

PIPEHENGE

WHAT YOU NEED TO KNOW

PIPEHENGE is a strange configuration of pipes designed to help teachers instruct about astronomy in the daytime. It is also quite useful at night.

MAJOR FEATURES

1. A southern facing circle maps out the apparent movement of the pointers at night. The pointers touch the inside of the circle as they move about the south celestial pole, the direction of which is denoted by a small circle within the large circle. Kneel on the grass in the centre of the structure and peer through this hole. By placing your hands in a cup like fashion up to your face, remember where the circle is then later go out at night to find the pointers. All stars within this circle are circumpolar; this means they never set from Adelaide's latitude of 35° .
2. The (true) compass points are shown by the north (red) pipe, east (green) pipe, west (yellow) pipe and south (blue) pipe. The centre of Pipehenge is where the NS and EW lines intersect.
3. The meridian is an arc that stretches from north to south and passes through the point directly overhead (zenith). This is the white pipe which runs between the N and S pipes. Local Solar Noon occurs when the shadows from the N and S pipes as well as the meridian pipe overlap. Note that local solar noon does not coincide with clock noon (midday) in Adelaide. Our time zone is not based on solar time from our longitude (138°). If Pipehenge was set up at our latitude but placed at 142.5° longitude the two would coincide.

If a student is in the centre of Pipehenge facing north at solar noon, the shadow from the meridian pipe will show the right half of their body in AM and the left half of their body in PM. (ante-before; post-after meridiem).

4. There are two arc pipes that stretch between the E and W horizon pipes. The lower more northern pipe traces the sun's apparent path across our skies in midwinter, 21 June, the shortest day/longest night of the year. Note that the sun's maximum midwinter elevation above the northern horizon equals our latitude (35°) on this day. Solar heating panels on rooves when correctly installed are aimed to achieve maximum heating effect in winter and should be angled perpendicular to this position at solar noon. On this day the sun is directly overhead points on the Tropic of Cancer.

The higher (more southern) arc is the summer arc. The apparent path of the sun follows this pipe on the summer solstice, or longest day, 21 December. The sun is over the Tropic Of Capricorn on this day.

Both of these arcs define the ecliptic on their days. On all other days of the year the ecliptic lies between the two arcs. Since the planets lie on the ecliptic plane, they can be found by looking somewhere in between the arcs. The moon can wander up to about 5° from the ecliptic plane, but should normally be between the summer and winter arcs. The 13 zodiacal constellations also lie in this region (yes, there are really 13. What is the 13th?)

Birthdays can take on a new meaning as students line up along the horizon pipes according to where the sun rises (or sets if you have a "birthnight", ie., born between 21 March and 21 September.)

5. On the equinoxes (equal day/night) the sun rises exactly on the east pipe and sets on the west pipe. Autumn equinox 21 March. Spring equinox 21 September.
6. Your students may be able to think of other useful applications of Pipehenge once they understand these ideas. This could form the basis of an investigation...

