God is Provider Teacher's Topic Guide Year 7

Topic: Air, wind & flight **Duration: 5 weeks**

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!

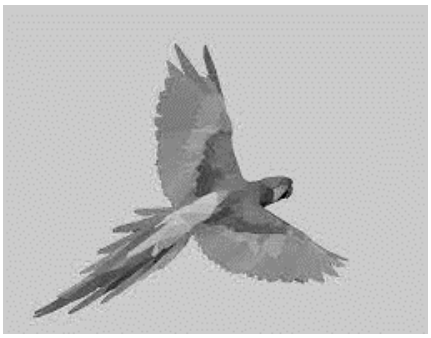
Mum:
What are you two fighting about?

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



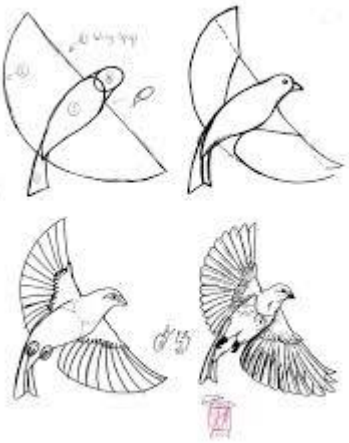
Art Year 7

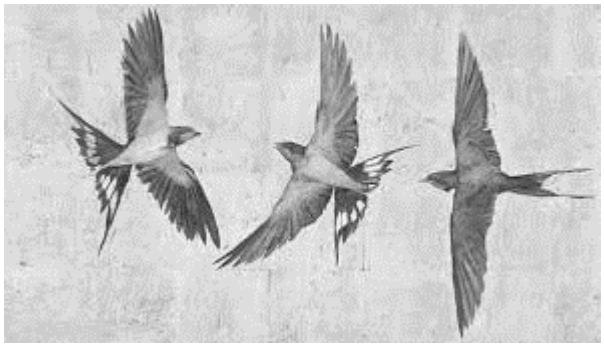
God is Provider

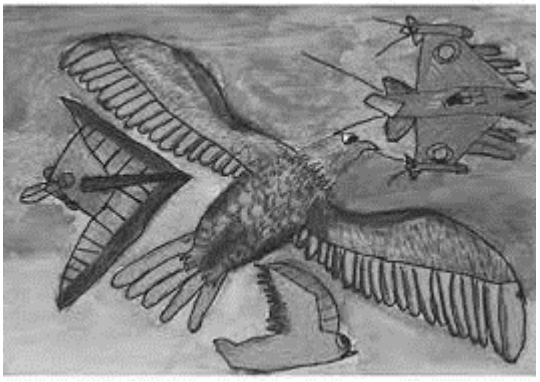
Air and flight

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

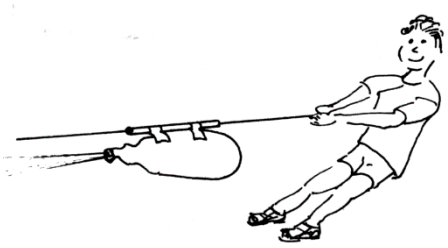
http://www.sciencebob.com/experiments/balloonrocket.php

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.

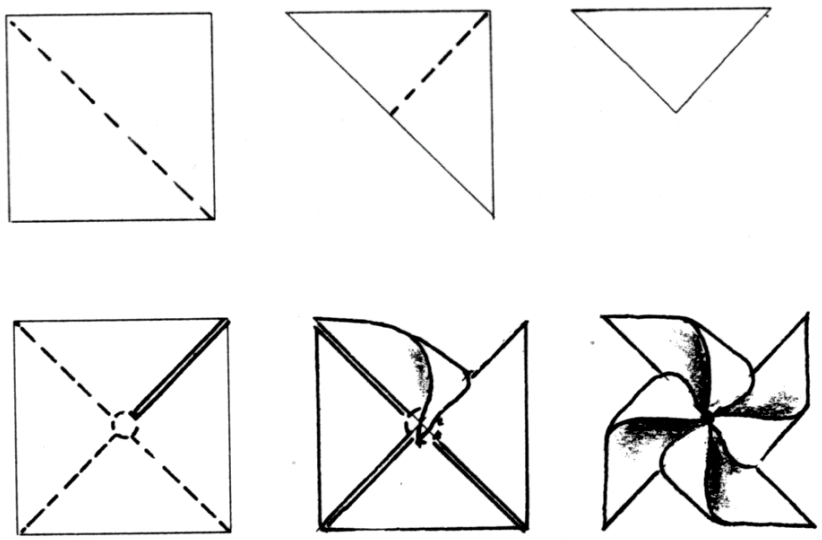
Observation: What do you observe? Why?

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.

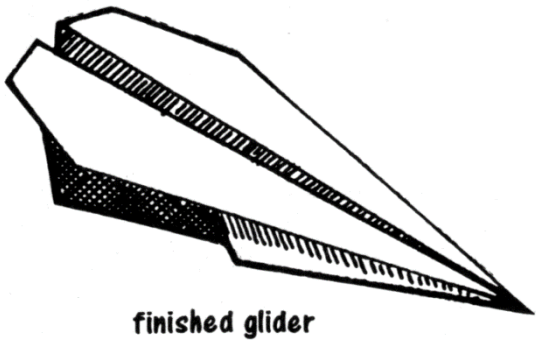


Practical Science
Topic: Air
Make a paper glider and a whirly twirly

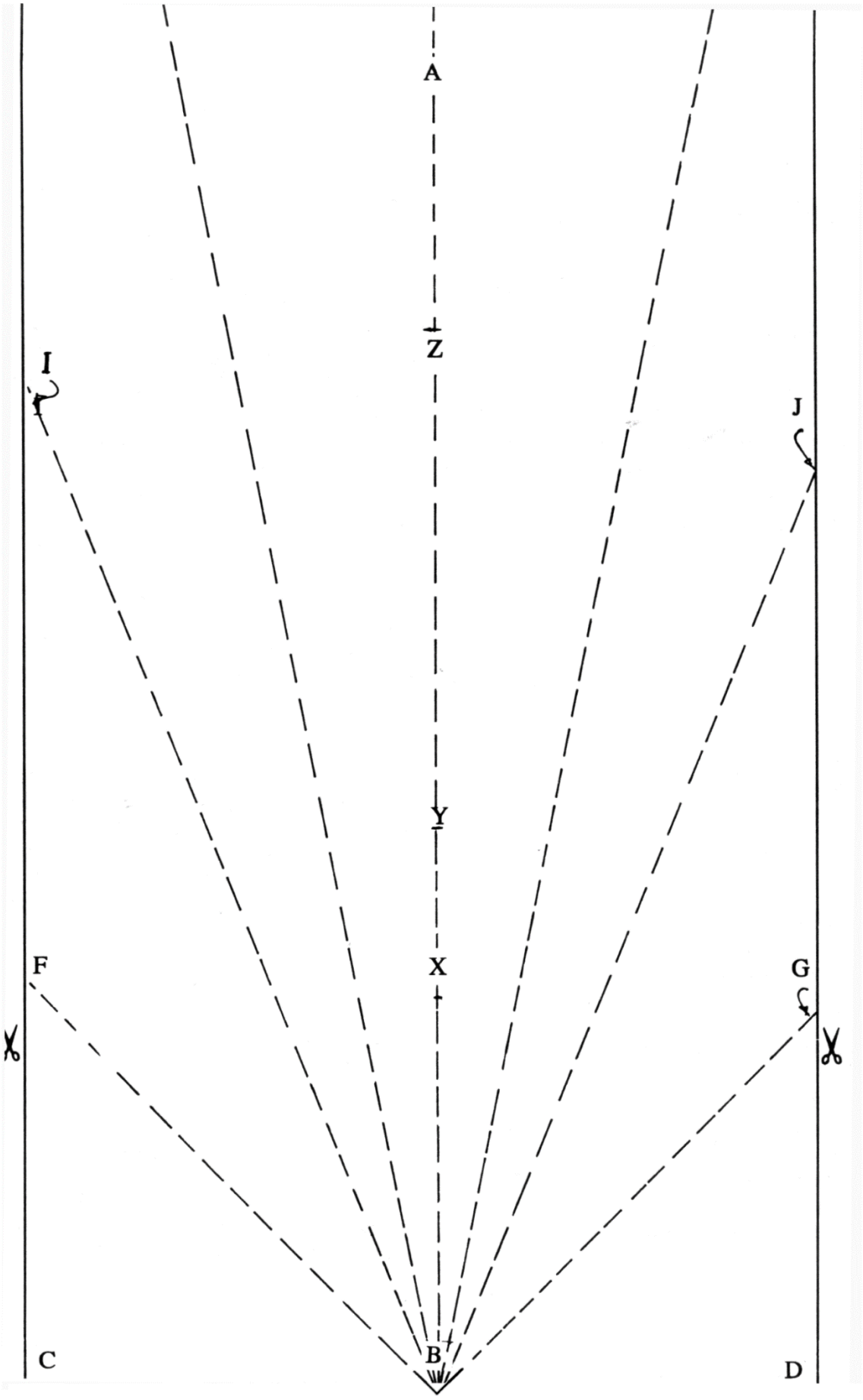
See patterns on the following pages

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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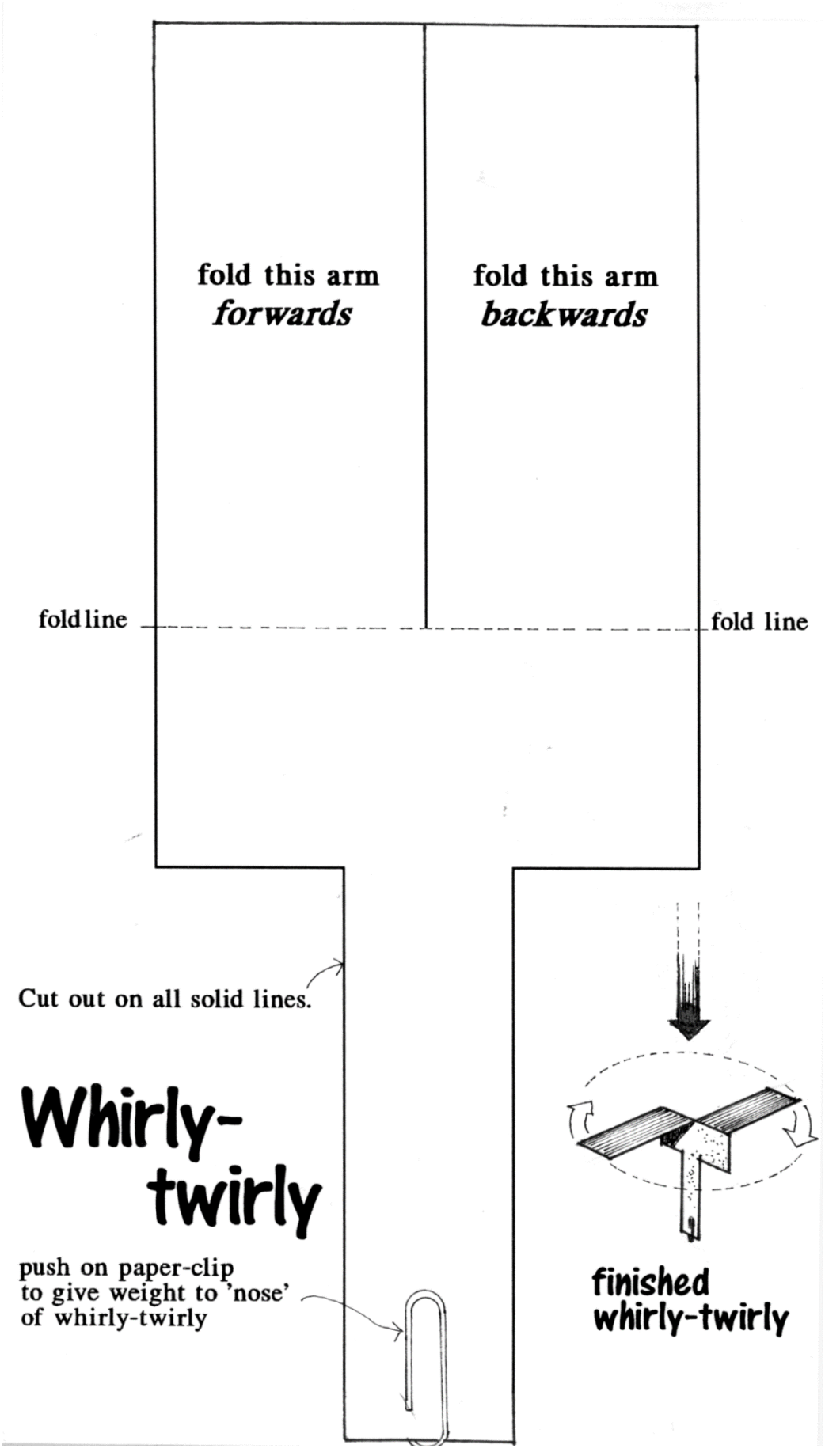
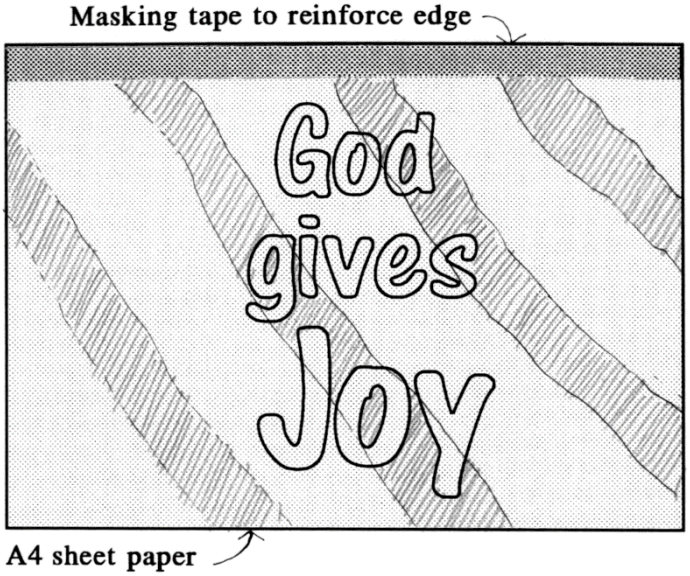
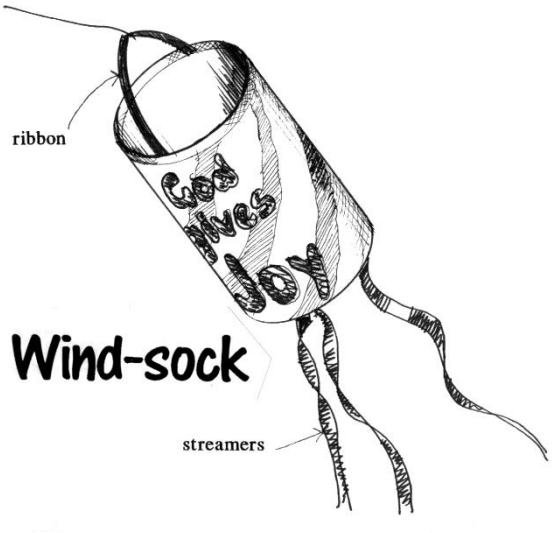

fold this arm
forwards
fold this arm
backwards
fold line
fold line
Cut out on all solid lines.
Whirly-
twirly
push on paper-clip
to give weight to 'nose'
of whirly-twirly
finished
whirly-twirly

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