

## **Example Unit of Work**

### **Using objectives for planning**

# **Australia and Our Near Neighbours**

**This unit of work draws on an integrated maths curriculum where learning outcomes are taken from a range of strands. In this unit, the integrating device gives the unit coherence as the learning is centred around a particular theme.**

# RATIONALE

## *Need to consider*

- *The purpose of the unit*
- *The location of the unit within the overall learning experiences for the students*
- *What the students have already covered and what still must be covered*
- *The theory behind what is being undertaken – content-wise as well as pedagogically- there should be a strong theoretical justification for the unit.*

This unit of work builds into the other curriculum areas so as to form an integrated unit. This is shown in the concept map below. The unit is devised for upper primary students. The unit seeks to build on students' knowledge of number, time, location and international currencies and exchanges through the integrated unit. Students will be able to see the relevance of the mathematical concepts due to the application to real life situations. For example, the use of exchange rates will show the floating value of the Australian dollar through the application of ratios. Similarly, the study of different times zones will show students why and how people in other countries experience time different from Australia. These applications will better prepare students for understanding the global village. These concepts will link in with other KLAs so the application is made even more concrete for them. Students in this class have little experiences with global travel and hence notions of time zones would be very foreign for them - other than daylight savings. This limitation in their background knowledge and experiences precludes them from discussing many aspects of world travel. The practical examples used in this unit will help to demonstrate the of these concepts - for travel or just communicating effectively. Exposing students to different cultures through this unit should help students to develop a deeper appreciation of other cultures.

Four main strands/substrands will be covered in this unit:

### **Measurement**

**Time:** Students will be revising previously learnt knowledge about time prior to this unit so that when time zones are introduced, pre-requisite knowledge has been adequately covered. 24 hr clock will be of particular importance for this component.

**Money:** Many of the currencies used by our new neighbours has very large base numbers. This will be used to consolidate place value operations. Daily newspapers will be used to find current exchange rates and this will be linked in with the English strands of reading newspapers

**Mass/Volume:** Links will be made with the science and SOSE KLAs through the diets and cuisine of the cultures investigated. Students will undertake cooking some national dishes.

**Temperature:** Temperatures will be collated from local newspapers to form the basis of collecting, organising, and interpreting information.

**Space**

**Location:** Grid work will be undertaken and students will be formally introduced to latitude and longitude. The students will need to be very familiar with basic grid work and only very easy-to-locate sites can be used in this unit.

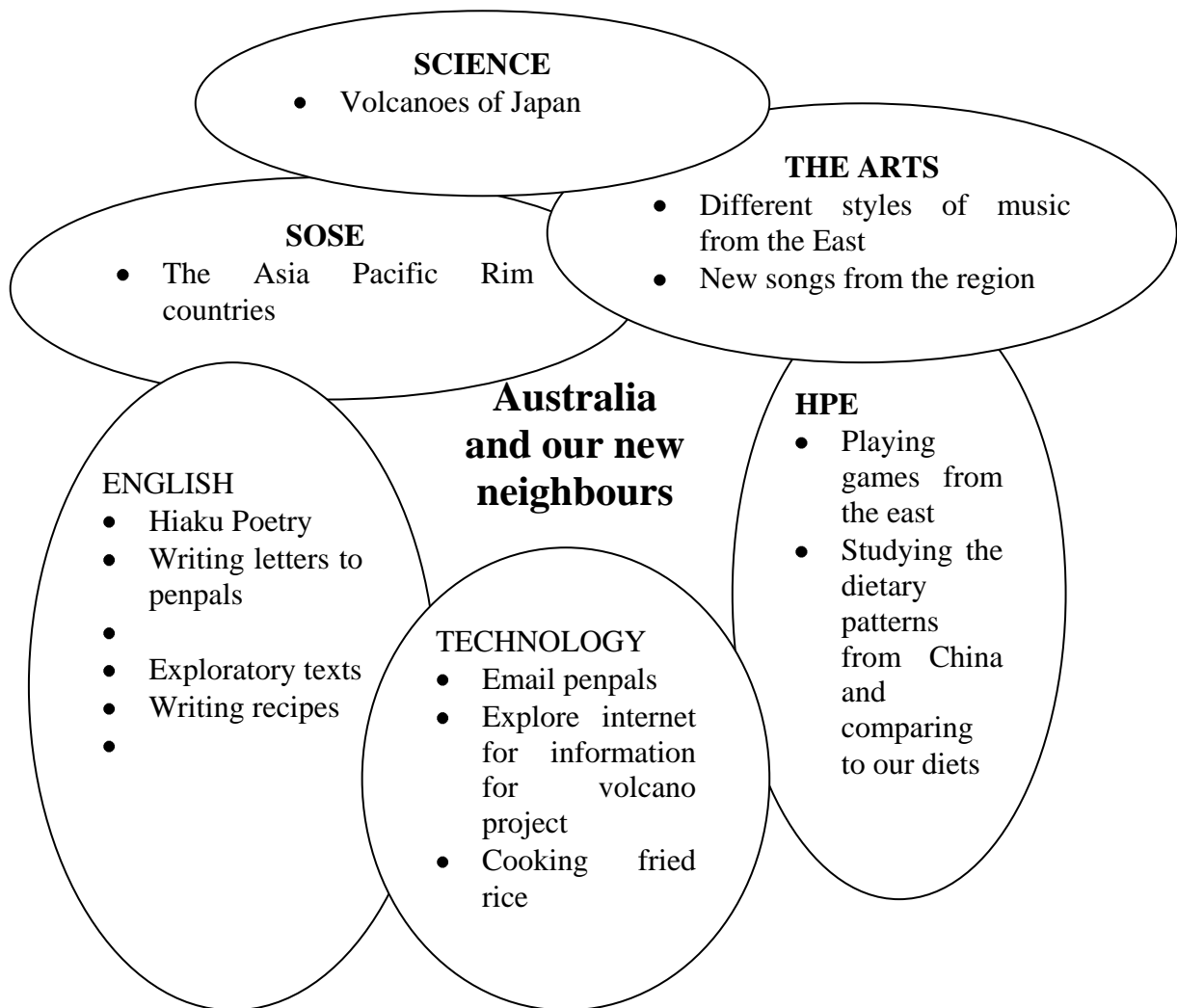
**Number**

**Number systems:** Students will be exposed to the different counting patterns of Asian cultures. Recording numerals from other cultures will also feature in this unit.

**Chance and Data**

**Data:** Students will be asked to collect data from the newspaper including the monetary exchange rates, but also temperatures in various cities throughout the unit.

## Integration across other KLAS



# CONTEXT

*Need to consider:*

- *Student needs, interests, abilities*
- *Resources available and needed*
- *Syllabus guidelines - curriculum as determined by Ed Qld*

## Context

### Background Knowledge

Calculators have been used throughout the school program so students will be able to use calculators in this unit of work. Prior to starting this unit, students should be:

<b>Time:</b>	Familiar with 24 hr clocks; addition and subtraction of time; able to read timetables, calculate duration of events;
<b>Money:</b>	Competent with multiplication and division; able to multiply with whole and part numbers, students will have had some informal experiences with money transfers (such as credit cards); able to record monetary values using decimal notations.
<b>Location:</b>	Competent with grid work; able to record co-ordinates using whole numbers; confident with decimal fractions,
<b>Number systems:</b>	Calculate effectively using large whole numbers and decimals; able to use a calculator effectively
<b>Mass &amp; Volume:</b>	Familiar with standard units of measure, able to measure effectively
<b>Temperature:</b>	Competent with degrees Celsius
<b>Chance &amp; Data:</b>	Competent with tallying and organising data, able to construct bar graphs using simple data; can interpret basic information from bar graphs; introduced to pie graphs but not competent with construction; able to add a series of numbers and divide - skills for calculating mean although not formally introduced to the concept.

### Social Skills

As the unit is to be structured around the use of small groups set up on a rotational basis, students will need to display good application skills along with good group work skills. These skills have been progressively developed over the year so students are now able to negotiate their own learning contracts and work through the unit with little intervention from the teacher.

# RESOURCES

Need to consider:

- The actual resources needed for this unit
- Examples of worksheets, black line masters, activities, board games, etc should be included so that it is a contained unit
- Resources from other sources (eg Rigby, Young Australia) should be listed **as a reference list**

## **Resources - Human and Material**

Five parents are actively involved in maths group work. These parents will be needed to help develop the activities and manage the group work. Resources will be as real as possible - so resources such as air tickets and timetables will be sought from travel agents; atlases or if possible the maps from travel agents will be used; newspapers will be needed to collect information on daily exchange rates. Some countries are not represented in these charts so information from Thomas Cook will be used - preferably with their letterhead to give more authenticity to the unit.

Posters collected from local travel agents will be used to decorate the room to give a feel of Asia to the room. Students will also write recipes from various Asian countries in their English lessons. These will be decoratively displayed in the room as well.

## **Students' needs, interests and abilities**

A number of the students have expressed some racial discrimination towards Asian students. This unit is an attempt to address some of these attitudes. Throughout the integrated unit, students will be exposed to interesting components of many of our near neighbours and the substantial contributions they have made to this country. The unit will conclude with the students planning a dream holiday to a country of their choice with decisions being made on their interests but also informed by knowledge gained in this unit.

# INTEGRATING DEVICE

Need to consider:

- What ties the unit together
- The type of unit being developed - integrated with other curriculum areas?  
one strand/substrand of the maths curriculum? a range of  
strands/substrands of the maths curriculum?

## **Integrating Device**

***Australia and our near neighbours:***

Mathematics for understanding global travel

# LEARNING OUTCOMES

*Need to consider:*

- *What are the main learning outcomes for this unit*
- *The various areas of the mathematics curriculum - concepts, processes, affect along with language, social skills & modes of communication*
- *The outcomes of the unit are expressed as learning outcomes NOT teaching strategies*

## Learning Outcomes

### Conceptual

Students should be able to:

Time:

- calculate differences in global time using 24 hr clock
- calculate time travel allowing for time differences
- able to read international timetables

Money:

- calculate exchange rates for currencies outside Australia using whole numbers and decimals
- calculate international transfer rates using credit card statements
- estimate exchange rates quickly
- record exchange rates for different currencies

Location:

- identify cities according to grid location
- give the co-ordinates for a given location
- record co-ordinates using whole numbers

Number:

- estimate values of currencies using simple exchange rates
- calculate exchange rates of international currencies using large numbers
- estimate money required for an overseas vacation using a problem solving approach

Mass and Volume

- effectively measure and record mass and volume during cooking
- measure and record appropriate units of measure for volume and mass

Temperature

- record temperatures using Celsius

Chance and Data

- collect, organise and interpret data using appropriate forms of graphs
- calculate mean.

### Process

Students should be able to:

- estimate exchange values for large numbers
- use a calculator effectively and proficiently

### Social Skills

Students should be able to:

- display independent learning skills through the use of the learning contract
- work co-operatively in small groups
- display culturally sensitive language

## **Language**

Students should be able to use the following language effectively:  
exchange rates, decimals, mls, gms, co-ordinates, axis,

# **TEACHING**

*Need to consider:*

- *The phases of the unit - orientating, enhancing and synthesising*
- *How the unit will actually be taught - what approach/es will be taken - group work, teacher-directed, contract learning, games, activities, etc.*
- *The resources that will be needed*
- *Preparation of those resources*

This introduction to this unit will consist of two primary purposes - to introduce this unit and to ascertain where the students are currently located insofar as their understanding. The students are familiar with many of the preceding concepts as these have been revised but there is no evidence of their understanding of money exchange rates and operations using large numbers. Accordingly, this will be used to introduce the unit for mathematics. The remainder of the unit will be undertaken using the contract model of practice which has been adopted in this class. Students will be able to take part in the organised learning activities based around the room. These will be structured so that students can take them from their bags and work with them as outlined the bags. Parents will be involved in the construction of these kits. Many have been made the previous year when a similar unit was undertaken with money. This has now been extended to incorporate the other activities identified above.

## **Orientating Phase**

Use the extract from the Current Affairs video which talks about the declining economy due to the crash of the Asian money market and contrast this with the story on how Australians are now keeping the Balinese economy afloat. This will later be linked to the SOSE and English units in which the implications for these people will be discussed and the types of genre used for reporting will be discussed respectively. Draw on students' knowledge of value of money to discuss what is happening. Using coins and notes from different Asian countries discuss what can be purchased, a week's wages and so forth. Break into groups and students to examine travel brochures to find what holidays appear to be good value. Report back at end of session and discuss why it may cost more to go to some countries for the same period of time than others. Outline the remainder of the unit to students, revising the learning contract system as it has not been implemented this term.

## **Enhancing Phase**

Students must select at least two activities from each of the substrands covered in the unit. Depending on student's abilities, the appropriateness of these activities must be

ascertained. Activities will be organised so that students can work appropriately for the given activities.

The activities used for the substrands include

Time:

- *calculate differences in global time using 24 hr clock*

Using an international time chart, students calculate the time in various timezones when a given time zone is nominated. Eg - if it is 2pm in London, what time is it in Australia. Problems will be given in a variety of formats including both addition and subtraction exercises; real life contexts (eg if a person needed to telephone someone else in another time zone); and allowing students to construct their own problems.

- *able to read international timetables*

Students are given international tickets and asked to calculate what time people will be arriving and departing from various airports in relation to Australia. Students to construct own problems. An open-ended question "If the time in Brisbane is 6pm in July, what might be the time in some other places - list them".

- *calculate time travel allowing for time differences*

Using an international flight booking, students estimate the time of travel.

This activity will be a laminated and proposed within a real-life context.

Money:

- *calculate exchange rates for currencies outside Australia using whole numbers and decimals*

Using data from newspapers and currency exchange depots, calculate what money would be given for particular Australian denominations or what Australian dollars would be given for various Asian monies.

- *calculate international transfer rates using credit card statements*

Using an authentic credit card statement, calculate the debit for the amounts collected. Using money exchange rates for various periods of time, estimate the different exchange rates. Students to justify why it might be better to stay at home or travel at particular times.

- *estimate exchange rates quickly*

\* In pairs or small groups, students to estimate exchange rates for different countries according to the amounts nominated

\* Small groups play bingo in which estimates of exchange rates are given. Students to match exchange rates. For eg, AU\$100 = ??yen.

- *record exchange rates for different currencies*

Students record exchange rates and then convert these to nominated amounts from both countries eg 100 rupiahs (Indian) = \$?? (Australian); \$6.50 = \$?? (Hong Kong)

Location:

- *identify cities according to grid location*

\* In pairs, students play "Battleships" but instead of boats, they allocate areas of the map using formal co-ordinates. Once a place is "sunk", students must identify what it was - eg Vietnam (2 units), Tokyo (1 unit), Indonesia (4 units).

\* In groups of three or more, students compete to find a given city. One person is nominated as the caller whose task is to give the coordinates of a city. Others identify the city according to the coordinates. The first to correctly identify the city becomes the caller.



- *give the co-ordinates for a given location*

- \* Individual activities in which the students are given a range of cities/sites which the students must be to find and then provide the co-ordinates.

- \* In small groups, students compete to locate a site (eg Beijing) and then to call out the co-ordinates.

- *record co-ordinates using whole numbers*

- \* Using rounding principles, students to record the co-ordinates of identified sites/cities.

- \* Bingo - students use both sites and coordinates. Modified maps are provided for students to make quick references. Eg the city at point x,y. or the co-ordinates for Sri Lanka.

Number:

- *estimate values of currencies using simple exchange rates*

- \* Board game in which students "travel around Asia". Units of money are won (and lost) students convert the Asian money to Australian currency to gain their prize money (similar to Monopoly).

- *calculate exchange rates of international currencies using large numbers*

- \* Using exchange rates where the rate is in multiples of greater than 100 to the Australian dollar, students estimate the amount of money that they would receive for a given Australian amount.

- *estimate money required for an overseas vacation using a problem solving approach*

Students plan a vacation to Asia (either within a set budget or unlimited) based on the knowledge gained from this unit, they will plan and justify their trip in term so budget only

Mass and Volume

- *effectively measure and record mass and volume during cooking*

Students plan to class party in which the cuisine is multicultural. Cooking is undertaken to make national dishes.

- *measure and record appropriate units of measure for volume and mass*

Link to English curriculum and explore report genre in which students write the recipes for dishes cooked ensuring that appropriate units of measure are recorded.

Temperature

- *record temperatures using Celsius*

Using local papers, students collect daily temperatures from around Asia. These are collated to be later used in the reporting of data. Comparisons between countries to be undertaken and linked to science curriculum - greenhouse, latitudes, etc.

Chance and Data

- *collect, organise and interpret data using appropriate forms of graphs*

Using the data collected from the daily newspaper, students collect, organise and display daily temperatures. Students should decide what forms of graphs are most appropriate. Use of spreadsheets will be useful for this activity if access can be gained. Students can then explore the best way to explore their data using the various functions of graphs on the software.

- *calculate mean.*

Students collect daily temperatures from old newspapers and use this to calculate mean temperatures over a nominated period.

## **Synthesising Phase**

The phase aims to draw the unit to a successful climax and employ as much information learned throughout the unit as possible. This will be achieved through the use of an open-ended task in which students plan their dream holiday to Asia. Drawing on knowledge gained through this unit, students will tackle the open-ended project using concepts, processes and social skills. The projects will require students to argue their holiday and use graphs where appropriate. This project expands the communication of mathematics. The skills learned from other KLA's will be useful in this project.

## ASSESSMENT

*Need to consider:*

- *Various assessment tools/methods - observation, consultation, focused analysis, self and peer assessment*
- *Linking assessment to learning outcomes*
- *Specific tools for assessment*
- *Specific behaviours to focus on*
- *Recording learning outcomes - how will you keep adequate records of student achievement - checklists; annotated work samples; test results*

### Assessment

#### Observation

Observation will be the key tool for assessment. Students will be observed by teachers, teaching support staff and parents. Behaviours which indicate learning outcomes as noted in the objectives for each of the individual teaching episodes will form the basis of these observations. Observations will be recorded on checklists for both concepts and individuals. A system that indicates - no understanding, some understanding and full understanding will form the key to this grid. (Checklist attached)

#### Consultation

Consultation will be undertaken with students throughout the lessons and in conjunction with the observations. Clarification will be sought for aspects of student's work which indicates confusion, misconception etc. Documentation will be through annotated work samples and journal jottings.

Journals will be used to communicate between teacher and students. These journals will be a part of the daily classroom practice. Students will be expected to note areas that they feel confident, confused, etc with. These will form the basis of further discussions and/or observations with students.

#### Focused Analysis

Some of the activities have been designed to be quite focused - eg the worksheet activities. These will give some clearer indications of students learning and provide information for students who may have been missed in consultation or observations. The main projects will also form part of the focussed analysis. A student-constructed test will be developed. The questions developed by students will serve as one form of assessment as these will indicate what students have (potentially) mastered. The overall score on the test will also serve as an indicator of students learning.

#### Self and Peer Assessment

Student journals offer self assessment of understanding. Peer assessment will be used on those activities where this is possible - this will serve as indicator of both students' knowledge.

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