# Countries of Asia

**ID: XXXX**

**Time required**
*45 minutes*

## Activity Overview

*How do we make sense of large amounts of information? This is the essential task of statistics, and two main methods present themselves:To use statistical calculations to reduce large amounts of data to small amounts of data, OR to view the information graphically.*

*In this activity, students use the statistical tools available to organise, to represent, and to seek to draw some conclusions from information about 25 countries in the Asia-Pacific region.*

## Concepts

- *Data organisation and display, outliers, logarithmic transformation and interpretation.*

## Teacher Preparation

*This investigation offers opportunities for students to explore a complex set of data using a variety of statistical tools and methods, with a particular focus upon logarithmic transformation and interpretation. As such, care should be taken to provide ample time for ALL students to engage actively with the requirements of the task, allowing some who may have missed aspects of earlier work the opportunity to build new and deeper understanding.*

- *This activity can serve to consolidate earlier work on data analysis. It offers a suitable introduction to further study of regression methods and transformations of data.*
- *Begin by discussing what students might already know about any of the nations included in the sample data.*
- *The screenshots on pages X–X (top) demonstrate expected student results.*
  *Refer to the screenshots on page X (bottom) for a preview of the student .tns file.*
- ***To download the .tns file, go to http://education.ti.com/exchange and enter "XXXX" in the search box.***

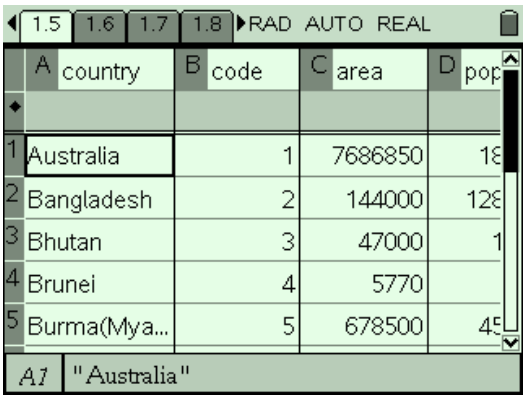
## Classroom Management

- *This activity is intended to be **teacher-centered,** leading to a student exploration. You should seat your students in pairs so they can work cooperatively on their handhelds. Use the following pages to present the material to the class and encourage discussion. Students will explore using their handhelds; the majority of the ideas and concepts are presented in their **TI-Nspire** document; be sure to cover all the material necessary for students' total comprehension.*
- *Students can either record their answers on the handheld or you may wish to have the class record their answers on a separate sheet of paper.*

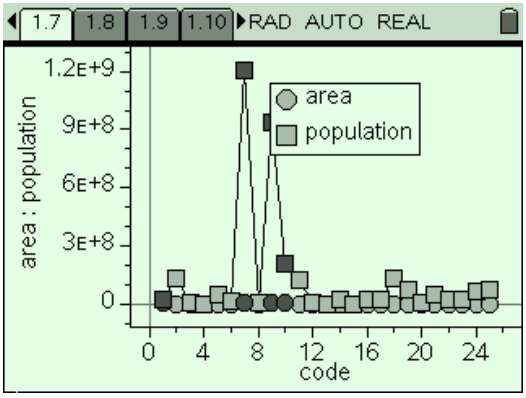
## TI-Nspire™ Applications

*Lists & Spreadsheet, Graphs & Geometry, Notes.*

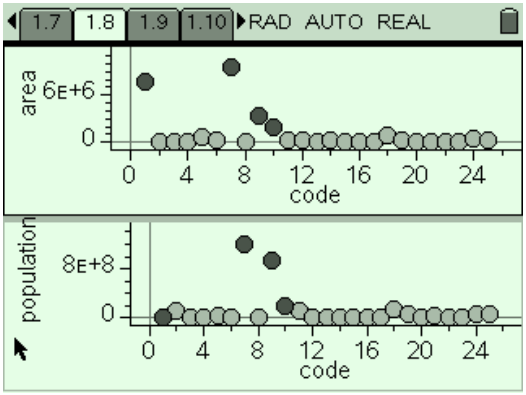
**Step 1:** Students should be encouraged to share what they already know concerning the nations of the Asia-Pacific region, and their initial impressions arising from study of the numerical data provided. Suggestions should be encouraged as to ways in which the data might be organized and represented so as to provide meaningful information leading to valid interpretation.



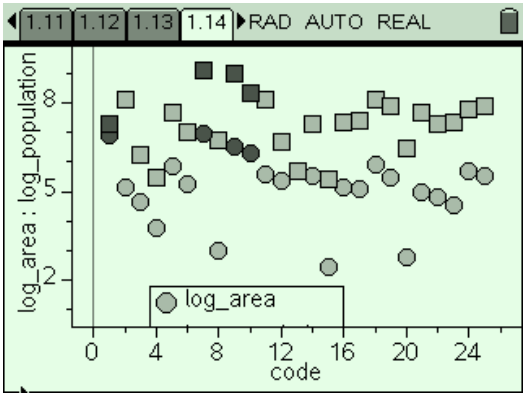

**Step 2:** Limiting the focus to just two variables provides a useful introduction to the methods used in this activity. Using the tools of the Data & Statistics application, students should be encouraged to represent the data in a variety of ways – for example, viewing area and population as box plots quickly leads to the idea of outliers. Have students identify three outliers arising from these two variables and discuss their relevance in interpreting the information provided: China and India are outliers because of their huge populations and large areas, Australia is an outlier because of large area but relatively small population. Another nation of interest in this context could be Indonesia – small area but large population.



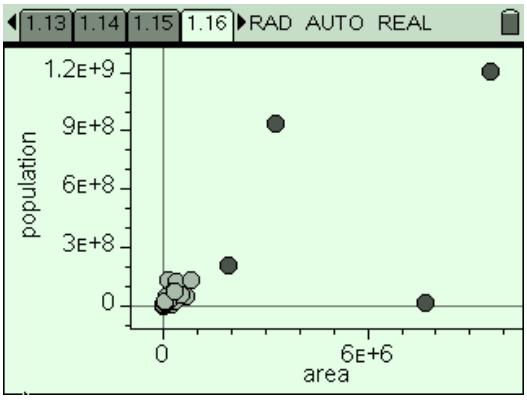

**Step 3:** Students should consider advantages and disadvantages of different representations – for example, putting area and population onto a single graph is ineffective due to the scale differences. Note that selecting the nations of interest on one graph highlights them on all graphs, making it easy to compare and contrast their properties.



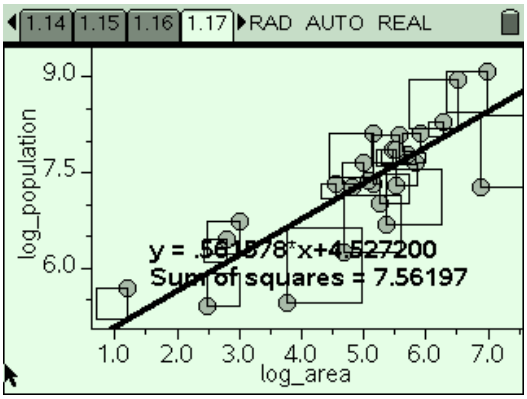
**Step 4:** The idea of transforming the data using a function such as logarithm may be a new one for students, and they should try and recall properties of this function that might make it suitable in such a context: in particular, it should be noted that the logarithmic function is monotonic increasing, so points remain in the same order, but a large spread may be reduced, allowing comparison of some features.




**Step 5:** Of course, the idea of using a scatter plot to compare two variables is hardly a new one for students and they will readily see ways in which this representation may prove useful. In particular, our four identified outliers are quickly exposed in such a format, as shown. However, little may be observed concerning all the other nations, since they are "crushed together".




**Step 6:** Clearly this offers an opportunity for a logarithmic transformation to come to the fore and support greater visibility and comparison of the full range of nations being considered. It also offers the possibility of using regression as a tool for studying relationships in greater detail.




**Extension:** Students should now use these techniques to present a report on the relationship between any other two data sets and what might be inferred in relation to Australia, China, India and Indonesia.

**Reference: OzDASL:** *http://www.statsci.org/data/oz/asia.html*

# Countries of Asia – ID: XXXX

**(Student)TI-Nspire File:** *StatActXX_Asian_Countries_EN.tns*

1.1 1.2 1.3 1.4 RAD AUTO REAL

**Countries of Asia**

**Keywords:** Outlier, log transformation, regression.

**Source:** *World Factbook (1995)*, Central Intelligence Agency, USA

1.1 1.2 1.3 1.4 RAD AUTO REAL

How do we make sense of large amounts of information? This is the essential task of statistics, and two main methods present themselves:

To use statistical calculations to reduce large amounts of data to small amounts of data, OR to view the information graphically.

1.1 1.2 1.3 1.4 RAD AUTO REAL

In this activity, we use the statistical tools available to organise, to represent, and to seek to draw some conclusions from information about 25 countries in the Asia–Pacific region.

For each nation, the following facts are available:

1.1 1.2 1.3 1.4 RAD AUTO REAL

* Country Name
* Area Total area (sq km)
* Population – est. at July 1995
* Life – Expectancy 1995 est. (years)
* GDP – GDP 1994 (US$ billions)
* GDP/caput – GDP per person 1994 est (US$)

1.2 1.3 1.4 1.5 RAD AUTO REAL

| | A country | B code | C area | D pop |
|---|---|---|---|---|
| 1 | Australia | 1 | 7686850 | 18 |
| 2 | Bangladesh | 2 | 144000 | 128 |
| 3 | Bhutan | 3 | 47000 | 1 |
| 4 | Brunei | 4 | 5770 | |
| 5 | Burma(Mya... | 5 | 678500 | 45 |

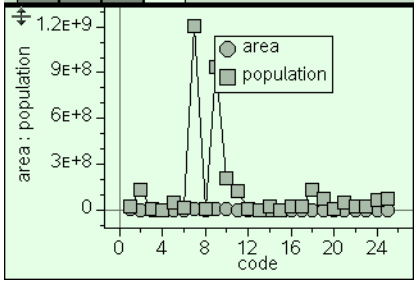
A1 "Australia"

1.3 1.4 1.5 1.6 RAD AUTO REAL

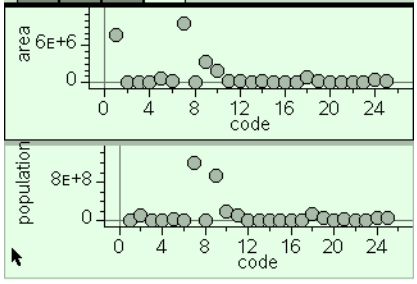
On the next page, you will find two graphs, allowing comparisons to be made between different data sets.

Initially, it makes sense to use the country codes as the independent variable, allowing direct comparison to be made for each nation on different properties, such as area and population.

1.4 1.5 1.6 1.7 RAD AUTO REAL




1.5 1.6 1.7 1.8 RAD AUTO REAL




1.6 1.7 1.8 1.9 RAD AUTO REAL

**Question**

1. It is possible to put these two properties on the same chart – can you explain why this is not particularly useful in this situation?

**Answer**

1.7 1.8 1.9 1.10 RAD AUTO REAL

**Question**

2. Carefully describe your observations regarding area and population for these Asian countries.

**Answer**

1.8 1.9 1.10 1.11 RAD AUTO REAL

**Question**

3. Three countries in particular stand out: name these and explain why they are of interest in this context.

**Answer**

1.9 1.10 1.11 1.12 RAD AUTO REAL

**Question**

4. Could you think of any benefits that might follow from applying a logarithmic transformation to our data sets?

**Answer**