Air, wind and flight: Teacher's topic guide

God is a Provider Year 7

Spiritual Awareness
Air supports life. God provides us with the requirements for physical life and spiritual life. Air is the first basic requirement. But we also need God as much as we need the air we breathe.

Values: Our response to 'God is a Provider'

- **Thankfulness** to God for His supernatural ability to create and provide the things we need to live.
- **Trust** in a mighty, supernatural God. Recognize that He is in control of all He has made.
- **Stewardship**: showing care for the universe and making wise use of the things He has provided for us.

Outcomes: Students will

- understand that living things depend on air to survive
- understand that air is a force which exerts pressure
- understand that air can move solids and liquids
- observe effects of moving air and measure wind strength using s speed indicator
- predict how an object may move depending on wind strength and direction
- learn the principles of flight
- explain how birds use their wings to fly

Bible stories and passages
Genesis 1 The creation - God created the things we need to stay alive.
Acts 2 The disciples receive the Holy Spirit – (wind representing power of the Holy Spirit). God provides the Holy Spirit to guide us through life.
Exodus chapters 15-17: God sustained and provided for the Israelites in the wilderness.
Matthew 6:25-34 Do not be worried about the food and drink you need to stay alive, and don't worry about clothes. Isn't life more than food and clothes? God cares for the birds; how much more will He care for us.
Matthew 10:29 God cares for the birds

Key questions
Who and what depend on air to stay alive?
What is air made from?
What does air do?
Why would we say that air is a powerful force? (*sustains life; moves things*)

Activities
Experiment with dropping things from a height

- a flat piece of paper, a large ball, a small ball, a feather
- Which fall straight down?
- Which float?
- What makes some objects float?

Experiment to show that air exerts pressure:

- Fill a drinking glass to the brim and place cardboard over it. While holding the cardboard against the glass, turn the glass upside down. Take hand away and cardboard will remain.
- Make a parachute

Experiment to show that air can moves things:

- Blow ping pong balls across a table.
- Make a yacht and move it across water by blowing the sail.
- Make a kite.
- Make a wind sock, balloon rocket, pin wheel, glider

Experiment to show how air pressure can move liquids:

- Make a siphon.

Observations of moving air

- Make a paper fan
- Measure and record wind strength on different days.
- Compare wind direction and direction of object's movement.
- Predict how an object may move, depending on wind strength and direction.
- Observe the effects of moving air in the environment.
- Measure and record wind strength on different days using a wind speed indicator.

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Assessment

Science Worksheet

Name..... Date .....

Before the experiment...

Title of Science Investigation……

- What do you want to find out?
- What will you do to find this?
- What will you need to use?
- What do you think will happen?

After the experiment...

- What happened?
- Can you try to explain why this happened?
- What did you learn from the experiment?
- What have you learned about God from this investigation?

Beacon Media Research cards: Birds and flight
Thinking skills: Air and wind
Biographies: Corrie ten Boom; Ruth Pfau

Values education Year 7
God is Provider
Generosity

Our response to God's generosity to us, is to be generous.

Generosity is…

- sharing our money and possessions
- giving our time and talents to help others
- giving to people in need
- giving cheerfully
- not being selfish
- not being greedy
- giving without expecting to receive something in return

Activities
Most school students do not have money to give away. But can they still be generous? Some people are very generous with their time. They share their time to help others. Examples: sports coaches, youth leaders, parents and relatives

Think of a person who helps you in your free time. List the activity and the help you are given.

How can school students be generous with their time to help others?

What does the Bible say about generosity?
Matthew 10:8 Freely you have received, freely give.
2 Corinthians 9:7 God loves a cheerful giver.
Matthew 6:1-4 Let your giving be in secret.
Acts 20:35 It is more blessed to give than receive.
Matthew 5:40-42 Give to the one who asks.

Sharing

Values education

Number of characters: 3

Billy:
My Mum gave me some sweets for helping her in the garden. She said that they are only for me, and I'm not to share them with anyone.

Betty:
I don't believe you Billy. You're just saying that so you don't have to share them with me. Well I'm not going to share anything of mine with you either!

Billy:
You never share anything with me anyway.

Betty: (shouting)
I do so!

Billy: (shouting back)
You do not!

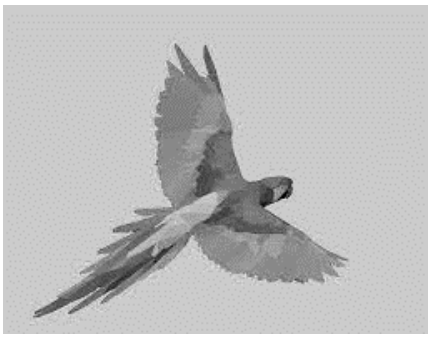
Mum:
What are you two fighting about?

Betty:
Billy won't share his sweets.

Billy:
And she won't share her things with me!

Mum:
You don't have to fight. Sharing is easy you know. Why don't you two say sorry to each other? Billy, you give Betty some of those sweets, then you can come inside and help me make a chocolate cake.

God is Provider
Character development/value: generosity
"Give to everyone who asks you for something. Do for others just what you want them to do for you." Luke 6:30-31



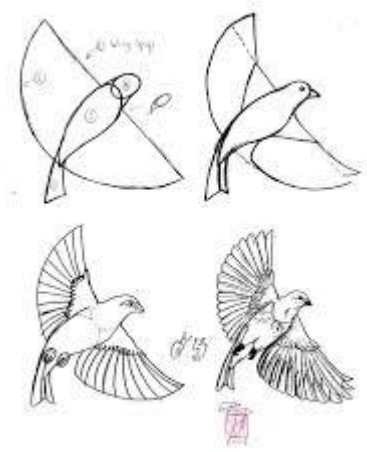
Art Year 7

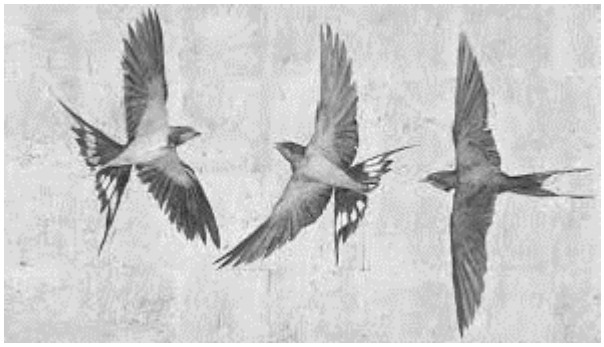
God is Provider

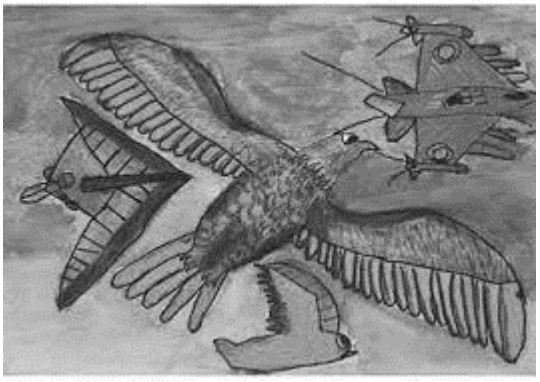
Air and flight

Biblical wall art and text: Look at the birds. Your Father in Heaven takes care of them. You are worth so much more than the birds. Matthew 6:26

Drawing and painting
Subject: birds in flight







Poster: The history of flight

Printing or stencil work

Use feathers for a print design, or a spatter painting.

Practical Science Year 7

God is Provider

Topic: Air

Air pressure

http://www.primaryscience.ie/media/pdfs/col/air_pressure.pdf

What you will need:
Paper cup
Plastic bottle
Water

BACKGROUND
The space around us is not empty but is filled with air, which is pushing on everything around us. This is called air pressure.
When tyres are pumped up, air is squashed inside. This makes lots of pressure. Therefore, the tyres can support a truck which is carrying a heavy load.

ACTIVITY 1
To show that air takes up space:
Place a cup upside down into water

ACTIVITY 2
To show that air is pressing on everything:

1) Squeeze air out of a plastic bottle.
2) Let go and see what happens. (The bottle regains its shape because air pressure forces air back into the bottle).
3) Now put the lid on before you let go and see what happens. (No air can get in so the bottle stays squeezed.)

Practical Science
Topic: Air
Make a parachute

Show that air can exert pressure by making a parachute.

Parachute 1

What you will need:

- A large cotton handkerchief
- Some string
- A weight such as a rubber (eraser)

What to do:

Cut the string into 4 pieces, about 40 cm per piece.
Tie a piece of string to each corner of the handkerchief
Tie the ends of the string together and attach the rubber.
Now allow your parachute to fall from a height.

Parachute 2

What you will need:

- A large plastic bag
- Some string
- A weight such as a rubber (eraser)

Instructions:

1. Cut a circle from your plastic bag, then make it into an octagon shape, (an eight sided shape).
2. Cut a small whole near the edge of each side.
3. Attach 8 pieces of string of the same length to each of the holes.
4. Tie the pieces of string to the weight.
5. Use a chair or find a high spot to drop your parachute and test how well it worked, remember that you want it to drop as slow as possible.

What's happening?

As the parachute falls, air is trapped inside the umbrella part. The air is squashed (compressed) so that it has greater pushing power than the air around it. The air presses up from under the parachute and pushes it upward.

Hopefully your parachute will descend slowly to the ground, giving your weight a comfortable landing. When you release the parachute the weight pulls down on the strings and opens up a large surface area of material that uses air resistance to slow it down. The larger the surface area the more air resistance and the slower the parachute will drop.

Cutting a small hole in the middle of the parachute will allow air to slowly pass through it rather than spilling out over one side, this should help the parachute fall straighter.

Practical Science
Topic: Air
Balloon Rocket

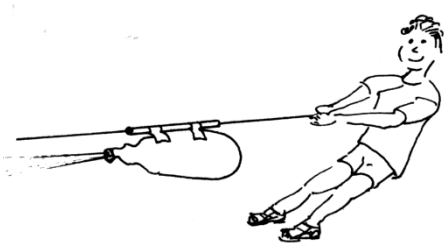
http://www.sciencebob.com/experiments/balloonrocket.php

What you will need

- Piece of string (about 2 to 3 metres long)
- Balloon
- 2 chairs
- Drinking straw
- Tape
- Scissors

What to do

1. Tie one end of the string to a chair, door knob, or let your partner hold on to it.
2. Put the other end of the string through the straw. (Tape the end to help it go through.)
3. Pull the string tight and tie it to another support in the room, (or get another person to hold this end).
4. Blow up the balloon (but don't tie it.) Pinch the end of the balloon and tape the balloon underneath the straw with its nozzle pointing to the closest end of the fishing line. Let go of your balloon.
5. as shown in the picture. You're ready for launch.
6. Let go and watch the rocket fly!



How does it work?

So how does it work? It's all about the air...and thrust. As the air rushes out of the balloon, it creates a forward motion called THRUST. Thrust is a pushing force created by energy. In the balloon experiment, our thrust comes from the energy of the balloon forcing the air out. Different sizes and shapes of balloon will create more or less thrust. In a real rocket, thrust is created by the force of burning rocket fuel as it blasts from the rockets engine - as the engines blast down, the rocket goes up!

Make it an experiment

The project above is a DEMONSTRATION. To make it a true experiment, you can try to answer these questions:

1. Does the shape of the balloon affect how far (or fast) the rocket travels?
2. Does the length of the straw affect how far (or fast) the rocket travels?
3. Does the type of string affect how far (or fast) the rocket travels? (try fishing line, nylon string, cotton string, etc.)
4. Does the angle of the string affect how far (or fast) the rocket travels?

Practical Science
Topic: Air
Warm Air Needs More Room

http://www.sciencekids.co.nz/experiments/heavyair.html

As its temperature rises, air starts to act a little differently. Find out what happens to a balloon when the air inside it heats up with this fun science experiment for kids.

What you'll need:

- Empty bottle
- Balloon
- Pot of hot water (not boiling)

Instructions:

1. Stretch the balloon over the mouth of the empty bottle.
2. Put the bottle in the pot of hot water, let it stand for a few minutes and watch what happens.

What's happening?

As the air inside the balloon heats up it starts to expand. The molecules begin to move faster and further apart from each other. This is what makes the balloon stretch. There is still the same amount of air inside the balloon and bottle, it has just expanded as it heats up.

Warm air therefore takes up more space than the same amount of cold air, it also weighs less than cold air occupying the same space. You might have seen this principle in action if you've flown in or watched a hot air balloon.

Practical Science
Topic: Air
Make a Ping Pong Ball Float

http://www.sciencekids.co.nz/experiments/pingpongball.html

Can you control a ping pong ball as it floats above a hair dryer? Put your hand-eye coordination skills to the test while learning the important role that forces such as gravity and air pressure play in this simple experiment for kids.

What you'll need:

- At least 1 ping pong ball (2 or 3 would be great)
- A hair dryer

Instructions:

1. Plug in the hair dryer and turn it on.
2. Put it on the highest setting and point it straight up.
3. Place your ping pong ball above the hair dryer and watch what happens.

What's happening?

Your ping pong ball floats gently above the hair dryer without shifting sideways or flying across the other side of the room. The airflow from the hair dryer pushes the ping pong ball upwards until its upward force equals the force of gravity pushing down on it. When it reaches this point it gently bounces around, floating where the upward and downward forces are equal.

The reason the ping pong ball stays nicely inside the column of air produced by the hair dryer without shifting sideways is due to air pressure. The fast moving air from the hair dryer creates a column of lower air pressure, the surrounding higher air pressure forces the ping pong ball to stay inside this column, making it easy to move the hair dryer around without losing control of the ping pong ball.

See if you can float 2 or even 3 ping pong balls as an extra challenge.

Practical Science
Topic: Air
Experience Gravity Free Water (Air Pressure)

http://www.sciencekids.co.nz/experiments/gravityfreewater.html

What goes up must come down right? Well try bending the rules a little with a cup of water that stays inside the glass when held upside down. You'll need the help of some cardboard and a little bit of air pressure.

What you'll need:

- A glass filled right to the top with water
- A piece of cardboard

Instructions:

1. Put the cardboard over the mouth of the glass, making sure that no air bubbles enter the glass as you hold onto the cardboard.
2. Turn the glass upside down (over a sink or outside until you get good).
3. Take away your hand holding the cardboard.

What's happening?

If all goes to plan, then the cardboard and water should stay put. Even though the cup of water is upside down the water stays in place, defying gravity! So why is this happening? With no air inside the glass, the air pressure from outside the glass is greater than the pressure of the water inside the glass. The extra air pressure manages to hold the cardboard in place, keeping you dry and your water where it should be, inside the glass.

Practical Science
Topic: Air
Egg Bubbles

http://www.sciencekids.co.nz/experiments/eggbubbles.html

Prove the existence of a small air pocket inside an egg as well as thousands of small holes in the shell called pores, while learning what air does as it is heated.

What you'll need:

- A clear glass or jar
- Hot water (adult supervision is a good idea when using hot water)
- An egg
- A magnifying glass

Instructions:

1. Place the egg carefully into the glass or jar.
2. Carefully pour hot water into the glass or jar until it is nearly full.
3. Leave the glass or jar on a table or flat surface and watch the egg closely for a few minutes (the glass may become hot so be careful).
4. Use your magnifying glass to closely examine what is happening.

What's happening?

After surrounding the egg with hot water you will notice tiny bubbles forming on the egg shell which eventually bubble their way to the surface.

An egg contains a small air pocket at its larger end between the shell and egg white. When the air trapped inside this small pocket begins to heat up it expands and tries to find a way out of the shell, but how does it escape?

They're too small to see under normal conditions but with the help of a magnifying glass you can see that egg shells contain thousands of small holes called pores (human skin has pores too).

The pores allow air to pass through the shell, making it look like the egg is breathing as the air expands and is forced through the shell.

Practical Science
Topic: Air and wind
Wave in a bottle experiment

Explore the wonders of how God's creation works with wave in a bottle. Students will discover how and why water behaves and will be amazed at the power of the God's creation.

Aim: To create a wave in the bottle using coloured water and air.

Apparatus/Materials needed:

- empty plastic bottle and cap
- vegetable oil
- water
- food colouring

Procedure:

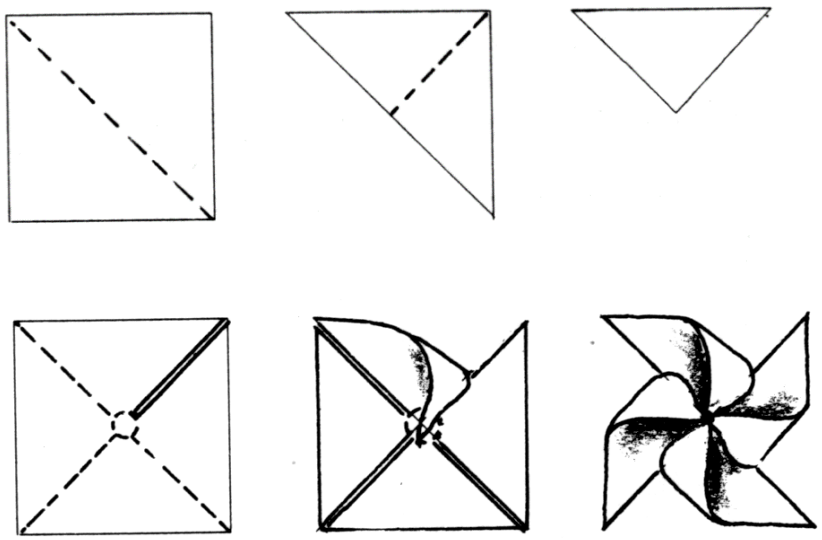
1. Wash a bottle and take off the label by soaking it in hot water.
2. Fill the bottle with 3/4 cup of water.
3. Add a few drops of food colouring.
4. Pour 1 cup of oil into the bottle. Screw the cap on.
5. Roll the bottle on its side and let it settle for a few minutes.
6. The water will sink to the bottom and the oil will rise to the top.
7. Now tip the bottle back and forth and make some waves.
8. The waves will be bigger at one end of the bottle and smaller at the other.

Observation: What do you observe? Why?
Your bottle wave is like an ocean wave.
Water moves up and down and doesn't go forward as the wave goes through the water.
The friction between water and wind makes a wave.
Longer waves travel faster than shorter ones and go further before friction makes them disappear.

Practical Science
Topic: Air
Make a pin wheel

A Pinwheel

- You will need paper; scissors; a drinking straw; a small piece of cork or a soft rubber; a five cent piece; a drawing pin.
- Cut a piece of paper 15cm square. Fold the paper in half to make a triangle. Fold it in half again to make a smaller triangle. Press hard on the fold lines.
- Open the paper so it is flat. Find the point in the middle where the 4 fold lines meet. Put the 5 cent piece on this spot. Trace around it with a pencil.
- Carefully cut along the 4 fold lines just to the circle. (Don't cut all the way through the circle!)
- Take the right corner of each triangle and hold it to the small circle. Put one corner on top of another. When you have 4 corners on top of one another, push the drawing pin through all of them. Now push the pin through the top of the straw, and then through the cork. Watch the pin wheel spin as you blow it or hold it in the wind.

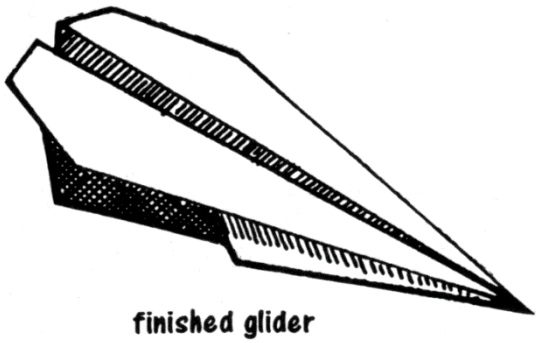


Practical Science
Topic: Air
Make a paper glider and a whirly twirly

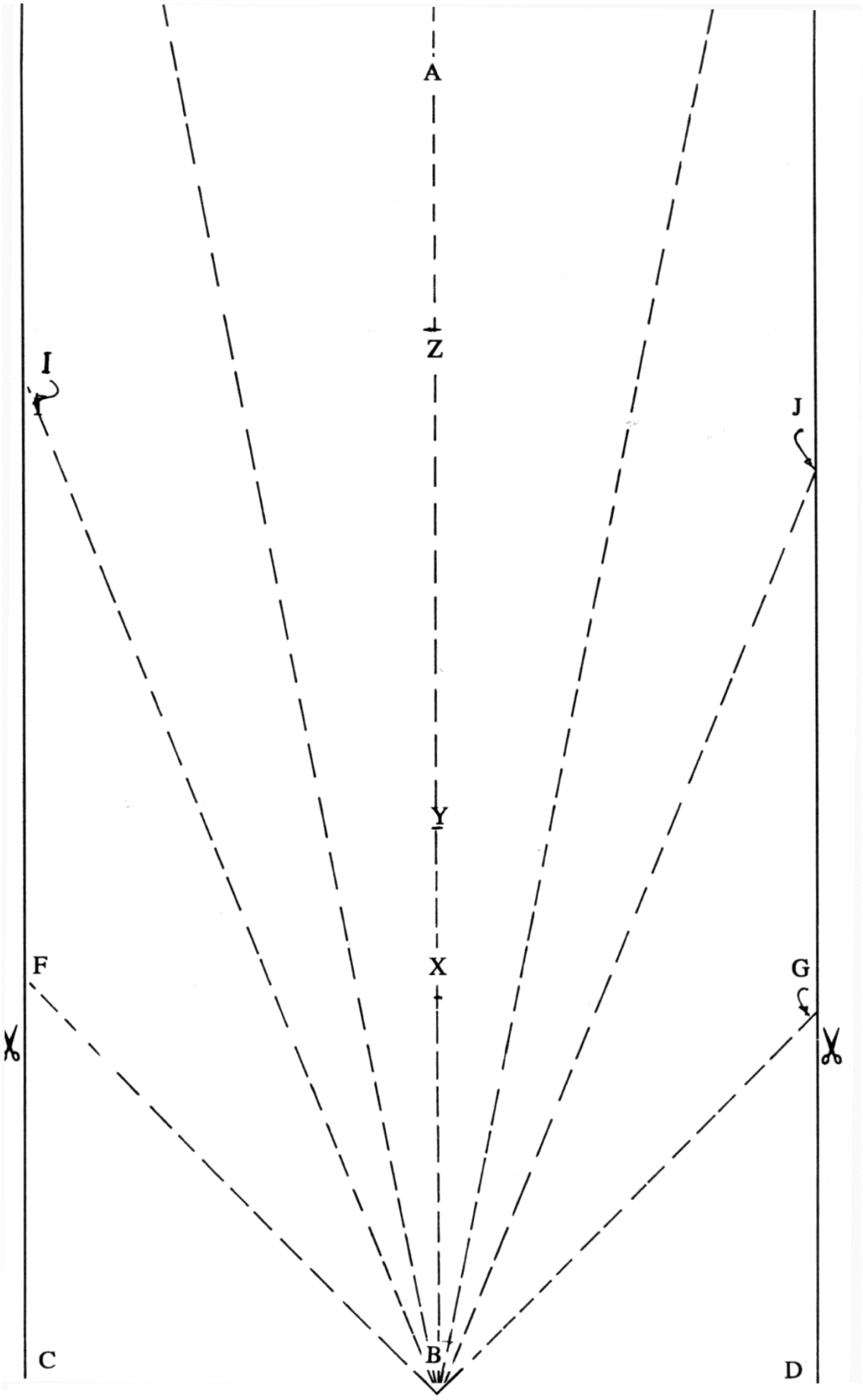
See patterns on the following pages

For the glider:

- You will need paper and scissors.
- Cut out the rectangle as shown.
- Fold along line A-B so you can see the marks.
- Fold point C to meet E along line B-F.
- Fold point D to meet E along line B-D.
- Fold point F to meet H along line B-I.
- Fold point G to meet H along line B-J.
- Fold point I to meet K.
- Fold point J to meet K. (This completes the wings.)
- Hold plane along line A-B at point H. (Do not hold the wings.)
- Uncrease the wings about half way. Turn the plane so that the wings are on top. Throw the plane gently into the air.



finished glider


A
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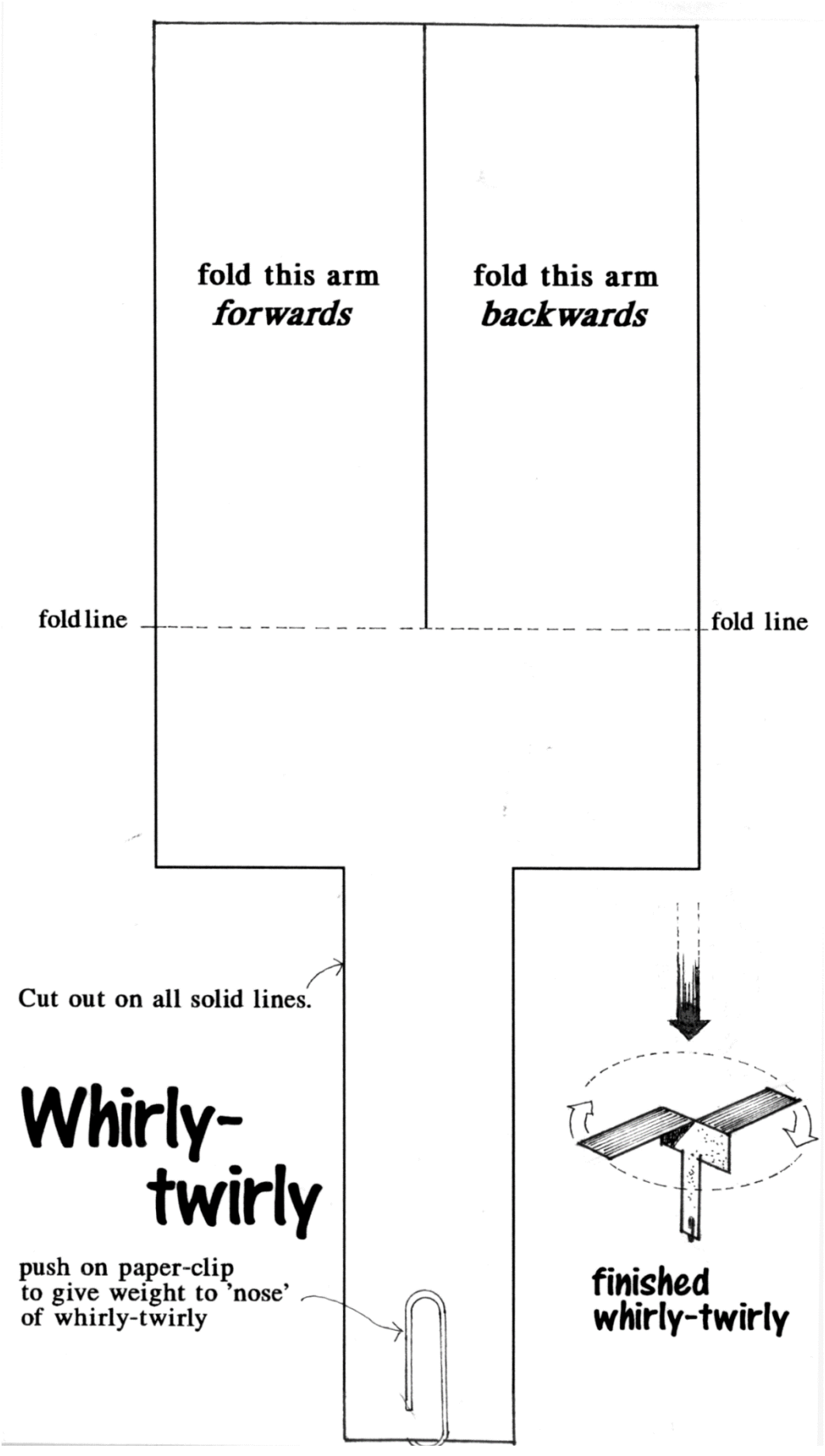
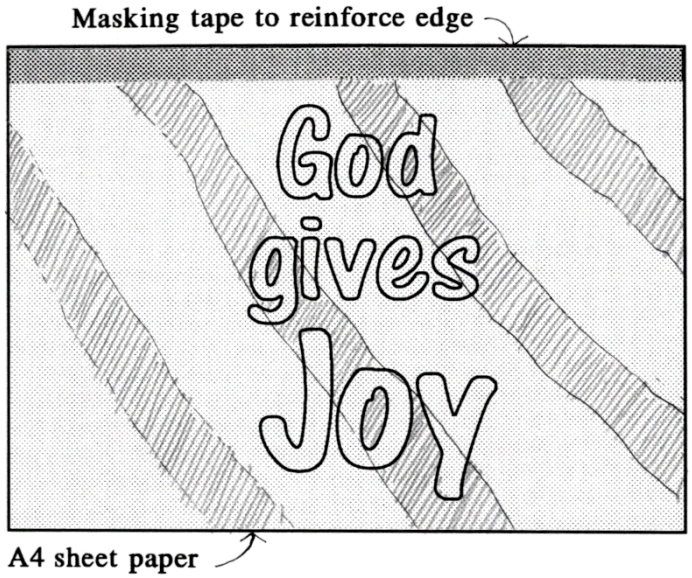
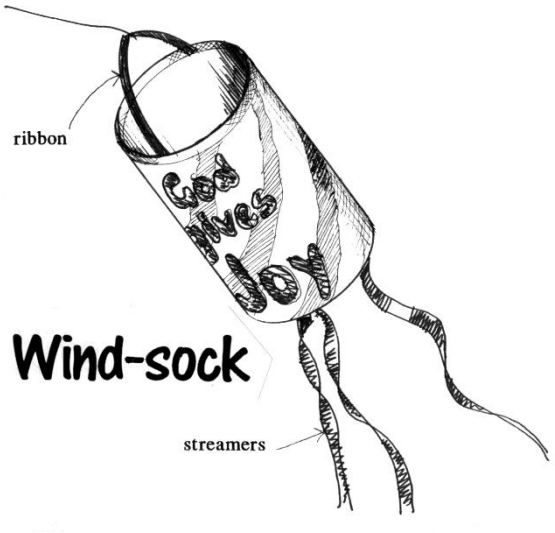

fold this arm
forwards
fold this arm
backwards
fold line
fold line
Cut out on all solid lines.
Whirly-
twirly
push on paper-clip
to give weight to 'nose'
of whirly-twirly
finished
whirly-twirly

Practical Science
Topic: Air and wind
Make a wind sock

Have fun with things that move with air.
Make a wind-sock for your porch or verandah.
Steps:
1. Take a piece of A4 paper (21 x 30 cm).
2. Make a colourful design on your paper and add a message in colourful letters.
3. Reinforce top (longer side) with masking tape as shown.
4. Make paper into a cylinder by gluing together the two shorter sides.
5. Using both glue and staples, attach ribbon to the top for suspending the wind-sock. Attach coloured streamers to the bottom.





Practical Science
Topic: Air
Oxygen used by a burning candle

Aim: To test the requirement of oxygen for burning a candle.

Materials: Wine glass, a glass of water, candles, match/lighter, food colouring and a plate.

Procedure:

1. Add two drops of food colouring into a glass half-filled with water and stir until dissolved.
2. Stand the candle on the plate and light it.
3. Pour the water with food colouring into the plate.
4. Place the glass onto the lit candle.
5. What happened to the coloured water and the flame of the candle?

Record your observation: what did you see?

Observation and understanding:
When we light the candle, the flame started to heat the air in the glass. The air expands and it is now warm inside. The flame goes out after the oxygen in the air inside the wineglass has been used up. The space created allows water from outside the glass to enter into the glass.

Inference: Oxygen was used for burning the candle. After oxygen was used up the candle was put off and the space created was filled with coloured water.

Thinking Skills Provider Yr 7

Air / wind 1 Design a machine to measure the force of wind.	**Air / wind 2** What if there was no wind? Write down 10 possible consequences.
Air / wind 3 Write down 10 things you could NEVER take a photograph of.	**Air / wind 4** Use you imagination. Work out 5 different things that this picture could be. It has to have something to do with air or wind. 
Air / wind 5 Make a pin wheel. Write down 10 different uses for it.	**Air / wind 6** Create something new with: a paper plane and a ping pong ball

Corrie Ten Boom

Biography

This is a true story about someone who used their faith to trust God when things were very difficult. It took place in Europe during the Second World War where the Jews who lived there were being captured and taken to prison camps.

The story is told by a lady called Corrie ten Boom who was not Jewish, but Dutch. She and her family decided to risk their own lives in order to help the Jews at that time. They took Jews into their own home for protection and hid them in a secret room. However, finally the day came when they were discovered.
Corrie ten Boom and her sister Betsie were placed into a prison camp along with the Jews they had tried to hide.

Women were crammed into dirty, cold, damp barracks. Food was little more than watery turnip soup. During the day, they were forced to do extremely hard labour. Despite their dreadful circumstances, Corrie and Betsie did not stop trusting God.
Betsie found it particularly difficult because she was not well. She was suffering from a vitamin deficiency for which she needed vitamin drops. Corrie and Betsie had managed to bring some of their things with them to the first prison camp, including the vitamin drops and a Bible. However, when they were moved to a second camp they were not allowed to take anything in with them. Each woman was searched thoroughly as she passed in line through the gates. All Corrie and Betsie could do was to pray desperately to their Heavenly Father.

Corrie stood in the queue, trying to hide behind her back, a jumper with vitamin drops and Bible wrapped inside. When it was Corrie's turn to pass the guard, instead of searching her, he just pushed her through the gate with the words, "Move along! You're holding up the queue."

And so Corrie and Betsie arrived inside the barracks bringing not only the Bible and vitamins, but the knowledge of God's power to work a miracle. Soon Corrie discovered that there were twenty-five other women with the same vitamin deficiency. They too need the precious vitamin drops.

"What should I do, Lord?" asked Corrie. "If I give the drops to all these women there will only be enough to last a day! Even if I save the drops for Betsie there will be only enough to last a month."

Corrie knew what she must do. She lined up all the women who were ill and gave them the drops. Strangely enough, she lined the women up again the next day and there were still enough drops for everyone. She tried it again the next day, and the next. Still there were enough. Every time she tilted the bottle a drop appeared at the tip of the glass stopper.

"It just couldn't be!" said Corrie. She held it up to the light, trying to see how much was left, but the dark brown glass was too thick to see through.

"There was a woman in the Bible," said Betsie, "whose oil jar was never empty." She turned to the story in the book of 1st Kings. They read about the poor widow of

Zarephath who had cared for Elijah. She continued to have oil in her jar and flour in her flour bin no matter how much she used.

It was one thing to believe that such things happened thousands of years ago, but another thing to believe that it could happen today. And yet it happened.

"Don't try to explain it." said Corrie to Betsie. "Just accept it as a surprise from a Father who loves you."

Then one day a young Dutch woman, also in the prison camp, came to Corrie.
"Look what I've got for you!" she said. "Vitamins!"
Somehow, she had stolen them from the staff-room. There were several huge containers of vitamins and yeast compound.
"We'll finish the drops first," thought Corrie. But that night, no matter how long she held the bottle upside-down, or how hard she shook it, not another drop appeared.

Activities

1. What nationality was Corrie ten Boom?
2. Why do you think Corrie's family tried to help Jews?
3. Why do you think the enemy wanted to kill Jews?
4. What happened to Corrie and Betsie for their efforts in trying to protect the Jews?
5. How was Corrie able to get the vitamins and her Bible into the prison?
6. Why do you think most of the ladies, including Betsie, needed vitamins?
7. Corrie decided to share the vitamins. What does this show us about her?
8. Do you think Corrie expected the Lord to keep on filling the vitamin bottle?
9. Which miracle in the Bible is similar to this one?

There are several miracles recorded in the Bible where God did a miracle of provision. This means that He didn't just provide in the usual way. God usually provides food through the sun, rain and soil, which are part of His Creation. There are three times in the Bible where God did amazing miracles to provide food. The miracle of loaves and the fish is one of these. Two more miracles from the Old Testament: God provided flour and oil when Elijah and Elisha prayed. Sometimes God provides in unusual ways. God can still provide in unusual ways today, just as He did for Corrie ten Boom.

Ruth Pfau

Biography

Ruth Pfau (pronounced Fow), was born in 1929 in Leipzig, in the eastern part of Germany. She died in 2017.

Ruth's father was a book seller and her mother was busy at home looking after six children. Ruth was the fourth of five daughters. Her only brother died as a boy.

When she was thirteen her peaceful childhood was interrupted by the Second World War. Her home and her school were destroyed when Leipzig was bombed. She had always wanted to be a doctor, and during the war she helped to look after children, the sick and the elderly.

Ruth did very well at school and received distinctions in her final school exams in 1947. Ruth moved to Western Germany to study medicine at university.

Having seen the destruction and unhappiness caused by the war, Ruth hoped that by her work as a doctor, she could give something of her life to helping others. In 1956, she travelled to Paris and became a Catholic nun and joined the "daughters of the heart of Mary". What is special about this order of nuns is that members do not wear uniforms or live in a convent. Instead they express their faith through their work. They have many different jobs. Some like Ruth Pfau, are doctors, some are teachers and some work by helping the poor. Today there are over two thousand members working in many countries around the world.

After training in midwifery, Ruth decided that she would go to India, where her order had been waiting for a doctor to help run a maternity home. Before she set off Ruth wondered what good she, just one person, could do. "It will be a drop in the ocean," she told herself, but she was encouraged by the six cases of medical supplies she was given to take with her.

In 1947, when India became independent from Britain, the country was divided up by the government. This decision was made to stop the fighting between Hindus and Muslims. Indian Muslims were given the area that is now called Pakistan and Bangladesh. The Hindus and Sikhs were given what we know as India today. This meant that millions of people had to move from their homes and relocate. Some six million Muslim refugees travelled to Pakistan and some five million Hindu and Sikh refuges left Pakistan and went to India.

Because of the new borders, Ruth now worked in Pakistan, (previously India.) Thousands of Muslim refugees were living in the slums that sprang up on the outskirts of Karachi. One of the biggest cities in Pakistan, on the coast of the Arabian Sea. One day a social worker took Ruth to see the leprosy sufferers of McLeod Road. These were people who were even poorer and more neglected than the refugees. Ruth and her helpers set to work at once. They collected money from friends. UNICEF, (the United Nations International Children's Emergency Fund),

gave them wood from packing cases to build a hut and the Red Cross supplied bandages, medicines and milk powder. In England in 1940, medicine had been discovered to fight leprosy, and this was sent.

Leprosy is a contagious disease that affects the skin, mucous membranes, and nerves, causing the skin to go white, or pink blotches can appear. Lumps the size of a bean can form on the face, under the skin and in the muscles. Sometimes the blotches and lumps break open into sores. Because leprosy affects the nerves under the skin, the victim loses all sense of taste, heat and pain. You could step on a nail or a piece of broken glass, or drink some boiling water, and not notice. If you lived in a slum, a rat might start chewing your toes during the night, but because you felt no pain you would not wake up and chase the rat away. The real problem is that leprosy victims do not realize they have hurt themselves and therefore do not treat themselves. The wounds fester, dirt gets in and infection develops swiftly. It is the infection that lead to fingers, hands, feet and noses gradually 'rotting' away. The other effect of leprosy on the nerves is paralysis. The muscles and tendons of the hands, fingers and feet stiffen and sufferers can no longer blink or close their eyelids. This usually leads to blindness. If leprosy is detected early enough the person can be cured, and the symptoms will not develop.

Ruth and her helpers built a dispensary hut on a patch of waste land in the slum, and soon leprosy sufferers from all over the city began to arrive for treatment. Some people who came to help did not want anyone to know they were working among leprosy sufferers. This was because people of all backgrounds were still very frightened of the disease. They thought that anyone who went near leprosy sufferers would carry the disease and be infectious. That was why the moment someone in a village showed signs of having leprosy they were thrown out of their family and out of the village. These "leper outcasts" had to beg for food to survive and soon drifted into slums like the McLeod Road slum where they stayed until they died.

Ruth and the other nuns worked for sixteen hours a day at the dispensary, cleaning and dressing wounds and giving medicine. They also treated patients with many different diseases besides leprosy. For every sufferer Ruth treated, another two would arrive outside the dispensary the next day. Some of her patients had such bad infections that they needed amputations to stop the infection spreading.

Ruth had to spend a lot of time trying to get hold of medicines, bandages, sterilizing equipment, food and other essential supplies. Every morning she went around Karachi calling on everyone she thought could help. She needed a water supply and a better draining system for the slums. It took time, patience and perseverance. One day she wrote in her diary, "What a wretched country this is. If it isn't pouring raining, it's the sandstorms, and when it isn't sandstorms, it's the locusts."

As the news of the work spread, there were some doctors who came forward and offered their voluntary services at regular intervals. Since that time the work grew fast and small treatment centres were established in Karachi and all over Pakistan.

Training was conducted for paramedics and social workers. The trainees were given and health education and started to get over prejudices and fear.

Later on, Dr. Pfau went to the far-off areas of Pakistan where there were no medical facilities for leprosy patients. She collected donations in Germany and Pakistan and cooperated with hospitals in Rawalpindi and Karachi. In 1968, Dr. Pfau persuaded the Government of Pakistan to undertake a National Leprosy Control Program in partnership with MALC (Marie Adelaide leprosy center) and began setting up Leprosy-control centers across the country.
Today, Marie Adelaide Leprosy Centre is the hub of 157 Leprosy control centers, with over eight hundred staff members. Thanks to the efforts of Dr Ruth Pfau and the MALC, Pakistan was declared leprosy in 1996.

Dr Ruth was very active in taking part in the relief activities in the aftermath of 2005 earthquake and 2010 floods. Dr Ruth Pfau identifies herself as a Pakistani, wears Pakistani dress shalwar kameez only. Says that if she were to be born again, she would be born in Pakistan.

On 8th March 2010, she completed her 50 years in Pakistan. She has been honoured for her dedicated services and commitment to eradicate Leprosy and help the poor in Pakistan.

Birds and Flight 1
About birds

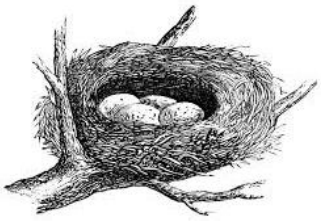
Student activities

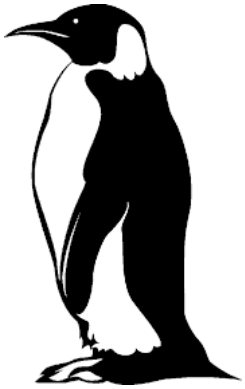
All birds have wings, although not all birds can fly. Kiwis, penguins, emus and ostriches are birds which have wings but do not fly.

A bird's blood is warm. Even penguins have warm blood.

All birds lay eggs. Some birds make their nests in trees. Some birds make their nests on the ground. Some birds make their nests
in holes in banks.

Eggs can be white, coloured or speckled. All birds keep their eggs warm.



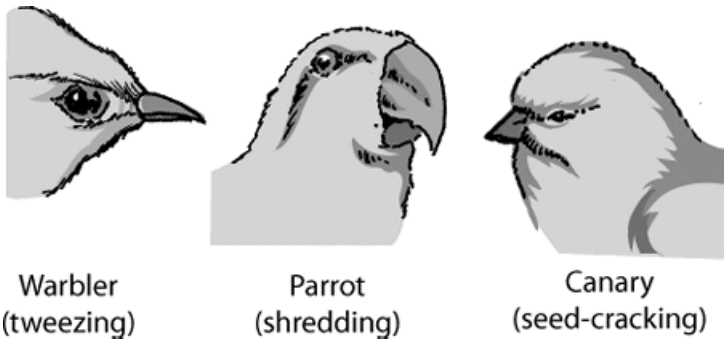


Some birds eat insects. Some birds eat seeds. Some birds eat worms, some birds eat fish. Some birds eat small animals.

1. Draw a picture of a bird that cannot fly.
2. Name a bird that builds a nest in a tree.
3. Name a bird that makes a nest on the ground.
4. Why do birds keep their eggs warm?
5. Name a bird that eats fish or small animals.

Birds and Flight 2
Food and beaks

Birds have no teeth but have beaks. There are many different kinds of beaks.



All birds have backbones.

Birds are not mammals. They do not feed their young on milk but find food to feed their babies.

1. Name a bird that eats seeds.
2. Name a bird that eats insects.
3. Name a bird that eats worms.
4. What do mother birds feed their babies?
5. Draw some birds showing different kinds of beaks.

Birds and flight 3
Types of birds

Perching birds
More than half of the different types of birds in the world are perching birds, for example, hens, finches and wrens. They have special feet for gripping the branches. Three toes point forward and one points backwards. This means that the bird can sleep without falling off its perch.

Birds of prey
With their sharp talons, hooked beak, excellent eye-sight and powerful wings, birds of prey are designed for hunting. Many birds of prey, such as eagle and hawks, spot their prey from the air. It may be a fish, a mouse or a snake. Then they swoop down and scoop it up with their feet.

Water birds
Many birds live near rivers, lakes or the sea. Ducks, swans and geese have waterproof feathers and webbed feet for swimming. Flamingoes have long legs for wading through shallow water. To feed, they stick their heads upside-down in the water and catch tiny water animals with their beaks.

Flightless birds
Not all birds can fly but they have other ways of getting about. Penguins are fast swimmers, using their wings and flippers. Ostriches and emus have long legs and are very fast runners.

Name and draw one bird from each group above. Write a sentence or two about each bird.

Birds and flight 4
Long journeys

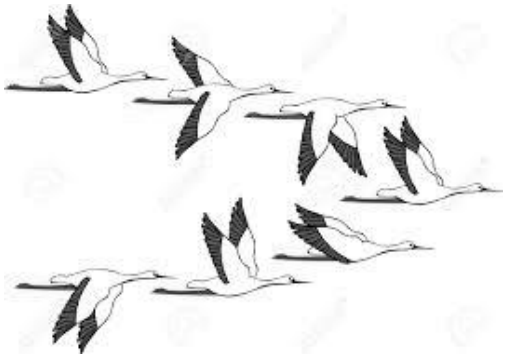
Some birds make long journeys to find warmer places to live. In places with cold winters, there is less food for the birds, so they fly together in a group to a warmer place that has more food. Then they fly back again for the summer. This is called migration.

Birds find their way by watching the sun during the day and following the stars by night. Something inside them acts like a clock. It tells them when to set off.

Before they set off birds eat plenty of food to store up energy for their long journey.

Migrating birds travel over oceans, deserts, mountains and arctic regions.

1. Why do birds migrate?
2. How do they find their way?
3. Who do you think gave them the ability to know when it is time to set off?



Birds and flight 5
A bird's body

To help birds fly, God made their bodies very light and streamlined. This means they have a smooth shape so they can slip through the air easily.

Feathers
Birds are the only animals that have feathers. Small birds have about 1,000 feathers. Large birds can have as many as 25,000.

Eggs
All birds lay eggs. God planned this so that they would not have to carry their young around inside them before they are born.

Wings
Birds have wings instead of arms. They are strong and light enough to make a bird fly when it flaps them. This makes the air pass through.

Necks
Birds have very flexible necks. They can turn their heads backwards to clean themselves.

Ears
A bird's ears are hard to see. But they can hear very quiet sounds.

1. What is special about a bird's body?
2. What would happen if birds carried their babies around in their bodies?
3. What happens when a bird flaps its wings?

Birds and flight 6
Feathers

Feathers keep birds warm, stop their bodies from getting wet and help them to fly.

Here are some different types of feathers on a bird's body:

Down feathers

These are the very soft ones next to the bird's skin. They help keep the bird warm.

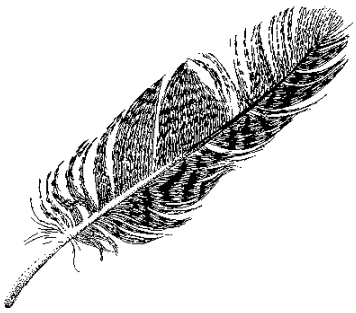
Tail feathers

Birds use their tail feathers to steer themselves in the air and to balance on the ground.

Body feathers

Body feather lie smoothly over the down feathers. They are oily so that they are waterproof. This stops the bird getting cold and wet.

1. What type of feathers keep a bird warm?
2. What type of feathers stop the bird from getting wet?
3. How do these feathers stop the bird from getting wet?
4. What do birds use their tail feathers for?



Birds and flight 7

About the Kakapo

Read the following and write three facts about the Kakapo

The kakapo is a parrot of New Zealand. It almost became extinct. Although the kakapo has wings it does not fly. It climbs trees using its claws and beak. It hunts by night and sleeps during the day. The kakapo is a friendly bird, quite happy to be up close to humans. To attract the females, the males make a booming sound at night which sounds like distant thunder. He does this by inflating air into special sacs in his body, a bit like blowing up a balloon, and then releasing the air.

Why did the kakapo almost become extinct?

When Maori people arrived in New Zealand about 1000 years ago, the kakapo was an easily hunted because it was asleep during the day. When Europeans came to New Zealand about 200 years ago they brought with them animals like cats, foxes and weasels, so by the late 19th century kakapos were almost extinct. In 1970 it was thought that the kakapo was extinct, but in 1977 a colony of about 200 kakapos was found on Stewart Island, an island just off the southern most point of New Zealand. The kakapos were moved to another island that had no cats and dogs. That is how the kakapo has survived.

Birds and Flight 8

The Kakapo: a parrot from New Zealand that does not fly.

What can we learn from the kakapo? Write three points.

- When parrots were released from Noah's ark, they could ALL fly.
- The flying parrots reached New Zealand from the ark, but one day in New Zealand, a flightless parrot hatched from an egg of a flying parrot. This was not meant to be. It was an example of something that went wrong. The Bible tells us that because of Adam and Eve's sin back in the Garden of Eden, things in the creation started going wrong. (Romans 8:19-22)
- The flightless parrot had flightless babies, and they grew up and produced flightless babies. These flightless birds were able to survive in New Zealand because there were no animals there that would eat them. They had not made the sea crossing.
- When humans came, and brought with them predators like cats and weasels, the kakapo almost became extinct.
- When something goes wrong in the process of animals producing their young, we call it a mutation.
- Mutations are when living things go from being perfect to less perfect.
- God's original creation was perfect, but things have gone wrong over the years, and now the creation is not so perfect.
- People who believe in evolution would say that things go from nothing into something fantastic, like slime that turns into a more complex animal, and that animals turns into an ape that turns into a human.

But we can see from the kakapo that our creation is not getting better. God made it perfect in the beginning.

Birds and flight 9

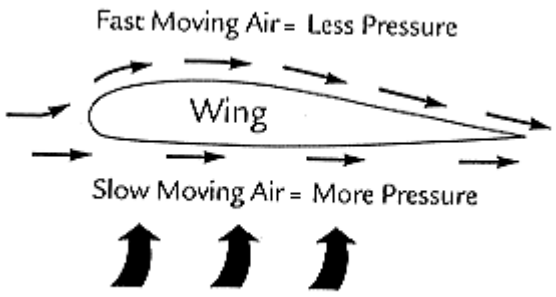
How do birds fly?
How do aeroplanes fly?

Birds and aeroplanes fly using the same principle.
An aeroplane's wing is designed so that the air moving under the wing travels a shorter distance than the air moving over the wing. This creates a high pressure under the wing and a low pressure above the wing, which forces the plane up.

The wings of birds and planes have what is called an aerofoil shape. This aerofoil shape helps us overcome weight which is the effect of gravity pulling down on the mass of the aircraft.

The aerofoil shape gives us something called **lift**. This is the upward force required to overcome gravity, being produced by a wing as it moves through the air. This action allows the object to lift up and push forward.

Try this experiment:
Blow over a narrow strip of paper held to your lips. The moving air above the paper has lower pressure than the air beneath it, which is not moving. This causes the paper to lift up. It is called the principle of LIFT.

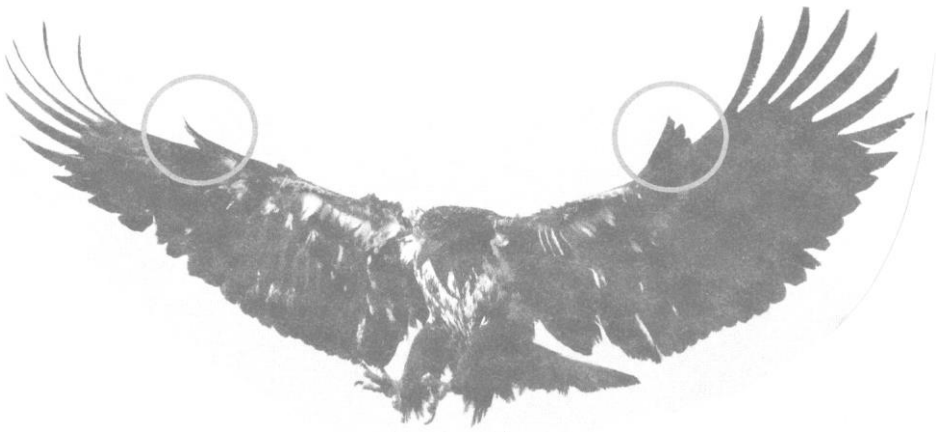


Birds and flight 10

What do jumbo jets and eagles have in common?

When a jumbo jet approaches an airport to land, the pilot deploys flaps on the leading edges of the wings. This allows the plane to fly at a low speed without stalling. Leading edge flaps were unknown in birds until now. A study of the Steppe eagle, at the Oxford University of England, shows that this bird has special leading edge feathers that it uses during takeoff and landing. These special feathers have been captured on video footage. The eagle deploys a wing flap on the front edge of the wing, just as a jumbo jet does. This flap helps the eagle to lift off when flying at low speeds and high angles of attack. It stabilizes the wing during unsteady flying movements.

Such wonderful design features did not come about by chance, but were designed by the Great Designer.



What does the eagle use its leading-edge feathers for?