

Orienteering Terminology, Skills and Understanding the Map

Basic Terminology

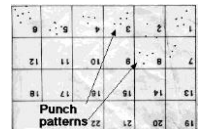
Attack Point – a distinguishable feature close to the control point from which the control can be located

Compass – a compass helps to determine direction. Some compasses contain a baseplate that can also be used to help measure distances on a map. A compass may or may not be used depending on how difficult the course is. Many beginner courses can be done with just a map.

Control – a marker placed to indicate you have found the correct location. Controls could be a flag or sign and are usually shaped like a square created by a white and orange triangle. On the map, the control is found inside a purple circle.



Control Cards – include numbered boxes for a specific course. Participants use the control punch to punch the correct square on the paper at each control marker to indicate they have been to that control marker. These may be included on the map for each park or could be a separate sheet.



Control Code – this is a unique number or letter combination displayed on the control that allows the competitor to know they have found the correct control.

Control Description or Clue Sheet – a list of controls to be visited in a specific order that includes descriptions of the feature or location of each control. On beginner sheets, the clues are in printed words. On more advanced sheets they are symbols.

Control Feature – a description of what to expect to see in the area of the control. This could be a symbol or a written description.

Control Number – this indicates the proper order in which to visit the controls, starting at control number 1 and continuing in order to reach all of the controls.

Control Punch – these are used with control cards to indicate that you have found a specific control. Each punch should be unique. If a marker has a control punch on it you can punch your card in the appropriate spot with the punch from that control marker. Some competitive courses will use electronic timers for checking in to that control marker.



Contour Line - a brown line on the map to indicate a change in height on the ground. The map will indicate what the contour interval is. On some maps, 1 contour line could indicate a difference of 10 feet. Others could be more or less, so be sure to read on your map what the contour line interval is. The closer the lines, the steeper the hill.

Course – a designated route to follow to find all of the controls. The course is indicated by purple or red on the map. A triangle is used to indicate the start and a double circle indicates the finish. Courses vary in difficulty and offer use a color system to denote the difficulty level.

Magnetic North - lines are drawn as straight lines across the map. These will help you line up your compass bearings if you are using a compass.

Map (with course) – orienteering maps are specially designed and detailed topographic maps created to a specific scale with grid lines aligned to magnetic north. Map symbols are standardized by the IOF and are designed to be readable regardless of the language you speak.

Orienteering - navigation through various terrains using only a map and compass. Orienteers can run, or walk, or both—it is a sport of navigation, not necessarily navigation on the run.

Orienting the Map – this is the process of associating the map to actual geologic features of the course

Scale - the size of the map compared to the area which it represents. The usual orienteering map scale is 1:15,000, which means that one millimeter of map corresponds to 15,000 mm (15 meters) of terrain. Most compasses have a scale for measuring distances on the map. Other scales can be used: as the numbers get smaller, the distance on the map for each unit gets larger. A 1:7,500 map shows half as much terrain as a 1:15,000 map.

Skills

Understanding Map Symbols – Being able to effectively use your map depends on your knowledge of different map symbols. Be sure to study the legend on the map and the control descriptions to know what each symbol represents.

Orienting the Map – Look around you for features that are significant that you might see on the map. Find the feature on the map then turn your map so what you see on the map matches what you see on the ground. For example, a pond to your left on the ground should be to your left on the map. As you move and turn, your view also moves so you need to move the map as you go. With a map lined up to magnetic North, this may mean your map is upside down as you're walking South.

Planning Your Route – The best route to your next control is not always a straight line. Use the map to see what challenges you may encounter getting to your next control. Is there water or a marsh in the way? Is the undergrowth thick and impassable? Is there a steep hill or cliff that would be easier to go around? Is there a trail that would make travel easier and more safe? Visualize what you might encounter along the route to plan your best approach. Is there a noticeable feature or an attack point that you can use to plan your route to the next control?



Thumbing the Map – Thumbing the map can help to keep you from getting lost. You can fold and re-fold your map to keep it concentrated on the most recent controls, or keep the map flat and follow along with your finger as you pass features that you see on the map. Is there a bridge, building, boulder, or path junction coming up on the map? Follow along with your finger as you walk and see the features on the map to help keep you focused on your location on the map.

Controlling Your Speed – Think of your speed in terms of a stoplight. There are times where you might know exactly where you are going based on features on the map and your familiarity with a location. That's a green light to move quickly to get to where you want to go. Other times you might be pretty sure where you want to go, but there might be some tricky terrain or you don't know exactly where in an area the control might be. That's a yellow light to slow down and look until you're certain again. There may be a time where something unexpected comes up or there is a feature that you don't recognize on the map. That's a red light and means you should stop to verify your location on the map to avoid getting lost.

Relocating – If you ever get into a situation where you're not sure where you are on the map STOP! Take a breath and look around you to see if there are any noticeable features. If you can find your last known location – or your last control, move back to that location and re-orient the map. If you can't find your last known location, match terrain features on the map with what you see around you and re-orient the map. This is where thumbing the map comes in useful. If you've been following along on your map, you should have an idea of the area you are in.

Using a Compass – For beginner courses, understanding how to read a map is often more helpful than using a compass. As courses become more challenging, the compass becomes a helpful tool to make sure you are going in the right direction. To use a compass, look at your map and determine where you are and where you want to go and draw a straight line between them. Line up the edge of your compass on this line so the travel arrow is in the direction you wish to travel, then twist the azimuth ring until north on the map and the orienting lines are aligned. Then move your compass from the map and turn your body until the orienting arrow and red magnetic needle are lined up (red in the shed). This is the direction you want to travel. There may be obstacles in your way, so you may have to take new bearings to get to your final destination.

Understanding Scale and Pace – Every orienteering map has a linear scale that shows various distances. The size can vary from map to map. 100 meters on a 1:5000 map will be twice the distance as 100 meters on a 1:10000 scale map. If you know how many steps you typically take to go 100 meters, then you can use that to track how far you've traveled. This becomes helpful when there are not a lot of distinct features on a map. To figure out your pace, mark out 100 meters (328 feet). This may be easiest to do on a track. Walk the length of the distance counting your steps along the way. Then turn around and walk back, counting your steps along the way. Your walking pace is the average of the two directions. Do the same running in order to figure out your running pace.

Using Control Descriptions – The site of a control is shown on the map by a circle. If you navigate to the point at the center of the circle you should be able to find the control. Control descriptions are clues to help you find the specific control once you have navigated to that location on the map. As courses become more challenging, the descriptions become a useful tool to find the control. All controls have a unique number or letter code on them. By checking the control's code against the description sheet you can make sure you have found the correct control. Beginner courses usually have written descriptions. As courses become more advanced, symbols or written descriptions may be used.

Understanding the Map

Map Acknowledgments – this typically includes the name and location of the map, who owns the map, who created the map, and the date it was created or updated.

Magnetic North - Lines across the map are drawn to magnetic north and north is always at the top of the map. Clues are often given with north, east, south and west references so knowing which way is north will help you know where to look.

Scale - Maps are drawn to scale and have a scale bar on them for measuring distances.

Legend - Use the map legend to help understand what the different symbols are on the map. All orienteering maps follow a specific standard and use universal symbols, so regardless of what language a map is in you should be able to understand the symbols and layout of any orienteering map whether you are in the US or in another country.

- Brown colors on the map are land form features and show the shape of the ground
- Blue are water features like lakes, streams and ponds
- Black shows smaller paths, rocks, and man-made features like statues and fences
- Tan in different shades are roads, paved areas, and wider gravel or dirt paths
- Colors are used to show different vegetation
 - Yellow – shows open land like a field
 - White – shows open woodland or forest
 - Green – different shades of green show thicker forests. The darker the green, the thicker the forest.
- Olive Green or Purple shaded areas denote an area is out of bounds

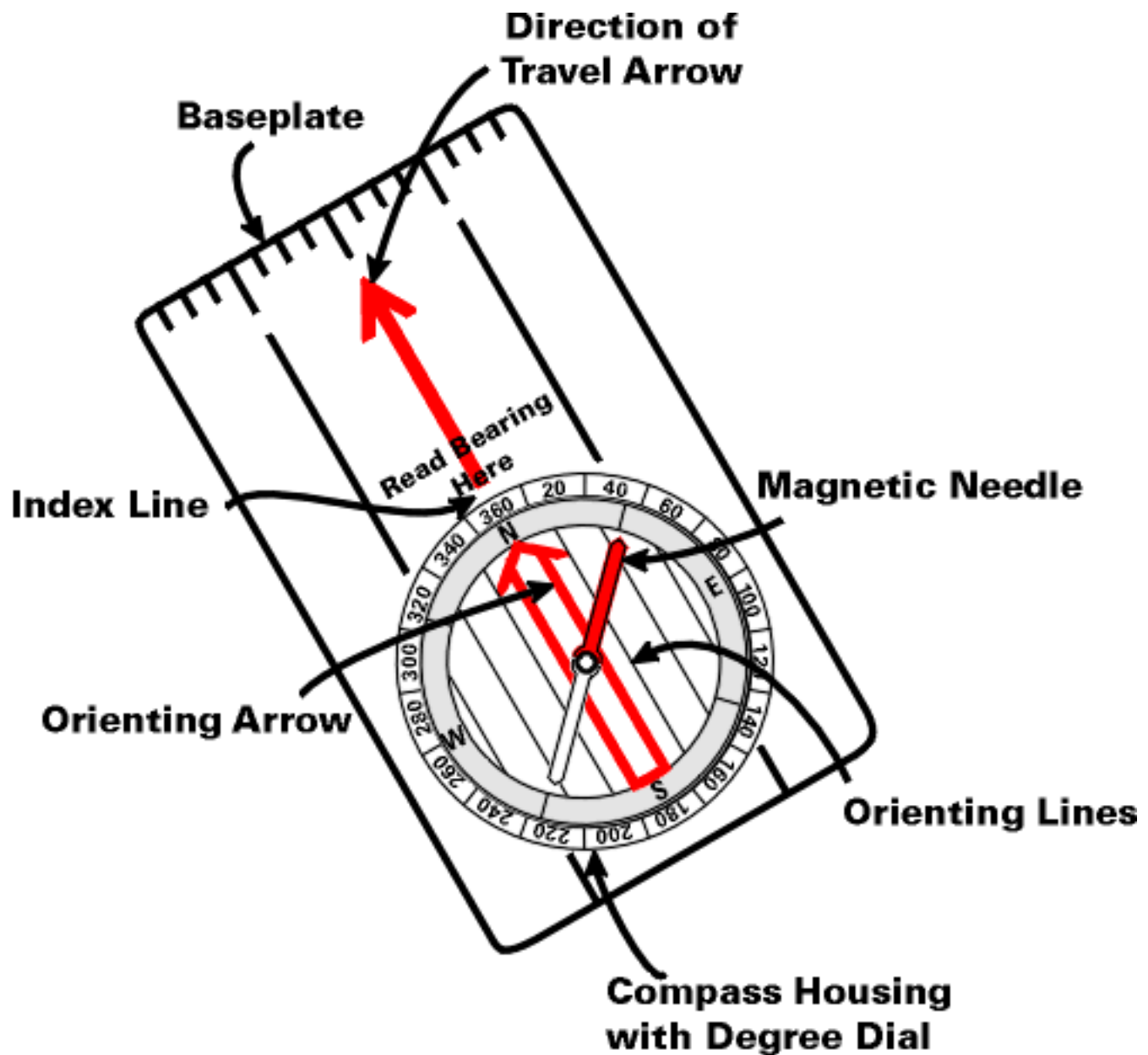
Course Symbols – The course is drawn out with purple or red symbols on the map to show the course information.

- Triangle – start
- Double Circle – finish
- Circle – control location
- Number – control number – these are visited in numerical order
- Line: solid or dashed – order and direction of next control, remember, a straight line is not always the best route of travel

Control Descriptions or Clue Sheet – The Control Description lists the name of the course, the level (typically denoted by a color) and the length of the course. Control descriptions give you clues to help you find the control when you have navigated to the correct location on the map. Clues include the control number (the numerical order of the control you are finding), followed by the control code (usually a letter or number combination on the control so you can verify you have found the correct control), and descriptions or locations of the features and where to find the control. In beginner courses, the control descriptions are usually printed in words. In more advanced courses the controls are listed as symbols. The International Orienteering Federation uses a standard set of symbols for the control descriptions so they can be universal in any language.

Control Punch Card – if a course uses control punches, a punch card will include numbered boxes that you can punch with the control punch to show that you have found the control. The number in the punch box is the control number - the order number that you find the controls in. Each control punch is unique and has a different pattern.

Parts of a Compass



Understanding a Compass

Baseplate – The base plate is the full base of the compass and can be used to line up the compass with the desired route on the map. It also has a direction of travel arrow, a measurement ruler and may also have other features like a magnifying glass.

Magnetic Needle – The red side always points north.

Housing – The liquid-filled housing includes a 360-degree bezel, orienting lines and an orienting arrow which is turned in order to line up north on the compass with the magnetic lines on the map.

*Remember, the compass has a magnetic needle so avoid anything metal because it will affect the compass's ability to give a correct reading.

Using a Compass - Hold the compass in front of you with the housing towards your belly and the direction of travel arrow pointing away from you.

1. To find North, make sure the orienting arrow and the N on the housing are lined up with your direction of travel arrow. You may have to turn the bezel to get the N in the correct place. Holding the compass level, turn your body until the red part of the magnetic needle is lined up in the orienting arrow - also known as putting "red in the shed". When the magnetic needle and orienting arrow are lined up you will be facing the correct direction.
2. To find East, turn the bezel so E is lined up with the direction of travel arrow. Then turn your body so "red is in the shed". Follow these directions to find South and West also.

True North vs Magnetic North – True north is the geographic north pole where the longitudinal lines of the earth meet. It is a fixed point on the globe. Magnetic north is the direction that a compass needle points to as it aligns with the Earth's magnetic field. As the earth rotates and shifts, so does magnetic north—ever so slightly. The difference between true north and magnetic north is known as declination and it varies as you move across the map. If you are not using a map aligned with Magnetic North you'll need to know the declination of where you are to adjust your compass accordingly. The declination for Boston, MA is -8.35 degrees.

*Orienteering maps are drawn to Magnetic North so you don't have to account for declination when you are using a compass with an orienteering map.

Map vs. Compass – Understanding how to read and use a map is the most important navigational tool. A compass can be used in addition to map reading skills to help make sure you are going in the right direction when the map has fewer distinguishing features or when the terrain becomes more challenging.

Use the Map: 1. To orient yourself to where you are 2. To follow trails or paths 3. To locate distinguishing features that you may be approaching 4. To see what the vegetation and land formations are in the area you are in 5. To plan the best route based on terrain	Use the Compass: 1. To determine direction or set a direction of travel 2. When not following a trail or main feature 3. When changing directions or to verify you are still going in the correct direction 4. When trying to find a specific control with directional clues 5. When crossing an area with little or no features by which to navigate.
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Compass Skills

Magnetic North - lines are drawn as straight lines across the map. These will help you line up your compass bearings if you are using a compass.

Bearing - The direction of travel according to the compass.

Using the Compass to Find Where you Want to Go – Look at your map and determine where you are and where you want to go and draw a straight line between them. Line up the edge of your compass on this line so the direction of travel arrow is in the direction you wish to travel, then twist the bezel until north on the map and the orienting lines are aligned. Be sure the orienting lines are facing North and not South. Move your compass from the map put it flat in front of your body and turn your body until the orienting arrow and red magnetic needle are lined up (red in the shed). This is the direction you want to travel.

After finding your bearing it's best to look ahead and pick a prominent point that is straight ahead in case you need to look down, take your eyes off of where you are going, or if you can't go in a straight line. There may be obstacles in your way, so you may have to take new bearings to get to your final destination.

Taking a Bearing to Find your Current Location - Start by finding a landmark that you can also identify on your map. Hold your compass flat in front of you with the direction of travel arrow pointing away from you and directly at the landmark. Rotate the bezel until the magnetized needle is inside the orienting arrow. Look at the index line to read the bearing you've just captured.

Now you can transfer that bearing to your map to find your location. Lay your compass on the map and align one corner of the straight edge with the landmark. Making sure that the direction of travel arrow remains pointed in the general direction of the landmark, rotate the entire baseplate until the orienting lines are running north/south and the north marker on the bezel is pointing to north on the map. Now you can draw a line on the map along the straight edge of your compass to try to find the location you are in. The point where that line from the landmark crosses your trail is your location.

If you aren't on a trail or still can't locate where you are, you can use **triangulation**. This is using the same steps above with 2 additional landmarks (at least 60 degrees apart from each other) to mark additional lines on your map. The lines will form a small triangle and your location will be somewhere in or near the triangle.

Map Scale and Pace Counting

Scale - the size of the map compared to the area which it represents. Orienteering maps use the metric system so you may have to train your mind to think about meters and centimeters instead of feet and inches. A map with a scale of 1:1,500 means that 1 cm on the map corresponds to 15 meters on the ground. 1:3,000 means that 1 cm = 30 meters and 1:10,000 means 1 cm equals 100 meters. Most compasses have a scale for measuring distances on the map, just be sure you are using centimeters.

Controlling Your Speed – There are times where you might know exactly where you are going based on features on the map and your familiarity with a location. In those times you can move quickly to get to where you want to go. Other times you might be pretty sure where you want to go, but there might be some tricky terrain or you don't know exactly where in an area the control might be. That's a time to slow down and look until you're certain again. If something unexpected comes up or there is a feature that you don't recognize on the map you should stop to verify your location on the map to avoid getting lost.

Pace Counting – If you know how many steps you typically take to go 100 meters, then you can use that to track how far you've traveled. This becomes helpful when there are not a lot of distinct features on a map or you have to travel off a trail and through the woods. There may be times that you decide to run or walk slower or faster than normal, so be sure to figure out your pace count for running and slower or faster walking if you think those situations might apply.

Our courses are set to 30 meter intervals, so we'll figure out a 30 meter pace and a 120 meter pace to help you out. For pace counting: 1 pace is each left/right combination, or every time your right foot hits the ground. Walk the length of the distance counting your steps along the way. Then turn around and count your steps again. Your pace for that distance is the average of the two. For maps that are set to a different scale, figure out your 1 meter base count by taking your pace count for 120 meters and divide it by your number of steps. This will roughly give you the length of each pace in meters. Then multiply by the number of meters for the new distance. This will help you determine your pace for other distances.

Speed	30 Meters	120 Meters	1 meter pace	100 Meters
Example Walking	19 paces	80 paces	$80/120 =$.67 paces per meter	$.67 \times 100 =$ 67 paces
Slow Walking				
Normal Walking				
Jogging/Running				

Attack Point – a distinguishable feature close to the control point from which the control can be located

Contour Line - a brown line on the map to indicate a change in height on the ground. The map will indicate what the contour interval is. On some maps, 1 contour line could indicate a difference of 2 meters (approximately 6.5 feet). Others could be more or less. The closer the lines, the steeper the hill. This may impact your route choice. Is it easier/faster for you to go up a steep hill or go a slightly longer way around it?

Control Features and Descriptions

Control Descriptions – The site of a control is shown on the map by a circle. If you navigate to that point, you should be able to find the control using the descriptions. Descriptions could be a symbol or a written description and will include where to find the control relative to a specific feature.

Control Feature – landforms, rocks or boulders, water or marsh, manmade features or vegetation where a control might be placed. Use the IOF Control Descriptions sheet to become familiar with the symbols that represent different features.

Description Clue Sheet - Each column on the description sheet represents specific information about that control.

A	B	C	D	E	F	G
Control Number	Control Code	Which of similar features	Control feature	Appearance	Dimensions or sizes of features	Location of flag
1	101	Upper, lower, etc	Boulder, depression, marsh, etc	Overgrown, shallow, rocky, etc	1.5 meter, crossing, junction, etc	West side, lower part, in between, etc

Want more practice with Control Descriptions? Check out the Maprunner control description quiz at maprunner.co.uk/cd

Planning a Better Route

Planning Your Route – The best route to your next control is not always a straight line. Use the map to see what challenges you may encounter getting to your next control. Is there water or a marsh in the way? Is the undergrowth thick and impassable? Is there a steep hill or cliff that would be easier to go around? Is there a trail that would make travel easier and more safe? Visualize what you might encounter along the route to plan your best approach.

Aiming Off – this is intentionally aiming to one side (or 'off') of a feature or control so that you know which way to turn to find it, rather than searching back and forth.

Catching Feature – this is a noticeable feature beyond another feature or control that indicates the destination has been passed up, if you reach this feature you have gone to far.

Handrail - A linear feature that approximately follows a route between controls and can be used for navigation.

Relocating – If you ever get into a situation where you're not sure where you are on the map STOP! Look around you to see if there are any noticeable features. If you can find your last known location – or your last control, move back to that location and re-orient the map. If you can't find your last known location, match terrain features on the map with what you see around you and re-orient the map. This is where thumbing the map comes in useful. If you've been following along on your map, you should have an idea of the area you are in.

IOF Control Descriptions 2018

This is a summary of the IOF pictorial control descriptions. Full details can be obtained from the IOF web site at <http://www.orientteering.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/bend
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
⊙	South East End
⊙	Upper Part
⊙	Lower Part
⊙	Top
⊙	Foot
⊙	North East Foot
⊙	Beneath
⊙	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
⊙	Bend

H - Other Information

+	First aid post
⊙	Refreshment point
⊙	Manned control

--- 200 m --->	Distance to Start Triangle from point of timed start
○ --- 70 m --->	Follow Taped Route away from control
○ --- 90 m --->	Follow Taped Route between controls
⊙ --- 90 m --->	Mandatory crossing point or points
⊙ --- 90 m --->	Mandatory passage through out of bounds area
○ --- 20 m --->	Follow Taped Route to Map Exchange
○ --- 80 m --->	Follow Taped Route to Finish
○ --- 50 m --->	Navigate to Finish Funnel, then follow tapes
⊙ --- 90 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, Termite mound

Rock and boulders

⊙	Cliff, Crag
⊙	Rock pillar
⊙	Cave
⊙	Boulder
⊙	Boulder field
⊙	Boulder cluster
⊙	Stony ground
⊙	Bare rock
⊙	Narrow passage
⊙	Trench

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
⊙	Prominent tree
⊙	Root stock, Tree stump



Maprunner
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Man-made features

⊙	Road
⊙	Track, Path
⊙	Ride
⊙	Bridge
⊙	Power line
⊙	Power line pylon
⊙	Tunnel
⊙	Wall
⊙	Fence
⊙	Crossing point
⊙	Building
⊙	Paved area
⊙	Ruin
⊙	Pipeline, Bobsleigh track
⊙	Tower, Pylon
⊙	Shooting platform
⊙	Boundary stone, Cairn
⊙	Fodder rack
⊙	Platform
⊙	Monument, Statue
⊙	Canopy
⊙	Stairway
⊙	Out of bounds area

Special features

⊙	Special item
⊙	Special item