
Landforms and NZ National Parks

Audience: Year 6-11

Time Required: 15 minutes

Activity: Students will interpret the landscape using topographic maps of NZ National Parks.

Standards: Some possible links to NZ Curriculum in this inquiry
Geography Level 6:

- Natural environments have particular characteristics and are shaped by processes that create spatial patterns.
- People interact with the natural environment and that this interaction has consequences.

Learning Outcomes: Students will:

- Students will interpret landform features within topographic maps.
- Students will determine distances and scale from the map.
- Students will predict implications of landforms for health and safety in recreation.

Map URL: <http://arcg.is/2mfzc0W>

Engage

New Zealand's First National Park

- Click the map URL to launch the map
- Investigate the national parks shown on the map
- ? Which was NZ's first National Park? [*Tongariro National Park*]
- ? How did this area become a National Park? [*gifted in 1887 by Te Heuheu Tukino IV (Horonuku), the paramount chief of Ngati Tuwharetoa*]
- Zoom into this park
- ? What do the brown wiggly lines represent? [*Contours*]
- ? What do the blue lines represent? [*Rivers and streams*]
- ? What type of landform is most visible on the map? [*Circular mountains with radial drainage*]

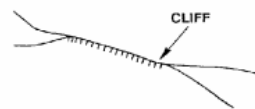
Explore

- Click the button, Bookmarks. Select the option for Saddle Cone
- ? Why do contour lines rarely touch or cross? [*If each line is a different elevation, then no point can be two different elevations. Cliffs or overhangs are exceptions.*]
- ? Click the button, Bookmarks. Select the option Ngauruhoe
- ? What pattern do contour lines make around hills and mountains? [*Hills are concentric circles or closed figures.*]
- ? The contours are particularly circular around Ngauruhoe what does this suggest about the formation of this mountain? [*Volcanic cone*]

Explain

When you get to the edge, what does it look like?

- Click on the button, Bookmarks. Select the option for Saddle Cone
- ? What is the pattern of contours lines for very steep areas like this cliff? *[They are close parallel lines.]*
- What symbol is used to show a cliff?
- ? Pan the map and notice the number of rivers with steep cliffs. Can you suggest a reason for this *[Possible glacial erosion or deep cut valleys in recent volcanic material]*
- Click the bookmark, North Crater
- ? Why does this area not have concentric circles or parallel lines that are close together? *[This area is fairly flat.]*
- Some contour lines are thicker than others and are called index contours.
- ? What do index contours have periodically along their lengths that other lines do not? *[The elevation number is written along the line.]*



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Elaborate

How do you show tall things on flat paper?

- Click on the bookmark Mt Tongariro and then find two index contours close together, with clearly marked elevations.
- ? How many lines are there between the two index contours? *[There are 5 contour lines between index contours.]*
- A contour interval is the vertical distance between contour lines.
- ? Determine the contour interval. *[Take the difference in elevation, and divide by the number of intervals: 100m/5 The contour interval is 20 metres.]*
- ? What is the elevation of edge of North Crater? *[It is 1840 metres. It is two contour lines above the index contour of 1800metres]*
- In the bottom left, there is a scale bar. Use a sheet of paper to copy the distance shown on the scale to the paper (it should be 0.2 km).
- Teachers may copy the scale bar with paper held against the projection screen or white board.
- Click the button, Measure. Click the Distance button and select Kilometres as the units.
- ? Measure the distance from the summit of Mt Ngauruhoe to the summit of Mt Tongariro. How far is it? *[3.28km]*

Evaluate

How difficult would the Tongaririo Crossing be?

- ? Looking at the Tongaririo Crossing Track from Mangatpopo Hut to Ketahi shelter. Which end would be steeper to start? *[From Ketetahi Shelter.]*
- ? Which would be the less strenuous sections? *[Across South and central crater.]*
- Click on the Bookmark Whakapapa Ski Field
- ? What comment would you make about the spacing of contours on the ski runs *[even – not too steep or too flat]*
- Zoom to summit of Mt Ruapehu
- ? In the past the crater lake has broken its crater wall and caused massive flows of ice, rock and water (a lahar) Which of is the mostly likely path that water breaking from the crater lake would take? *[The Whangaehu Glacier and River.]*

Key Skills

Measure

- Click the button, Measure.
- Click the Distance button and select the units of measure.
- Click once on the map to start the measurement; click again to change direction and double click to stop measuring.

Zoom to a bookmark

- Click the button, Bookmarks.
- Choose the bookmark; the map will change location and scale.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to New Zealand public and private schools. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://www.eagle.co.nz/gis-schools>.

THEN TRY THIS...

- Find out more about historic lahars on Mt Ruapehu and particularly the disaster one caused in 1953
- Check out some photos of South Crater, Ngauruhoe and other landforms of the National Park. Can you see how the contours represent the shapes.
- Explore other national Parks. Are there similar or different landforms shown by the contour patterns?

Text References

- Anderson Lois Tongariro A Field Guide Pearson Education 2005
- Williams Karen A Volcanic Guide To Tongariro National Park, Volcanoes of the South Wind Random House NZ 2013
- Department of Conservation Lahars from Mt Ruapehu <http://bit.ly/2mykblJ>

NEW ZEALAND GEOINQUIRIES

<http://arcg.is/1GPDXe>