

Growing Things

God is Creator, God is Life, God is Provider,

This unit of study has been designed for use in conjunction with other Beacon Media resources:

***Themes for Christian Studies:
God is Creator, God is Life, God is Provider***

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Part A: What plants need – God is Life

1. God gives life to plants

In the beginning God made the heavens and the earth. On the first day He separated the light from darkness. There was night and day. There was no sun yet, but God was the light. On the second day God divided the water and land. There was now soil for plants to grow in, and water to keep the plants alive. But the plants were not on the earth yet. On the third day God created plants. On the third day the earth had everything that plants needed:

Light and warmth (God was the light)

Air

Soil

Water

What do plants need to stay alive?

2. Roots

Most plants have roots. Their roots go into the soil and hold them in the ground. Roots get food and water for the plant. The food and water come from the ground. Some roots are long and thick. Some roots are short and thin.

Why does a plant have roots?

3. Leaves

Most plants also have leaves. Leaves are nearly always green. Food is made in the leaves.

Where does the plant's food come from? (two answers)

4. Stems

Stems grow up from the roots. They take food and water to the leaves. They lift up the leaves into the sunlight.

Why do stems need to be strong?

5. Flowers, seeds and fruit

These allow a new plant to grow.

6. Plants need food to stay alive

We have learned that plants need food. Jesus said that people need food and water to stay alive. But we don't just need food and water that goes into our stomachs. We need a type of food and water we cannot see. The Bible is *like* a food because it helps us get through life, just as food helps us get through the day. The Bible has the things we need for life. That life comes from Jesus. 1 Peter 2:2 tells us that just as new born babies love milk, we should love God's word, the Bible, because by learning from it, we can *grow* into the people that God wants us to be.

What is a good food for people who want to become more like Jesus?

7. Plants need water to stay alive

We have learned that plants need water. One day Jesus was thirsty. He went over to the well, where the water came from in the olden days. He saw a lady there and asked her to bring the bucket up from the well so that he could have a drink of water. Jesus told the lady something about herself that surprised her very much, because she did not know Jesus at all. The lady immediately knew that Jesus was special. Jesus told the lady that when people drink ordinary water, like the water from this well, they will get thirsty again. But when they drink the water of life that Jesus gives, they will never thirst again. We cannot see the water of life. It is something you have to pray for. It's a special something that Jesus gives you when you really love him. It is the Holy Spirit, which can live in us. Just as plants need water to stay alive, we need the Holy Spirit to help us through life. The Holy Spirit is God's spirit. He helps us do what Jesus would do. (John 4:7-29)

What is the water of life that Jesus gives?

8. Plants need air to stay alive

We know that the leaves of a plant make food for the plant. The plant uses sunlight to make the food. The leaves also help the plant get air. A plant breathes with its leaves and its stalk, a bit like we breathe with our lungs. Some plants have thick leaves. Some plants have thin leaves. A plant cannot live without air. People cannot live without air. But if a person wants to live forever in Heaven, then they must have Jesus. Jesus is just as important as air.

How does a plant breathe?

9. Plants need stems to stay alive

Some plants are big and some are small. A plant is held up by its stalk or stem. But if it is a very big plant, like a tree, the stalk is called a trunk. Grapes grow on grape vines. The branches of the vine grow out from one main thick stem. Jesus said that he is the true vine. He is like the main stem of the vine, and we are the branches. He holds us up and helps us through life when we stay connected to him. We can read about this in John 15 verses 5-10.

How can we stay connected to Jesus?



JESUS
*is the vine,
we are the branches*

Part B: Seeds – God is a Provider

1. Seeds are different shapes and sizes

Nearly all the plants around us started as seeds. Seeds are different shapes and sizes, but they are alike in two ways.

- A seed always contains the young plant, called the *embryo*
- The seed contains food for the young plant to live on, before it can make its own food.

Draw some seeds you know to show their different shapes. Try to draw them the right size too. Here are some examples: pea, apple, pumpkin, tomato, bean, orange, watermelon, lettuce.

Seeds are alike on two ways:

- a) the seed contains the _____
_____ (this is called the em _ _ _ _).
- b) the seed contains a supply of
_____.

Why does the embryo need food from the seed?

2. Seeds have a hard coat

If you look at a seed closely and feel it, you will notice that it is hard and dry. The hard coat protects the young plant inside from hard. On the outside of the seed you will see a little scar. This is where it was attached to the stalk while it was growing on the parent plant. On the hard coat you will also find a little hole. It is here that the water gets into the seed when it is planted.

Why did God give seeds a hard coat?

Ephesians 6 says “Put on the whole armour of God so that you may stand against the arrows that the devil fires at you.”

What is a hard coat that we can put on to protect us from fiery darts of evil?

The little scar on the outside of the seed is where it was _____ to the stalk when it was growing on the _____ plant.

Draw some peas growing in a pod. Show the little stalks attaching the peas to the pod.

The little hole on the hard coat of the seed is where the _____ gets into the seed.

3. Germination

When a seed starts to grow into a plant, we say that it has germinated. Before it can do this it must have three things: water, warmth and oxygen. Yes a seed needs oxygen just as we need it. The oxygen comes from the air in between the soil particles. The water comes from the moisture in the soil, and of course the warmth comes from the sun.

We say that a seed has germinated when

Add "ion" and "ing" to make words:

germinat _ _ _

germinat _ _ _

Before a seed can _____ it needs three things:

a)

b)

c)

A seed gets oxygen from the _____. Draw the soil showing small particles with air between them.

How does a seed get the moisture it needs for germinating?

How does a seed get the warmth it needs for germinating?

Try planting a bean seed. This is what will happen:
First the skin will split and a little white root appears. The root points down and pushes down through the soil. The root is called the radicle. To protect the root from damage the tip is covered with a little cap which is soft and moist, and slips easily among the soil particles. Next a white shoot pushes upwards into the air and soon grows green leaves. The shoot is called the plumule.

Draw the four stages showing the germination of a bean seed:
(1) skin split (2) root (3) cap (4) shoot. (Use a separate piece of paper)

At first the seed gets moisture from soaking up the moisture in the soil around it. After a few days, tiny hairs grow out from the root and these suck in water and food from the soil. Both the root and the shoot are fed at first by two thick leaves from the seed. These are called the seed-leaves. The plant cannot make food for itself until it grows more leaves. Choose the correct word:

- a) The root grows (up / down)
- b) The cap is (hard/soft) and (moist / dry) and (rough / slippery)

How does a seed take in moisture at first?

How does the seed take up moisture after a few days?

The white shoot pushes _____ into the air. It soon grows _____

When the plant starts to grow more leaves, the leaves may be a different shape to the seed-leaves. The seed-leaves are not the true leaves of the plant. The leaves that grow after the seed-leaves are the true leaves.

Draw the bean seed with these two types of leaves.

4. God is a Provider

We can see how God has planned for new plants to grow from seeds. God provides everything the seed needs, even before it can make food for itself. God provides for new born babies too, by giving them milk to drink from Mum. Babies cannot get food for themselves, so God provides.

How does God use the following to provide for you?

- a) parents
- b) plants
- c) animals
- d) the sun
- e) the earth
- f) the sky

God looks after his creation. He says, "Look at the flowers. Aren't they dressed in beautiful colours? I look after them. Look at the birds. They don't make their own food but I look after them. And I look after you, so don't worry about anything!" (Matthew 6:25 – 31)

How do you know that God will look after you?

5. How seeds travel

Think about what would happen if seeds didn't travel. What do you think would happen if seeds dropped to the ground only directly below the plant?

Seeds have special devices for making them travel faster through the air. Here are some:

- a) wings
- b) bits of fluff
- c) parachutes

Find out which seeds have these devices, then draw and name them. Make a collection if you can.

Seeds have another way of traveling. They can get a ride on people or animals. These seeds can have:

- a) bristles
- b) hooks
- c) gluey coats

Find out which plants have these, draw and name them.

Some seeds travel by floating on the sea or down a river. It may be the fruit that floats, and the seeds get a ride inside the fruit.

Coconuts do this.

Find out which fruits or seeds float. Draw and name them.

Some seeds can act like rockets. As soon as they are ripe, the cases enclosing them become dry and brittle and snap open. The seeds shoot out in all directions.

Find out which seeds act like a rocket. Draw and name them.

6. Seeds we eat

Make a collection of seeds we can eat.

7. Seeds bring new life

God uses seeds to provide for us and bring new life.

Jesus said, “Unless a grain of wheat falls into the earth and dies, it remains alone; but if it dies it bears much fruit.” John 12:24

When the seed falls from the plant, it seems dead. It has no life. But when it receives the things it needs for life – soil, water and warmth – it comes to life. Think of an apple seed. How many apples do you think you might get from one apple seed? _____

Seeds bring new life.

But Jesus was talking not just talking about wheat seeds growing into wheat plants. He was talking about Himself. Jesus had to die in order to bring new life. When Jesus died for our sins, He gave the opportunity to everyone in the world who wanted to accept His gift of love and forgiveness, to receive new life.

Jesus also said, “If you have faith the size of a mustard seed, you shall say to this mountain ‘Move from here to there,’ and it shall move. Nothing shall be impossible to you.’ (Matthew 17:20)

How big is a mustard seed? Have a look in the supermarket next time you are there. You will find them with the spices. Mustard seeds are used in Middle Eastern cooking. They are very tiny. When we have faith in God, we can do great things. But it's not us doing the great things. It's God. When we have new life in Jesus, and listening to His voice, nothing is impossible!



Seeds test

1. Write true (t) or false (f) about the seed coat.

- a) It protects the inside of the seed
- b) It is called an embryo
- c) It is hard and shiny

2. What does a seed need before it will germinate?

- a)
- b)
- c)

3. Choose the right word.

- a) The plumule grows (up / down)
- b) The radicle grows (up / down)
- c) The radicle becomes the (root / stem)

4. Where does the embryo get its food from for growing?

5. Draw five different kinds of seeds you know. Name them.

6. Tick the things that would make a seed travel faster through the air:

- a) a prickle
- b) a parachute
- c) a plane
- d) a wing

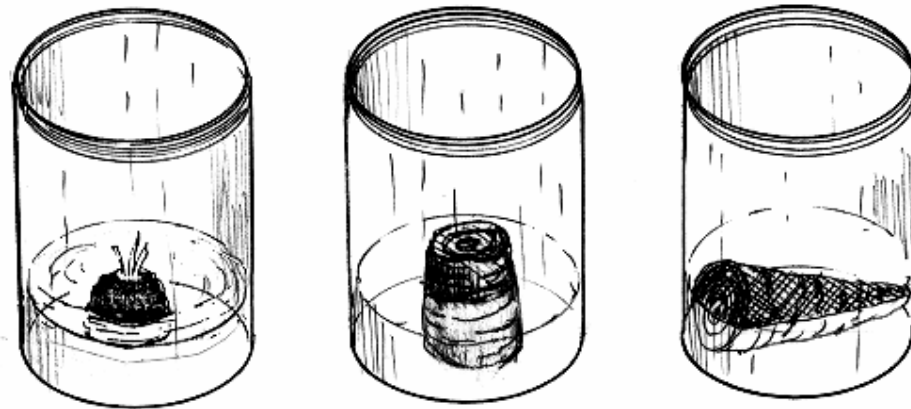
7. Name two things a seed can have to help it stick on to animals or people's clothes.

Part C: Growing new plants from old ones

1. Carrots

The carrot we eat is really the root of the plant. There are no seeds in the root of the plant, but we can still grow a new plant from it. Here's what you do:

1. Take a fresh carrot and three clear glass jars, each the same size.
2. Cut the carrot so that you have three different parts.
3. Place each of the parts in a jar of water. Label the jars 1, 2 and 3. Make sure that the jars have the same amount of water and sunlight.
4. Leave the parts in the water for a week or two until some shoots have appeared.



What did you observe? Did all the parts grow new shoots?

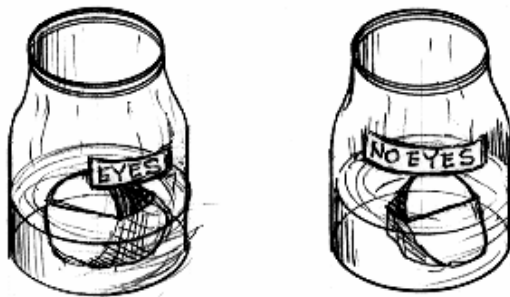
2. Potatoes

What vegetable has eyes but cannot see?

A potato of course!

We call the dark spots on a potato, the *eyes*. If you have ever seen a potato that has been left too long in the cupboard, you will have seen shoots growing from it. Here's an experiment for you to try: Take two pieces of potato, one with eyes and one without, and see whether they will both grow shoots.

1. Cut two pieces from a potato, one with eyes and one without.
2. Place each piece in a jar of water, and leave them there for one week. Make sure both jars have the same amount of water.
3. Describe the results of your experiment.



The eyes are the buds on the underground stems of the potatoes. The underground stem is the part that provides the potato we eat. This is called a tuber.

A tuber is a stem because buds, shoots and leaves will grow out of 'eyes'. It will even become green like a stem when it is left in the sun. However a **green** potato should never be eaten! It contains poison.

Most plants in the potato family contain poisons. One plant belonging to the potato family is called Deadly Nightshade. It grows poisonous berries. The berries are green at first, (this is when they are especially poisonous), then they turn black. But Deadly Nightshade can also provide valuable medicines. Another plant in the Nightshade family is the tomato. It is not poisonous, but its leaves look like Deadly Nightshade.

Grow a potato plant in the soil and make observations.

Many potato plants grow flowers. Can you find out what colour these flowers are? In the late summer, the green tops of the potato turn brown and die off. The potatoes underground are then ready to be dug up.

3. Cuttings

Some plants grow from cuttings. Hibiscus or Geraniums are good ones to try. Select pieces of the stem as thick as a pencil. Cut off six lengths about 15 cm long. Nip out all the new shoots and leaves except for the top two on each one.

Plant the cuttings in a pot of soil. Make sure your pot has holes in the bottom. Before putting the soil in, place some stones in the bottom so the water will drain through.

Use a pencil to make six deep holes in the soil. Dip each cutting into cutting powder, then plant each cutting about 10 cm deep. Water the soil very well, then place the pot in a large clear plastic bag. After 3 or 4 weeks each cutting should have its own roots. Each one can be planted into a separate pot with good soil.

God is Creator, God is Life

God created plants to keep creating. We know that seeds bring new life. But new living plants can also grow from old ones, like old potatoes and old carrots. A pineapple will also grow a new pineapple by planting the top of the pineapple in the soil. God uses the creation to show us things about ourselves. People can also have new life.

One day a religious leader called Nicodemus came to Jesus and said, "I know that you must be from God, because only a person from God could do the things you do."

Jesus said to him, "If you want to be in the kingdom of God, then you have to be born again."

Nicodemus was puzzled because he knew that he couldn't go back inside his mother and be born again.

Jesus said, “You have to be born of the Spirit.” (John 3: 1-5)

Jesus was talking about the Holy Spirit. Jesus meant that the Holy Spirit can make a person new. The Holy Spirit can give a person new life. We can think of our old life as the old potato. Our old life might be full of sin – the wrong things that we do. But we can give all the wrong things to Jesus and ask for forgiveness. He will forgive us and make us new in Jesus.

New plants from old: observation chart

Set up carrot, potato and cuttings experiments.

Carrot – Cut the carrot into three parts – top, middle and bottom – and place each one in a container with a little water.

Potato – Cut pieces from a healthy potato, some with eyes and some without eyes, and place each piece in a jar with a label.

Try the same in the soil.

Draw up three observation charts – one for carrot, one for potatoes and one for cuttings.

Allow enough space to record changes over a six week period.

Enter observations each week.

Things to look for:

Potato – leaves, stems, roots, flowers. Look for a tuber (an underground stem which is swollen to store food). Look for the eyes – the place from which buds, stems and shoots will grow.

How does a potato become green? Take a full grown potato and place it in the sun for a week. Take another and place it in the dark (e.g. in a paper bag).

What is the difference between an old and a new potato? Try to peel them and you will notice a difference in the thickness of the skin.

What food does a potato tuber contain?

Soak a potato overnight or longer. Test the water for starch. You can do this by the feel and the colour of the water. Compare the water to clear water.