32: weather 101

teacher's notes

Unlike other worksheets, the answers to these questions cannot be found readily in the text.

suggested answers

1) The Sun shines more directly overhead in the tropics throughout the year. (See quote below*.)

2) When a gas bottle valve is opened, the pressured gas *rushes out* from the high pressure environment inside the gas bottle to the low pressure environment outside the gas bottle.

3) In southern Australia, in January, dominant highs bring hot weather, at least to areas in the path of winds from the hot interior that are created by those highs. (A high over the Great Australian Bight would subject eastern Australia to cool southerly winds.)

4) In southern Australia, in June, dominant highs bring weather characterised by clear skies, cold nights and mild days,

5) For good images of cloud types, visit: http://www.bom.gov.au/weather-services/about/cloud/cloud-types.shtml

6) All of these are forms of precipitation, except black ice and icicles which consist of sheets or drips of water that are frozen when the temperature drops below zero.

*quote re why the tropics are hotter

Most of the sun's heat is deposited into the tropics of the Earth. This is because the Earth's rotational axis is almost perpendicular to the plane of Earth's orbit around the sun. The polar latitudes receive on average much less solar heating than the equator. If the tilt of the Earth's axis were exactly perpendicular to the orbit plane around the sun, then there would be no seasons! Climate in January would be the same as climate in April or July, all over the Earth. But the Earth's rotational axis tilts 23.5° away from perpendicular. Consequently, during one part of the orbit around the sun, the North Pole will be tilted 23.5° toward the sun and will be in sunlight 24 hours a day. Six months later at the opposite side of the orbit around the sun, the North Pole will be in total darkness 24 hours a day. Why is this important? The amount of solar heating of the polar latitudes varies greatly through the year. In the summer, polar latitudes receive almost as much solar energy as the tropics, while in the winter they receive no solar heat at all. Meanwhile, the tropics receive by comparison roughly constant solar heating throughout the year (hence the small seasonal cycles there). As a result, in the winter hemisphere, the difference in solar heating between the equator and the pole is very large—a situation perfect for driving a strong "heat engine," or circulation of the atmosphere.

from: http://terra.nasa.gov/FactSheets/EnergyBalance/

footprints answers

storm clouds over Torquay Surf Lifesaving Club

These answers can also be found at www.wipeout.com.au/footprints/answers/