3-5 years

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Science Content:
Science Content:
Earth Science and Life Science

Target Concepts/Skills:
Soil covers the earth as part of its top layer. Soil is not uniform in structure and appearance. Soil has particular properties according to the type of soil. There are a variety of things (living and non-living) in soil.

Target Age group:
3-5 years

Duration of activity:
Maximum time 3 hrs.

Summary:
Children explore the composition covering of the earth. They are engaged in handling different types of soil and adding water to see how these different types of soil behave. The behaviour of soil when water is poured through different soil samples is then carried out as an investigation.

Objective:
By the end of the activity children should be able to:

- recognise that soils have a structure and different components;
- realise that different types of soil have simple different properties of appearance and water retention;
- use appropriate vocabulary to talk about what they do and observe.;
- manipulate and observe different soils;
- collaborate and share observations with other children;
- carry out simple filtration ;
- establish fair test concept with the help and support of the teacher.

Resources:

- Pictures of soils and word wall featuring ' Soil' words
- Trays each with different soils, such as sand, peat/compost, and soil from garden.
- Digital cameras, computers for uploading pictures taken by the children, access to internet
- Work surfaces covered with protective covering
- Hand washing facilities and towels
- Trowels, containers to put soil into.
- Plastic see-through beakers for soil samples and for looking at air bubbles
- Lollipop sticks or some sticks spoons for touching and mixing soil
- Non latex disposable protective gloves
- Newspapers or other cover for work surfaces
- Water supply
- Newspaper or paper and 2 paper plates and a scoop for each child. Each child can have a scoop of the soil. They may like a spoon or large plastic forceps to use as equipment to sort the soil.
- Paper plates or card squares and glues to stick samples on to the paper plate etc.
- Hand lens or magnifiers
- Jugs;
- Water supply
- Small thin plastic bags to use as gloves or small disposable gloves if obtainable.
- Plastic bottles with tops cut and inverted to make a filter system;
- Filter papers or pieces of kitchen towel to act as filter paper. The inverted top acts as a funnel and needs to be lined with filter paper or a piece of kitchen towel double thickness to stop the soil going through the hole.
- Local children's stories about soil, Children's own stories about soil written and illustrated in an OUR SOIL big book.
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Soil

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CAPACITIES

Soil

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1. Engage (Forming hypotheses)

What is soil like? Are all soils the same?

Inquire what the children already know about soil, what is it? What have they done with it before? What stories can they tell about soil? Collect these for a BIG BOOK.

Orientate children by asking them to look outside, help them remember what they see at home and whilst coming to school. If there is not much variation in the local environment, show pictures of a built environment, gardens, and ploughed field.

Ask them what covers the earth?
Ask them to point out in the pictures or on a walk around school what is natural covering and what humans have made and what is made from plants but humans have put there (lawns, flower bed shapes)
What cover have been put there by humans around school and in school (floor)? By nature? What is under the coverings? What is it called? Is it all the same?

What is in soil? How can they find out what soil is like?

2. Inquiry

Ask the children their ideas for obtaining soil, how much; what will they put it in? What is their plan? What items do they need to carry out their plan? If in a group which child will do what action?

When they have garden soil samples what is their suggestion of finding out what it is like and what is in it?

Ask children to talk about the soil samples. What word can they use? If the soil is all the same? Is a sample the same all the way through? Is soil wet or dry?
What ideas do the children have for investigating the soil. What do they need to do this? What are their ideas? Does using a hand lens help?
What about the size of the particles?

Do they comment on the colours?

Are there any other things in the soil (stones, leaves? Shells, invertebrates, sticks perhaps)
If they add water how can they measure the amount of water they use? How can they make it a fair investigation?

They may want to add water, in what amounts? How will they measure the water? They may want to dry soil and see what happens.
Encourage them to add some water to an amount of dry soil and watch the air bubbles come out. Ask them what is happening.

Encourage them to pick out any stones, vegetable matter, and any animals. (If there is any animal they need to be put in a separate container and kept moist and returned to outside).
Tell them to use the science implements or the scoop not their hands.
Each child will have their collection of what they have observed on the second plate or piece of paper.

3. Evaluation

Ask the children one by one to say what they have seen and found out.

Ask them to describe their soil plates.

Older early years children can be invited to draw their plate and its contents and say a few words about them,.
Encourage the children to photograph their plate if you have that facility
Is soil the same or has it different bits?

What can they say about it?
What have they found in it?
What do they feel about soil?

If the children stick bits (e.g. a stone, a twig soil particles) from their soil sample on the plate with a firm glue they can hold their plate up and compare their soil sample with that of another learner. The plates can be displayed on the wall with soil words , descriptive and then affective, written near them as a dissemination.

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Second Activity

1. Engage (Forming hypotheses)

Can you pour water through the soil and collect it again? Extension work
Does the water go through all soils in the same way
Ask the children what will happen if they add water to soil? How can they test their idea?

What do the children know about separating things already?

2. Inquiry

What are their ideas for investigating? In their groups or one to one with adult they can talk and then share their ideas to ay other groups working on the same topic.
What equipment do they think they need? What is their plan?
What do they need to do? What do they expect to find happens?
If they are working in twos, what will each children's job be in collecting equipment then doing the investigation.

How can they measure the amount of water they use and how much they have at the end? Do they want to time by some means the time it takes? This is small group work. How will the children measure the water they pour in and collect at the bottom?

Ask what are their ideas? How will they do this?

Use another same sized plastic drinks bottle and mark on the bottle with sticky tape the level at which the water is when they start pouring
Use the same sized bottle as the bottles with the inverted cut off tops.

3. Evaluation

Once they have poured through the entire water volume, wait. Ask the children what they observe. When the drips stop falling into the water place the pouring bottle with the mark on it next to the bottle in which the water that has gone through the soil is contained.

Are they the same level?
What is the explanation?

You can try this activity again with sand, peat/compost and with clay and the children can notice the different water holding power of different soils and the different speeds at which the water will pass through .
How can the children make this a fair test?
What are their ideas?

They need to use the same amount of soil and water for each investigation. Different groups could try different soil and then compare.

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Soil

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Teachers Notes

Vocabulary: Soil, earth, particles, mixture, spaces, air, rocks, stones, twigs, leaves, plant remains, animal, clay, peat, garden soil filter, pour, sort, stick, measure, fair test, equal volume, water.

These activities require observational skills using descriptive words and action words and basic science skills and the appropriate words to use such as fair, pour, sort, measure, time.

Earth or soil is the top, layer of the earth and is brownish in colour. It is often covered over by close growing plants such as grass or human made materials such as concrete. Peat is largely organic material composed of sphagnum moss. Rainwater soaks into the soil. When soil is full of water is a darker colour than when it is dry. Leaving soil inside usually results in its drying out. If you put some damp soil on a paper plate near a window in the summer or a radiator and watch the colour change. The soil will dry out and change colour as the moisture is lost. Different soils contain differing amount of water. Sand for example contains very little water, whereas peaty soils and clay retain a lot. That is the point of using the filters and pouring the same amount of water at the same temperature through the same amount of different soil.

Earth is not uniform. It contains small bits of broken rock called stones and is a mix of minerals from the underlying rocks and biological material such as dead parts from plants or other living things. Fresh garden soil may also contain snail shells and dead parts from other invertebrates. When plants grow their roots are in the soil. If you uproot a weed you may find bits of soil clinging to the roots.

The idea of these activities is to introduce the children to the fact that soil is not uniform and is made of small bits called particles, which have gaps between them full of air or other items. If you put some dry soil in water you can see the air bubbles leaving the gaps between the soil particles.

Have the children look at small amount of soil and separate what they see using sticks or a spoon to spread out the particles. Health and Safety - check what the local regulations are about soil use and avoid allowing the children use their fingers. Non-latex disposable protective gloves may also be useful for protecting hands. Small, thin plastic bags may be used instead of gloves if small sized one is not available. Children need to transfer some soil onto a plate to examine a small sample of the soil and make their comments on what it looks like, what it is made of and what is its function.

Encourage the children to talk and remember stories and experiences about soil. Use their photographs of their work and their collected dialogues to make a BIG BOOK of OUR SOIL, including photographs and drawings of their work.

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