



Airfield weather and landing lights teacher notes

Key Stage 3

Science:

- Obtaining and communicating data
- Evaluate methods
- Series and parallel circuits

Key Stage 3

Mathematics:

- Communicate findings effectively

Overview

These activities look at how the weather can be observed, measured and how this influences the working of an airfield:

1. Measuring the weather
2. Airfield landing lights

NOTE: a suitable risk assessment must be performed before carrying out any practical activity.

Activity 1: Measuring the weather

In this activity, young people use simple methods to gather data on the weather.

This type of activity is excellent for incorporating the use of ICT in the form of dataloggers. Measurements of temperature and light intensity can be gathered over an extended period of time and viewed graphically.

The measurement of weather data can be taken to quite sophisticated levels with commercially available instruments. Complete weather stations are available that deliver data electronically for use with associated software.

Preparation

The degree of preparation will depend on the activities that are undertaken (see the notes below). To take weather observations, young people will typically need some of the items below:

- Thermometer (alcohol)
- Wind speed measuring device.
Young people make one using activity sheet below, copied onto thin card. Or purchase a commercial anemometer.
- Wind sock (see activity sheet) for indication of speed and direction.
- Light meter
- Compass (North, South, East, West) to measure the wind direction
- Rain gauge (see instructions below)

Activity notes

Using an interactive whiteboard and Internet connection, show young people current weather data for a local weather monitoring station. This data can be obtained from the Meteorological Office web site using the interactive map at:

http://www.metoffice.gov.uk/weather/uk/uk_latest_weather.html

Young people suggest weather factors that could be measured to give pilots an indication of the weather. This could include things such as:

- Air temperature (taken in the shade)
- Wind speed and direction (especially for take-off and landing)
- Visibility
- Cloud cover
- Ground ('runway') conditions such as snow, ice, wet or dry.

Have young people use the instruments to take measurements of the weather. This gives an opportunity to discuss the reliability and consistency of measurements as well as the need for standardised methods.



If the activity is taking place during a visit to an airfield, the young people can also discuss the best location for taking the measurements and positioning of equipment such as wind socks and monitoring stations.

Using their observations, young people work in groups to write and present a weather report for local TV or a radio bulletin for pilots using a local airfield. Alternatively as a presentation to the class, audio recording or video clip.

This activity offers a wide range of possibilities to use ICT in gathering data and presenting the information. Links with mathematics include the presentation of data using graphical methods.

Extension

Have young people watch a local weather forecast on TV and make a note of the prediction for the following day. Compare this prediction with the actual weather they observe the next day. How accurate was the weather forecast? How could they judge and report the accuracy of the forecasts over a period of time?

Young people use the Internet to research the standardised methods used to gather weather data around the world. See the Meteorological Office fact sheet 17 at: <http://www.metoffice.gov.uk/learning/library/factsheets>

Making a rainfall gauge

This gauge allows rain to be collected and measured. It will not be the 'standard' as used by the meteorological office but will allow a comparison over time.

1. Take a 2-litre plastic drinks bottle.
2. Use a plastic funnel, with a large diameter, and secure it into the bottle.
3. Place the bottle and funnel outside where it is exposed to any rainfall. Secure the rain gauge so that it does not fall over, e.g. to a tent peg in ground.
4. Collect rainfall over a 24-hour period.
5. Measure the volume of water using a measuring cylinder.
If a measuring cylinder is not available, draw a centimetre scale up the side of the plastic bottle (in permanent felt-tip pen).
6. Measure rainfall over several days and plot results using a bar chart.

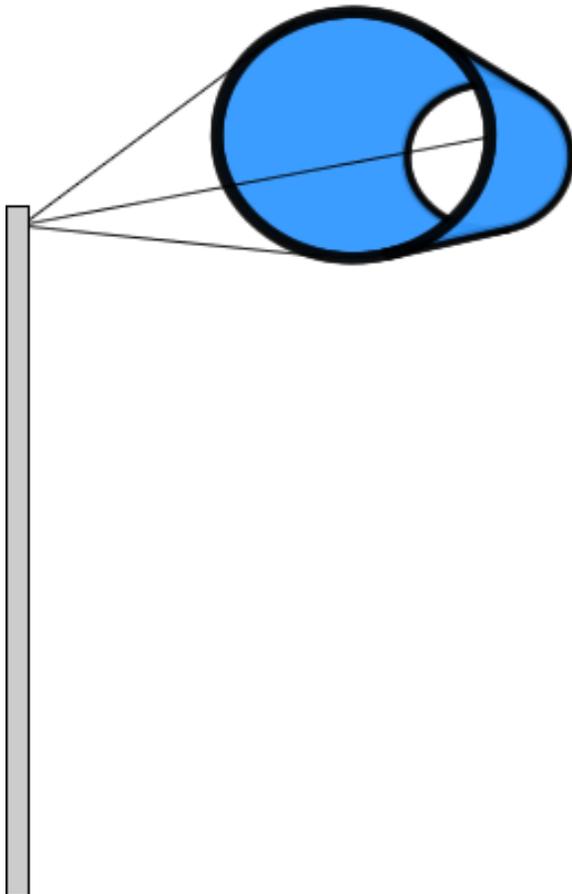
TAKE FLIGHT

Exploring our aviation heritage



Windsock

Airfields have a windsock.
It shows the direction and speed of the wind.



Make your own windsock

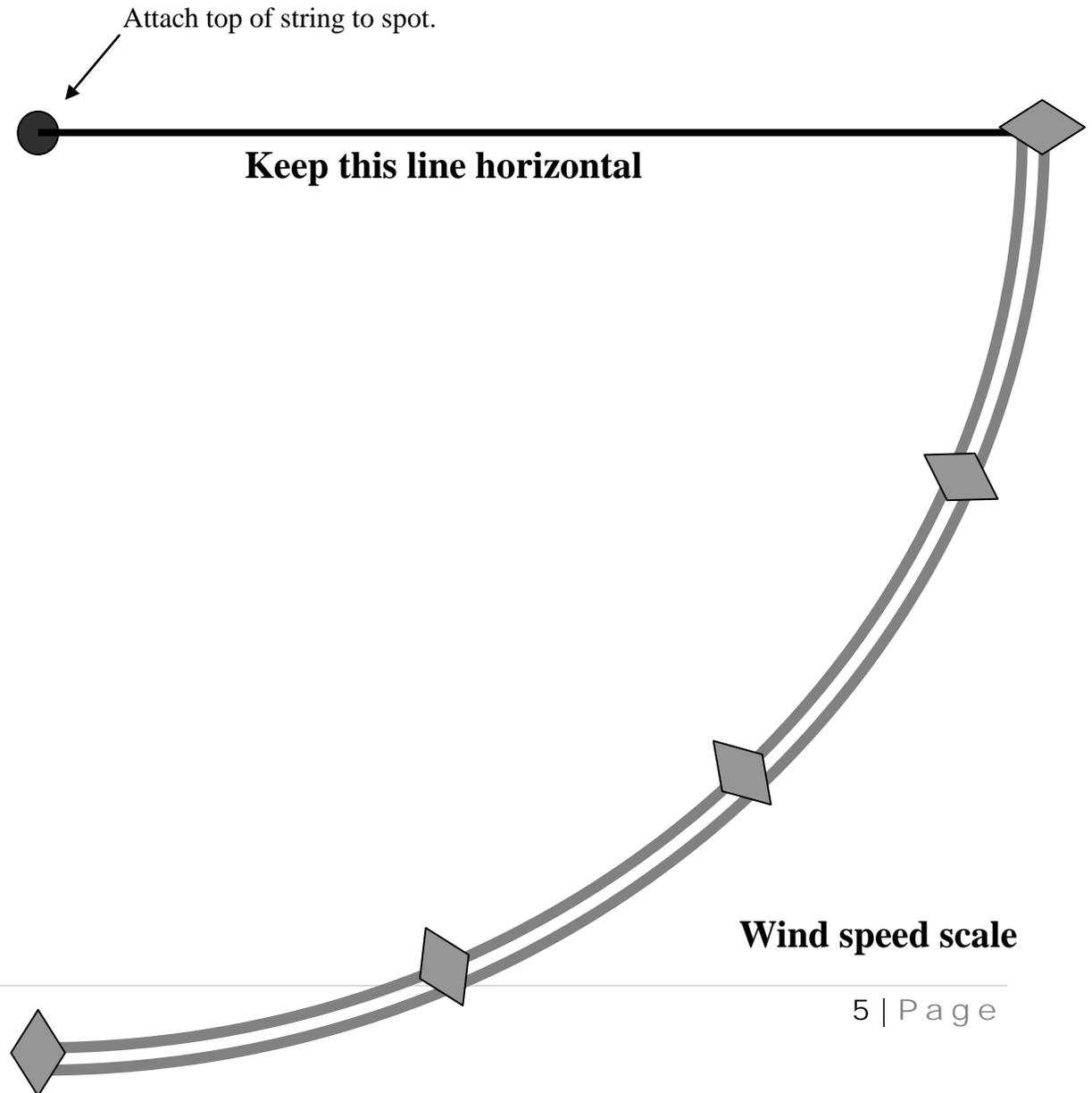
1. Roll a sheet of paper into a tube like the one in the picture.
2. Stick it together using some sticky tape.
3. Attach three pieces of string to the tube.
4. Attach the other ends of the string to a metre rule.
5. Hold your windsock into the air to indicate wind speed and direction.

TAKE FLIGHT

Exploring our aviation heritage

Wind speed gauge

1. Use sticky tape to attach the top of a piece of string to the spot shown on the gauge.
2. Make sure the string is long enough to go past the scale.
3. Hold the gauge so that the line next to the string is horizontal (flat).
4. Let the string get blown by the wind.
5. Observe the wind speed using the scale.
 - What is the wind speed?
 - How can you improve your scale to allow reliable comparisons?
 - What is the Beaufort scale?
 - How does the Beaufort scale classify different wind speeds?



Activity 2: Airfield landing lights

Young people produce an electrical circuit that contains lights (to represent landing lights) that can be switched to indicate the appropriate runway to use for take-off and landing (into the prevailing wind).

Preparation

- Weather data sheet or access to the internet to get real-time data from local weather station
- Airfield map (attached) enlarged onto an A3 sheet.
- Lights, wires, switches and power source

Activity notes

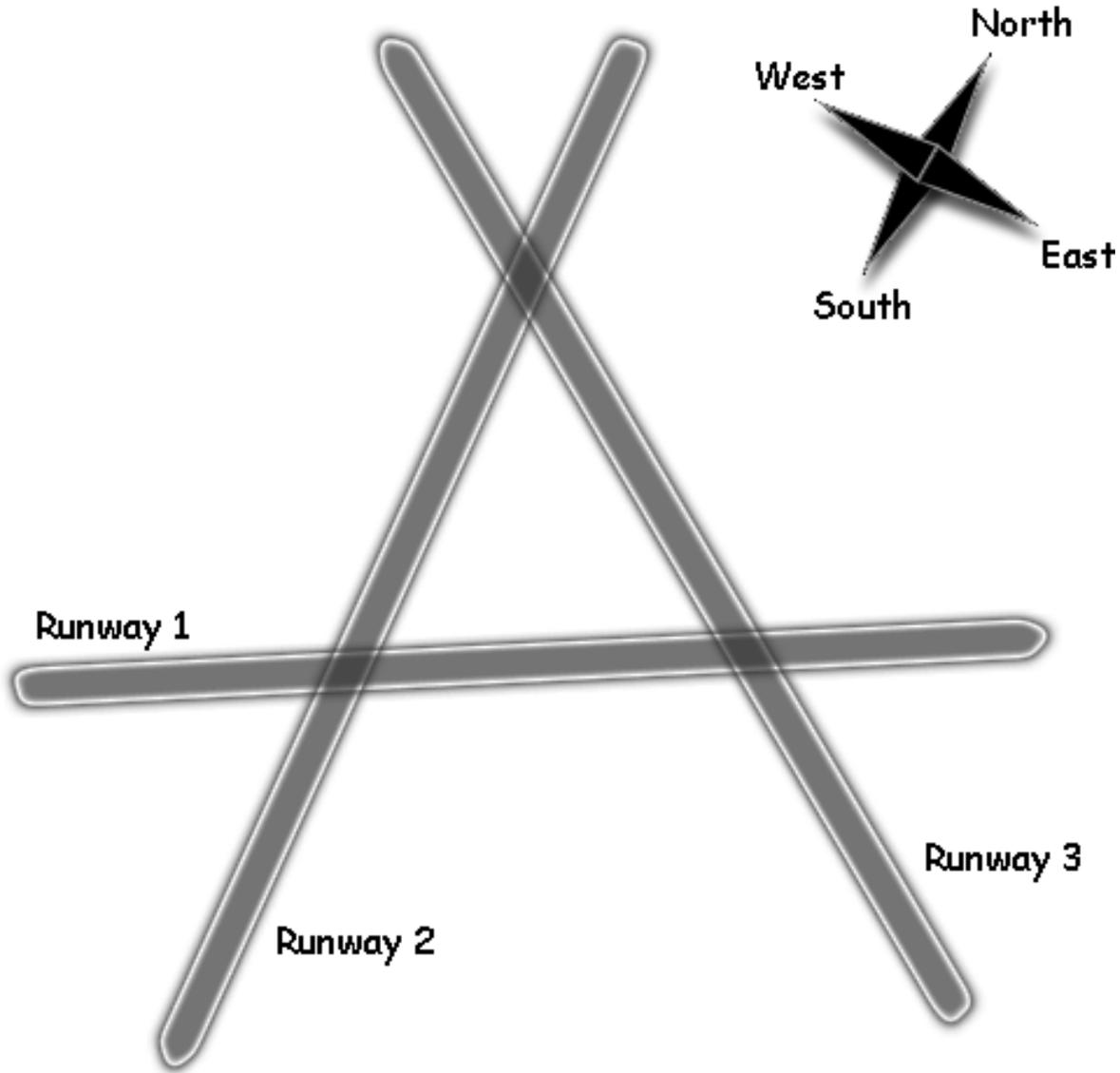
Young people then lay out circuits onto the airfield map. The circuits must be able to independently illuminate the landing lights on each runway to indicate which one is operational. So when one runway is lit, the others are not.

Extension

View the aircraft and flight paths over the UK at: <http://www.flightradar24.com/>



Control tower



Landing lights

Your task is to use switches and bulbs to make some landing lights for the airfield. The landing lights must indicate to an approaching aeroplane which runway to use.

- Think about the switches you are going to use.
- Design your circuit so that you can only have one runway lit at a time.
- Lay out your circuit on the airfield plan to show that it works.



The wind is coming from the South West. Use your lights to show which runway should be used for take-off and landing.