



## Tortilla Map A Hands-On Look at Antarctica

In this lesson, students create a 3-D map of Antarctica using a tortilla and dough. It is intended to introduce students to the continent.

**Grade levels:** specifically developed for 5-8, but easily modified for younger students. (Modify by offering a pre-labeled work page and reduce the number of features labeled)

**Purpose:** In creating this map, students will do the following:

- ✓ Develop an understanding of the geography of Antarctica
- ✓ Understand the global position of Antarctica
- ✓ Become familiar with the field locations of ITASE
- ✓ Identify significant geographic features of Antarctica and locations relevant to Antarctica
- ✓ Use the map as a reference during discussions and future learning activities

### Science Content Standards

- Standard D: Earth and Space Science

### Materials:

**1 flour tortilla for each two students (any size will work, but the 8" ones work best on 9 X 12 paper)** Students could do this individually.

However, the benefit of working in pairs is to have the students discuss the map and placement of features as they are working.

**1 rounded tablespoon Model dough for each map** (see recipe below)

**1 sheet 9 X 12 blue construction paper per map**

**Fine point black and red markers**

**White chalk**

**Glue**

**Scissors**

**Pencils**

**Outline map for each pair**

**Transparency of outline map (opt)**

**Atlases or copies of attached maps**

It can be difficult to find good maps of Antarctica for student use. A few web options are:

<http://pubs.usgs.gov/fs/fs50-98/>

<http://www.aad.gov.au/information/aboutantarctica/atlas/>

<http://www.nationalgeographic.com/xpeditions/atlas/antarc/antarc-dwl.gif>

### Preparation:

1. Make **model dough** for maps. Use 2 parts flour to 1 part each salt and water. Stir. (For every 10 students, use \_ cup flour, \_ cup salt, \_ cup water.) This can be made a few days ahead and covered with plastic. (It's actually easier to use and dries faster if it sits for a day before use.)
2. Run copies of maps. One **outline map** for each pair plus additional maps for resources as needed. The **National Geographic Expeditions** map helps with finding features.
3. (opt) Make an **overhead transparency** of the outline, Expeditions, and global position map.

### Time:

Two 40 minute class periods

**Note:** Make the maps through the mountain building in the first class period so the dough has time to dry before labeling.

### Introduction:

Ask the students what they know about Antarctica. If this is the beginning of a unit of study, you might want to record group responses on a poster or have groups of students record their own responses. Refer to this at the end of study to reflect on what was learned.

Tell a few interesting facts about this continent that were not included in the student information. (See list of **Interesting Facts** for ideas)

### Activity:

1. **Draw a reasonable outline of Antarctica on the tortilla.** The shape of Antarctica can be related to the head of an elephant. The Antarctic Peninsula is like the trunk. West Antarctica is like the face and East Antarctica is like a huge ear. Another way to imagine it is as a turkey. The peninsula is the neck, West Antarctica is the gobbler, East Antarctica is the tail feathers. **Emphasize the 3 distinct parts of Antarctica: Antarctic Peninsula, West Antarctica, and East Antarctica.** Encourage the students to use most of the tortilla. The end product will be about 6" from the tip of the Antarctic Peninsula to the eastern side near the Shackleton Ice Shelf.
2. **Cut out the outline shape.** Keep the scrap pieces for other landforms.
3. Using scraps, **cut rough shapes** to resemble the southernmost parts of  
South America  
South Africa  
Australia  
New Zealand
4. **Cut out islands** for  
Madagascar  
Tasmania  
Falkland Islands

**5. Set the cutout pieces on the blue paper** to show relative direction and distance to each other. (See map of Global Position.) This is not intended to be done to scale, but to give an overall visual introduction to the relationship of the various parts. The smaller islands are included because they are less frequently discussed, but sometimes of higher interest than the more recognized continents.

**Note:** South America is about 600 miles from the tip of the peninsula with South Africa 4 times as far and Tasmania about 3 times as far.

**6. Glue the pieces to the paper.**

**7. Label the landforms and major oceans and seas**

|              |             |                |
|--------------|-------------|----------------|
| Chile        | Madagascar  | Pacific Ocean  |
| Argentina    | Australia   | Atlantic Ocean |
| Falkland Is. | Tasmania    | Indian Ocean   |
| South Africa | New Zealand |                |

**8. Build model dough mountain ranges** to roughly show terrain of the continent. **Label during the second session.**

Transantarctic Mountains  
Ellsworth Range  
Andes

**9. Using chalk, color in the ice shelves.**

**10. Label the significant areas of interest on Antarctica.** (Adapt this list to match the maps you use and to include any particular items you want to emphasize.)

Antarctic Peninsula  
Weddell Sea  
Larsen Ice Shelf  
Ronne Ice Shelf  
Ross Ice Shelf  
Ross Sea  
McMurdo Station  
Mt. Erebus (12,280')  
Vinson Massif (16,684')  
Mt. Kirkpatrick (14,856')  
West Antarctica  
East Antarctica  
Geographic South Pole  
Magnetic South Pole (approximate)

11. Using a red marker, **draw in the Antarctic Circle** and label 66 \_ degrees South.
12. **Optional:** Draw in the traverse maps for the ITASE teams. This makes the map really crowded. Using a larger bulletin board map seems to give a better view of the traverse. The individual maps can be used to compare or discuss the route. (see <http://www.ume.maine.edu/USITASE/Proposal/images/ltaseroutemap.jpg>)

### Interesting Facts:

- There are really 3 South Poles. There is a Ceremonial South Pole with a reflective ball and flags of all the nations that have signed the Antarctic Treaty; the geographic pole, which is where all of the lines of longitude converge; and, the magnetic pole where a dip needle compass will point straight down.
- The ceremonial pole is not moved annually and is carried on the flow of the glacier. It's over 100' from the geographic pole.
- The geographic pole is marked each year and the marker is moved to correctly identify the location. The pole doesn't move, but the ice does!
- The magnetic pole is presently located out in the sea. It actually travels daily in an elliptical path and may move on a northwesterly path 10-15 km each year.
- Antarctica is the highest, coldest and windiest continent on earth.
- The average elevation of Antarctica is 7500'..
- The South Pole station is at an elevation of 9,300' (2900m)
- The largest active volcano on the Antarctic continent is Mount Erebus (12,444') on Ross Island.
- The Vinson Massif is the highest peak on the continent and is higher than any peak in the lower 48 states.
- The Transantarctic Mountain range runs across Antarctica and is about 3000 miles long. The distance across Antarctica is about the same as traveling from New York City to Los Angeles.

- Antarctica is about    the size of Africa, twice the size of Australia or the size of the United States and Mexico combined.
- The coastline of Antarctica is about 19,800 miles long or about the distance from Anchorage, Alaska to the tip of Chile.
- About 98% of the continent is covered by ice.
- The ice covering Antarctica is so heavy that it actually pushes down on the land to make some of the landmass below sea level.
- The average thickness of the ice sheet is 1.5 miles.
- At least 90% of the world's ice is on Antarctica.
- Scientists believe that the ice cap has covered the continent for the last 5 million years.
- The Antarctic ice sheet contains 70% of the world's freshwater.
- Inland, the continent is a desert because of the low snowfall. The interior region receives less than 3" of precipitation a year.
- The ice sheet preserves a record of the world's past climate and pollution over the ages.
- Lake Vostok is one of the world's deepest lakes (1764') and it's entirely under 2.5 miles of ice.
- The largest ice shelf is the Ross Ice Shelf, which is almost the size of Texas.
- The dry valleys on Antarctica are used to simulate the landscape of Mars.
- The air in the dry valleys is so dry that nothing decomposes there. There are Weddell seal carcasses there that are over 1000 years old.
- There is no native wildlife on Antarctica except insects. The largest of these is the wingless midge that is about 1/2 " long.
- Man has never lived there permanently
- The largest land animal is the wingless midge which is a wingless insect about    " long.
- The tip of South America is about 600 miles from Antarctica.

- The tip of South Africa is about 2500 miles from Antarctica.
- No country owns Antarctica.
- The low temperature on July 2, 1983 at Vostok Station was minus 129.3 degrees F.
- Coal beds and plant fossils have been found on Antarctica. This proves that the continent was not always covered with ice.

Helpful links:

[http://www.antarctica.ac.uk/About\\_Antarctica/](http://www.antarctica.ac.uk/About_Antarctica/)

[http://www.glacier.rice.edu/invitation/1\\_background.html](http://www.glacier.rice.edu/invitation/1_background.html)

<http://www.coolantarctica.com/>

<http://www.antarticconnection.com/>

<http://astro.uchicago.edu/cara/outreach/resources/other/poles.html>