



Discovering the Underground with Snow White

unique  
mix of  
**ENCYCLOPEDIA**  
& fairy tale



# Discovering the Underground



with  
**Snow White**

Albatros



When she woke up in the morning, Snow White learned that she was lying close to a mine entry. She had never seen anything like it before, but she could hear an echo and see shadows on the cave wall. She started feeling uncomfortable again. So when she learned that the voices and shadows belonged to seven dwarfs extracting gemstones from the mine, it made her laugh heartily. "I got lost in the woods and I have no place to go. And I can't go home because my mother is trying to kill me," she explained. "Stay with us, then!" they burst out in unison. Snow White was pleased, and the little men were happy to have such a beauty at home. And the dwarfs had an eye for beauty since they spent their days looking for precious gemstones in their mine.





## Vegetables



### Potato

It is a widely used crop native to South America. Its underground tuber, which is its only edible part, is a popular side dish.



### Peanut

Its fruit is a pod, also known as the peanut. It develops underground, and it is a popular delicacy as well as meal ingredient.



### Onion

The onion bulb is a basic ingredient of most meals, and its use reaches as far back as the antiquity.



### Garlic

A very popular aromatic crop, garlic is one of the first spices ever used and also a natural antibiotic.



### Carrot

It is a sweet orange root vegetable with beneficial effects on digestion, skin, and the eyes.



### Beet

The red beet is a globular root vegetable, the healing effects of which are appreciated by people with blood circulation disorders.



### Wasabi

Its Latin name is *Eutrema japonicum*. With its hot flavor and aroma, wasabi is a main ingredient of Japanese dishes. It is also used in eye-watering fire alarms for deaf people.



### Ginger

Popular for its high content of beneficial substances, ginger can help people who suffer from digestive disorders and circulatory system problems and also works as an immunity booster.

The queen hatched her plan while preparing poison from the most venomous plants. She could hardly wait to take her revenge on Snow White. However, plants are not poisonous to do harm but to protect themselves against circumstances they could not withstand otherwise. Most plants even help each other and live together in perfect harmony. For example, trees couldn't exist without fungi and fungi couldn't live without trees. They essentially operate as single organisms.

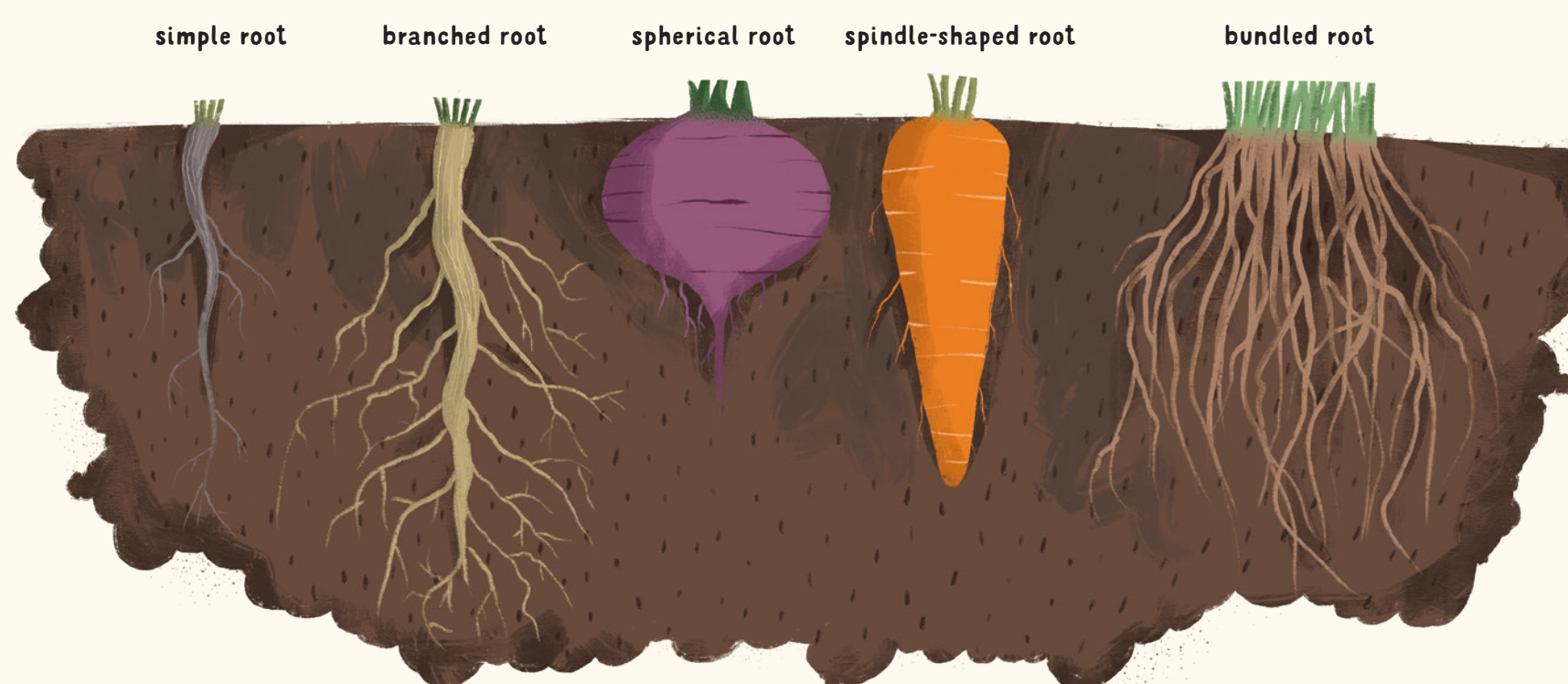
## Photosynthesis

Trees are capable of wonderful things, one of them being photosynthesis. In the course of this process, they use sunlight to synthesize the substances they need, at the same time producing the life-giving oxygen. Tree leaves are also the place where important saccharides are made. Fungi are unable to produce them, so they need trees to provide saccharides through their roots in soil.

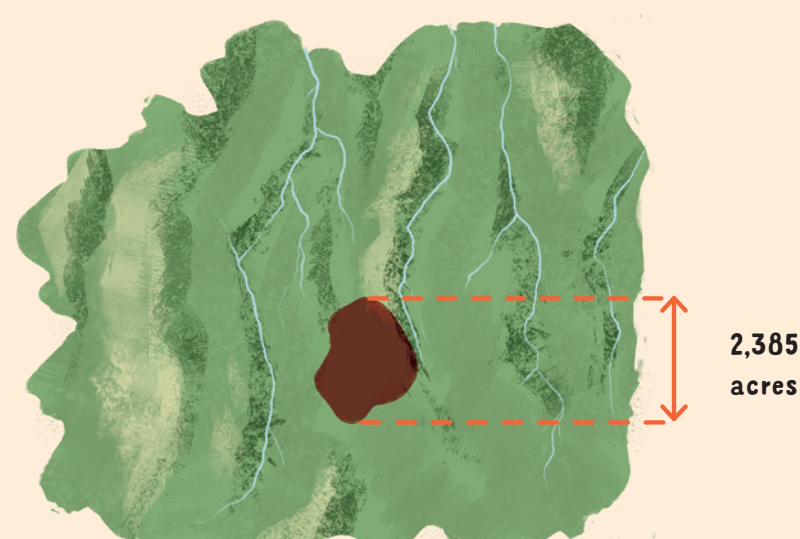


# ROOT SYSTEM

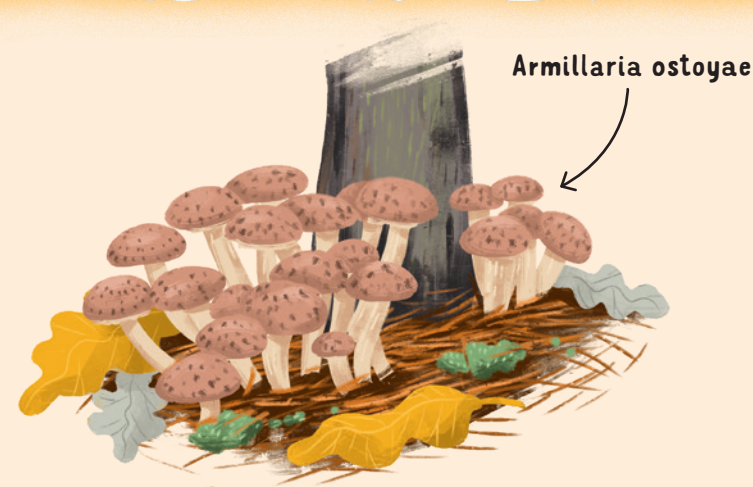
## Types of root systems



## The biggest mycelium in the world



The Malheur National Forest in the U.S. state of Oregon



The biggest fungus, or rather the biggest mycelium, in the world can be found in Oregon, US. It belongs to a giant *Armillaria ostoyae* and its mycelium covers 2,385 acres of the Malheur National Forest. This is almost as large as 2,000 football fields placed side by side. Owing to this size, *Armillaria ostoyae* is by right the largest living organism in the world.

## Decomposition

The soil is full of **vitally important substances**. These are released from underground rocks and minerals and by living organisms through the process of decomposition. These substances accumulate in the soil. When a plant fades, an animal dies, or leaves fall on the ground, they gradually decompose and turn in **soil nutrients** that plants need to live. Animals or people then eat those plants because they contain those necessary substances. Each creature or plant is part of the **cycle of life**.

## Fungi

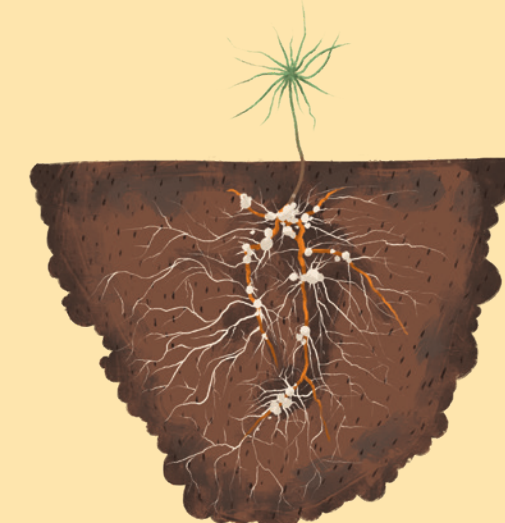
### Mycorrhiza

Now we know that mushrooms receive the much needed saccharides from trees. By contrast, trees receive **water** and important **minerals**, such as phosphorus and nitrogen, from fungi. This exchange takes place through a linkage between the tree roots and fungal fibres, called the **mycelium**. This is precisely why fungi are abundant around trees.



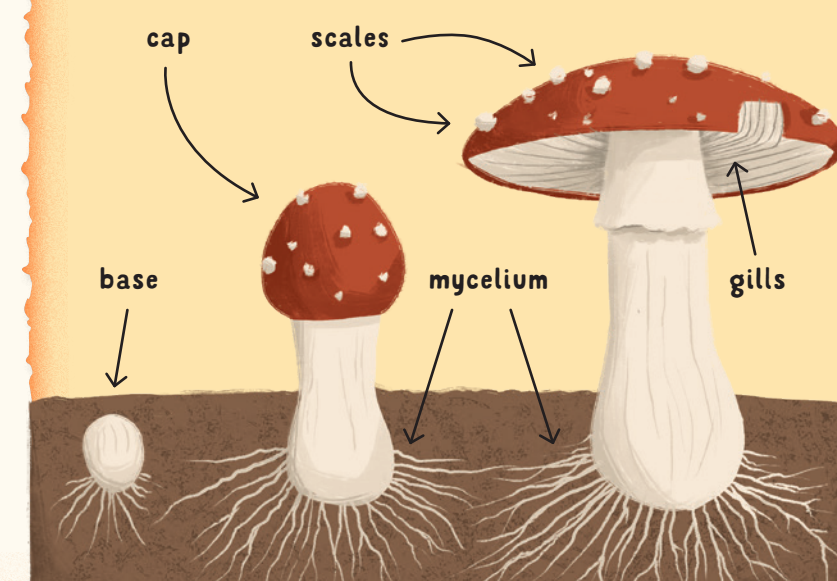
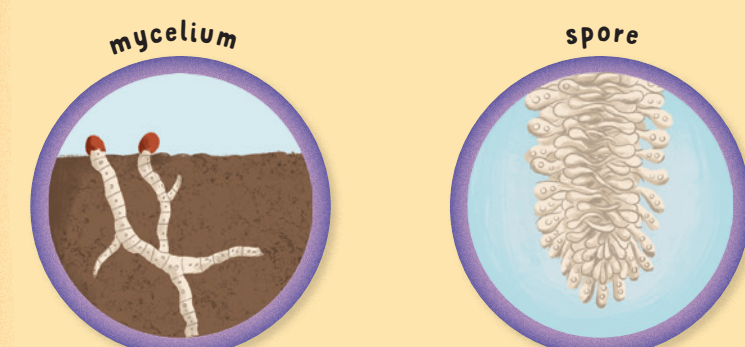
### Mycelium

The mycelium is a cluster of fibres, through which fungi receive nutrients from soil. The mycelium of a certain mushroom is linked to the roots of a certain plant, the spawns of other fungi, and with the roots of other trees. In this manner, they form a **network**, through which trees and fungi exchange nutrients and even communicate. For example, they send warning signals when there is an impending danger.



## Reproduction of fungi

Do you know the saying "like mushrooms after rain"? It means that something emerges and spreads quickly and in abundance because mushrooms grow really fast. When a mushroom grows, a so-called **spore** falls out of its cap. The spore forms its mycelium in the soil, from which a small veil emerges. The **veil** turns into another mushroom, from the cap of which a spore falls out, and so on ...





The next day, the dwarfs went back to work. "Do not open for any strangers, Snow White!" they warned her before leaving their little cottage. Snow White said goodbye, planning to cook something nice for them. But she had no food to cook. All of a sudden, someone knocked the door, "Is anyone in? I sell sweet fruit, fresh vegetables, and varied spices." "What a coincidence," Snow White thought. "Just when I needed these." And she was pleased to open. Behind the door, disguised as an old woman, there stood the queen. "Taste this nice sweet apple." Snow White took a bite of the poisonous apple and dropped down. In the meantime, the dwarfs were digging for stones diligently, without the slightest idea of what had just happened.





## Important Staff

A subway operation requires the **cooperation of a variety of professions**. Some of the professionals work right in the subway station. Right after the train's arrival in the station, you can see the train driver.



**Drivers**

The subway train is not controlled using a steering wheel, as cars are, but using a panel with lots of buttons and levers. The driver **controls** the subway's speed, the place where it stops, and the direction it takes at crossroads (if there are any on the track), and they use a **camera system** to check whether people are getting on and off.

## Conductors

The conductor is to check whether passengers **have purchased** their tickets and **validated** them properly. Ticket fees allow for the proper functioning of the subway; they are used to pay for the **repairs** and **improvements** of tracks and trains. Ticket checks are performed at turnstiles, although **random inspections** also take place in the cars.



## Engineers

Engineers play a very important role in transport companies. They monitor the condition of the tracks and trains, resolving all technical problems so as to ensure the smooth running of transport.

Trains are capable of transporting **millions** of passengers a day throughout the city.



# THE SUBWAY

The dwarfs rushed with the prince to Snow White, taking the fastest way they knew: by mining trolley through underground tunnels. Similarly, people make use of a system of underground train tracks called the subway system, allowing the fast movement of large numbers of people in metropolises. This transport system offers a great advantage, which is that trains follow a straight route and do not need to overcome any obstacles. It is a highly effective and, thanks to its electric propulsion, also an environmentally friendly solution.



## Schedules

To make orientation easy for everyone, train schedules are located on platforms and in cars. However, they do not show arrival times, as would be the case of buses or trams. Instead, they **display** the **stops** and interchange stations where you can change for other subway lines.

## Turnstiles

Turnstiles serve for validating tickets and for **regulating** the number of people entering the subway at the same time.

**Passengers** usually rush, moving in large groups. Perhaps you can imagine the chaos had there been no turnstiles!

## Escalator

To get passengers from the surface to the subway as fast as possible, **moving staircases**, also called escalators, are in place. They allow people to move quickly and easily.



## Train

The emergence of the subway dates back to **1863**. After futile attempts to pull trains using ropes for example, the system quickly switched to **electric drive**. Electricity flows right through the rails and the train is capable of speeds from **50 to 75 miles per hour**.

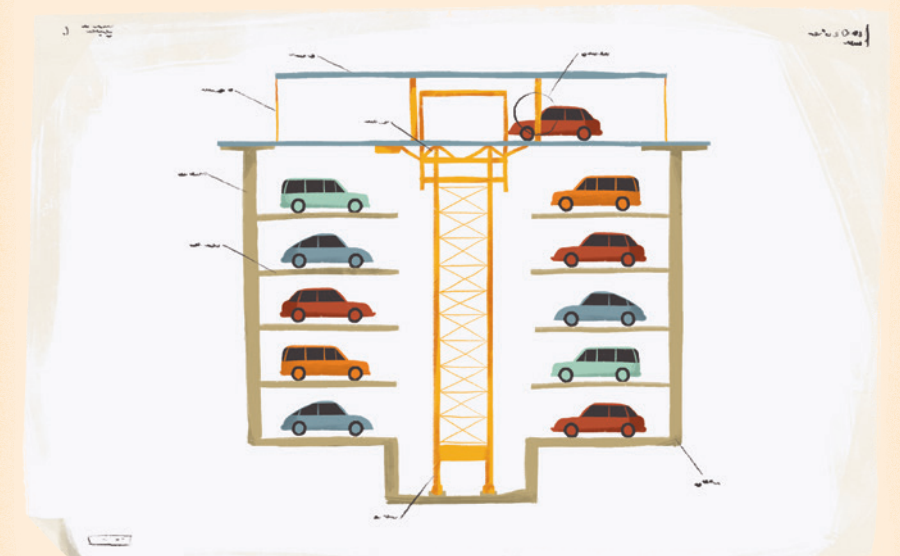
## Ticket

After **validating** your ticket, you can see the time of your entry in the subway. This and your **fare** will help you determine the period of time you are allowed to travel the city using the subway. Traveling without a ticket is called "fare evasion." If you get caught by a conductor, you can be fined as much as 10 times the ticket price.



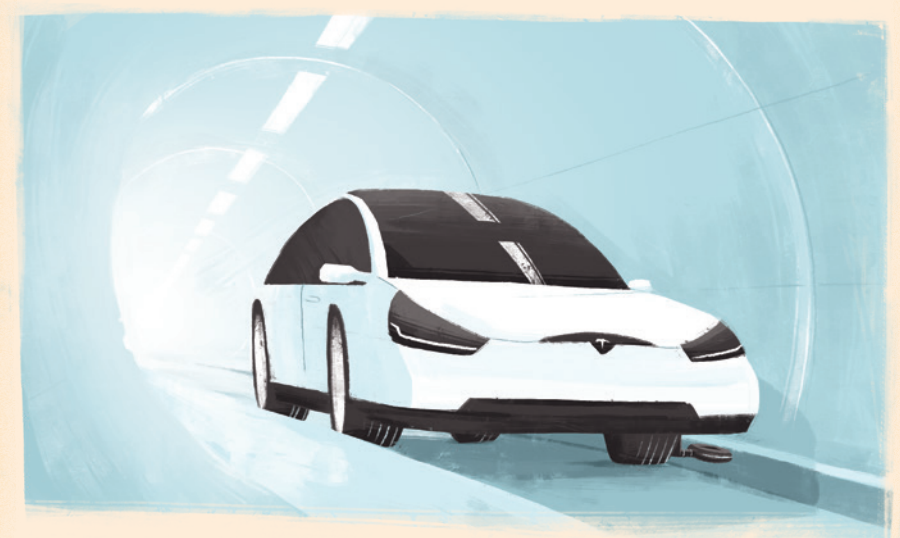
## Further underground transport

The subway is a unique transport system that saves passengers a lot of time while also being **environmentally friendly**. Other means of transport are aiming for the underground as well. For example, cars can already park below the ground. However, reducing car traffic using underground highway systems is, for the time being, **just a future plan**. Can you think of any **means of transport** that could be driven on **other than roads**?



## Underground parking

As the number of passenger cars grows, parking spaces are becoming scarce. Underground parking lots with automated lifts allow to park cars also on the **underground floors of buildings**. In most cases, underground parking is considered cheaper and more practical than regular parking lots, protecting vehicles from weather such as snow, rain, or high temperatures. It is also safer, making it impossible for robbers to get inside your car.



## Underground highways

Although still at the design level, some **visionaries are planning** an underground highway. This would allow traveling below ground by electric cars, **similarly to the subway**. Underground highways should address crowded roads and **decrease pollution**. The use of the underground should also reduce the growing number of road accidents by using self-driving cars.



## Underground messenger service

**Online goods ordering** and shipping to homes is another source of the growing number of freight transport vehicles on roads. Such vehicles are bulky and heavy for the roads. Future plans foresee using an **automated underground transport service**. Some companies are considering using the underground routes currently used by energy companies as well as magnetic motors (similar to those of roller coasters), which promise a fast and safe transportation of goods.

## Types of subway lines

The world's cities differ from each other by area and structure, and the subway lines need to be adapted accordingly. There are **9 basic types**.

Underground lines **cross each other** in Atlanta, Kyoto, Minsk, Warsaw, and in Bangalore.



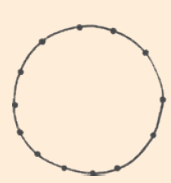
In Beijing, London, Moscow, Paris, or Tokyo, the subway goes in a **circle** as well as **across it**.



You can take a **direct line** in, for example, Algiers, Helsinki, Miami, Hiroshima, or Sydney.



Two **intersecting routes** forming a circle are available for passengers in Cairo, Marseilles, Montreal, Rotterdam, and Toronto.



A subway going in a simple **circle** can be found only in Glasgow, Scotland.



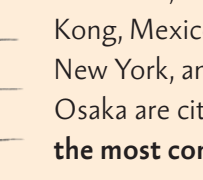
Multiple **intersecting lines** can be found in Athens, Budapest, Prague, Munich, and Rome.



**Radial arrangements** of subway lines are found in Boston, Vancouver, Washington D.C., Buenos Aires, Kiev.



Barcelona, Hong Kong, Mexico City, New York, and Osaka are cities with the **most complex systems**.







## Discovering the Underground with Snow White

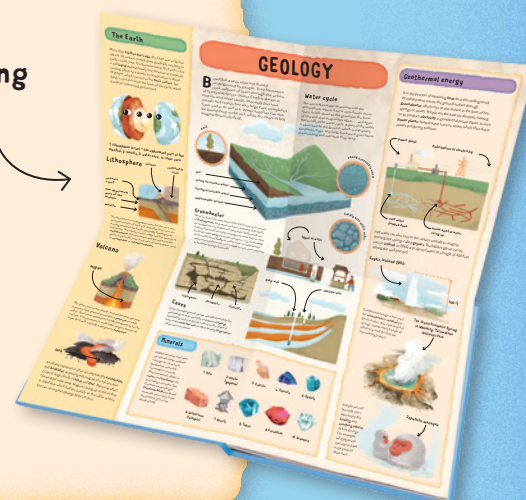
Text by Tom Velčovský  
Illustrations by Jakub Cenkl

Once upon a time, there was a queen who only cared about her looks. She believed she was the most beautiful woman in the world, except for her stepdaughter, Snow White. And what happened to the beautiful princess and her evil stepmother? You can read that in the fairy tale *Discovering the Underground with Snow White*. In addition to the well-known fairy story, there are seven folding and richly illustrated maps from which you can also learn about what lies underground, who works there, which animals live there, and other curiosities associated with the “realm” below the Earth’s surface. *Discovering the Underground with Snow White* is a unique mix of encyclopedia and fairy tale that pleases but also instructs all young readers and their parents.

Check out other releases in this series:



big folding  
maps



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WARNING:  
Choking hazard.  
Not suitable for children  
under 36 months.

