

# Soils activity

## What it is

**Soils** is a card activity for 2-6 players designed to help learners understand the characteristics of the main components of soil. It comes as a pack of cards organised into five suits, each of which has 13 cards. The suits are:

- clay
- silt
- sand
- living organisms
- organic particles

**Soils** is essentially a sorting activity. You could use a similar approach in other parts of the curriculum where sorting into related characteristics is appropriate, such as plant taxonomy or disease characteristics.

## Tips

You can use the cards at different stages in the learning process, and you could use them more than once to support progressive development of your learners.

Early in the learning process If you use them **to help learners acquire and develop their knowledge of the topic**, then you may wish to do some preparatory work before the activity such as:

- spending some time organising the cards into suits to check basic knowledge of the different components of soil. You could do this by putting all the cards on the table and picking out the ace of sands, silts etc. Learners then allocate each card to one of these, making a line of cards under each ace. Learners could work in small groups, discussing any unfamiliar terms or concepts
- using copies of one or more of the handouts beforehand – in particular the handout **Soil components** provides a full list of cards which learners can use as a preparation or crib sheet

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- having a practical session beforehand to familiarise learners with the different components of soil. The handout Testing soil may be useful for this
- a quiz, word search or gapped handout to check understanding of technical terms. One of the trial sites, Shipley College, used the 'hangman' approach to help learners to become familiar with technical terms. One learner (or group) indicated how many letters there were in the word – the other learners then suggested letters. Where the word contained these letters the first learner wrote this in the appropriate place in the word. Where it did not belong, the learner drew part of the hanging man.

Later in the learning process You can also use the cards to help **learners revise or deepen their knowledge of the topic**. For example, you could use the activity as a basis for discussing good and bad practice.

Note: the activity is most relevant to **Priority 1: How you teach theory**.

### How to use the activity

You can use the cards in many different ways. Here we provide three suggestions which have all been used successfully.

#### Option 1 - Rummy

- Shuffle the cards and decide who will deal.
- Dealer gives out six cards per player in clockwise direction. He or she places the remaining cards face down in the centre of the table and turns over the first card to create a discard pile.
- The first player decides whether to take the discarded card or the card on the top of the pile. He or she then throws away one of his or her cards.
- When a player has three cards from one suit he or she creates a 'set' and puts this on the table face up.
- The winner is the first to make two sets. The game may then continue or finish at that point.

## Option 2 - Sevens

Note that you can do the full version of this activity by using all five suits – or you can simplify the activity by using just three suits: sand, silt and clay.

- Shuffle the cards and decide who will deal.
- The dealer deals out all the cards in a clockwise direction. Each player makes an initial attempt at sorting their cards into suits.
- The player with the 7 of silt goes first and lays the card face up on the table.
- The next person then checks their cards to see if they can go. They can place either a 6 or 8 of silt or another 7 of any suit. Cards are placed down in rows of the same suit (sand, silt or clay), starting with a 7, working down to ace (7, 6, 5, 4, 3, 2, ace) or up from the 7 to the king (7, 8, 9, 10, J, Q, K)
- The next player then lays down a card if they can go. If they cannot go they pass to the next player.
- The winner is the first to go out, by using up all their cards.

## Option 3 - Soilitaire

Note that you can simplify this activity by using just three suits – sand, silt and clay. Explain to learners in advance that they need to watch the activity carefully so that they start to know where different cards are on the table.

- Lay out all the cards face down on the table. Decide who will play first.
- The first player picks up three cards. If they are all from one suit they place them as a set in front of them. If they are not from one suit they put them back in the same places they took them from.
- The next player does the same thing, using memory to help match the cards.
- Continue round the table.
- The winner is the first player to make two sets.

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## You could also use the cards:

- for matching activities – in small groups or one-to-one with work-based learners
- for background information
- to help with key skills and language, literacy and numeracy (LLN) skills – for example, by focusing on spellings of technical terms.

## Extension activities

You could extend this activity by :

- introducing concepts such as cation exchange
- discussing ways of modifying soil for a particular purpose – this could lead into the Soil Preparation activity.

## Soils – interactive version

There is an interactive version of **Soils** on the continuing professional development CD-ROM and learner CD-ROM.

## Instructions

The aim of **Soils** is to become familiar with the characteristics of sand, silt and clay.

The dealer deals one of each soil type. The players must match the upturned card with one of the soil suits. The activity continues until all the cards have been placed correctly.

When the game is completed, the player is given a percentage score, based on the number of correct turns taken.

# Soil Preparation activity

## What it is

This activity is designed to help learners investigate how best to prepare soil for planting different plants. There are two versions, one for agriculture and one for horticulture.

**Soil Preparation** is essentially a sequencing activity. You could use a similar approach elsewhere in the curriculum where the ability to put tasks into a sequence is useful such as growing a crop, carrying out a risk assessment or planning an event.

## Tips

It can be used in three ways.

- **To link with and support practical work** If learners are working on a real site they can complete the data sheet when visiting the site and discussing with the teacher. In pairs or groups they then use the preparation activity cards to plan how to prepare the soil for planting.
- **During work experience** Learners could complete the data sheet with employers, using a site in the workplace. They could then use the preparation activity cards to plan how to prepare the soil for planting either near or off-the-job.
- If a real site is unavailable, then it could be used **to prepare for or simulate practical work** – learners can complete the data sheet fully for a scenario which the tutor gives them (or that they give each other). Again, they decide in pairs/small groups how to prepare the soil for planting. A photograph of a possible site might help add realism.

Early in the learning process Some learners may need to do some preparatory work to define terms or to ensure they are familiar with the operations involved and the effect they have on the soil.

Later in the learning process More experienced learners may be able to work more independently and carry out the extension activity below.

Note: the activity is most relevant to **Priority 1:** How you teach theory and **Priority 2:** How you relate theory to work experience.

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You may need to adapt the activity to local conditions by removing cards that are not relevant to your area, or by using the cards most useful for your learners.

### How to use the activity

The activity has three stages.

1. The first stage is to fill in the data sheet by ticking the relevant information for your site, including:

- plants to be established
- soil type
- previous crop/plants
- topography
- ground condition.

If the weather is poor or you can't access a real site you could give the learners a scenario that includes this information. They can then complete the activity.

2. Learners, individually, in pairs or small groups, choose the cards that describe what they will need to do to get the soil ready for planting. Note that they may choose to carry out one activity more than once. They should then discuss their choices with the teacher or trainer. Add cards as necessary by writing on blank cards (supplied).
3. Learners then put the preparation cards in what they consider to be the best order to carry them out. They can justify their choice in discussion with other groups and/or the teacher or trainer.

Task (in sequence)	Reason why the task is needed at this stage	Effect of this task on the soil

## Contents

There is one board for each team of up to three players. It is good to have more than one per board to stimulate discussion. It can be played by up to 18 participants (or more if more boards and cards are used).



## Tips

The activity can be played by teams of up to three players per board. It involves choosing appropriate plants for specific soils and sites. If done as a competitive activity, the winning player/team is the one to successfully plant all plots or fields on their board. It is an activity which will greatly **benefit from planning well in advance**.

Early in the learning process it will be useful to start to build understanding of the terms and concepts involved. For example:

- use just the cards for sorting into plant types (alpines or cereals), soil preferences (sandy), or other qualities, to become familiar with plants, terms and information on the cards or other sources of information
- use just the boards to discuss terms such as pergola, poor drainage or names for soils, to clarify understanding
- use just the boards, perhaps along with other farm or garden plans, to discuss planting areas and types of planting.

Later in the learning process, some of the extension activities will help learners progress further. Consider:

- using the activity as described below, completing the first part of the score card (up to the column 'reason this crop/plant was chosen'). Encourage discussion before reasons are written down
- revisiting the activity again soon afterwards to complete the remainder of the score card. Discuss with learners soil management options consistent with responsible environmental practice and Cross Compliance.

Note: The activity is most relevant to **Priority 1**: How you teach theory, **Priority 2**: How you relate theory to work experience and **Priority 3**: Programme management.

## How to use the activity

It is important that you prepare the activity for your learners before you use it with them. You may wish to remove certain crops or plants that are not appropriate to your area.

Select the version you will use – horticulture or agriculture.

1. Each player or team takes a board with six different types of plot or field
2. Shuffle the plant labels and place them face down on a table
3. Players take turns to collect a plant card from the pile
4. They then try to match the plant with one of the plots or fields on the board (discuss their choice within their teams). They can use the information on the board and on the plant cards to help them
5. There are then two choices:
  - place the card on the chosen plot or field on the board. This is then 'planted'
  - to return the card to the bottom of the pile, and collect another card. They may do this only once each turn.

On the next turn, the player collects another card and evaluates it in the same way for another plot or field. The activity continues in this way until all agreed plots or fields have an attempted planting.

If played competitively, the winning team is the one with the most successfully planted plots or fields.

Players can use the score card to keep a record of the reasons for their choice of planting, and what they will do to the soil to help ensure the plant thrives. This might help when they come to justify their planting choices.

### Evaluating the choices

When a player/team has matched a plant to each plot or field on their board, discuss as a whole group:

- the reasons for their choices, and why they think the plant will thrive there
- what they will do to the soil to help the plant thrive
- how to manage fields (in the agriculture version) in an environmentally responsible way.
- Related issues such as Cross Compliance, maintenance and budgeting implications.

The board is counted as correctly planted when either:

- their peers agree they have made a satisfactory case or,
- the teacher agrees they have made a satisfactory case.

### Extension activities

The activity can be extended and adapted in a number of ways. For example:

#### Using blank boards with a dice

The Thrive! resources CD-ROM contains boards with blank fields and plots. To use these, add an extra stage after stage 2 of the activity. The teacher chooses two or three aspects for learners to determine the level in each plot, by rolling a dice; for example:

- drainage (1 or 2 = wet, 3 or 4 = good, 5 or 6 = dry)
- sun to shade (1 or 2 = full sun, 3 or 4 = partial shade, 5 or 6 = total shade)
- previous crop or planting (1: cereals / 2: grass / 3: potatoes / 4: sugar beet / 5: legume / 6: brassica or similar).
- degree of acidity (1 or 2 = acid, 3 or 4 = neutral, 5 or 6 = alkali)
- nutrient levels (1 or 2 = low, 3 or 4 = medium, 5 or 6 = high)

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If you do this you will obtain some unlikely combinations. But it will also present useful opportunities for discussion about why they are unlikely, and what might result if it occurred. If the teacher agrees the combination is not credible, roll the dice again to obtain a different combination. Record the 'set up' information for each plot or field on the score card. After each roll of the dice, discuss as a group and with the teacher, the implications for the plot or field.

You can use the dice to emphasise factors that may be relevant to the level of learners, the subject area, the experience of the group and even local ground and climate conditions. The dice can also be used to adapt the activity to meet individual learning needs.

### **Timed activity**

All the cards could be dealt out and players have to find a plant for each plot from their hand within a stated time limit.

### **Trading**

The plant cards are dealt out to teams so that each has just enough cards to 'plant' each of their plots/fields. Each team must then either use the cards they have been dealt, or trade with other teams to obtain the best possible planting for their board. This is an opportunity to develop group interaction and communication skills.

### **Real fields, plots and plants**

The activity can also be used with plans of actual fields or plots such as from the learners' workplaces. Real crop/plant seed labels (or other information) could be incorporated into the activity – the selection can be varied to be most relevant to the learners. In this case, they may also be able to bring actual information on acidity/nutrient status/other factors and so help to link what they do at work with what they learn in theory sessions.

### **Environment and conservation**

Once planting is complete, learners can discuss where possible hedge planting or other conservation measures might best be placed, or how the management of the soil affects soil conservation, compaction, water retention/runoff, erosion, nutrient loss/pollution. A plan can be drawn up to detail how best to manage the areas to minimise adverse environmental effects, paying particular attention to Cross Compliance issues (Agricultural version).

### **Consideration of soil and crop rotations (agricultural version)**

The activity could be played using only two fields on each board (using the 'blank' fields available on the CD-ROM), where the learners must collect all the cards needed for their fields for a complete rotation, playing in turns and evaluating their choices as described above.

Discuss soil management and conservation, biodiversity, soil fertility, disease control, efficiency of cultivation, the relationship between soil management and soil air and water (preventing compaction, managing runoff, managing soil to optimise moisture availability without waterlogging), and the relationship between these things and optimum cropping sequence. Learners' completed score cards should reflect sound environmental management as well as good crops.

### **Links with other parts of the curriculum**

The activity can be used to link work on soils to other topics forming part of the programme. Learners could research the availability of each plant chosen, cost the proposed planting, calculate gross margins or the machinery required to grow the crop, plan the maintenance requirements of the planted areas.

### **Developing language, literacy and numeracy (LLN) and key skills**

Debate different planting options (communication), calculate field areas, work rates of machinery or estimate labour needed (number) or plan the planting work (working with others). You could also link to possible assignment work, using a real garden or farm.

### **Use of supplementary information**

Learners could use reference books or other sources of information to identify and justify suitable crops.

### **Blank cards**

Blank cards are supplied in the resources folder so that the selection of plants can be made more relevant to the learners.