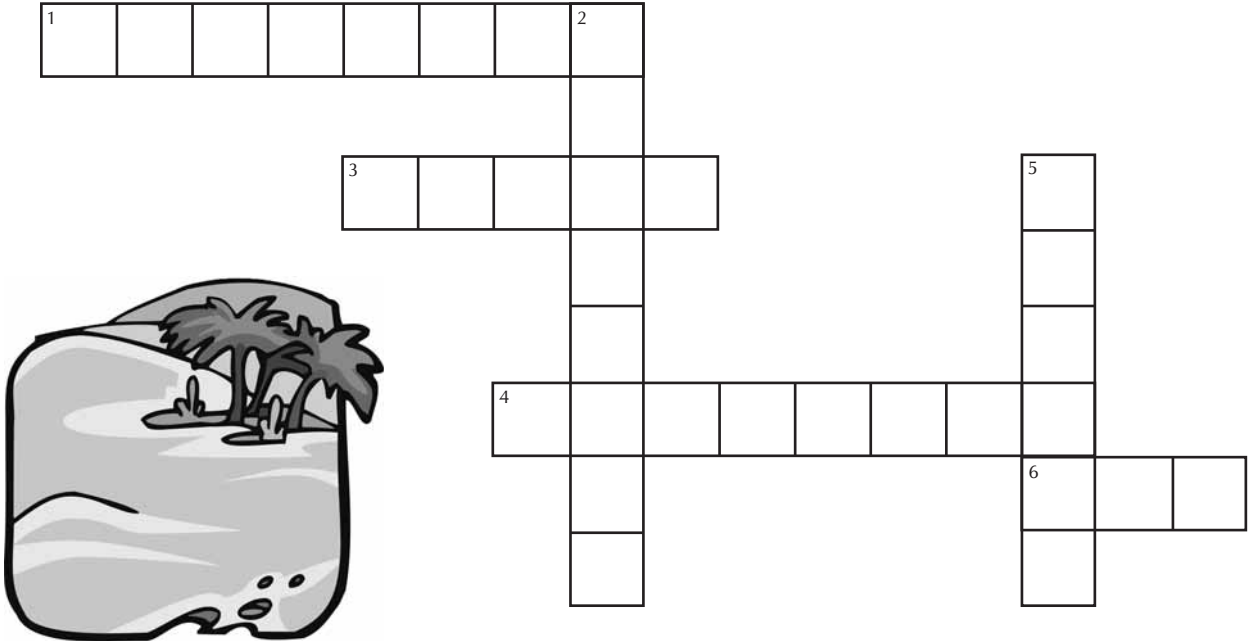


A black and white photograph of a tractor plowing a field. The tractor is in the middle ground, moving from left to right, leaving a furrow in the dark, textured soil. The background is a dense line of trees under a clear sky. The entire scene is framed by a white border.

Soil

Activity I: Soils types in India

Do you know the names of the various types of soils found in India? Can you fill in the names (using the clues) in the squares below?



Across:

1. Abundant along the river banks and coastal strips of India
3. Also known as Black Soil
4. Formed due to leaching in areas of heavy rainfall
6. The soil named after its brilliant colour

Down:

2. Found along the slopes of the Himalayas
5. Found in the western part of the country (in arid condition)



Activity II: Soil cover in an area



A. Where do you find soil?

- | | | | |
|-----------------------------------|--------------------------|--------------------------------|--------------------------|
| i) Inside the house | <input type="checkbox"/> | vi) In the park | <input type="checkbox"/> |
| ii) Below the trees | <input type="checkbox"/> | vii) Along the riverside | <input type="checkbox"/> |
| iii) Along the sea and the ocean | <input type="checkbox"/> | viii) On top of a mountain | <input type="checkbox"/> |
| iv) In the garden | <input type="checkbox"/> | ix) In the farm house | <input type="checkbox"/> |
| v) At the foothills of a mountain | <input type="checkbox"/> | x) Other locations – name them | <input type="checkbox"/> |

There can be more than one correct answer.

B. Prepare a soil map

Take a map of your municipality or neighbourhood. Mark the areas where soil occurs in green (according to your answers in A above).

C. Plot the area covered by soil

Measure the area of the entire map (using graph paper) and the area covered by soil. Calculate the percentage of the area covered by soil to the total map area. Depict this in the form of a pie diagram in the space given below. You can do a similar exercise for the entire city/district/state.

Pie diagram

Activity III: Know your soil

Soil colour, the first visible aspect that meets the human eye is a result of the mineral composition of the soil. We find Black and Red soil in the Deccan Plateau region of India.

Soil-structure refers to the arrangement of soil particles. On the one hand, it influences water movement thereby affecting plant growth, and on the other it gives clues about past biological and human activities.

Soil texture refers to the composition of soil into three categories – sand, silt, and clay. Clay soil is highly water retentive and resists wind and water erosion.

Here is a simple exercise to help you understand soil colour, structure and texture.

a) Collect soil samples from different locations.

b) Note down the colour of each sample.

c) Can you detect any living organisms in the soil sample? (You can take the help of a microscope from your school lab.) Write down their names.

d) Find out the main rock (parent material of the soil) of the area.

e) What is the main mineral present in that rock?

f) Does the colour of your soil sample more or less correspond to the colour of the main mineral present in the parent rock?

g) Dry the soil sample in the sun.

h) Take one part of the sample and weigh it.

i) Burn the sample and weigh it again. Compare the two measurements.

j) The difference in the measurements will tell you the amount of organic matter present in the sample.

Activity IV: Uses of soil



Do you know what the most important uses of soil are? Why must we protect it from getting washed or carried away? The following sentences will remind you the different uses of soil. Fill in the blank spaces by choosing the most appropriate word from below:

1. Soil cover on the earth helped human _____ to grow and prosper. It is the main base of _____. It provides _____ and _____ to plants.
2. Soil absorbs excess _____ and prevents _____ as well as recharges _____. Most of the rain water passes through different layers of soil _____ to reach the layer of ground water. During this period, soil plays the role of filtrating and _____ the rain water.
3. Soil plays a crucial role in _____. Many landfills use soil for daily cover.
4. Soil is the foundation for _____ projects. It is essential for building of roads, dams and _____.
5. Soil is the habitat for many _____.
6. Moisture present in the soil absorbs _____ and helps regulating the temperature of an area.
7. The type of soil needed by a particular crop depends on its ability to hold _____. While Regur soil helps the growth of _____, thick _____ can support rice, wheat, jute etc. Coastal alluvium helps the growth of _____ forests.
8. Naturally occurring grassland on thin soil cover along the hill slopes helps _____ and helps the economy of the people living on the hills.

rainfall, agriculture, organisms, animal rearing, construction, alluvium, heat, flood, mineral, moisture, purifying, waste management, mangrove, sugarcane, groundwater, profile, buildings, cotton, civilization, water.

Activity V: Genesis of soil

Soil formation is a result of physical, chemical, biological, and anthropogenic processes on the parent material (rocks).

1. Can you name the factors that affect soil formation?
2. Locate those names from the grid below

B	C	X	M	A	C	L	T	I	M	V	P
S	U	C	P	T	L	Q	M	V	F	G	O
R	O	C	K	A	I	L	L	B	K	S	T
D	I	G	Z	B	M	H	R	S	M	A	L
O	F	S	T	N	A	J	K	T	I	M	E
C	A	B	O	L	T	D	A	T	K	G	L
F	S	Z	M	N	E	G	Q	K	J	P	K
T	O	P	O	G	R	A	P	H	Y	W	D
R	O	L	L	N	G	B	P	L	A	O	L
B	I	O	T	I	C	M	A	T	T	E	R

Activity VI: Water content in soil

Soil contains mineral salts, organic matter, air, and water. While the mineral salts originate from the parent rock, humus gets added due to biological action taking place on soil over a period of time. The pore space in a soil segment contains air and in some circumstances, also water.

How do we know that a soil sample contains water? Carry out this simple experiment mentioned below to figure out the state of your soil sample.

Pick up a fistful of soil in your hand, and observe the following. Note down your observations and then match them with the indicators mentioned below:

1. Does it fall through your fingers?
2. Does it become a mound if you tightly press it in your hand?

3. Does some water seep out through your fingers if you tightly press the soil sample in your hand?
4. Does water come out of the soil sample without any action by you?



Answers:

Yes to question 1 – you are holding absolutely dry soil, cannot support crops.

Yes to question 2 – you are holding mildly wet soil, it will keep the plant-roots hydrated.

Yes to question 3 – you are holding very wet soil, good for crops like rice.

Yes to question 4 – your soil sample is saturated, it cannot breath as it has no air.

Activity VII: Measurement of the porosity of soil

Pore spaces present in the soil help in the retention of moisture. Porosity of soil depends on soil texture. You can measure the porosity or absorptive capacity of the soil by conducting a simple experiment.

- Collect a soil sample
- Dry it in the sun
- Take a funnel. Put a piece of filter paper on the funnel
- Put a measured quantity of sand on the filter paper kept on the mouth of the funnel
- Keep a cup below the funnel. Now pour a measured quantity of water onto the soil sample
- After 15 minutes, see how much water has collected in the cup below. Measure the quantity of water. Subtract this amount from the total amount (of water). The difference between the two figures will tell you how much water has been absorbed by the soil.

Sand is very porous and allows most of the water to pass through.

Silt contains fine grains and is moisture retentive.

Clay is highly moisture retentive.

Can you guess which category (sand, silt, or clay) your soil sample belongs to?

Activity VIII: Soil erosion and conservation

Soil formation is a very slow process; it takes hundreds of years to form a few inches of soil. However, it gets washed away in a second. Therefore, it is essential to preserve this valuable resource which helps us get our food and shelter.

Try out the simple experiment described below to understand soil erosion and conservation

- Take a tray whose sides are one inch high.
- Fill it up with soil.
- Take a sprinkler or 2-3 empty soft drink bottles (big size). Pierce a few holes below the bottle.
- Keep the soil-tray in an inclined manner – ensure that one end of the tray is raised slightly than the other side.
- Keep a plain tray just below the soil-tray.
- Start pouring water through the sprinkler on the raised side of the soil-tray. This is artificial rain on your barren soil cover. If you are using the soft drink bottles then ask one of your friends to help you in filling them up so that you can keep pouring the water continuously.
- Stop the artificial rain after 5 minutes. See how much soil has accumulated in the lower tray. This is what happens when rain water falls on soil in a tree-less region.
- Now put the soil back from the lower tray onto the soil tray again. Plant some weeds and grasses on the soil tray and again have artificial rain for 5 minutes.
- See how much soil has accumulated in the lower tray. You are likely to find less accumulation of soil in the lower tray. This means that you have succeeded in conserving soil with the help of weeds and grasses which hold the soil particles together and thereby prevent soil erosion.
- Find out more about other ways of soil erosion and methods of conservation. Make small bunds at regular intervals on the soil tray. The artificial rain on the tray will help you see rill and gully erosion. Can you suggest a way to prevent them?

Answers
Activity I: alluvium, mountain, regur, laterite, desert, red
Activity IV: civilization, agriculture, mineral, water, rainfall, flood, groundwater, profile, purifying, waste management, construction projects, building; organisms; heat; moisture, cotton, alluvium, mangrove; animal rearing
Activity V: climate, rock, time, topography, biotic matter

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