

HOW TO PREPARE A ONE-DAY ASTRONOMICAL MOUNTAIN TRIP

**A PRACTICAL GUIDE TO
MOUNTAIN ASTRO-TOURISM
IN THE WESTERN
CARPATHIANS**



**Sport Develops
the MIND**



**Co-funded by
the European Union**

The mountains are a perfect place to combine physical activity, science, nature and discovery.

A one-day astronomical mountain trip is more than an ordinary hike. It is an opportunity to explore the landscape during the day and discover the night sky after sunset. Walking, navigation, environmental observation, astronomy and photography can become parts of one educational adventure.

Walking, navigation, environmental observation, astronomy and photography can all become parts of one single educational adventure in the open air.

The aim is simple:

Walk through the mountains, understand the environment around you, and finish the day by looking up at the sky.

The Western Carpathians are particularly suitable for this type of activity. The region offers mountain landscapes, protected natural areas, rural communities, cross-border attractions and locations where participants can experience a darker night sky away from large urban areas.

This guide has been prepared especially for two target groups:

- families with children;
- university students.

The activities can be adapted to the age, experience and physical condition of participants. The main idea is to make astronomy accessible through direct experience: walking, observing, discovering, measuring, asking questions and looking at the night sky.

INTRODUCTION

WHO IS THIS GUIDE FOR?



FAMILIES WITH CHILDREN

For families, an astronomical mountain trip can turn a weekend outing into an educational adventure.

Children can:

- learn basic navigation;
- discover mountain plants and landscapes;
- learn how to recognise selected stars and constellations;
- observe the Moon;
- use simple astronomical equipment;
- take photographs of the night sky;
- discover why dark skies are important;
- learn about meteorites and the Solar System;
- experience the mountains after sunset in a safe and organised way.

The activities should be adapted to the children's age and abilities. Shorter routes, frequent breaks and simple observation tasks can make the experience accessible and enjoyable.



UNIVERSITY STUDENTS

For university students, an astronomical mountain trip can combine outdoor recreation with informal scientific and environmental education.

Students can:

- plan and navigate a mountain route;
- investigate artificial light;
- collect environmental observations;
- identify plants using digital tools;
- learn basic astrophotography;
- use telescopes and binoculars;
- compare urban, rural and mountain night skies;
- work in teams;
- investigate astronomical attractions;
- prepare educational or promotional materials.

WHAT IS MOUNTAIN ASTRO-TOURISM?

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Mountain astro-tourism combines two experiences.

Mountain tourism

- hiking;
- navigation;
- physical activity;
- landscape observation;
- contact with nature;
- exploration of local places and culture.

Astronomical tourism

- observing the night sky;
- learning about stars and planets;
- visiting astronomical attractions;
- observing through telescopes or binoculars;
- photographing the night sky;
- learning about light pollution;
- discovering the relationship between Earth and the wider Universe.

The combination creates an informal educational experience in which participants learn by doing.

WHY THE WESTERN CARPATHIANS?



THE SKY ABOVE THE WESTERN CARPATHIANS DURING SDM YOUTH CAMP (SUMMER 2026)

The Western Carpathians are a transboundary mountain region extending across several countries. This makes them particularly valuable for international tourism and educational activities.

The region offers opportunities to combine:

- mountain hiking;
- astronomy;
- environmental education;
- cultural discovery;
- cross-border tourism;
- healthy lifestyles;
- family recreation;
- student activities.

The region also provides different types of places relevant to astro-tourism.

These include:

- astronomical museums and educational institutions;
- mountain observation points;
- open landscapes with broad horizons;
- locations with lower levels of artificial light;
- places suitable for astrophotography;
- cross-border attractions.
- An astronomical trip does not have to take place at a professional observatory.
- A safe mountain clearing, ridge or summit can also become an excellent place to introduce participants to the night sky.

SELECTED ASTRONOMICAL AND CULTURAL HIGHLIGHTS

MUSEUM OF METEORITES – FRÝDEK- MÍSTEK, CZECHIA

The Museum of Meteorites in Frýdek-Místek is a particularly interesting place for introducing visitors to astronomy, meteorites and the origins of the Solar System. Meteorites are pieces of material originating in space that have reached the Earth's surface. Studying them allows scientists to learn more about the formation and evolution of the Solar System. The museum can therefore serve as an indoor component of an astronomical mountain trip, particularly when weather conditions do not allow outdoor observations.

MOUNTAIN OBSERVATION POINTS

The Western Carpathians offer several mountain locations that can be combined with hiking and astronomical observation. Wielka Racza (1,236 m) provides an open mountain landscape and broad horizons, making it a suitable destination for observing the changing sky after sunset. Rachowiec (954 m) is another accessible mountain viewpoint where participants can combine physical activity with sky observation. Laliki (703 m) can serve as a lower-altitude starting point for an astronomical mountain trip and as an example of how observation opportunities change with landscape and surroundings. These locations can be used as educational stops during a one-day trip, with activities adapted to weather, visibility, season and the abilities of participants.

THE POLAND–CZECHIA–SLOVAKIA TRIPOINT

Trójstyk, where the borders of Poland, Czechia and Slovakia meet near Jaworzynka, is a symbolic stop on a Western Carpathian astro-tourism route. The three-country meeting point connects the themes of mountains, intercultural learning and astronomy: although people live on different sides of the borders, they share the same landscape and the same night sky. It is an ideal place for a short hike, group activities, intercultural reflection and introducing the idea of "Three Countries, One Sky."



CHECK THE ROUTE

Consider:

- distance;
- elevation gain;
- trail difficulty;
- expected duration;
- accessibility;
- emergency options;
- weather conditions.



CHECK THE SKY

Before the trip, check:

- cloud cover;
- precipitation;
- visibility;
- Moon phase;
- expected darkness;
- sunset and sunrise times.

Astronomical observations depend strongly on weather conditions.



CHOOSE THE OBSERVATION POINT

The ideal location should have:

- a safe surface;
- a relatively open horizon;
- limited direct artificial light;
- sufficient space for the group;
- safe access.

Avoid exposed or dangerous terrain at night.

BEFORE YOU GO

Hiking equipment

Every participant should have:

- appropriate hiking footwear;
- weather-appropriate clothing;
- rain protection;
- water;
- food or snacks;
- personal medication where needed;
- a charged mobile phone;
- headlamp or torch;
- backpack.

Navigation equipment

For navigation activities:

- hiking map;
- compass;
- smartphone with an offline map;
- route description;
- emergency contact information.

Astronomy equipment

Depending on the programme:

- binoculars;
- telescope;
- star maps;
- red-light torch;
- tripod;
- smartphone;
- telescope smartphone adapter;
- camera;
- power bank.

Expensive equipment is not necessary.

The most important astronomical instrument is the participant's own ability to observe and ask questions.

WHAT SHOULD YOU TAKE WITH YOU?

A ONE-DAY ASTRONOMICAL MOUNTAIN TRIP

Time	Families with children	University students
09:00	Safety briefing	Safety briefing and route planning
09:30	Easy hiking and observation game	Hiking and navigation exercise
11:00	Nature discovery	Ecological field observations
12:30	Lunch	Lunch
13:30	Plant identification with PlantNet	Plant identification and data collection
15:00	Daytime Astronomical Activity – Solar Observation	Daytime Astronomical Activity – Solar Observation
16:00	Hiking / team games	Hiking / team activity
18:00	Dinner and rest	Dinner and preparation
19:30	Introduction to the night sky	Astronomy briefing
Sunset	First-star challenge	Naked-eye observation
+30 min	Moon and constellation observation	Telescope observation
+60 min	Simple astrophotography	Smartphone astrophotography
+90 min	Family discussion	Light-pollution measurements and discussion
End	Safe return / overnight stay	Safe return / overnight stay

MINI-ORIENTEERING

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Navigation is one of the easiest ways to connect sport with learning.

Participants receive:

- a map;
- a compass;
- a route;
- several checkpoints.

They must determine the direction of travel and identify landmarks.

For children use simple tasks:

- find a marked point;
- identify a mountain;
- follow a short route;
- find a hidden clue;
- identify the direction of the setting Sun.

For university students add:

- bearings;
- route planning;
- distance estimation;
- GPS comparison;
- independent navigation.

ECOLOGY AND PLANT IDENTIFICATION



PLANTNET MOBILE APPLICATION

The Western Carpathians are valuable not only because of their landscapes but also because of their biodiversity.

Participants can use PlantNet or another plant-identification application to identify selected species.

They can record:

- plant name;
- location;
- photograph;
- date;
- habitat;
- additional observations.
-

The information can contribute to the development of an interactive map of plant observations in the Western Carpathians.

For families

Children can create a simple “nature detective” list.

For university students

Participants can create a structured dataset and discuss:

- biodiversity;
- protected species;
- habitats;
- human impact;
- citizen science.

LIGHT POLLUTION

One of the most important environmental topics connected with astro-tourism is light pollution.

Light pollution is the excessive, unnecessary or poorly directed use of artificial light at night.

It can affect:

- astronomical observations;
- wildlife;
- ecosystems;
- plants;
- human sleep and health;
- the natural rhythm of day and night.

A SIMPLE LIGHT-POLLUTION ACTIVITY

Select several points along the route.

At each point, record:

- location;
- time;
- weather;
- visible artificial light sources;
- approximate darkness;
- visible stars;
- visibility of the Milky Way.
-

If appropriate equipment is available, use a light meter or sky-quality measurement device.

Compare:

Point A – inhabited area
with

Point B – rural area
and

Point C – mountain observing location.

The objective is to demonstrate how the night sky changes as artificial light decreases.



Astronomy does not have to wait until sunset.

During the hike, participants can discuss:

- why the sky appears blue;
- why stars are difficult to see during the day;
- how the Earth rotates;
- why stars appear to move;
- how altitude affects observations;
- how mountains influence the horizon;
- why artificial light makes stars harder to see.



Participants can also use smartphone astronomy applications to identify objects that may be visible later that evening.

ASTRONOMY DURING THE DAY

Sunset is a perfect moment to change from hiking to astronomy.

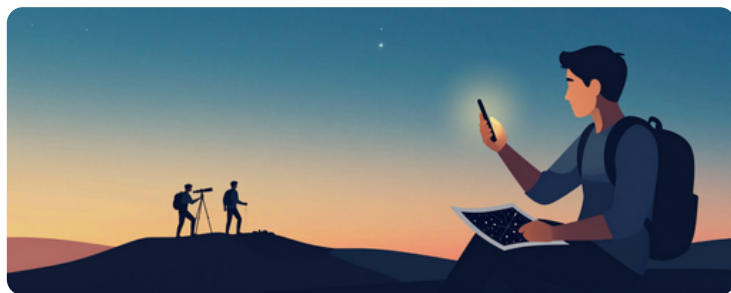
Participants can:

1. finish the hiking activity;
2. eat and rest;
3. prepare the equipment;
4. discuss the evening programme;
5. observe the changing colours of the sky;
6. identify the first visible stars;
7. allow their eyes to adapt to darkness.

This is also a good moment to introduce **dark adaptation**.

The human eye needs time to adapt to low light.

Participants should therefore avoid unnecessary exposure to bright screens and white lights.



SUNSET – THE TRANSITION TO NIGHT

TELESCOPE OBSERVATION



If a telescope is available, begin with easily recognisable objects.

Depending on the season and conditions, these may include:

- the Moon;
- bright planets;
- star clusters;
- double stars;
- selected nebulae;
- other visible deep-sky objects.
-

The exact programme should always be adapted to the date, location, weather and equipment.

For each observation, participants can record:

What did I expect to see?

What did I actually see?

What did I see with the naked eye?

What became visible through the telescope?

What question do I have?

SMARTPHONE ASTROPHOTOGRAPHY

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Smartphones allow beginners to experiment with astronomical photography.

Participants can try to photograph:

- the Moon;
- constellations;
- the Milky Way;
- mountain silhouettes under the stars;
- star trails, where appropriate.

A smartphone adapter can also be used with a telescope.

The purpose is not to produce professional photographs.

It is to understand:

- stability;
- exposure;
- focus;
- light pollution;
- composition;
- atmospheric conditions.

Participants can compare photographs taken in different environments and discuss how artificial light affects the result.

COMBINING ASTRONOMY WITH SPORT



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the MIND**

THE PROJECT LOGO

The SDM project demonstrates that physical and intellectual activities can reinforce each other.

A mountain astronomy trip naturally combines:

Physical activity

Hiking, navigation, climbing and team games.

Scientific activity

Astronomy, observation and measurement.

Environmental activity

Plant identification, light-pollution research and clean-up activities.

Social activity

Teamwork, family cooperation and intercultural exchange.

The strength of the programme comes from connecting these elements.

INTERCULTURAL LEARNING

The Western Carpathians are a transboundary region.

The Tripoint provides a particularly powerful example of this shared landscape.

Participants can compare:

- hiking traditions;
- mountain sports;
- local games;
- food traditions;
- tourism;
- environmental challenges;
- astronomical traditions;
- local stories and legends.

THREE COUNTRIES, ONE SKY

The Tripoint can serve as a central symbolic element of the guide.

Participants stand at the meeting point of three countries. Yet above them there is only one sky.

This can introduce a broader discussion:

Can environmental protection also cross borders?

The answer is particularly important for astronomy.

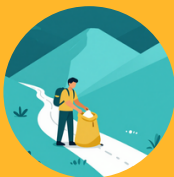
Light from one town does not stop at a national border.

Environmental challenges do not stop at a national border.

The night sky belongs to everyone.

This is why cross-border cooperation is important for protecting natural darkness and developing responsible tourism.





An astronomical mountain trip should protect the environment that makes the experience possible.



Participants should:

- take all waste with them;
- stay on designated trails where required;
- avoid damaging plants;
- avoid disturbing wildlife;
- minimise noise;
- respect protected areas;
- avoid unnecessary artificial light;
- use existing infrastructure;
- leave the observation site clean.



The group can finish the daytime programme with a short mountain clean-up activity.

This turns environmental awareness into practical action.

LEAVE NO TRACE

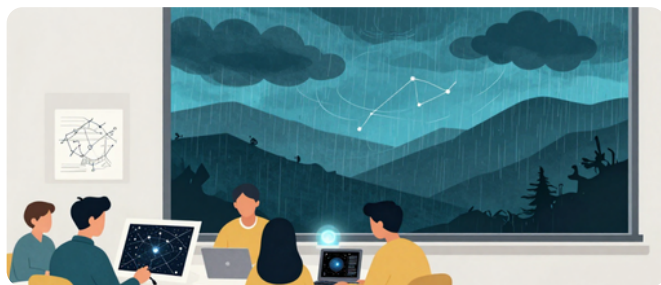
Clouds do not mean that the educational programme has failed.

If outdoor observation is impossible, participants can:

- analyse photographs;
- learn to use star maps;
- practise constellation identification indoors;
- analyse light-pollution data;
- prepare an astrophotography plan;
- create an astronomy quiz;
- research astronomical attractions;
- prepare presentations about the Western Carpathians;
- visit an astronomical museum or educational institution where available;
- use planetarium or online astronomy resources.

The goal is not simply to see stars.

The goal is to learn how to understand the night sky.



WHAT IF THE WEATHER IS BAD?

FINAL REFLECTION



At the end of the trip, participants can complete three sentences.

Before the trip I thought...

What did I expect?

During the trip I discovered...

What surprised me?

After the trip I want to...

What would I like to explore, learn or change?

Families can discuss their answers together.
University students can use them as part of a more structured evaluation.

The activity can also support reflection on learning outcomes and the Youthpass process.

LET'S GO!

SDM



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