

Russia is the home of soil science

This lesson takes a look at Russia's soils and the important work of its soil scientists

Key questions

- What is soil?
- Why is Russia regarded as the home of soil science?
- What are the main soil types?
- Why do soil characteristics vary from place to place?
- What is evapotranspiration?
- How are climate graphs used?
- What is a transect and why is it useful for fieldwork?

Subject content areas

- Understanding the physical characteristics of **soil** (weathered parent material and organic matter).
- Understanding how **water movements** (precipitation and evaporation) give rise to soil forming **processes** and soil type variation (podzol, chernozem, gley), with reference of theories of soil formation.
- Developing a sense of **scale**.
- Recognising that different opportunities for **agriculture** are linked to the soil types found in different locations. The Russian Steppes are an important location for cereal-based agriculture.

Downloads

- What is soil? (PPT)
- Russian soils A4 activity (PDF)
- Russian soils A3 activity (PDF)
- A postcard from Russia (PPT)
- Teacher notes PDF | MSWORD
- Images (PPT)

Starter

What is soil, and why is Russia the home of soil science?

The introductory PowerPoint gives an introduction to soil science and a potted history of soil studies in Russia in the 1870s, with photographs of notable Russian geographers (e.g. Dokuchaev). Russian geographers undertook the groundwork that underlies much of our modern soil science. Many of the names we use for soils, such as chernozem and podsol, are Russian in origin.

- Ask students: what other kinds of scientific breakthrough were happening around the same time in other countries?
- The starter presentation should also be used to get the class to brainstorm the answer to the very important question: *what is soil?*

Main

Transect mapping of soil, vegetation and climate

In the main activity, students will be making use of a variety of maps, photographs and resources in order to describe some basic features of the changes in soil type and characteristics seen along a north-south transect drawn across Russia. Russia's sheer size brings enormous variability in its soil characteristics. Russia's soil scientists deduced the key link between climate and soils at a global (non-local level).

Critically, the balance between rainfall and evaporation determines whether rainwater leaches nutrients out of the soil, or draws them towards the surface. The teacher notes provide some simple links between rainfall, evaporation and soil forming processes. These will need explaining to the class as each soil type is studied (see teacher notes).

- Students need to receive a printed copy of the A4 sheet which is an orientation exercise, showing them what a transect is and the scale it has been drawn to.
- The A3 sheet contains the main exercises for the lesson, which students may work on individually or in pairs. They will undertake climate data analysis (describing annual variations in temperature and precipitation), identify the dominant vegetation type, and will carry out a brief analysis of the soil types shown (identifying depth, colour and horizons). By the end of the activity they should be able to identify three important soil types (podsol, chernozem, tundra gley) and be able to explain one process that has contributed to the formation of each of these.
- Atlases should be provided.
- Implications for agriculture can be considered as an extension exercise.

Plenary

What would a postcard home from Russia look like?

Concluding their look at the hugely varied physical geography of Russia Lessons 1-3, students consider what pictures or images best sum up Russia. They can write their postcard home in class, or for homework. A PowerPoint is provided to introduce this, the third slide of which can be printed for students to write on.