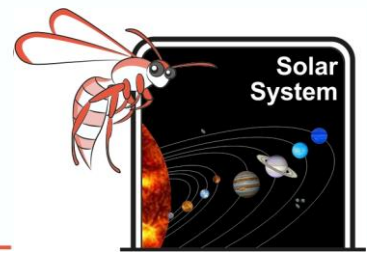
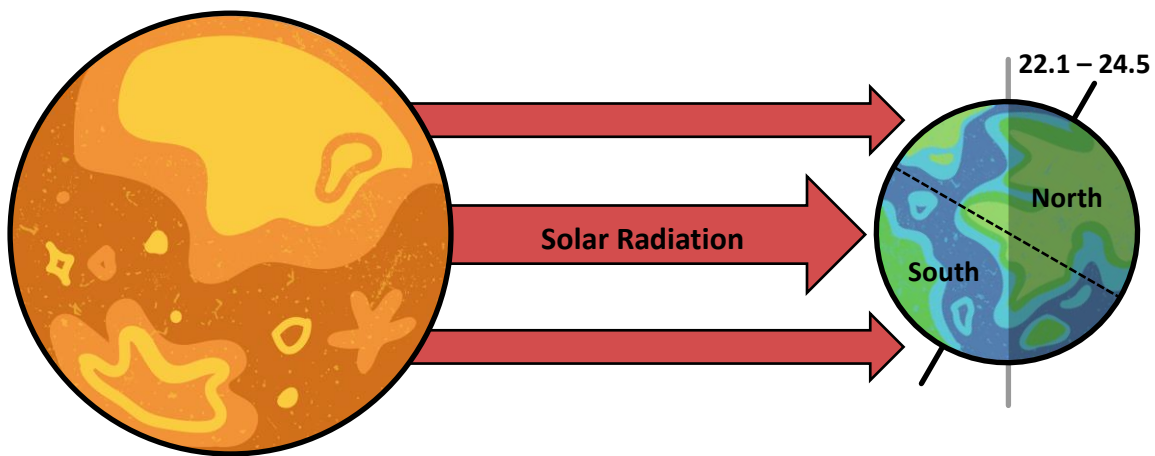


## The Seasons of Change – Teacher Notes



Planet Earth rotates on its axis every 24 hours which results in night and day. It also makes an elliptical orbit around the Sun every ~365 days. The axis on which the Earth spins is tilted, moving between 22.1 and 24.5 degrees over a cycle of 40,000 years.

When the north pole is pointing away from the Sun the northern hemisphere receives less solar radiation than the southern hemisphere. This means days are shorter and the temperature is cooler in the northern hemisphere. This marks winter in the northern hemisphere and summer in the southern hemisphere.



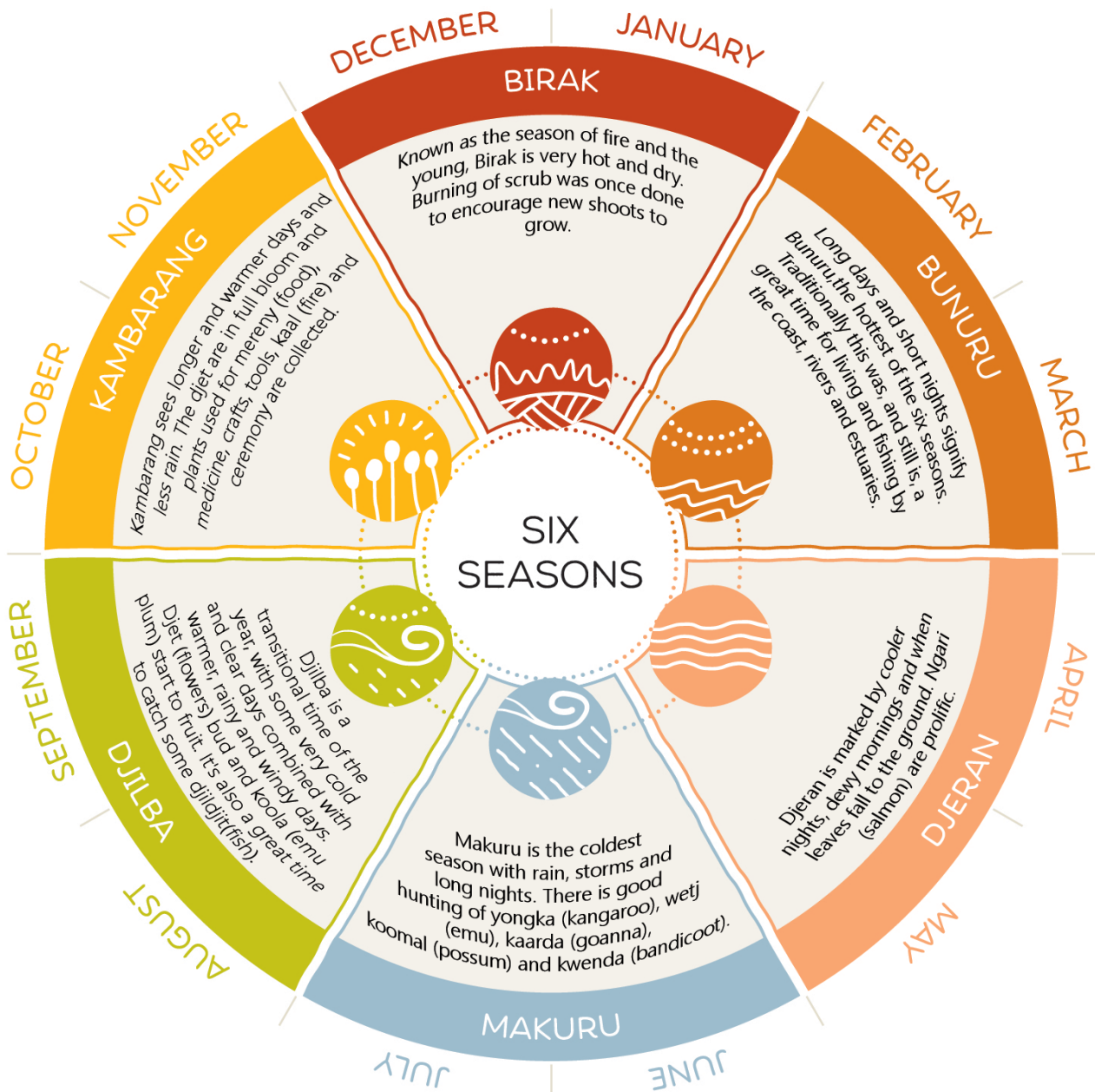
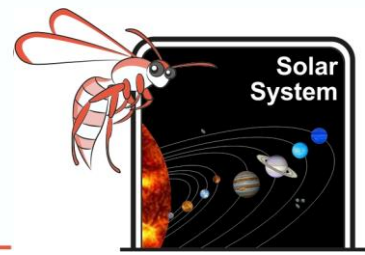
Conversely, when the north pole is pointing towards the Sun the northern hemisphere receives more solar radiation than the southern hemisphere, and it is summertime in the northern hemisphere and winter in the southern hemisphere. The greater the axial tilt, the more extreme the corresponding seasons.

There are many different variations of seasons based on where in the world you are from. Most temperate and sub-polar regions use the Gregorian calendar which splits seasons into Summer, Winter, Autumn and Spring. This is based on meteorological observations such as that of solstices, where one hemisphere receives the maximum amount of solar radiation, and equinoxes, where both hemispheres receive equal amounts of solar radiation. Within tropical climates, such as the Northern Territory in Australia, there are typically two seasons; the wet or monsoon season and the dry season.

Seasons were often identified based on important ecological and environmental events, such as in ancient Egypt where they had three seasons; flood, growth and low water, which referred to changes to the river Nile.

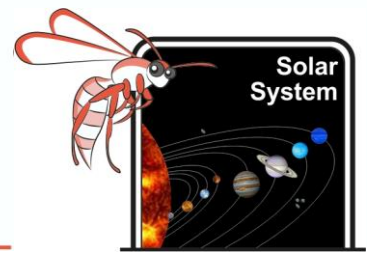
Australian Aboriginal people have many different seasons based on local changes in their environment, including changes in flora and fauna. This helps them more accurately understand how to interact with the environment around them in a sustainable way. Most language groups use a different set of seasons, based on their local environment.

## The Seasons of Change – Teacher Notes

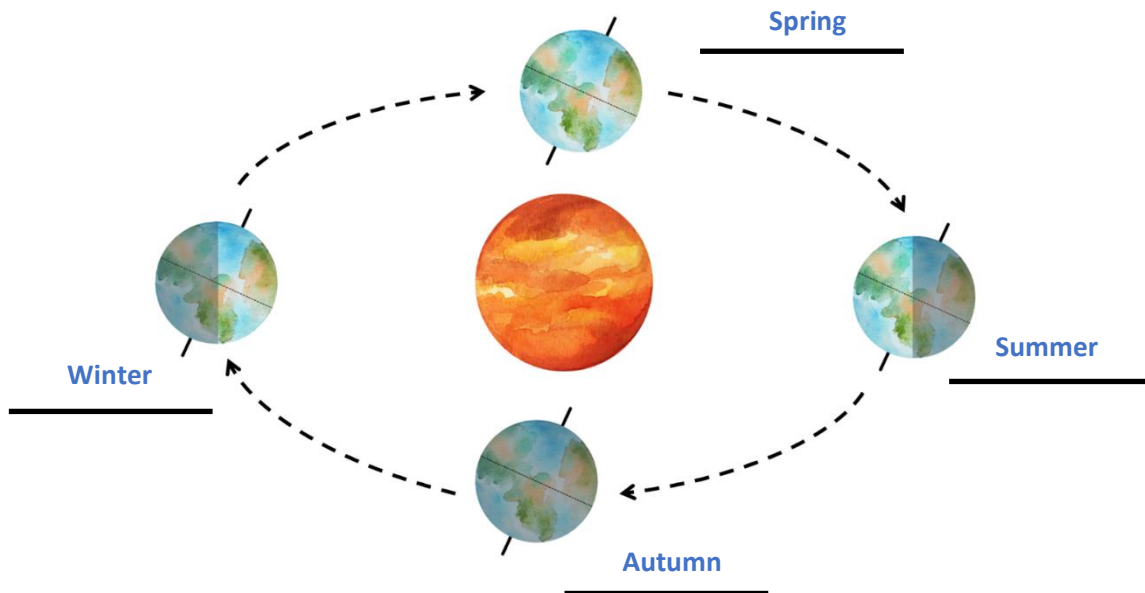


The six seasons of the Noongar Calendar (adapted from [Australia's South West](#))

## The Seasons of Change – Teacher Notes



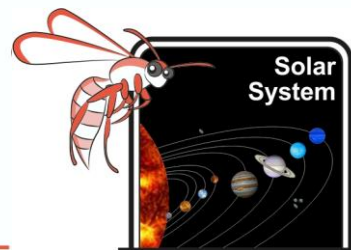
- 1) Using what you have learned, have a go at labelling the seasons according to the Gregorian calendar (Summer, Winter, Autumn, Spring) for the **southern** hemisphere in the diagram below.



- 2) Hemi means half. What does hemisphere mean? Half of sphere
- 3) What separates the northern and southern hemisphere? The equator
- 4) Try creating a calendar for your local area using the Gregorian calendar and the closest (local) Aboriginal calendar. Make sure to include the name of the season, months it spans and how we identify the season. For example, changes in temperature and rainfall, animal migrations, nesting/breeding, fruits available, flowers in bloom etc.  
You may find this website helpful: <http://www.bom.gov.au/iwk/index.shtml>
- 5) How can we use nature to help identify seasons?

This will be different depending on your class/location. For example, in the Northern Territory seasons are marked by periods of wet and dry.

## The Seasons of Change – Teacher Notes



6) Discuss the pros and cons of each calendar, Gregorian and local.

**Gregorian Pros – fits calendar dates, almost globally understood.**

**Gregorian Cons – over generalised, doesn't work for specific regions**

**Local Pros – based on local changes in environments**

**Local Cons – no specific start/end dates, specific to local environments/regions and**

**cannot be applied to other areas.**

7) Which calendar do you think is most useful for each of the following people? Explain your answers.

Farmer:

**Answers will vary. Students might highlight the benefits of a local calendar as it fits actual conditions but may recognise the challenges of forward scheduling activities.**

Tour Operator:

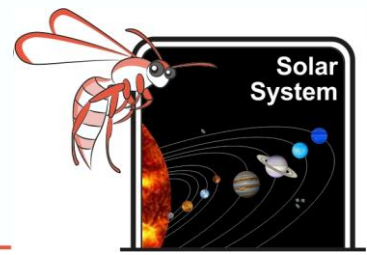
**Answers will vary. Students may particularly note the issues of forward scheduling when using local calendars.**

Traveller:

**Answers will vary. Students may note the benefits to travellers using local calendars, as they will be more aware of key times, like wildflower seasons, but again, the issues with scheduling.**

8) Why do you think the Gregorian calendar is the most commonly used calendar worldwide?

**It is generalised and lines up with specific dates of the year. European colonialism also spread it worldwide.**



## The Seasons of Change – Teacher Notes

**Extension:** There are many other calendars that are or have been used by other cultures, for example the Chinese lunar and agricultural calendars. Research a calendar that hasn't been discussed and answer the following questions.

1) What region was your chosen calendar designed for? Student choice

2) Discuss the pros and cons of using that calendar a) in the region it was designed, b) globally.

Answers will vary, dependent on calendar chosen. Most will recognise issues with using many  
of these calendars globally.

3) Global climates are changing, how could this effect local calendars?

Changes to the times of the year that rains start and end.

Changes to the amount of rain experienced.

Increased frequency of extreme events during relevant seasons.

Changes in animal behavior.

Changes in plant flowering times.