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WEEK 1 -- ROCKS AND SOIL

Soil is one of the great mysteries. We know that different plants need different kinds of soil. Gardeners learn which parent rocks form sandy, clayey, and loamy soils – and which soils are preferred by different plants.

DAY 1

Verse, Song, and/or Dance – Rock verses.

Activities

Indoors – **Rock Music** -- Bring rocks inside the classroom. If you have a section of the classroom where the children build with blocks, have a rock pile as well. Use them in the Nature Corner and also on the puppet stage. Use the round river rocks with the best sounds in the instrument corner. Write poems about singing rocks after exploring them thoroughly as musical instruments. Students can clap the stones together to determine if they have high pitched or low pitched or somewhere in between. You can ask children to find groups where the pitches are most the same. Of course you will help them as one by one they demonstrate the pitch and sounds of their rocks. In ancient China there was a rock instrument called a “pien ching”. It was different pitched stones hanging from a stick and played with another stick. These can be made easily.

Bring geodes to class and wonder at the crystals. Put them on the Nature table. Have the children feel them, smell them. Geodes seem to hold magic secrets. Tell stories of gnomes gathering these jewels under the earth.

Teach them the African rock passing game OBA SEMI SA. Do it until their own rock comes back to them. Then they can add that rock to the wall or garden border that you are making. Do this in as many classes as the enthusiasm lasts.

Outdoors – **Rocks and Soils** -- Every now and again in the classes there will be a time to go out and choose a rock. Then we can do a sensory exploration of the rock. We can smell the rock; feel it for smoothness, roughness, sharp areas. Is your rock cold? Is it heavy or light? How many colors does your rock have? What sound does your rock make when tapped against another rock? Which kinds of rock make the most musical sound -- the flattest sounds? the loudest sounds? what words do you use to describe your rock?

Note -- Throughout the Outdoor Garden Lessons, the children will be working with soil, rocks, compost, plants and water. These activities will get them a bit muddy or soiled from time to time, so it is important that the children wear clothes and shoes which can take this treatment. Brand new pure white \$50 tennis shoes are not appropriate for Garden Classes ...!

MAIN LESSON - SOIL (1)

March

WEEK 1 – DAY 1

Outdoor Activity, continued

Observe, feel between the fingers, and note colors and differences to touch (textures) of four different rocks each with their associated soil types and elemental origins (relate to Creation stories):

Fire: Lava rocks: born from the volcano types: (a) heavy and dense;
(b) light with air bubbles

Note also lichens and mosses

Soil: cindery gravel (feel between fingers and thumb, note coarseness)

Wind: Sandstone: deposited by wind (or water) into sand dunes; crumbly to touch

Soil: sand (feel, note graininess)

Water: Mudstone: deposited by water; note ripples

Soil: clay (feel dry and wet; note stickiness, plasticity, fine grain)

Limestone: also water deposited, formed of shells of ancient creatures;

Soil: loam (feel, note intermediate quality -- between sand and clay)

Compost: note fresh uncomposted materials and developed compost;

(if time permits, look under trees for evidence of litter decomposing into soil)

Art or Journal Work – Draw the earth's rock cycle –

muds, clays, sands to sedimentary rocks
to erosion back into muds, clays, sands --
to compression/heat (in the folding of the Earth's crust) to igneous rocks –
to erosion back into muds, clays, sands --
to volcanoes to lavas --
to erosion back into muds, clays, sands --

MAIN LESSON - SOIL (1)

March

WEEK 1 – DAY 2

Verse, Song – Continue, expand Earth verses and songs.

Story and Discussion -- Explain to the children the process of soil formation –

Rock particles (eroded by wind and water) +
plant/animal remains + water + air + sun +
soil life + Time = Soil

Activities

Indoors – Soil Formation -- Make puppets to tell the story of the formation of different soil types, from parent different materials.

Outdoors – Soil Textures -- Repeat soil texture experiences – have children feel the difference between gravel, sand, loam and clay.

Take a Field Trip to collect rocks for the garden beds (and to look for good digging sticks).

Art or Journal Work -- Draw Soil Formation from parent rock and other constituents

WEEK 2 -- SOIL LIFE AND COMPOST

The Soil (Nutrient) Cycle -- When a plant or animal dies it decays (through action of insects, worms, and micro-organisms) and leaves nutrients in the soil. New plants take in the nutrients through their roots, and become part of the soil cycle.

The soil cycle:

1. Plants growing in the soil.
2. Animals eat the plants
3. Carnivores eat the herbivores
4. The animals and plants die and fall to the earth
5. Insects, worms, fungi, bacteria and other tiny creatures decompose the animal and plant remains, returning nutrients to the soil, and to the next generation of plants and animals.

Insects, worms, bacteria, fungi and other living things decompose nutrients such as leaves and twigs and create soil. This is the original re-cycling – for example, forest floors. We imitate this process with our composting methods – which still require the power of worms, insects, bacteria and fungi.

MAIN LESSON - SOIL (1)

March

WEEK 2 -- DAY 1

Verse, Song, and/or Dance – Earth worm songs.

Activities

Indoors – Soil Cycle Puppets – Make puppets, enact the Soil Cycle.

Start compost collection – from children’s lunches, from school cafeteria. Encourage other classes to participate also.

Outdoors – Compost -- There are many different kinds of methods of composting. A quick one is to take the bottom out of a plastic laundry basket. Dig a hole in the garden in the shape of the laundry basket. Then put the basket over the hole and fill it with alternating layers of soil, collected compost materials, straw and manure. Keep it moist and turn it over once a week with a shovel or fork to let air get to the bottom. It will take two months or more (depending on the season) for the pile to develop a loose crumbly texture. Then you can add it to the garden.

Have a Tool Safety and Care lesson – teach the children to always be mindful of where both ends of their tool (shovel, rake, hoe) are; teach them to clean off and put tools away in Tool Shed after each class.

Art or Journal Work -- Draw the Soil (Nutrient) Cycle -- Make a chalkboard drawing of this cycle and have the children put it in their journals

WEEK 2 -- DAY 2

Verse, Song – Continue and expand Earth verses and songs.

Story and Discussion – “Willy the Worm” and others.

Worms are very beneficial to the garden. They break up and aerate the soil, making it good for plant roots to grow in. Worms digest organic matter and excrete it as castings which are high in nutrients for all soil life. Worms eat their own weight in soil every day. The mouth takes in the soil -- the crop, gizzard and intestines digest it. A worm has a brain, nerves and five pairs of hearts. Worms have a very fine sense of touch with which they can feel vibrations from above the earth when they are three feet underground.

Activities

Indoors – Worm Garden -- Build your own Worm Garden box (or take a large plastic storage box and give it a plexiglass cover that is taped with duct tape. Turn it on its side and you can view worms make their tunnels). Fill two boxes with organic materials and add earthworms to one. Compare and record the results with drawings in journals.

Outdoors – Compost -- Dig a compost pit. Fill with materials in layers as above (Day 1 Compost). Cover the pit with straw; moisten and turn it frequently. Keep the pile loose so that worms and other creatures can move around and do their work of decomposing the soil. Note what creatures are unearthed.

Art or Journal Work -- Draw Willy the Worm and his/her companions in the compost.

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MAIN LESSON - COOL SEASON PLANTS

March

WEEK 1 -- BULBS

DAY 1

Verse, Song, and/or Dance -- Song: MY ROOTS GO DOWN, DOWN TO THE EARTH

Learn a dance. Get a book of simple children's dances. CHIMES OF DUNKIRK is an excellent book of very simple and joyful dances for young children.

Activities

Indoors – Plant Needs -- Review and discuss what plants need (from February's earth Main Lesson). Relate this to Bulbs. Note that bulbs in particular need cold as well as warmth. Check on daffodil, tulip and hyacinth bulbs put in refrigerator back in late January (eight weeks or so ago). Make puppets and enact bulb needs.

Outdoors – Garden Beds -- Build new garden beds – divide children into manageable groups (not more than 4-5 per group, with one adult mentor, is ideal). Each group should work on one part of the new bed.

- (a) define with rocks where bed is to be;
- (b) dig up area to remove rocks, loosen soil;
- (c) shovel manure, compost, soil amendments onto dug area; smooth with rake;
- (d) turn whole bed area over with shovels;
- (e) smooth bed with rakes, working from back to front edge of bed;
- (f) bring more rocks to define the border.

We want the children to become enthusiastic diggers. This is a real experience of teamwork, for there are many different things that can be going on at once. A screen can be used to sift soil that is turned out and so you can have an area of sifters. Some children can be gathering large rocks. Some can be transporting soil to the sifting screen. The diggers and rakers can be taking turns.

There will be hardy children that love the work. Let them have more than their fair share; others can specialize in what they're more suited to. Encourage the hardiness in all as it lives on in their later capacities to work and love the outdoors.

Art or Journal Work -- Draw Bulb Life Cycle – from sleeping bulb to emergence of roots and shoots to growth of stems and buds to flowering to formation of new bulblets.

Make base map of the garden beds, which the children can fill in and add to as they plant and build rock walls.

MAIN LESSON - COOL SEASON PLANTS

March

WEEK 1 -- DAY 2

Verse, Song – *Busy gnomes bring to birth
Little seeds in the earth.*

*Airy sylphs power bestow,
Help the plant to thrive and grow.*

*Sunsprites bring warming gold,
Rainbow hued buds unfold.*

*Watersprites feed the shoots
Striving upwards from the roots.*

*Flowers all secrets keep.
In their hearts new seeds sleep.*

*Water, fire, earth and air
In their growth have a share,
That a seed
a seed may bear.*

– Roy Wilkinson

Story and Discussion – It is now early Spring. What is happening in the earth? What are the first signs of Spring? Discuss changes in Sun, Air, Water, Earth, Plants, Animals.

Activities

Indoors – Bulb Planting in Pots – Plant in pots (4-inch for hyacinths, 1 gallon for tulips and daffodils) the bulbs cooled in refrigerator since January. If weather permits, mix potting soil fixings outside and bring in; otherwise you can mix soils inside on large tarp brought in for the purpose. Basic bulb potting soil mix: two parts sand to one part compost or loam; add dash of greensand and rock phosphate (for trace elements and phosphorus nutrition).

If you have enough sunlit classroom space (southern exposure), you may also start some warm season seedlings indoors at this time (about eight weeks before last frost). These might include tomatoes, bell peppers, hot chiles and eggplants – all of which need eight weeks to develop. Basic seedling potting soil mix: one part sand to one part compost or loam to one part peat moss; with dash of greensand and rock phosphate.

Examine bulbs and rhizomes to be planted outdoors. Be sure children know which end goes down. You might want to prepare some little garden signs with bulbs' names, to identify plots.

Outdoors – Bulb Planting -- Plant spring bulbs and rhizomes (lilies, day lilies, gladiolas, anemones, irises; also, ranunculus, alliums, scillas) in prepared beds at proper depth; cover with enough soil, mulch; mark bed edges with rocks and prepared signs, if any.

Continue building new garden beds.

Art or Journal Work – Record plantings on garden map. Draw early Spring – the awakening of the Earth.

MAIN LESSON - COOL SEASON PLANTS

March-April

WEEK 2 -- SEEDS AND SEEDLINGS

DAY 1

Verse, Song, and/or Dance – Continue and expand verses and songs for early Spring.

Activities

Indoors – **Seedlings** -- Review the plants' life cycle – as for bulbs, only now starting from and ending with seeds.

You may start seeds indoors if you have enough exposure to sunlight (at least four to six hours per day). Or you can start some cool season seedling pots or “six-packs” and set them outdoors in the grow boxes made in December – or in your new cold frames (see below).

At least one grow box or cold frame should have a recording thermometer which the children can observe, to be sure temperatures don't get too hot. Also, you must be sure to check on seedlings in the grow boxes and cold frames, and water them lightly but consistently as needed (probably twice a week).

The cool season greens, stems, herbs and flowers listed below are among the best for starting in pots – especially those with the larger seeds (marked with an asterisk *) for easier handling by the children.

Outdoors – **Cold Frames** – There are many ways to protect hardy plants from Spring frosts, and help them start growing earlier. A **cold frame** is a wooden frame with a removable glass (or plastic) lid. It is a good place to put the seedlings that have been grown indoors before they go into the garden beds. This is called hardening off. The plants will get used to the outdoor conditions gradually. Or you can plant the cold frames directly. On warm days you can open the lid, and on cold days leave it closed. Third-graders with teacher and parent supervision can learn measurement and planning from building these.

Similar is a **hot bed** - a more effective cold frame. This will give plenty of digging for the children if you have a source of fresh manure. Dig a pit 18 inches deep that will be filled with the fresh manure. Add one part soil to two parts manure. Add water and stomp it down. Make sure there is a layer of soil over it. Turn it and do this process for several days. Then plant directly into it. If you have a removable frame right over your intentional bed, you can jump start the season at least a full month.

Field tunnels are made of heavy wire hoops (like oversize croquet wickets) stuck into the beds in a row at 2-3 foot spacing. Then you stretch polyethylene plastic sheeting over the row lengthwise from end to end, with two feet extra at each end to secure to a stake. You pull the plastic sheet so it covers the hoops evenly on both sides; bury one edge with shovel-fulls of soil; the other edge can be opened and closed for ventilation.

Cloches - You can even use inverted glass jars, or cut plastic 1-gallon water jugs to put over individual plants ('cloche' means ('bell' in French).

Art or Journal Work – Draw more Spring, Earth awakening.

MAIN LESSON - COOL SEASON PLANTS

March-April

WEEK 2 -- DAY 2

Verse, Song -- Continue and expand verses and songs for early Spring.

Story and Discussion -- Tell the children a story about a seed.

Activities

Indoors – **Seedlings/Coldframes** – Continue with indoor seedlings plantings and/or building cold frames.

Outdoors – **Cool Season Plantings** -- The children need to know how deep and how far apart to plant. Radishes, peas and garden cress take the least time to germinate. Planting in prepared beds --

- * rake bed smooth and level;
- * line children up along back edge, facing back; make furrow 1/2 inch deep for seed with hands;
- * sow, cover and pat down (lightly) radish or other seeds;
- * move out 2 feet, make another furrow, plant, cover, pat down – and so on;
- * when planting is done, mulch whole bed lightly with straw or hay, and water.

Cool season plantings -- leaf greens -- *spinach, *chard, lettuce, cabbage, cress, kale, mustard, endive;
stems – broccoli, cauliflower, brussel sprouts, kohlrabi;
roots -- *onions (sets), chives, *radishes, *beets, carrots, turnips, parsnips;
herbs – mints, thymes, oregano, marjoram, sage; catnip, dill, parsley; others;
*peas and *fava beans also may be planted early.
annual flowers – *sweet peas, *bachelor buttons, *calendula, california
poppies, pinks, snap dragons, larkspur, *cosmos, pansies, violets,
other;
perennial flowers – *hollyhock, sweet william, *flax, *coreopsis – and others.

(The fruits -- tomatoes, eggplants squashes, beans and cucumbers) are sensitive to frosts and so don't go into the garden until mid to late May).

Remember to check on seedlings in the grow boxes and cold frames, and keep them moist but not soggy. (Don't flatten the tiny seedlings by watering too hard).

Art or Journal Work – Record plantings on garden map.

SPRING

MAIN LESSON - SOIL (2)

April

This two-week Main Lesson block is to allow you to complete all Cool Season plantings and to prepare garden beds for Warm Season plantings in May. You may also want to use this time to do some of the Indoor or Outdoor Activities previously described which you haven't gotten to yet.

WEEK 1 -- COMPOST AND PLANT BEDS (1)

DAY 1

Verse, Song, and/or Dance – Full flush of spring .

Activities

Indoors -- As noted above. Also, by now it is time to start moving some seedlings from indoors to the cold frames.

Outdoors – Double Digging – A digging-intensive method of building fertile garden beds.

Dig out your first trench along an edge and down the length of a garden bed. Make the trench one foot deep and one foot wide at the bottom. Put the soil you have dug outside the garden bed, in a long pile. It is top-soil and will be used later. With a garden fork, dig down into the bottom of the trench another foot deep and loosen all the soil but don't remove it. This is the subsoil. To improve this soil, mix in a sprinkling of sawdust or straw with a handful of compost or old manure. Do this down the length of the trench.

Then start your second trench, beside the first one. Use the soil from the second trench to fill the first one. After you have dug the second trench out, loosen and amend its subsoil, as above. Continue in this way until the whole bed has been completed. When you have taken the soil out of the last trench, and loosened and amended its subsoil, fill the last trench with the soil you saved from the first trench.

After double-digging, fertilize the bed with compost or old manure and rock minerals. Greensand is trace-mineral rich ancient ocean mud; while rock phosphate is a good natural supplier of this essential nutrient. You can add these to the subsoil too, to increase the depth of the bed. If you are wanting to warm up soil, add fresh manure and fresh stable sweepings, hot compost and bone meal to the subsoil.

You can divide the children into teams – some for digging, some to fork subsoil, some to mix in straw and compost, some to rake fertilizers into the surface of the double-dug bed. Other children can be gathering out the rocks in buckets to be used to mark paths and borders between the garden beds.

This is also a good time to plant wheat and/or other cool season small grains (oats, rye, barley, triticale). Prepare a smooth seed bed, broadcast seed, rake to cover lightly; mulch lightly with a scattering of hay or straw; water.

Art or Journal Work – Record day's activities.

MAIN LESSON - SOIL (2)

April

WEEK 1 -- DAY 2

Verse, Song – Continue with Springs verses and songs.

Story and Discussion – As appropriate.

Activities

Indoors – Discuss work to be done outdoors. Get the children out !

Outdoors – Continue and complete planting cool season crops in prepared beds, as appropriate.

Adults (parent volunteers) should work to design and install a simple drip irrigation system for all the gardens beds. The drip system should be completed and functional by the end of April.

Art or Journal Work – As appropriate.

WEEK 2 -- DAY 1

Verse, Song, and/or Dance -- Continue with Springs verses and songs.

Activities

Indoors – Discuss work to be done outdoors. Get the children out !

Outdoors – Continue and complete planting cool season crops in prepared beds, as appropriate.

Art or Journal Work – As appropriate.

WEEK 2 -- DAY 2

Verse, Song -- Continue with Springs verses and songs.

Story and Discussion – As appropriate.

Activities

Indoors – Discuss work to be done outdoors. Get the children out !

Outdoors – In late April to early May (around two weeks before the last frost), you can plant potatoes – especially in double-dug beds well-fertilized with manure. Get your seed potatoes from a nursery or supplier, as store potatoes generally have been sprayed to retard sprouting of eyes. You want smallish potatoes a bit bigger than golf balls to plant; plant them whole, six inches deep, about 1 _ feet apart, in rows three feet apart.

Also, by early May, all seedlings started indoors should be moved outside, the hardier ones in garden beds, warm season seedlings in cold frames. Check of them at least twice a week, to be sure they are moist enough.

Art or Journal Work – Record plantings. Other as appropriate.

SPRING

MAIN LESSON - WARM SEASON PLANTS

May

Now that it's May, we can plant all of the Warm Season crops (those which do not tolerate any frost, so must be planted when ground is warm and all frosts are past). These include direct seeded crops --

corn and sunflowers;
beans (for green string beans and for dry beans);
squashes (summer, zucchini, and winter), and pumpkins;
watermelons, canteloupes, honeydew melons; cucumbers;
dipper and birdhouse gourds; okra;
herbs – basil, coriander (cilantro); rosemary;
flowers: marigolds, zinnias, morning glories, 4 o'clocks, nasturtiums, and others;

And also seedlings which we started at least eight weeks prior (back in mid to late March) –

tomatoes, bell peppers, chile, eggplant;

We will put in a Three Sisters Garden. The Three Sisters: Corn, Beans and Squash provided food for Native Americans from Canada to Florida and west to Arizona -- as well as throughout Central and South America. There are many different legends about the coming of the corn, for it was the staple food of many peoples. Corn combined with beans and squash is a complete (complementary) protein.

WEEK 1 -- SEEDS AND SEEDLINGS (1)

DAY 1

Verse, Song, and/or Dance – Planting verse, song.

Activities

Indoors – Prepare for Planting – Discuss and look at seeds of the various warm season plants which should be sown directly.

Shell kernels of Native American corn (e.g., Hopi or Pueblo blue, Navajo white) from cobs and set out to soak overnight. Examine and set out bean and squash seeds for plantings.

Examine and discuss warm season bulbs to be planted (gladiola, dahlia, begonia).

Outdoors – Warm Season Bulbs – Plant warm season bulbs in bed already prepared.

Also, the first radishes planted in early April should be ready for the children to pick and eat.

Art or Journal Work – Record plantings on garden map.

MAIN LESSON - WARM SEASON PLANTS

May

WEEK 1 -- DAY 2

Verse, Song - Three Sisters verses and songs.

Story and Discussion -- Three Sisters story.

Activities

Indoors – Make and play with Three Sisters puppets.

Outdoors -- There are different ways to create a Three Sisters Garden. You may want to alternate rows of corn, beans and squashes; or plant corn in “hills” of four to six kernels each, with beans and squashes alternating. Or make “teepees” of poles on which pole beans may climb. The squashes, especially Navajo winter squashes (the very best for pie) need a lot of space, so put them on the edges of beds.

Art or Journal Work – Record plantings. Draw Three Sisters.

WEEK 2 -- DAY 1

Verse, Song, and/or Dance -- As appropriate.

Activities

Indoors – As appropriate.

Outdoors – Continue planting warm season crops in prepared beds.

Art or Journal Work -- -- As appropriate.

DAY 2

Verse, Song -- As appropriate.

Story and Discussion -- As appropriate.

Activities

Indoors -- As appropriate.

Outdoors -- Continue planting warm season crops in prepared beds.

Art or Journal Work -- As appropriate.