B Man, Technology and Electricity , B1 Man and Technology

Navigation Systems and Orientation in Nature and in the City

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Recommended year	*7th-9th class*
Time framework	*3-12 class hours*
Thematic block	*Man and technology*
Objective and development of competencies	*The aim is to motivate the pupil to improve his orientation in space and in plain – in the nature and in the city not only using a map and GPS device. Together with his classmates, the pupil is able to solve problems and follow the given instructions, he practices his logical thinking.* *He develops his competency for solving problems (he solves given tasks, is able to algorithmically follow the instructions, is able to think out similar simple task), information competency (he is able to search for the needed information, sort them according to their relevancy and choose the important ones), communicational competency (he express himself in oral and written form, formulates his thoughts) and social and personal competency (he works in a group, is able to enforce his opinion and support it with rational arguments, he accepts his classmates' opinions, is able to evaluate achieved results).*
Interdisciplinary (cross-curricular) relations	*Geography – work with a map and navigation device* *Information and communication technologies – use of GPS and information sources* *In part also other subjects (for example, history) depending on the choose of cache and its theme in activities 6 and 7.*

Theoretical introduction

Although the orientation in space is one of the most important skills to master in one's life, there is no subject in the primary school where pupils would become acquainted to it. The topic is usually reduced to information about the GPS (global positioning system), which is used for handheld GPS devices to navigate from point A to point B.

It is important to realize that it is not appropriate to see the skill of orientation in space so narrowly - mobile device can run low battery, the GPS signal may be inaccurate due to the excessive cloudiness or disturbing circumstances in surrounding areas and the user is then forced to rely on the more traditional ways of orientation, ie. determining the cardinal directions using so called backwoods rules, work with a map and so on. Sometimes, the cooperation in teams is necessary, too.

Moreover, according to the conclusions of some researches, the deterioration of orientation skills occurs for users who often work with devices that use GPS, for example, using the GPS worsens the skills associated with working with the map.

Methodological section for teachers

The aims of the topic:

- To motivate students to become familiar with the orientation in space and plane and deepen the already acquired knowledge in this field.
- To introduce students to the problems of geographical coordinates and their various formats.
- To show students that GPS is one (but not the only) way of navigation. The work with a map also plays a big role, concretely the ability to correctly orientate the map according to the cardinal directions, read the map and navigate by compass.

Overview of planned activities:

Activity 1 - Backwoods rules (30 minutes preparation + 3 hours in the countryside)

Activity 2 - Wristwatch as a compass (1 hour in nature)

Activity 3 - Watching the surroundings (20 minutes preparation + 1 hour in nature)

Activity 4 - Treasure Quest (½ day and full day trips)

Activity 5 - Hunt for thieves (45 minutes)

Activity 6 - Finding geocaches (20 minutes preparation + 1 hour to half a day in the countryside)

Activity 7 - Hiding a cache (longer preparation + 1 hour to half a day in the countryside)

Information - Activities are sorted from simpler (using cheaper and conventional tools - map, compass, analog wristwatch) to more complex ones (using modern equipment - GPS device), but it is not necessary to follow their order because the activities are not directly connected one to each other.

Tools:

pencil, paper, map or plan of the area, compass, analog wristwatch, GPS devices

At the beginning teacher and pupils take a walk in nature, in which pupils will observe whether so called backwoods rules for determining cardinal directions stand. Pupils can obtain prepared list of the rules or they may create one of their own in a discussion moderated by the teacher. The list may include for example the following rules:

- The sun in our latitudes is in the south at noon.
- The bark of trees is often covered with moss or lichen on the north side.
- Growth ring of the stumps are thicker and denser on the north side.
- Anthills are situated on the south side of the stumps or trees that serve them as a protection.
- North side of the anthill is steeper than the south.
- Snow cover melts faster on the slopes facing the south than on the slopes facing north.
- Bee hives are oriented towards the south.
- Sunflowers turns toward the sun even in a cloudy sky.
- Entrances of the old churches are usually oriented to the west, the altars were located on the east side.

Each pupil checks the rules in his backwoods rule list as he founds and confirms them as true.

The walk can be extended by the information related to determining the cardinal directions using the Sun and analog wristwatch. The process during walks can be marked in the map with the position confirmed by the GPS device.

Finding a cache, chosen by the teacher before the walk, may be an interesting motivational moment for the pupils.

The project consists of the implementation of individual activities properly completed with supplementary information for pupils and some tasks. It is important to introduce each activity to pupils, make sure that they understand the activity and in the end, make an assessment of the activity results.

Activity 1 - Backwoods rules

The list of backwoods rules for determining the cardinal directions can be put together by the pupils in a moderated discussion. The alternative for the case of bad weather (so the class is not able to go outside to the countryside) is preparing the activity in the classroom where pupils receive worksheets with a set of rules and in groups and in the discussion with classmates they try to choose the true ones. Eventually, they may support their decision with arguments.

Activity 2 - Wristwatch as a compass

In the time of mobile phones and digital watches, it is almost a forgotten ability, however the ability to determine the cardinal directions with analog wristwatch and the Sun or Moon, can be a powerful motivating factor for the further study of the navigation and geography.

Pupils in groups get analog wristwatch and the task is to use it to identify correctly the cardinal directions. There are two alternative versions of the activity we can choose. The second one may be a bit complicated but also challenging:

1) In the first place, pupils should be explained the relation between the time of a day, the movement of the Sun in the sky and the orientation of the cardinal direction. This discussion implies the dependence for determination of the south using a hour hand and the position of the Sun.
2) In a similar way the Moon can be used for determining the directions with the help of wristwatch. If the Moon is full, you can use it to determine south with analog wristwatch in the same way as in the day with the sun. However, if the moon is waxing or waning, it is necessary to count with some deviation and the determination of directions may not be accurate.

In the activity we assess correctness of the task and the accuracy of the determination of cardinal directions. It can be checked, for example, with a compass or GPS device.

Activity 3 - Watching the surroundings

At first, pupils should repeat the symbols used in maps. After this preparation, we will set out for a place where it is easy to see the surroundings. We take a map of the area and colored pins, a telescope or field-glasses would be also advantageous. Pupils in groups will have a map with pins pined into the spots where the major objects of the surrounding terrain are situated (high hill, an important building, big lonely standing tree,...). The task is to identify those places in the actual terrain. For a correctly specified object group obtains one point, the group with the highest number of points wins.

As a more complex version of this activity for more advanced pupils we can choose an alternative where there are in the map even objects that cannot be seen in reality from the point where we are standing (they are situated, for example, in a valley or behind a hill, etc.). The activity can be extended by estimating distances of selected objects. These estimates are to be verified in the map.

Activity 4 - Treasure Quest

This activity is field game focused on orientation, thus it requires a larger preparation by the teacher. At first, he has to choose the suitable places for hiding the indices that pupils will search for. They may be shops, information centers, public and cultural buildings, where he can arrange the possibility of leaving the indices with the appropriate persons (if we want pupils to come into greater contact with strangers, so that they would be forced to talk to them), and also in significant places in nature, such as the top of the hill, important tree etc. (this reduces the amount of interaction with people).

The form of these indices depends on the teacher. It may be a letter with a word description of a journey for treasure, a puzzle showing a destination on the plan or directly a picture of the searched object, or geographic coordinates (this variant, unlike other ones, leads to use of GPS devices). The selected indices will be divided into several parts, each of them will be hidden in different location. The teacher then prepares a map for the pupils, where each location with an indicia is marked, and the task is to visit these places, acquire all the indices, put them together and determine the destination - a place where there is hidden a treasure (the form of the treasure depends on the teacher).

Alternative forms of activity may be more complex version, where pupils use, for example, a blank map or a historical map instead normal (tourist) one.

The exclamation mark - in any case (but especially during movement in the countryside, where there is no one who pupils could ask) pupils should know what clues they are looking for. Each place in the map may eventually be accompanied with a brief description where the indicia is hidden.

Activity 5 - Hunt for thieves

When working with a GPS device, it is necessary to master the usage of geographical coordinates and understand their significance. Hunt for thieves is a short and simple activity devoted to this issue. Pupils have a list of six sites where a group of robbers have struck, the places are specified by one of three formats of the most commonly used system WGS-84. The task is, according to these data, find out the names of the six locations (cities) and write down their names into the prepared crossword puzzles. When the crossword is completed, the pupils will find out where thieves are going to strike next time.

The most commonly used coordinate system called WGS-84 is being used since 1984 and it is related to the reference ellipsoid, which can fairly accurately replace the surface of the globe. Its coordinates are based on the geographic coordinates where the position of a given point on Earth's surface (and above it or below it) is determined by latitude, longitude and altitude. Latitude takes values from 0° to 90° north of the equator and from 0° to 90° south of the equator, the longitude has the values from 0° to 180° east and from 0° to 180° west of the prime meridian (passing near the English town of Greenwich).

Activity 6 - Finding geocaches

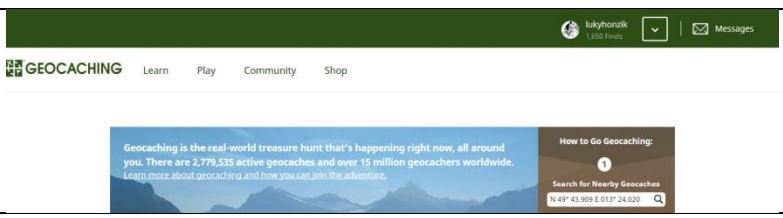
The main goal in this activity is to find a hidden box, so called cache or geocache, with the help of GPS device. The teacher together with pupils will choose one of many caches on the website www.geocaching.com which is located nearby, and set out to find it. The activity will require working with GPS, since information about the exact location of the cache is provided in this way. If we have more GPS devices, it would be appropriate, according to their number, divide the class into groups so that each group has its own device.

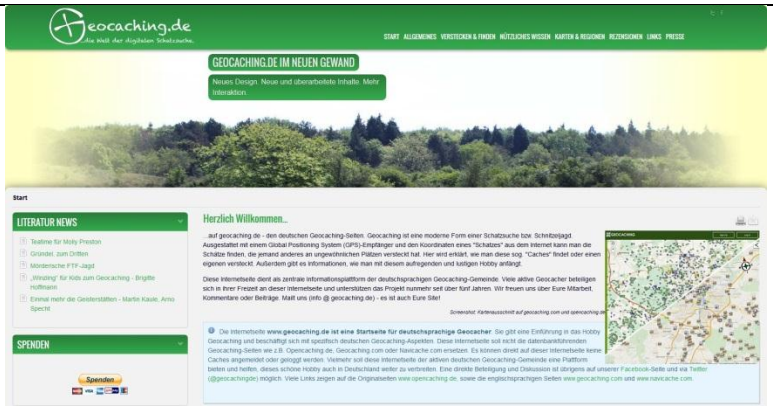
For the first time, it is good to choose a cache that is hidden in the nature, or at least outside the city center (in the city, there is a possibility of an increased movement of people, therefore it would be more difficult to operate quietly). Quite attractive may be caches placed in the significant places or near the interesting objects, for example, castles, high hills and so on. Finding a cache can then be connected with a further extension of pupils' horizons in studying additional information about the local area (a large part of caches are dedicated to these interesting or important places and on the web they have nicely prepared listing containing a large amount of information). It is also important, in the case of beginners, to choose a cache according to its type. The most suitable are so called traditional caches that are located directly on the specified coordinates (in the case of other types of caches - unknown caches, multicache, letterbox, ... it is usually necessary to solve a problem first, before the cacher obtains the geographical coordinates of hidden boxes). In the end, it is also necessary to pay attention to the description of the terrain in which the cache is located (some caches are placed on trees or under water and cannot be achieved without the necessary climbing or diving equipment).

Activity 7 – Hiding a cache

Pupils who already have some experience with geocaching can try to hide their own cache. This can be done in two options: they can hide an official cache, however certain rules have to be obeyed when publishing the cache on official geocaching webpage, but later even the other cachers will have access to it, or they can create an unofficial cache intended only for their classmates who set out and try to find it. In both cases, at first they have to select an appropriate place where the cache will be hidden (for example, near a castle or some other interesting place), then the exact coordinates are determined using GPS and at the end they create a listing with some information on the place, with acquired geographic coordinates included.

Additional information

Geocaching.com Official webpage of worldwide game geocaching. After creating an account, the user has access to	

the huge amount of caches or he can hide his own cache for the other users. The web is available in several languages including German or Czech. *https://www.geocaching.com*	
Geocaching.de Localized German webpage dedicated to various manuals, videos, discussion forums, calendar of planned actions and so on. *www.geocaching.de* Similar local webpages are available in Czech and Slovak on: *www.geocaching.cz* a *www.geocaching.sk*.	

Used resources

[1] *Rozum do kapsy: malá* encyklopedie. Praha: Albatros, 1999, 629 s. ISBN 80-00-00737-1.

[2] *Geocaching* [online]. Seattle, WA, USA: Groundspeak, Inc., 2016. Available from: https://www.geocaching.com

[3] *Geocaching.cde* [online]. Available from: www.geocaching.de

Learning text for the pupil

Many of you have already met a device that use GPS for navigation, some of you even have a smart phone that can be used as such a device. This kind of navigation device is actually only a receiver that receives signals from many satellites that belong to the project of global positioning system operated by the Department of Defense of the United States. Currently, there are 31 satellites in the orbit around the planet and each of them is, besides various antennas (for communication and signal broadcasting), solar panels and batteries (as sources of electrical energy), equipped with three or four highly accurate atomic clock. Your GPS device then receives signal with some data from the satellites currently located above the horizon and is able to calculate its current geographical positions given by the latitude and longitude. Additionally, the device is then able to determine the direction and the distance to another desired point on the Earth's surface. In many cases these devices offer just the basic navigation in the appropriate direction and in the shortest possible way. "Smarter" devices used for example in the transportation are able to calculate the distance on the roads, pick up the best one, avoid a traffic jam etc. but they are more expensive.

Bulb - The signal with the data goes only from the satellites to the GPS device. These devices are only passive receivers.

Regardless of the fact that our life is filled with all sorts of electronic devices, which covers even the orientation in the countryside or in the city, it is good not to forget about the traditional ways of orienting in the field. It can happen that the GPS device goes low battery or for dense cloud cover or due to interference it will not be able to determine its position. In such cases, it is useful to know how to navigate using only a map or plan of the area. It is quite often necessary to determine the cardinal directions so we can correctly orientate the map in the terrain where we find ourselves. This knowledge (determining the cardinal directions – no matter if it is done accurately by using a compass or less accurately by so called backwoods rules – and reading the map) was the only mean of navigation for a long time and even today it is often beneficial to master it.

Therefore, there are several activities with different focus prepared for you. They should help you get acquainted with some new knowledge and skills or eventually consolidate the knowledge and skills already acquired. But it is good to keep in mind that no one become a master in orientation and navigation in the nature by reading a textbook and executing a few activities, but only by a long-time practicing.

Activity 1 - Backwoods rules

When navigating in the nature, it is necessary to be able to specify the cardinal directions correctly. A proper orientation in a map or a plan depends on that.

One of the easiest ways to determine the cardinal direction includes observing the position of the Sun in the sky, depending on the time of day - in our geographical latitude, the Sun rises in the southeast,

at noon it is approximately above head slightly inclined towards the south and in the evening it sets in the southwest. Another way to orientate in the nature is to find the Polaris which is the brightest star in the constellation Ursa Minor. There is the north celestial pole in its immediate vicinity, thus Polaris reliably indicates the direction to the north.

In addition, there is also a quite large number of other interesting indicators, so called backwoods rules which can help with determining the cardinal direction.

Work out

In the following list of statements try to identify those ones that are true and can be used to determine the cardinal directions.

Statement	**YES/NO**
At noon, the Sun is situated in the sky approximately to the south.	
At midnight, the Moon is situated in the sky approximately to the south.	
Polaris always points to the north.	
The tree bark on the north side is more coarse than on the southern side.	
The growth rings of stumps are usually thicker on the north side and thinner on the southern side.	
The cattle on pastures usually graze in the east-west direction.	
There is often moss or lichen grown on the north side of trees.	
Snow usually lasts out longer on meadows and hillsides orientated to the south.	
The southern side of anthills is often steeper than the north side.	
The anthills are usually built to be protected from the north side by a tree or a stump.	
The portals of older catholic churches are situated to the east.	
High voltage power cables in the nature usually go from north to the south.	
Bee hives have their entrances turn to the south.	

Question mark

- There may be some incorrect information in some statements. Can you find these errors and fix them so that the claims are true?
- Think of the statements that you marked as true. Can you substantiate your choice and explain them?

Work out

Use the true and corrected statements in the list and try to verify them on a walk in the nature (you can add additional statements in the list, which you found, for example, on the internet).

Question mark

Are you able to determine the cardinal directions according to your list of backwoods rules? in the end you can verify your work using a compass.

Activity 2 - Wristwatch as a compass

Relatively accurate way to determine the cardinal directions is to use analog wristwatch in connection with the position of the sun in the daytime sky. Just point the hour hand to the solar disc and bisect the acute angle between the hand and the number 12. Ray led thus cut in half of an angle points to south.

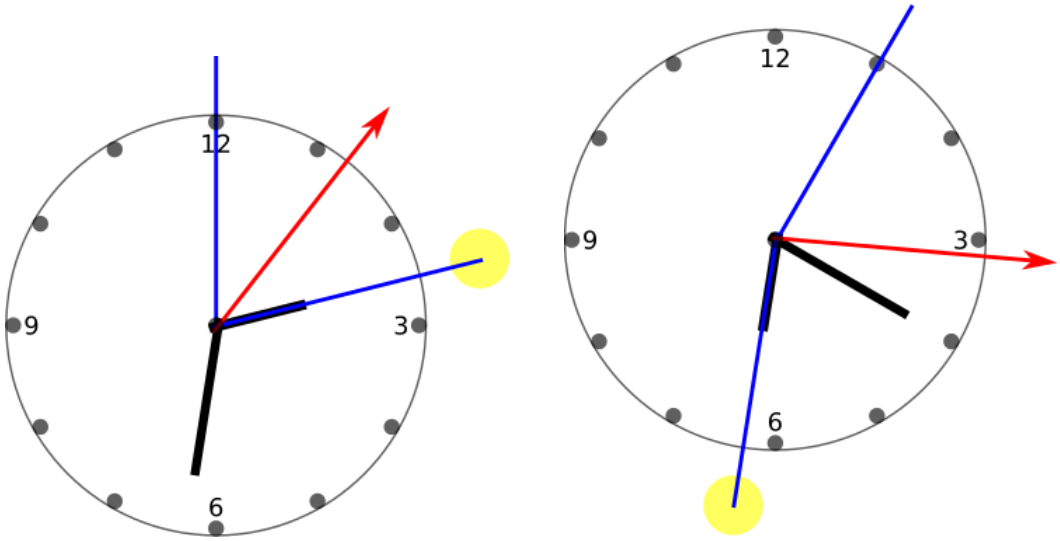


Fig. 1 - Identifying south direction through analog wristwatch and sun (CET at the left and CEST right)

Bulb

Remember that during the year the time changes - from March to October Central European Summer Time (CEST) is used instead Central European Time applied in the rest of the year. This means that the hour hand on watch shifts its position by one hour. In this period the angle which should be bisected is defined by the hour hand and the number 1.

Work out

Try to determine the cardinal directions using your wristwatch according to the presented description. Verify the accuracy of your work, for example, with a compass or GPS device.

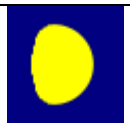
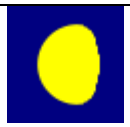
Information

The cardinal directions can be determined using analog wristwatch even in the night with the help of the Moon's position in the sky instead of the Sun. This procedure is a bit complicated because the

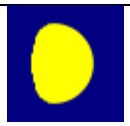
Moon may be in different phases. When it is full moon, this means that it is "directly opposite" to the sun, the procedure of determining the south is identical.

Bulb

When the Moon is full, the knowledge of the relation between its phases and its position in the sky can be used. However, this is again quite an inaccurate measurement (as in the case of estimating the directions using only the Sun's position in the sky). The following table describes the dependence between the position of the Moon in the sky in its various phases at the time of day.

time							
18	SW	S	SE	E	-	-	-
21	W	SW	S	SE	E	-	-
24	-	W	SW	S	SE	E	-
3	-	-	W	SW	S	SE	E
6	-	-	-	W	SW	S	SE

When Central European Summer Time is used, the time is again shifted by one hour:

time							
19	SW	S	SE	E	-	-	-
22	W	SW	S	SE	E	-	-
1	-	W	SW	S	SE	E	-
4	-	-	W	SW	S	SE	E
7	-	-	-	W	SW	S	SE

Work out

Try to determine the cardinal directions using the Moon. If you're lucky and it is the full moon, you can use a more accurate method using wristwatch. If it is not the full moon, try to determine the directions at least as accurately as possible.

Activity 3 - Watching the surroundings

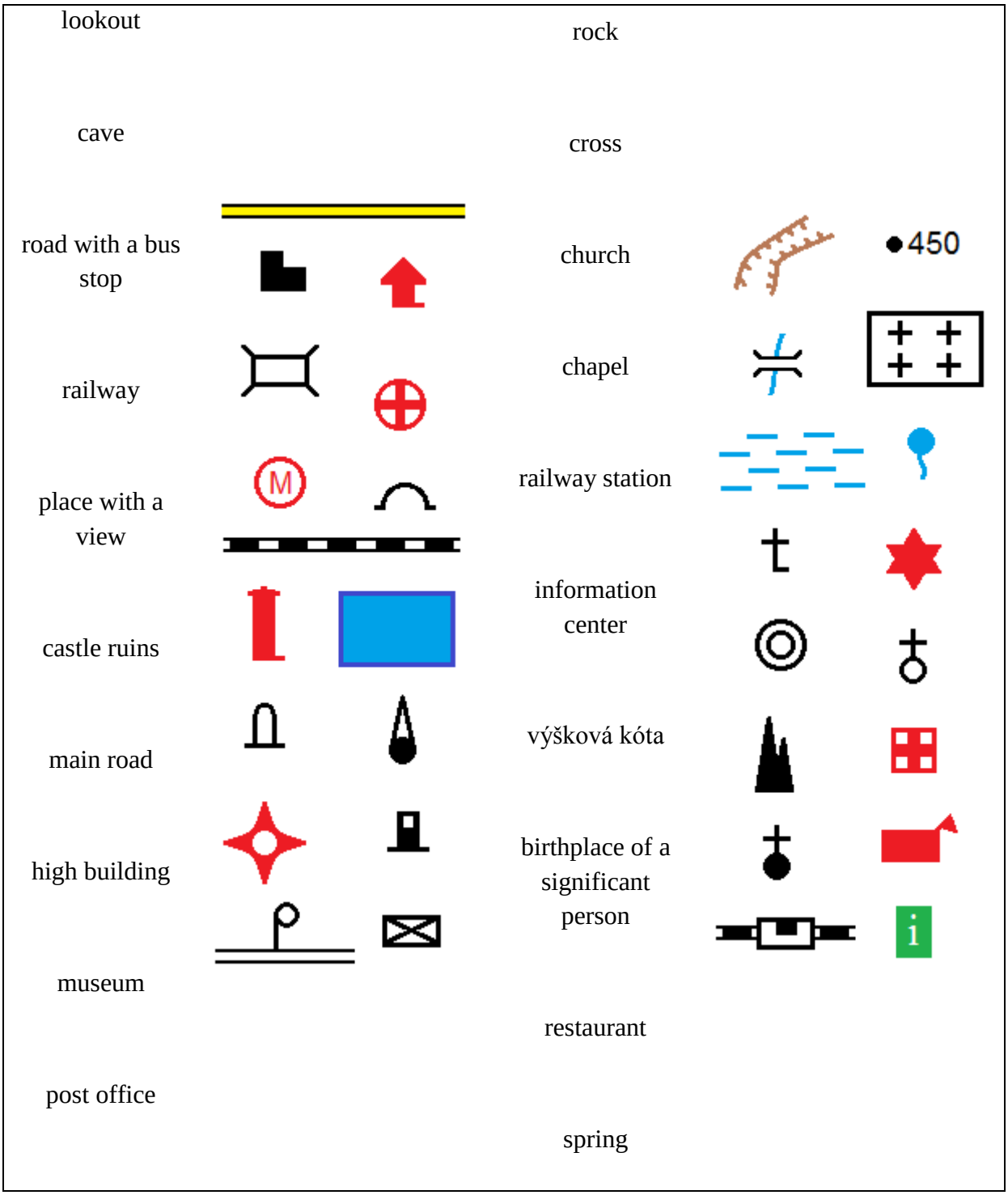
It should be easy for you to correctly orientate the map if you are familiar with determining the cardinal directions in the nature. The majority of maps are printed so that the north is on its upper side

and the south is bottom side. In the other cases, there is a compass rose on the map which shows where the north is.

Before a work with the map it is useful to repeat the symbols which are being used there. They are symbols for important objects which are in the map, and these symbols are universal.

Work out

Match the symbols that you may find in the map with their names.



gas station

swamp

memorial

bridge

swimming pool

ravine

castle

settlement

hospital

mountain rescue service

bunker

cemetery

Work out

When you get to the place with a good view, the teacher will give you a map where there are significant objects from the surroundings marked with colored pins. Your task is to correctly orientate the map and try to identify the marked objects in the landscape you see.

As an additional task, you can try to estimate the distance to these objects. Then your estimates can be checked by measuring the distances in the map using its scale to calculate the actual distance in reality.

Bulb

If estimating the distances in nature, keep in mind the following propositions: The success of estimating the distances in the field always depends on one's experiences, quality of vision and current visibility. Under ideal conditions

- up to 50 meters - a human face can be recognized,
- up to 100 meters - clothes and various body parts can be recognize,
- up to 500 meters – you can see whether the character is walking towards you or away from you,

- up to 1 kilometer - you see the windows of houses, standing figures and recognize individual trees,
- up to 2 km - the trees and houses appear only as silhouettes without discernible details,
- at 3 km - individual houses in the village cannot be distinguished,
- over 5 km - details of distant hills cannot be distinguished.

Activity 4 - Treasure Quest

Work out

It is important not only to understand the paper map, but also be able to navigate by it in the field. You will get a map with marked locations from the teacher. Find out where these places are and visit them. They can be shops, cultural centers, information centers, or some significant places and objects in the vicinity. Your task is to find hidden indices there which you need to collect. Put them all together and use them to identify where the treasure is hidden.

Activity 5 - Hunt for thieves

There are several different systems of geographic coordinates in the world (for example, UTM systems, S-42, etc.). The best known and most widely used, mainly for navigation through GPS, is the system called WGS-84. Each point anywhere on the Earth's surface (or above it and below it) is defined by latitude, longitude and altitude. All three values are related to the reference ellipsoid, which approximately describes the shape of the globe.

For normal (touristic) navigation, the knowledge of the altitude is not so important, whereas latitude and longitude are necessary. They describe the position on globe as follows: latitude takes values from 0° to 90° north of the equator and 0° to 90° south of the equator, the longitude takes values from 0° to 180° east and 0° to 180° west of the prime meridian (passing near the English town of Greenwich). Therefore it is necessary to indicate on which hemisphere the described point is situated - places north of the equator are marked with the letter N (from the English word "north"), places south of the equator takes the letter S (from English "south"), if the place is located east of the prime meridian, the coordinates are supplemented by the letter E ("east") and places located to the west of the prime meridian have the letter W ("west").

Latitude and longitude can be written in one of the three formats: in degrees (DD.DDDDD°) or in degrees and minutes (DD° mm.mmm') or in degrees, minutes and seconds (DD° MM' ss.sss").

For example, coordinates the Monument of St. Wenceslas on Wenceslas Square in Prague can be written in the form of N 50.07978° E 14.42973° or N 50° 04.787' E 14° 25.784' or N 50° 04' 47.220" E 14° 25' 47.040".

Information

Converting between the three different formats is quite simple. It assumes that the degree consists of 60 minutes and a minute consists of 60 seconds, and follows the formulas.

DD° MM’ SS.SSS” to DD.DDDDD°

- DD.DDDDD° = DD° + MM’/60 + SS.SSS”/3600

DD.DDDDD° to DD° MM’ SS.SSS”

- DD° MM’ SS.SSS” = DD° (0.DDDDD·60)’ (0.DDDDD·3600)”

DD° MM’ SS.SSS” to DD° MM.MMM°

- DD° MM.MMM’ = DD° MM’ + SS.SSS”/60

DD° MM.MMM’ to DD° MM’ SS.SSS”

- DD° MM’ SS.SSS” = DD° MM’ (0.MMM·60)”

DD° MM.MMM’ to DD.DDDDD°

- DD.DDDDD° = DD° + MM.MMM’/60

DD.DDDDD° to DD° MM.MMM’

- DD° MM.MMM’ = DD° (0.DDDDD·60)’

Work out

There is a gang of robbers stealing remarkable paintings from galleries all over the world. Find out in which cities the paintings have already been stolen, fill out their names into the crossword puzzles and find out in which city the robbers intend to strike again.

The first robbery took place in the city, which is located on coordinates N 41.38522° E 2.18089°, the second gallery was robbed in the city on N 40° 46' 46.800" W 73° 57' 47.800". For the third time, the robbers struck on the coordinates 31° 57' 01.400" E 115° 51' 38.100" and the fourth robbery of precious paintings happened in the museum situated on coordinates S 12° 08.198' W 77° 01.398'. The fifth and sixth robbery took place in a relatively short time in a row, the first one on coordinates N 41.02665° E 28.98441° and two days later on N 51° 30.547' W 0° 07.698'.

			B	A	R	C	E	L	O	N	A
		N	E	W	Y	O	R	K			
	P	E	R	T	H						
			L	I	M	A					
			I	S	T	A	N	B	U	L	
L	O	N	D	O	N						

Work out

As an additional task, mark in the map the locations of all six cities where the robbers stole the paintings and a place of planned seventh robbery, too.

Fig. 2 - Map of the World (Source: www.pixabay.com)

Activity 6 - Finding geocaches

Work out

On the webpage www.geocaching.com, choose one geocache in your nearby and try to find it together with your teacher. During the searching, use the GPS device with entered GPS coordinates of the hidden cache. Usually, there is a small logbook in the cache where you have to subscribe with your geocaching nickname (individual and team nicknames are allowed), and then go to the page www.geocaching.com and log your cache visit online.

Information

There is a great amount of caches, in addition to so-called traditional caches, which are located at the given coordinates, there are some other types of caches (unknown caches, multicaches, letterboxes,

Wherigo caches,...) where you have to finish a given task (for example, solve puzzling ciphers) and then you get the GPS coordinates. For the beginners, it is therefore advisable to start with one of the traditional caches and try the other types later.

Bulb

Choose the cache carefully, try to prefer traditional caches outside city centers (you would look suspicious between buildings with lots of people, in addition small or micro caches in the cities usually don't look nice). Read carefully the general description of the cache, so called listing (nicely prepared description improves the probability that the cache is nice, too), how much favorite points has the cache collected from the other cachers (the more points, the more people liked it) and you should be also interested even in the availability of cache (some caches are placed high in the trees or under water, and they cannot be reached without a proper equipment).
It is quite useful to take an advice from a more experienced cacher who can help you to select a cache suitable for beginners.

Bulb

In most cases, there are mentioned some other interesting places nearby in the cache listing (for example, a place with a nice view). It is worth to pay attention to them and visit them.

Activity 7 – Hiding a cache

Work out

If you already have some experience with finding caches, try to create one of your own. It is not necessary to create directly an official cache, you can prepare it only for the rest of your class. Choose any interesting object near your town, it may be, for example, a castle, a high tree or just a nice place. Overlook its surroundings and try to think out the places where your cache could be hidden (usually a waterproof plastic lock'n'lock box is the best choice as a cache container, it can be hidden in a hollow tree stump or under a rock, more skilled of you may try to make wooden birdhouse that would be hanged on a tree and in which the cache is located). Then select one of these locations and using GPS device find out its geographic coordinates. Hide the cache here and create its listing, which mention the history and interesting data on the place. Complete it with the GPS coordinates of the geocache. Give this description to your classmates who would go to search for it, or you can publish it as your cache on geocaching webpage.

Bulb

If you create an official geocache, there can be a small delay before it is published and becomes available to the other cachers. It must go through the approval process that it meets all the required formalities.