Pathfinder Honour:
Trainer's Notes

Seeds 1

Instructions to Trainers / Instructors of this Honour

Thankyou for being involved with this Honour. These notes have been developed to assist in teaching / instructing this honour. We recognise that there is much more information available and we are grateful that you should share your expertise.

Please remember that Honours are designed to develop our Pathfinders in many ways; their interests, their knowledge and their relationship with their Saviour and Creator. Your enthusiasm and creativity will have a huge impact on those doing the honour.

To complete an Honour, the following (where applicable) must be completed satisfactorily:

- Physical and Practical Requirements.
- Honour Workbook.
- Honour Assessment Sheet. *(On SPD Honour Website but Leader's level access is required)*

Additional Reference Material

http://en.wikipedia.org/wiki/Seed

http://en.wikibooks.org/wiki/Adventist_Youth_Honors_Answer_Book/Nature/Seeds

Acknowledgements

South Pacific Division of SDA: *Seeds Honour Notes*

Please refer to acknowledgements in the following text.

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REQUIREMENT 1: What is the main purpose of a seed?

Seeds are the means employed by plants to reproduce themselves. Plants of all kinds die of old age, disease, accident, or unfavourable weather conditions. God has arranged that practically all plants can reproduce and multiply by means of seeds.

Teaching suggestion: Find a plant going to seed and take a photo or make a drawing.

REQUIREMENT 2: What foods were first given to man in the Garden of Eden?

Gen. 1:29. *Then God said, "I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food"* – New International Version.

In the Ministry of Healing, Mrs E G White explains on pages 295, 296. *"He who created man and who understands his need appointed man his food ... Grains, fruits, nuts, and vegetables constitute the diet chosen for us by our Creator. These foods, prepared in as simple and natural manner as possible, are the most healthful and nourishing."*

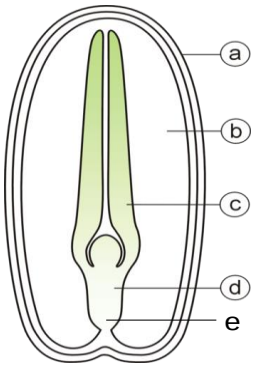
Teaching suggestion: Paste or draw and colour pictures of these 4 kinds of foods first given to man in Eden.

REQUIREMENT 3: Identify from a seed or drawing and know the purpose of each of these parts of a seed: embryo, seed coat, endosperm, cotyledon, hypocotyl and radicle.

The various parts of the different seeds are quite complex and a detailed knowledge of such is beyond the scope of this honour. For more information please search on 'seed anatomy'. A useful site is: http://en.wikipedia.org/wiki/Seed#Seed_structure

The diagram shows the basic parts of what is called a dicotyledon seed. See (c) below.

The embryo is an immature plant that will grow under proper conditions contained in a seed. In other words, it is the baby plant.



(a) The seed coat is the covering which protects the seed parts.

(b) The endosperm surrounds the embryo and contains the food required for the seed to grow. It is in the form of starch, though it can also contain oils and protein. It is an important source of nutrition for humans. For example, wheat endosperm is ground into flour for bread (the rest of the grain is included in whole wheat flour).

(c) The cotyledon will become the first leaves a plant will produce. A dicotyledon has two of these 'seed' leaves.

(d) The hypocotyl is a part of a germinating seed. After the emergence of the radicle - see seed part (e) - it emerges and lifts the growing tip (usually including the seed coat) above the ground, bearing the 'seed' leaves (called cotyledons). The hypocotyl is the primary part of young plant which develops into the stem.

(e) The Radicle will become the primary root and penetrate down into the soil.

Source of diagram: http://upload.wikimedia.org/wikipedia/commons/4/4f/Budowa_nasienia-dwuliscienne.png

Teaching suggestion: Carefully cut open some of the seeds that have sprouted and draw the baby plant. Peas, pumpkin, or beans are easy to watch this way.

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REQUIREMENT 4: Know four different methods by which seeds are scattered by the plant. Name three kinds of plants that scatter their seeds by each method.

By animals and birds.

Edible fruits - These are usually pleasantly flavoured - a payment to animals and birds for scattering the seed. viz apple, blackberry, cherry, currant, mistletoe, prickly pear. Until seeds are ready to be scattered, fruit is often protectively coloured and has an unpleasant flavour. In some cases it may even be poisonous until the seed is ripe

Hitch Hiking on Fur or Clothing. Seeds are usually hooked, e.g. grass seeds (spear grass), bindi bids, bindii, clover burr.

Animals squeeze out seed; viz melons, cucumber, grass

By Wind

These seeds are usually lightweight, small or have a large surface area.

Hairy seeds - viz thistle, plane, clematis, bulrush, dandelion. These seeds soon reach soil and do not travel long.

Winged seeds - viz pine, elm, maple, oak, sycamore. Crows ash

Seed boxes that rock - viz poppy, carnation, larkspur.

Parts that separate – viz spinifex, wind grass.

By Water

Seeds that float – viz coconuts (ocean islands), thorn apples (along rivers), mangrove fruit (tidal mudflats).

Seeds that wash to islands – viz spinifex.

Lifebelts to assist in floating – viz wattle seeds.

By Explosion

Pods burst and throw away seeds - seed pod halves twist in opposite directions – viz gorse, sweet pea, lupin, broom.

Seeds squeezed out – viz pansy.

Seeds squirted out – viz balsam, squirting cucumber.

Seeds twisted off – viz geranium.

REQUIREMENT 5: What conditions are necessary for a seed to sprout?

The seed must have a live embryo which has not been affected by heat, cold, or disease.

The seed must not be in a dormant or resting state. Some seeds can be dormant for a long time while others die after a short period.

The correct environmental conditions must exist - good soil, oxygen, water and ideal temperature are required for germination. Most seeds are not affected by light or darkness, but many seeds, including species found in forest settings, will not germinate until an opening in the canopy allows sufficient light for growth of the seedling.

In Australia, many species such as Wattles sprout after a bushfire has passed through.

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REQUIREMENT 6: Know ten kinds of seeds that we use for food.

Many people earn their living by raising seeds for people to eat. All the cereal breakfast foods, bread, cakes, cookies, biscuits and nuts come from seeds, as well as many seasonings, spices and coffee or cocoa.

Here are some seeds that are readily found. Wheat, barley, oats, rice, sweet corn, maize, walnuts, almonds, sunflower seeds, peas, beans, lentils, Brazil nuts, peanuts, rye, millet

REQUIREMENT 7: Know five kinds of seeds that are used as sources of oil.

Many seeds produce oil which can be eaten and used in cooking.

Hazelnuts (or filberts or Barcelonas): Turkey produces half the world supply. The oil goes into soap, varnishes, and finishes for fine wood products like gunstocks and aeroplane propellers.

Cotton seed: The oil extracted from the seed of the cotton plant is of considerable commercial value. It is used as a substitute for olive oil.

Sunflower seed: This is grown extensively in Western Canada, Hungary, and the Ukraine for cooking oil.

Soya beans: The Soya bean is cultivated in Asia and is used as a source of edible oil.

Flax: Linseed oil, used in paints, is extracted from the seed of the flax plant, which came from India and Afghanistan.

Maize/Corn: This common food is grown in many parts of the world including South Africa, North and South America. A cooking oil is made from the seeds.

Olives: Olive oil is extracted from both flesh and nuts of the olive fruit. These trees grow wild all around the coasts of the Mediterranean Sea, and are cultivated in many parts of the world as a source of cooking oil.

Teaching suggestion: See how many other kinds of seeds you can find out about; those which are used for oil, to eat, or in industry.

REQUIREMENT 8: Know five kinds of seeds that are used for spices.

Spices contain volatile oils that make simple foods appetizing and interesting. However, we should keep in mind that excessive use of spices is not healthful and should be avoided.

Allspice: Allspice is named because the flavour is similar to several spices, chiefly cinnamon, cloves, nutmeg. It is sold whole or ground. It is the berry of a small tree, also called pimento, and is used for savoury dishes, stews, and pickles.

Caraway: Dried seeds obtained from a plant similar to parsley. Used for flavouring cakes, breads (especially rye) with soft cheese spreads, sauerkraut.

Cardamom: Seeds obtained from a plant of the ginger family. Dried whole seeds are used in mixed pickles, ground dried seeds in Danish pastries.

Coriander: Dried seeds of an annual plant used ground in meat dishes, in breads with cheese.

Cumin: Ground dried seeds of the caraway plant. Used in curry powder and chili powder for Mexican food.

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Nutmeg: Shelled nut, thick and hard, from a tree. It can be purchased whole or powdered. It is used grated or powdered in cakes, puddings and drinks.

Poppy seeds: Greeks and Romans made a delicate confection using poppy seeds, honey and rich dough pastry. Seeds are used as a topping for breads, rolls and cookies.

Vanilla: Vanilla is obtainable as a long dark thin bean or an extract from it. It is used to flavour desserts, ice-cream, cakes, icings, cookies and pastries.

Mustard: The ground up seed of the mustard plant.

Pepper: The ground up seeds of the pepper plant.

Celery Seed: Celery seed from a special variety of celery, sold dried and powdered. May be used in soups, stews, savoury dishes or ground, mixed with salt and used as celery salt.

Sesame: Small seeds of an East Indian plant, may be used in oriental type cookery or breads, cakes, biscuits, cream soups, and with noodles.

Teaching suggestion: Get samples of these spices and make a 'spices' part of a seed's collection.

IMPORTANT. Not all spices come from seeds. Listed below are a few which do not:

Cinnamon - the inner bark of a tropical tree sold either powdered or in sticks.

Cloves - dried flower buds of an evergreen shrub, sold whole or ground.

Ginger - the underground stem of the ginger plant, sold ground, preserved, whole in syrup, crystallized or as root ginger.

Mace - The outer leafy network of the nutmeg, bought either whole or ground.

Paprika - A mild flavoured, orange-red powder made from red capsicum pods.

Saffron - The tiny stigma of the crocus flower, handpicked to flavour and colour.

Tumeric - Comes from a perennial plant in Southern Asia and is used to colour and flavour mustard and curry powder.

REQUIREMENT 9: Make a collection of thirty different kinds of seeds, twenty of which you have collected yourself. Label each kind with its name, the date collected, and locality, and the collector. You may glue them on heavy paper or cardboard or put them in clear vials.

Seeds are all around us. We find them in apples, oranges, pears, grapefruit, passionfruit, paw paws, watermelons, strawberries, lemons and so on.

They are also present in many vegetables, such as cucumber, squash, pumpkin, corn (use a sample of popcorn for your collection and eat the rest!), and beans of all varieties. Take a stroll through a fruit shop. It is fun to try new and unusual fruits and vegetables.

Flowers also make seeds, so you can collect seeds from flowers that you already may have growing in your flower bed.

You can also collect various seeds in the wild. In Australia, many seeds will 'volunteer' to join your collection as they attach themselves to your clothing and body – cobbler pegs, burrs of all types and shapes, spear grass etc

Try the pantry. Once you have exhausted these sources, go to the seed section of a store or a nursery. This should be reserved as a last resort.