor as the bag. Keep control boxes off the ground. Don’t hang the control on small dead branches which may break off and try to use a knot that is solid but also easy to untie after the event.

Note: The stands are compatible with only one size control box.

1 Hour Before Event

- Course setter and vetter must meet and confirm that all controls are in place.
- Check that only control boxes you planned not to use are remain in the case.
- Recheck printed maps for possible errors. If any are found, make notes on event white board.

C. Course Setting Principles

General Guidelines

1. Create challenging courses with the proper degree of difficulty for the people who will orienteer it. For advanced courses the challenge is to offer both a mental and physical test appropriate for the course level.
2. Consider fairness to all who orienteer on the course so that possible elements of chance or luck are lowered.
3. Don't focus only on the control points. A good leg keeps the orienteer thinking from the moment they leave the previous control.

The quality of the map determines to a large extent the control features that can be used. If the map lacks good contour detail then it will not be possible to set controls on small topographic features. If the map has not been field checked recently then the vegetation features may not be accurately portrayed. Any problems in the map will tend to decrease the fairness of the event (e.g. some orienteers will find that unmapped trail and others will struggle in the unmapped dark green). Map corrections and additions should be submitted in time to be printed on the map. Unmapped or unclear features must not be used for control sites.

Choose control sites whose difficulty is appropriate for the course level. Size of control feature, distance from distinct attack point, and type of control point (top of hill vs. small reentrant) all effect the difficulty of the site. Don't place controls in areas where the map seems inaccurate unless corrections can be made before the meet.

The progression in difficulty of control sites listed from easy to hard is approximately as follows: roads, trails, paths, fields, boundaries, buildings, streams, lakes, open marshes, power lines, tops of obvious hills, spurs, reentrants, boulders, knolls, pits. For example, use road features (such as a bend) for beginner courses, and use reentrants and point features like boulders and pits for advanced courses. Other things that will affect the difficulty and should be kept in mind for different course levels include, the difficulty of the terrain (elevation changes, vegetation, etc.) and the quality of the map.

To make a fair and enjoyable course:

- Avoid dog-legs (incoming runners spotting outgoing runners). Although acceptable on beginning level courses they can easily be eliminated by adding a second control close by to "spread out" the dog leg.
- Try to emphasize: First- map reading, second- route choice with several equal choices, and last- compass bearing sections. Featureless compass bearing runs should be avoided.
- The length and direction of the legs should vary as much as possible.
- The type of control site should be varied as much as possible.
- Courses can loop back on themselves BUT make sure the course will be readable (a figure eight is OK but avoid more complicated looping back)
- Where possible, the control feature should be visible before the control flag. The flag can be on the far side of a hill top if the hint specifies it so, but do not hide the control.
- Route from the last control to the finish should give runners a chance of free running on easily runnable terrain for a hundred meters or so. It is nice to have all courses come together at a common final control for a common run to the finish.

Control Choice and Placement

Orienteering is not a game of hide and seek. Control sites should be clearly defined by the circle on the map and by the control description sheet.

1. Controls placed in wooded areas must be on features which are distinct. Never place controls in thick vegetation. Orienteering should not be an unpleasant experience.
2. Don't try to increase the technical difficulty of the course by hiding the control. Controls should be hung so that if the orienteer finds the feature, is within the control circle and uses the hint they will find the control.
3. Don't hide a control behind any object that is not on the map. Behind a boulder is ok since it is on the map and hint column G can indicate "North Side", but not hidden behind a bush or large tree that is not on the map.
4. With the exception of being blocked by a mapped feature, controls should not be more visible from one direction or another since that would give an advantage to the lucky person who's aim was off to the most visible side.
5. Good placement *is* one where the orienteer must find the control feature before seeing the flag. If you don't want competitors seeing a control on a hill top from far away, place the control and adjust the hint's control location (column G) to be on the opposite side of the hill top from where runners will likely approach.
6. All orienteers will have trouble with map corrections or places where the terrain and their map do not agree. Therefore, do not place a control on or near a map correction or a map inaccuracy. If in doubt, don't!
7. Don't use vague control sites, such as questionable depressions. They lead to aimless searches, a crowd gathers, and the competition becomes unfair.
8. Make sure that you have at least 100 meters between any 2 controls on different courses if the features are similar enough to be confused. For example, 2 reentrant controls on different courses should be at least 100 meters apart. There should be at least 60 meters between any 2 controls on different courses regardless of the features used.
9. Avoid including dangerous areas such as cliffs with poor visibility, sink holes, large areas of poison ivy or poison oak, or deep swamps. Remember, a White or Yellow runner may go into these areas accidentally, while a Red or Blue runner may be tempted to try a dangerous short cut.

Number of Controls to Put Out

We now use only electronic punches. We have 45 control boxes so unless you have a compelling reason, you must keep it to 45 or less. Using some common controls among courses or making Brown and Green courses short circuited versions of Red is standard practice and lowers the number of controls needed for a meet. However, for the MNOC spring events when there is often a large JROTC turnout it is beneficial to have the advanced courses be somewhat independent (i.e. only a few common controls). With the full slate of courses (W, Y, O, B, G, R and maybe even a Blue) you may need to use 35 to 45 controls total.

We want to avoid setting our expensive control boxes out before the day of the meet so keep in mind you will have to put out all controls the morning of the meet. They should be ready by an hour before the start. Keeping the control count down also makes control retrieval less arduous.

In the fall, with lower attendance and earlier sunset, more control sharing between courses is advisable. White and Yellow can be combined as a white/yellow course. Typically, a nice fall meet can be set using between 20 and 32 controls.

Calculating Course Length (kilometers)

Course length is measured along the shortest practical straight line method from one control to the next (avoiding ponds, lakes, other uncrossable obstacles and out of bounds areas). Purple Pen calculates distances but only as the crow flies, even if an uncrossable lake is in the way. You can put bends in the lines connecting control points if desired. Always do that to keep runners from crossing out of bounds, dangerous areas. Or you can adjust the length manually.

Calculating Course Climb (meters)

The course climb (meters) is computed by counting the number of contour lines crossed going up by the orienteers who choose the ideal fastest route (as defined by the course setter) and multiplying by the contour interval.

For example, if the ideal fastest route for the course crosses 24 contours going uphill on a map with a 5 m contour interval the climb is reported as 5 x 24 or 120 meters. Note that this says nothing about how much downhill there is, for example on a course with 120m of climb, you could end up having 200 meters of downhill and so end up 75 meters below where you start. (if start and finish are in different places)

This is reported for each course on the clue sheet. Course design should make sure that course climb divided by course length is less than 4% or 0.04 . Note that gently rolling terrain may in total have as much course climb as a location that has a few big hills.

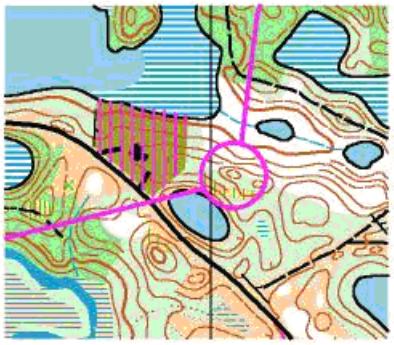
The easiest way to calculate climb is to count *all* topo lines crossed and divide by two. Then you don't have to pay attention to whether you are going up or down across a topo line. Then if the start and finish are at different elevations, add or subtract the difference in elevations.

Graphic Examples

Aspects of Control Placement and Course Design

Out of Bounds Issues

Control Placement may result in some runners trespassing on private land.



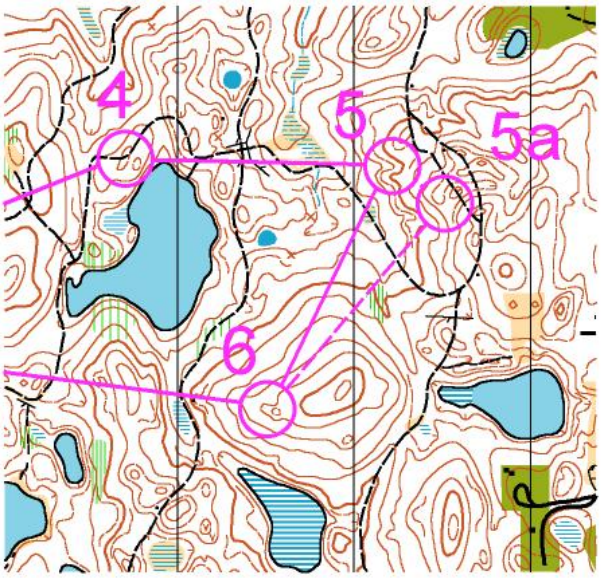
Addition of a second control keeps people away from private land

Control Placement can change the difficulty greatly

In this case the runner is approaching from the South. If the control is placed on the North side of the boulder (hint = "boulder, 2 meters high, N side") the flag will not be obvious while approaching. Good navigation will reward someone heading directly to the correct boulder. Sloppy navigation will waste time investigating other boulders in the area. If the flag is placed on the same boulder but on the S side then the navigation is much simplified because it will be seen before orienteering to the correct boulder.

Doglegs

This dogleg (4 > 5 > 6) is made worse by the steep sided reentrant. It is very likely that runners go in and out from 5 the same way (and thus aid those behind them in finding number 5). There is almost a dogleg at 6 also (people may run up and down the same westerly spur or close to it). However, if control 5a is inserted (so the sequence is 4 > 5 > 5a > 6), the runners are no longer going to follow the same path going in from 4 to 5 as coming out from 5a to 6. A short leg introduced in this way takes away the dogleg and also varies the length of the legs.



D. Environmental and Other Park Considerations

Check with the MNOC Park Liaison and the park authorities early on to determine particular considerations and out of bounds areas. They vary one season to the next.

1. Courses should be designed so as to avoid and not concentrate runners at or on the following:
   - Eroded banks and eroding slopes
   - Muddy areas
   - Sensitive vegetation
   - Sensitive fauna (e.g. eagle nests)
2. Avoid dog legs. In addition to being bad course design they serve to concentrate runners creating unsightly “elephant tracks”.
3. Courses should be set in such a way that runners are not tempted to cross or take short cuts through out of bounds areas or across private land. Controls should be at least 50 meters away from private land; the distance should be greater if there is no fence and/or the park boundary is unclear. In the case of some parks (notably Murphy Hanrahan, William O’Brien and Afton’s NW side) the legal boundaries of the park are either ill defined, in dispute, sensitive or just plain incorrectly marked on the MNOC map.
4. Make sure that all controls, including the start and finish, avoid areas or shelters that may be reserved by other members of the community. Even orienteers dressed in the smartest of O-suits aren’t usually welcome at someone’s outdoor wedding ceremony. Fort Snelling Chapel area is always out of bounds to us, but people hold meetings, weddings etc. at other parks/shelters as well. Avoid camp grounds and picnic areas. Ask the park ranger/contact for specifics.

E. MNOC Meet Formats:

There are two ways to see examples of how past events were set. If you want a Purple Pen project to look at or practice with, they are available in the /Sample Purple Pen Files/ folder of our map Drobox:
https://tinyurl.com/MNOC-Maps
Read the *_Sample Event Readme.rtf* file in that folder to see how to set up a sample event on your computer.

If you simply want to view PDFs of past courses, go to the MNOC website and look on the Results tab of past years. Click on a past event of the type you are interested. Near the top of the event results page are links to each course's pdf.

Regular Meets

Water requirements: Effective Jan 2007 MNOC no longer puts water out on courses. Participants are encouraged to take along their own water, especially in warm weather.

Beginner Courses

WHITE: 1.5 -2.5 km, 30 minutes approximate walking time for a 12 yr. old.
This is a basic introduction to an orienteering course that should be completed without leaving paths or other obvious line features. All White course competitors should easily finish the course. There should be ample controls. Avoid out-of-bounds areas and edges of the map. Try not to use contour features unless they are very large and obvious. Beginners should not have to read contour lines. The area of the map should be very accurate. The first part of the course should have no route choice, with possibly a simple choice near the end of the course. Controls should be located at each decision point (e.g. trail junctions). Dog legs are OK. The area should be safe. Controls are hung high or in the open. The challenge of the course is to choose the correct path and simply read the map. A White course should not require the use of a compass.

YELLOW: 3.5 - 4.5 km, 40 minutes approximate slow run time for a 13 - 14 yr. old.
This is for people with some experience who have done at least one White course. Some challenge is desired, so simple route choices and small navigation problems can be added (possibly choice between trail and through woods, or choice between two trails). Controls are on or within 75 meters of a large attack point. Use short legs with none being over 800 meters. Use large features for control points, or features close to large, obvious features. First controls should be easy. Do not place controls in dense areas.

Intermediate Course

ORANGE: 4 - 5 km, 50 minutes approximate win time for a 15 - 16 yr. old
Create moderate navigation problems that take orienteers off trails and through woods. There should be catching features or backstops (obvious feature that tell orienteer s/he has gone too far) nearby and have good, strong attack points. However, attack points can be further away than for Yellow. Allow lots of route choices so decisions have to be made. Use distinct control features. Route choice might be a trail, but it should not be the best way to every control.

Advanced Courses

All courses in the Advanced class should challenge the orienteer's navigation skills as much as possible. Everything said in the Course Setting Principles section about how to set courses still applies to each course. They should test rough and precision orienteering, pace counting, route choice, terrain and map reading. Use small control features when possible. The control should not be near large features but must still be a distinct mapped feature. Try to place control flags

so they are not seen before the control feature. Make competitors orienteer to the feature, however once in the control circle and using the control hint a competitor should be able to find the flag without having to be lucky. Avoid controls near collecting features (such as trails). Avoid long runs on trails. The best legs include orienteering along their whole length. That said, not all legs will be equally challenging, for instance some may be short legs set only to avoid a dogleg. Climb should be kept to less than 4% of length, especially on Brown.

Brown: 3 to 4 km

This course is primarily for older orienteers or others who have advanced navigation skills but desire a shorter, less physically challenging course (4K of Afton hill climbing is not a Brown course). Avoid making this course a short Orange. It should be as technically challenging as possible but without the length or hill climbing of other advanced courses. This often makes Brown the hardest course to set well.

Green: 4 - 5 km, 50 - 60 minute approximate win time.

This course has advanced difficulty, but the length of the Orange course. This is normally the entry point for orienteers breaking into the Advanced class.

Red: 5 - 7 km, 60 minute approximate win time.

Like Green, Red is of advanced difficulty but longer.

Blue: 7 - 12 km. 60 - 80 minute approximate win time.

Not usually set for regular MNOC meets, Blue courses are typically offered at A and B meets for the M21A class runners.

Specific Park Notes:

Wirth, Como and French are small parks that are usually used for beginner meets. It is difficult to set true advanced courses including difficult navigation at these parks, so score O's or the use of contour only / no trail maps can be considered. Afton has particularly hilly terrain so extra care should be taken to ensure that the courses are not unusually long and that climb does not excess 4% of course length. At events at parks like Mille Lacs Kathio where some areas have few trails or obvious handrails, care should be taken not to send beginner and intermediate participants on a route that if a mistake is made, they are likely to become completely lost.

Score-O

The standard MNOC Score-0 typically has a 60 to 90 minute time limit. We most often have had mass starts for this format. Sometimes this has been to pin down the finish time, either because it is part of a social event where we want to start a barbeque or another event or in winter because daylight is so short. There is also some fun in watching the final racers sprint to the finish. However, a mass start is not required. A normal staggered start can work as a score-o and has the advantage of spreading people throughout the park.

Try to set enough controls out to keep the fastest competitors busy for at least most of the time limit. Also set enough close in controls so that beginners can pick up a fair number. Remember that there will be new people to the sport and they should have a good time as well. Generally having one map for all works fine but there are no rules saying a score-o can have only one course. A separate map for beginners can make it more fun for them and keep crowds down near the start/finish. If only one map is used, control placement near the start/finish should generally be easier than controls that are far out where only experienced runners are likely to go.

In setting a Score-O the key is to give competitors many route choices. Those who plan and plot out a good course should be rewarded. Avoid a layout of controls which clearly can be hit by following around one or two large loops, with the only choice being clockwise or counter-clockwise. A uniform distribution of controls through the area will help to avoid setting up obvious loops.

Scoring can vary. Commonly we grant 10 points per control and subtract 5 or 10 points for each minute runners are late. It is also common to assign higher point values to some controls. These

higher value points can be particularly far out, distant from other controls or particularly challenging to find. This helps to challenge fast and/or skilled competitors without simply adding a lot of extra controls.

Night-O

Night-O has its own set of challenges to the course setter. Night-O typically makes the terrain one level higher in navigational difficulty. Parks that may seem too easy during daylight may be very suitable for night events. The difference in navigation between open woods and thick vegetation becomes extreme. Travel through thick areas becomes a frustrating thrashing exercise so thick areas should be avoided. If there are any, they should be adequately marked on the map. Open areas with hills and depressions are very suitable for Night-O. Areas with bold line and point features are the best. Areas with cliffs and sunken hazards should be avoided. Both the map itself and the terrain should be viewed at night by the setter/vetter team.

Butterfly looping of the courses helps to raise the fun of a night event as well as limiting the range that folks will stray. This is good for safety purposes and closing down the event in a timely manner. Some parks may have security procedures, such as locking gates. MNOC may have to pay extra for late locking.

MNOC has reflector equipped control flags; if these are used they should be hung low (approx. 18" off the ground) so that they are not visible from ½ mile away.

Sprints

The IOF guidelines describe the Sprint as:

Controls:	Technically easy.
Route choice:	Difficult route choice, requiring high concentration.
Running:	Very high speed.
Terrain:	Very runnable park, streets or forest. Spectators are allowed along the course.
Map:	1:4000 or 1:5000. (take an existing MNOC map and magnify a portion (don't forget to change the scale)
Start interval:	1 minute.
Winning time	(for Senior Elite competition): 12--15 minutes.

We usually set a sprint for a fun activity before, after or in between other events. Fun and fast is the idea. A course which loops within sight of folks at the start/finish helps with the fun part.

Adventure Runs

Adventure Runs have only two courses, a Long (approx. 4.5k with up to about 15 controls) and a Short (approx. 3k and about 12 controls). These are mass start events with a fairly short time limit, typically 60 to 90 minutes. Runs are usually scheduled during Summer and Fall weekday evenings in city parks. Summer meets will have daylight but Fall meets are usually scheduled as Night-O's (see Night-O notes above). Although control points can be more challenging and have more off trail running than in Sprint meets described above, summer vegetation and heat dictate that we not run people too hard through heavy vegetation. Fall events will be in the dark so keeping people closer to the start/finish area is also desirable. Although Adventure Runs could be Score-O's we usually set them as normal punch in order courses. Short controls legs loosely follow the Orange control difficulty standards. They can be off trail but some sort of backstop or catching feature should be nearby to avoid getting beginners completely lost. Long can mix in some more challenging controls while keeping in mind summer heat and vegetation.

Being a mass start event it is best to make the first leg of the event a longer one. This helps spread out the field before the first control. You can also spread out the field by making the first control of the short and long different and/or setting the control such that there is more than one logical route to get there. It is possible to have multiple control boxes at the first control point but that has to be worked out with the event computer operator(s).

Adventure Runs can have unusual or "Adventure" features in them as well. Optional Skips, or

Forks where some maps have slightly different legs can add interest and keep people from simply following. Butterfly loops with a common central control can be done in different orders depending on group number. Butterflies work especially well for night events. Events near Halloween have seen zombies adding control points to unfortunate runner's courses. Even vampires with lasers have shown up. If you have an idea for something new, talk to a few folks to see if it is workable. If the score-keeping is out of the ordinary, also run it by a Race Computer Manager.

Winter Meets

Winter Score-O

MNOC has now established mass start 90-minute Score-O as the format for winter meets. These are designed for snowshoe/foot travel. Because travel along groomed ski trails is forbidden, course design should not have legs that parallel or make ski trails the best route choice.

Ski –O

Ski-O is most challenging when A) there is a big network of trails and many junctions and decision points and B) when there are elevation gains to be considered in the route choice. It is difficult to set challenging Ski-O courses when there are limited options.

Courses should generally stick to trails but some off-trail controls are fine. It is also permissible to "ski-in" an ungroomed new trail if park managers allow it. Those trails should be added to the map. The best courses are those that include many route choices. You can allow off trail running through the woods which can add short-cut choices but skiers must carry their skis as they run. Allowing skiers to skip one or two controls can also add to the route choice challenge.

Another way to increase the route choice is to make the event a Score-O. Place some controls on hill tops to make people think twice about whether that control is worth it.

Ski courses can be a bit longer than a normal Foot-O course; Short should be 2- 4 km, Long can be up to 10 km (just remember that dusk comes early in winter)

Avoid placing a control on a downhill where it will be difficult for skiers to stop and for other skiers to avoid hitting them.

Courses must respect any existing one-way trials. Make notes as to whether classic or skate skis must be used.

Snowshoe-O

Typically, a short course (1.5 to 2.5 km with easy navigation) and a long (3 to 5 km with hard navigation). Courses are set similarly to regular O-Meets with these exceptions:

Avoid ski trails. When the course must cross a ski trail, set controls so a runner will cross nearly at a right angle to the trail. Don't set consecutive controls close and parallel to a ski trail.

Depending on snow depth, keep the courses on the short side of the standard lengths.

To break up the "follow the path in the snow" mentality, make some equally logical route choices. Or you can make a section where something like 4 controls in a box shaped area, can be taken in any order.

Winter Meet Notes

Design in flexibility to your plan. It might snow a foot the day before the event and you will need to shorten the courses or it might all melt and your Ski-O will have to be on foot.

Caution: Ice crossings should be avoided (there is always the possibility of flowing water (river or stream) or springs.

Minnegoat

GOAT races, or in our case Minnegoat events, are mass start races where controls must be run in order. Following is allowed but to break things up and provide more choices, runners are usually allowed to skip one or two controls. Part of the challenge is to pick the best control points to skip. Controls are set at a difficulty level similar to, or a bit easier than regular advanced courses. However, if non-orienteering maps are used, fine precision orienteering is limited. Course length is comparatively long, usually 10 to 14K.

Rogaines and Adventure Races

Although the club puts on Rogaine and Adventure Races, the setting of them is beyond the scope of this handbook. Rogaines and Adventure Races have their own rules and participants generally compete in teams. Since USGS maps are often used, they do not demand as precise map reading skills as standard orienteering events. On the other hand, they are much longer and more strenuous. Our events are usually from 3 to 7 hours but some Adventure Races can run multiple days. The maps generally have had very little field checking and no fine detail so controls must use large features. Also, in contrast to regular orienteering meets, controls need not be on a feature marked on the map. For more information, consult with our experienced Rogaine and Adventure Race setters and runners. More details can also be found on the Rogaines rules page of the USOF web site.

F. Using Purple Pen

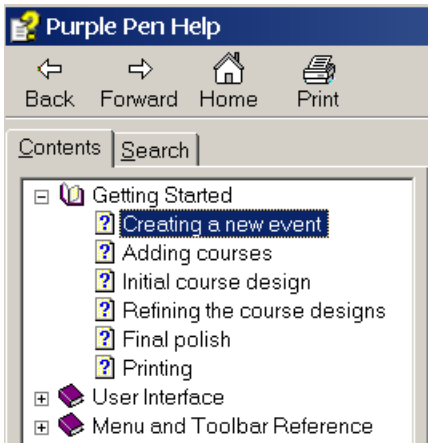
Purple Pen (http://purplepen.golde.org/) is a well-designed program, one made specifically for setting, as opposed to programs complicated with mapping functions. Most questions can be answered using its help system and clicking around the menus. If this is your first Purple Pen meet, play around working with a Sample Purple Pen file in the MNOC\Maps\Sample Purple Pen Files\ Dropbox folder:

https://www.dropbox.com/sh/7f2evt4o5p90xue/AADXzyTL_l72-CVz5QfYZCSUa?dl=0

Read the "_Sample Event Readme.rtf " file in that folder for download instructions. Once you get the hang of the program start your own event.

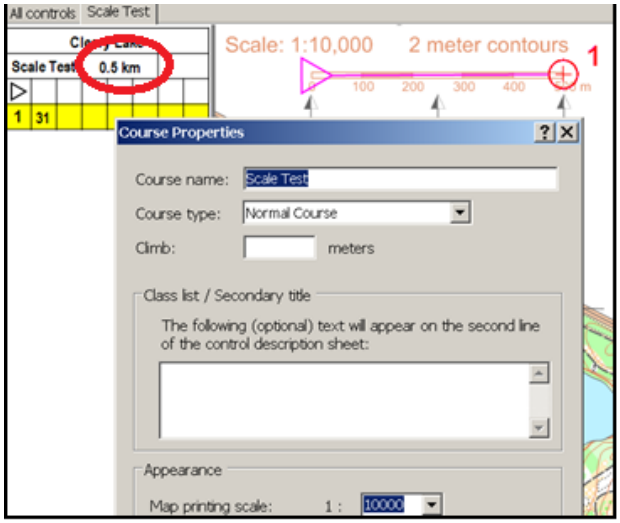
Start working with Purple Pen by reading the help file topics "Getting Started" pages. It will just take a few minutes and you will be off and running.

Also check out the links to Purple Pen Videos at bottom of this document. Links



When starting a new Purple Pen project, the program will ask for a map file to use. (This file will be provided when you volunteer for a meet.) Purple Pen does not change this file. It makes a second file with a .PPEN extension which will contain your courses. The program gets the embedded scale of the map from the OCD file and asks for a print scale. Unless you are only using a small part of the map choose the same scale. If you do want to enlarge a portion of the map the scale logo from the base map should be corrected. Once loaded, before working on the courses, you need to check that the scale is properly set. Do this in two steps:

First, make a temporary course called "Scale Test". Activate the Scale Test tab and click Add>Start. Place the start on the "0" of the scale bar. Then click Add>Control to place a control on the 500 meter end of the scale bar. In the example below the clue sheet should indicate you have made a 0.5 km test course.



Second, print the map and check the scale. If the text indicating the scale says “Scale 1:10,000” then a 500 meter bar must print 50 mm long. For Sprints you will likely print the map at something like 1:5000. Make sure the text is corrected to match the scale bar. (To save paper you can adjust the print area *File>Set Print Area>This Course* to just print the scale bar.)

Once you have verified the scale is correct, follow the general outline of Purple Pen’s “Getting Started” help file to guide you through the process.

Choose either the 8.5 x 11 or 11 x 17 paper size depending on park size. Label each course with its level (Red~White) near the top of the map. If there is room on the map, include clues on the map as well as on separate clue sheets.

After your courses are set you must manually calculate elevation gain. See above: Calculating Course Climb (meters).

As the meet date approaches you should check the reports menu, in particular run the “Event Audit”. You don’t want to send in a file to be printed with errors you could easily have caught.

- There are a number of checks that Purple Pen does to catch errors such as:
  - Whether you included a start triangle
  - Whether you have entered the amount of climb
  - Whether controls from different courses are too close to each other
  - Checks on missing or inconsistent clues
  - Finds unused controls, which should be deleted before the file is sent to the Map Coordinator.
- Then check these items that Purple Pen cannot audit:
  - Move control numbers so they clearly refer to one and only one control circle.
  - Avoid placing numbers on important features leading to the control.
  - If a control circle obscures an important detail, like a depression tick, break the control circle so the detail can be seen.
  - Avoid rotated text.
  - Recheck to see that the scale is correct.
  - Recheck that the hints given for each control are correct.
  - Confirm that control boxes numbers you plan to use are actually available. Sometimes they are out for repair or battery replacement. If you don’t have the control box case yet, contact the equipment manager.

The Purple Pen file you send to be printed should be “Ready to Print”. Both setter and vetter should have checked the file. All error checking, number placement, elevation gain and breaks in control circles and lines should be complete. On the other hand, especially if you are new to setting, sending a draft to the Map Coordinator in charge of printing and asking them to check it over is just fine.

Hint to make vetting and setting out controls easier:

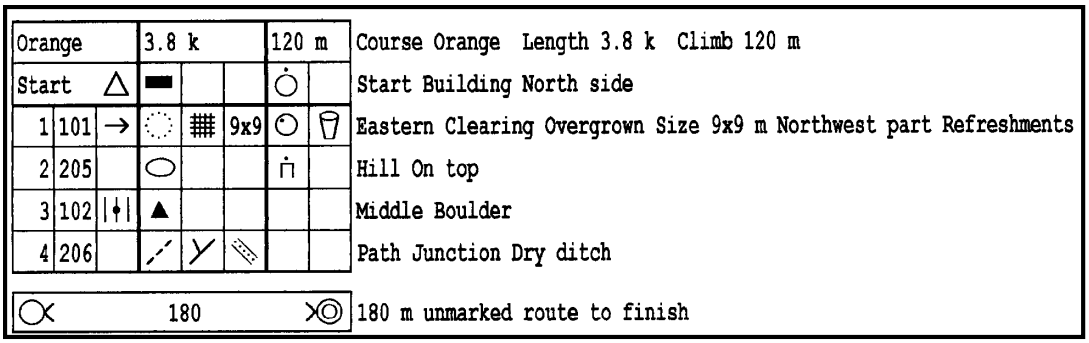
In addition to making courses for competition, also make ones for you and your vetter. Order the routes to get to all your controls in the most logical (easy) order. Start locations can be different if parking your car at different locations would help. Divide up the controls so each person setting out controls will have approximately equal work the day of the meet.

G. Control Description Sheets “Clue Sheets”

Purple Pen software has made making Clue sheets much simpler however it is important to understand what each box in the control description table is for.

Control Sheet Sections

The control description sheet is divided into eight columns with nine vertical lines. The top of the control description sheet is divided into 3 parts: Course Class; Course Length; Climb on the course. The bottom of the control description sheet gives information about the finish.



Control Sheet Columns

Column A Consecutive control numbers as runners must visit them (1, 2, 3 ...).

Column B Control code of flag/control box (MNOC boxes run 201 through 245).

Column C Description of Which feature when there is more than one similar feature within the circle (Example above - Eastern).

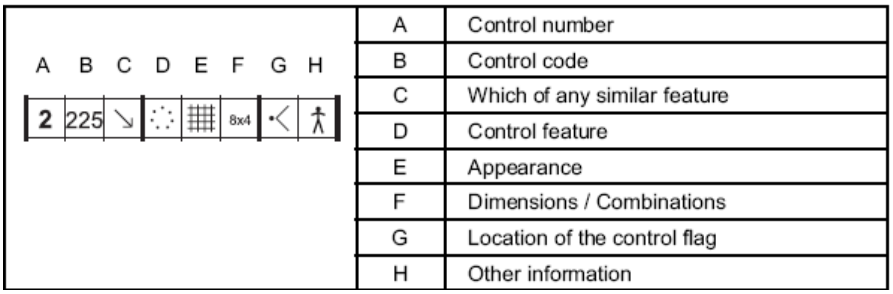
Column D Control Feature. (Example above - eastern Clearing).

Column E Appearance of Feature. (Example above - eastern clearing, Overgrown).

Column F Size of the Feature. (Example above - eastern clearing, 9 x 9 m).

Column G Position of the marker. Note: If this attribute is not stated, the orienteer is to assume the marker is in the middle of the feature. (Example above - eastern clearing, overgrown, NW part.).

Column H Miscellaneous information. (Example - eastern clearing, NW part (Water Stop).



Beginner courses should use clue symbols and English words. Advanced courses do not need text descriptions. (change this option in Purple Pen's menu Course>Properties>Descriptions Appearance. Loose clue sheets may be printed when the map is printed but it is common practice to also print clues somewhere on the map if space allows. In Purple Pen highlight each course tab. To print clues on the map, click > 

Be sure to have the correct option set for whether text will appear then adjust size and placement so as not to obscure detail required for that course.

Purple Pen places control numbers automatically on the map. However often the placement is where they are not easily read or can be confused for other control circles. Before sending the Purple Pen file to Map Coordinator be sure numbers can be clearly seen to refer to the proper control.

The following page details the official hint options available in Purple Pen. There can be some confusion over some similar descriptions, such as whether to use NE Side, NE Edge or NE Part. In general think of the dot as the control and the line drawing as the feature.

So if control is placed on the northeast side of a boulder use  meaning NE Side not  which means NE Part. At the bottom of the Purple Pen clue sheet panel, check Purple Pen's "Text Description" to avoid mistakes.

Other Control Description Notes:

- The control flag must always be placed in the center of the circled site. If the Location of Flag (Column G) is blank the control must be in the middle of the control feature.
- Size descriptions are to be in meters including one decimal place. Use to give the height of such control features as boulder, cliff, well (projecting above ground level), and some small knolls.
- Where the size of the control feature on the map is symbolic rather than to scale the dimensions (length and width in meters) shall be given, e.g. Clearing 9 X 9m.
- Points of the compass can be abbreviated using the IOF abbreviations as follows: N, E, S, W, NW, SE etc.

Control Sheet Symbols

IOF Control Descriptions

This is a summary of the IOF pictorial control descriptions. Full details can be obtained from the IOF web site at http://www.orienteering.org

A	B	C	D	E	F	G	H
1	123	↓			15 x 5		

- A Control number
- B Control code
- C Which of any similar feature
- D Control feature
- E Appearance
- F Dimensions/combinations
- G Location of control flag
- H Other information

C - Which Feature

- Northern
- Upper
- Lower
- Middle

D - Control Feature

See below.

E - Appearance

- Low
- Shallow
- Deep
- Overgrown
- Open
- Rocky, Stony
- Marshy
- Sandy
- Needle leaved
- Broad leaved
- Ruined

G - Location of Flag

- West Side
- South East Edge
- East Part
- South West Corner (inside)
- North Corner (outside)
- North West Tip
- Bend
- South East End
- Upper Part
- Lower Part
- Top
- Beneath
- Foot
- North East Foot
- Between

F - Dimensions

- 1.5 — Height or Depth
- 5 x 3 — Size
- 1.0/2.5 — Height on slope
- 1.5 / 2.5 — Heights of two features
- Crossing
- Junction

H - Other Information

- First aid post
- Refreshment point
- Radio or TV control
- Control check

100 m — Follow Taped Route away from control

70 m — Follow Taped Route between controls

Mandatory crossing point or points

Mandatory passage through out of bounds area

50 m — Follow Taped Route to Map Exchange

120 m — Follow Taped Route to Finish

40 m — Navigate to Finish Funnel, then follow tapes

220 m — Navigate to Finish, no tapes

Land forms

- Terrace
- Spur
- Re-entrant
- Earth bank
- Quarry
- Earth wall
- Erosion gully
- Small erosion gully
- Hill
- Knoll
- Saddle
- Depression
- Small depression
- Pit
- Broken ground
- Ant hill

Rock and boulders

- Cliff, Rock face
- Rock pillar
- Cave
- Boulder
- Boulder field
- Boulder cluster
- Stony ground
- Bare rock
- Narrow passage

Water and marsh

- Lake
- Pond
- Waterhole
- River,Stream,Watercourse
- Minor water channel, Ditch
- Narrow marsh
- Marsh
- Firm ground in marsh
- Well
- Spring
- Water tank, Water trough

Vegetation

- Open land
- Semi-open land
- Forest corner
- Clearing
- Thicket
- Linear thicket
- Vegetation boundary
- Copse
- Distinctive tree
- Tree stump, Root stock

Man-made features

- Road
- Track/Path
- Ride
- Bridge
- Power line
- Power line pylon
- Tunnel
- Stone wall
- Fence
- Crossing point
- Building
- Paved area
- Ruin
- Pipeline
- Tower
- Shooting platform
- Boundary stone, Cairn
- Fodder rack
- Platform
- Monument or Statue
- Building pass through
- Stairway

Special features

- Special item
- Special item

H. Maps for Apps

We now are supporting the use of the smart phone app, Avenza. This app, as well as some others, allow setters and vetters to view their location real time on MNOC maps.

The idea of using a GPS App is to make setting and vetting quicker and less error prone. GPS is especially useful when you set a challenging control point for which there is no good attack point. It is also very useful when there are several of the same features near the control. Often setters find it necessary to attack from several directions to be sure the tape is set in the correct location. GPS apps can avoid some of that extra work. In addition, we all have experienced thinking the setter should have set the control further up or down a reentrant or that it was put in the wrong pit. The hope is with an app that can show you where you are on our own O-Maps real-time that setters can avoid mistakes and time consuming rechecks from different attack points. GPS apps are also useful when a good attack point is out of the way. For instance, with GPS you can park a car along a straight, featureless road and still be confident you know where you are starting into the woods.

For more information about using a smartphone GPS App and how to download compatible maps go to the MNOC Maps Dropbox and open the *Maps for Apps* sub-folder.at: https://tinyurl.com/MNOC-Maps

Start by reading the __*ReadMe GPS O-Maps.rtf* file.

Links

Latest revision of this document in electronic form

tinyurl.com/MNOC-SettersHandbook

Setter Vetter Schedule

tinyurl.com/MNOC-Calendar

Purple Pen Download and Information

http://purplepen.golde.org/

Purple Pen Instruction Videos

Getting Started: https://www.youtube.com/watch/PRMByZhgspI

More in depth: https://www.youtube.com/watch/qHmS_zKsw_c

Score-O: https://www.youtube.com/watch/uBnhZ6LNKYo

IOF Control Descriptions with Graphics of Control Features

https://www.dropbox.com/s/wdhyftm4nvl26gy/IOF-Control-Descriptions.pdf?dl=0

MNOC Maps and Maps for your smart phone

tinyurl.com/MNOC-Maps

For Purple Pen [.OCD] map files, open current year's sub-folder.

For Maps for your smart phone, open *the /Maps for Apps/Avenza (GeoPDF]* folder.

MNOC Web Documents

http://www.mnoc.org/documents/

Instructions for Control Box Time Synchronization

Appendix II

A copy of this procedure should also be in the control box case and at the link below.

tinyurl.com/E-Punch-Synchronization

or:

https://www.dropbox.com/s/f9lb1ir033lk50i/E-Punch_Time_Synchronization.pdf?dl=0

General Orienteering Information

https://orienteeringusa.org/

http://www.britishorienteering.org.uk/

Appendix I

Tips from an Expert: Hints and Ideas on Course Setting

(Notes taken from a lecture by Peter Gagarin at the US 0' Convention on Aug. 17, 1979)

Once you have the good map and good terrain to orienteer in, there is still the important factor of course-setting. Any weakness in any of the factors that determine a successful meet can decrease everyone's enjoyment. Setting courses can be helpful to your orienteering skills, so it's really no sacrifice of your time to do the work.

Before you even step out in the woods, you should devote at least one month before the meet working on the course layout; if it's your first time, you should allow at least two months (about two weeks if you're an experienced course-setter).

Give orienteers a fine and challenging event, a positive experience. Remember, they've come a long way to most meets.

You usually are asked to set several courses, but you have more to deal with than just the pure orienteering challenge of a course. There are constraints: all courses should come to the same finish, in the same direction; it's nice to have one start; and it's nice if the parking and the start/finish are close.

Where you put the start/finish is dependent on the white course. What is suitable for a white course? Basically choose an area with lots of trails, distinct features, clearings, all nice and friendly, no thick woods and no complicated topography.

Work backwards: how do you get all the courses back to the finish? the start can be placed anywhere in the woods.

Design a course and then put it away for a week. Try to improve on what you've done; *you* can't do it in one evening.

Choosing the appropriate terrain is very important. A key factor is how thick the woods are. For example, the start/finish area at the 1979 Convention 4-day meet on days 1 & 2 was in an open area surrounded by fairly open forest. You can't set the finish in the midst of thick woods, since all courses would then have to traverse the rough areas.

There are no fixed criteria on what a white, yellow, orange, red or blue course is. There is no absolute quantifiable measure. However, the degree of difficulty does determine a course.

In designing courses, tape your map to the clipboard (on the bottom edge). Then tape as many sheets of Mylar as you have courses you need to work on (taped to the left side of your board). This method allows you to view each or all of the courses.

A White course is easy. The goal is to make it so easy that a competitor will want to go back and try the yellow course. **The white course can never be too easy.** But don't get carried away with setting up too many controls, 12 in 2 km is a bit much, 6 to 9 is OK.

A Yellow course is slightly harder. There should be route choices, more turns in trails You should have people follow major linear features. The danger in setting a yellow course is to make it too hard. If more than 10% of the people don't finish the course, it wasn't a good course. As you progress from the easy white course to the blue course, features should get smaller and markers are placed further from obvious features.

The Orange course is the hardest to set because you have the widest range of skill and age levels to set for. Don't set for the hotshots; set for the majority - at their skill level. Controls are on smaller features (not small); there should be distinct route choices. Offer trails, but make the trail choice the out-of-the-way choice. Legs should vary from 150m to 800m. Legs must be varied; up, down, long, short, usually about 8-12 controls.

Brown, Green and Red courses have longer legs, controls on small features and farther away from attack points.

Then the Blue course is at the opposite end of the spectrum from a white course. One thing to

avoid is making blue courses merely extended detours of a red course!

After a set of courses have been set on paper, you must field check the controls to see if all of the proposed controls are acceptable or not. If they are, hang a piece of surveyor's tape and label it with a number. Do this for all locations in the field and on your map.

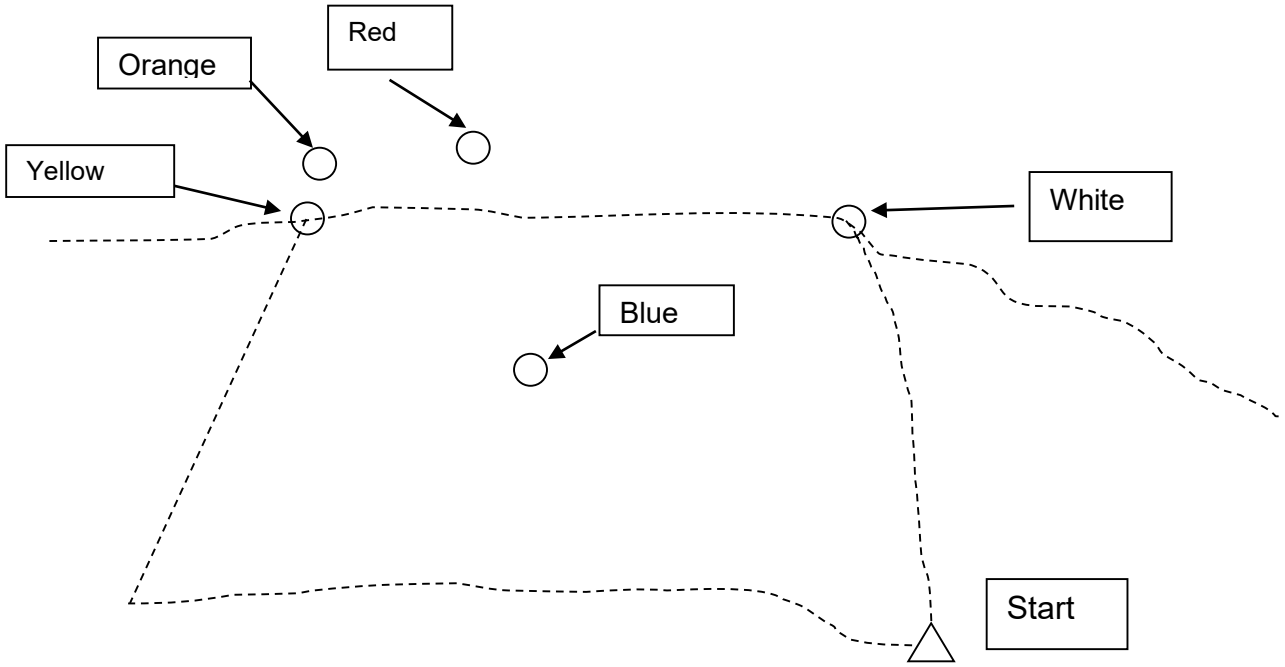
If the location is in very thick vegetation, then don't use it. You shouldn't place controls in prickly areas. Don't hide a marker, it must be seen. **The control should not be hidden** by a **non-mapped feature.** In placing markers, the tendency is to make them less visible than necessary - but that is what most course-setters try to do. For the easier courses, the markers should be hung so that there is a good chance the runner will see the marker before the feature. The more difficult control placements should require the orienteer to recognize the terrain feature first. If using a large boulder, the marker can be placed on the back side for the brown, green, red and blue courses. If it's a choice between seeing the marker 50m or 1m away, better opt for *50m.*

Usually about 10% of the originally planned locations will be thrown out. (more if the quality of the map is less than perfect).

If there are features not on the map, give this information to the mapping director for inclusion in map updates. Don't use the feature if it is not already drawn on the map.

Course-setting must be perfect. Check the details, then double check, then triple check. When an orienteer makes a mistake, it only affects him. When you, the course setter, make a mistake, it affects everyone. Some orienteers are not that forgiving...

<u>The risk/reward theory</u> simply means setting courses such that a runner is forced to choose between a safe, but longer route and a faster, but riskier route. If the runner takes the risk and finds his marker quickly, he is rewarded for a faster time. But if he misses the control, he must accept the penalty of lost time in trying to relocate himself The exact placement of a control can make a big difference in its difficulty level and its risk/reward level.



Risk/reward and Marker Placement

To run the white control, you get on the trail and follow it until you see the marker, you have almost no risk. The yellow marker offers an simple route choice: trail network all the way (safe) vs. taking a rough bearing then using the two trails as collecting features to the marker on the trail junction. The orange point involves a little more risk requiring a careful compass bearing to the point. If you miss you can quickly return to the trail junction and try again. The red point has a penalty factor added: you can aim straight for the marker, crossing the one trail (collecting

feature), but then you don’t have any assurance that you are right on (or to the left or to the right). If you miss you’re penalized. To recover, you must go to the trail junction and re-attack. The safer choice would have been to go to the junction first. The blue location has the greatest risk/reward since there are no attack points until after the control.

No controls should be within 100m of another, and the features should be different. Don’t try to be tricky. Two reentrants within 100m just isn’t fair. Also be sure the codes on the control markers are distinct, not AO for one and AD for another close one.

Appendix II

Time-Mastering (Synchronization) of Controls

When to do it

- Before every event with short distances between controls, e.g., Sprints, Corn Maze
- For events on weekends where the clocks are adjusted for daylight saving time
- Before a new orienteering season, after a longer break
- At least every 2 months.
- If you have 2 or more start or finish control punches this must be done very shortly (< 2hrs) before the event starts.


Note: Some control box LCDs are difficult to read through their scratched up windows. Temporarily applying clear, glossy packaging tape to the window will help make displays readable. Remove the tape when done.

Adjusting SI-Master Station's Time

Adjusting the SI-Master time is only required if the Master's clock significantly wrong. A few seconds off will not cause problems. However, if it is off enough that a competitor relying on their watch might either come in late or mistakenly come in early, the SI-Master clock should be adjusted. This procedure can only be done with SPORTident Configuration software which is installed on the club laptops.

- Update the computer time to internet time or to a GPS watch.
- Connect SI Master station to the PC
- Write this time to SI-Master unit using the "Remote Station" mode of SPORTident Configuration software.

Control Box Time Synchronization Method

1. Dip the purple card marked "Service/Off" into the blue SI Master station. This will wake the station and it will flash it's clock and current mode. Dip again to cycle to the desired mode.
2. Cycle to **EXTMA** mode on the SI-Master unit to synchronize all units, especially START and FINISH. This both synchronizes time and clears memory of all previous punching at this station.
3. Use **TIMEMA** mode instead if you need to synchronize time but do not want to erase stored punching history. (this is rarely the case)
4. Insert the black coupling stick with the thin end sticking out the bottom of the master.
5. Place the SI Master station on top of a control station, wait for two beeps indicating the time has been synchronized.
6. When all the stations have been synchronized, including the Start, Finish and Print stations, dip the purple "Service/Off" card into each one (including the SI-master) until each one beeps, and LCD display turns off. This helps save their battery.

   TIP: Be very methodical, go in numerical order and make sure you do the start, finish, and clear control boxes. If you have two or more finish or start punches, synchronize those boxes less than 2 hours before the event start.

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