Lesson Plan 14

Earth and space sciences (The changing Earth)

Year Level: 5/6

Key learning area: Science

Modelling Tropical Cyclones

Objectives

By the end of this lesson the student will:

interpret the simulation of a cyclone using an animated model

have made a plasticine model of a cyclone

describe some of the main characteristics of a cyclone

describe the use of satellites in detecting and tracking cyclones

demonstrate the ability to process simple data from experiments and graphs.

Background

Go to the information contained in Modelling Tropical Cyclones: http://www.bom.gov.au/lam/Students_Teachers/cycmod.shtml. Please note/ The Modelling Tropical Cyclones link will automatically down load three animations with a total size of 167K.

Resources and actions

You'll need to access the content at the following internet location: http://www.bom.gov.au/lam/Students_Teachers/cycmod.shtml.

Photocopy maps of Queensland, The Northern Territory and/or Western Australia for use with the task on making a cyclone out of plasticine. Choose maps that have a scale and will result in plasticine cyclones that will be large enough to work with. A small map has been provided on the student worksheet.

Print off the student's worksheet and photocopy one for each student: http://www.bom.gov.au/lam/Students_Teachers/Worksheet14.shtml.

Ask the students to carry out the activity from the worksheet then go over their results at the end of the class. Please note cyclone rotation is reversed in the northern hemisphere.

Solutions

1. Students should make a model similar in design to the animation. They need to refer to the map's scale to ensure that their plasticine model is of the correct size. Highlight the enormous size of a cyclone and the fact that the eye is clear allowing them to see the map below through it. The map scale should only be used for the diameter of the cyclone not the height. As with the animation most cyclone diagrams use a different scale for the height to exaggerate the structure of the cyclone.

2. They should draw their cyclone with the eye labelled. Ask a student to demonstrate how the top part of the cyclone turns in the opposite direction to

the bottom. This is due to winds in the upper levels of the atmosphere moving in the opposite direction to those in the lower levels (this is a typical condition but not always the case). They should turn the bottom part in a clockwise direction (for southern hemisphere tropical cyclones only).

3. Figure 1 shows the wind speed being high around the eye of the cyclone and very low in the eye itself.

4. Students should choose a coastal city on their map and write a short piece about what they would observe as the cyclone passes. They should mention that the wind speed will increase as the eye approaches. They should describe some of the devastation caused by the strong winds and heavy rain. The wind speed drops dramatically when they are in the eye and then the wind comes from the opposite direction and increases in speed as the eye passes. They will observe a lot of rain and cloud until they are in the eye where it is clear and still. If they choose a coastal area they may mention a rise in the sea level i.e. a storm surge. This is a large and sudden rise in sea level which occurs close to the eye of the storm near the region of maximum onshore winds which is just to the left (in the southern Hemisphere) of the cyclone centre in the direction of motion as it crosses the coast. The surge is produced by the combined effects of the sudden reduction in atmospheric pressure and the very strong winds piling up the sea water. The worst surges occur when the cyclones coastal crossing time coincides with a very high tide. More than 140,000 people were drowned in Bangladesh in 1991 through the flooding of coastal communities by a storm surge generated by a tropical cyclone.

5. Satellites are used to detect and track cyclones. Geostationary satellites take photos of the earth at hourly intervals. These help us to see if a cyclone is forming and allow us to track its movements. Warnings can then be given to areas that seem to be in its path.

6. They are similar. The Bureau's logo is a stylised representation of the southern hemispere tropical cyclone, with winds spiralling clockwise and inwards to the calm, cloudless 'eye' at its low pressure centre. Why the Bureau chose that symbol is arguable and can be related to the Bureau's Service Charter (http://www.bom.gov.au/inside/services_policy/serchart.shtml). A good response would be that it relates to the Bureau's role of *'helping people make better-informed decisions affecting their lives and their community and business activities, on a daily basis and in their long-term planning, and especially in* ***dangerous or life-threatening weather situations****'.*

Time

45 - 50 minutes

Assessment Task

Q. 1, 3, 4 and 5.