

The Andes Mountains: The Backbone of South America

Grade Level: Fourth

Presented by: Angee Allen, Mark Twain Elementary, Oklahoma City, OK

Length of Unit: Two weeks [seven lessons]

I. ABSTRACT

The students will learn about the Andes Mountain range of South America. This range of mountains is known as the Cordillera de los Andes or the Andes Backbone, which is appropriately named by its location along the western coast of South America. According to the Quechua word “anti,” The Andes means copper. Rich in mineral resources, the Andes are said to be one of the most valuable mountain ranges in the world. Through the disciplines of Geography, Geology, Literature, Math, added emphasis in Spanish, the students will learn amazing facts about the history and culture of the area. By using Total Physical Response, and through the inclusion of the Spanish language, this unit is especially beneficial for classrooms with ESL students. It enriches cultural awareness for all students, regardless of language background. Because the Andes are in a Spanish location, it is fun to learn vocabulary in Spanish. The activities and lessons will be presented with the non-Spanish speaker in mind.

II. OVERVIEW

A. Concept Objectives:

1. Develop an awareness of place and the characteristics of that place.
2. Recognize that literature and language reflect the inner life of people.

B. Content to be Covered from Core Knowledge Sequence:

1. World Geography- Mountains and Mountain Ranges
2. Numbers and Number Sense
3. Measurement
4. Geology: The Earth, Mountains, Weathering and Erosion, Geological time
5. Sayings and Phrases
6. Poetry

C. Skills to be taught:

1. Vocabulary
2. Map skills
3. Writing Process
4. Note taking
5. Main Idea
6. Spanish language

III. BACKGROUND KNOWLEDGE

A. For Teachers:

1. Wakefield, Celia. High Cities of the Andes. Tetra: Wide World Publ., 1988. ISBN 0-933174-58-6
2. Wood, Robert M. Dr. Earthquakes and Volcanoes: Causes, Effects, and Predictions. New York: Weidenfeld & Nicolson, 1987. ISBN 1-55584-083-3

Internet Resources:

1. www.sfu.edu/depts/artsi/ges/lamerica/samero.htm Geography of Latin America
2. www.cybernet.com/bvcs/me Andes
3. www.mcs.com/~mo/andes Andes Mountains
4. www2.best.com/~gibbons/count Quechua Language
5. www.mountain-city-es.johnson.k12.tn.us/soamerica/southamerica.htm South America
6. www.doubleogood.com/about-alpacas.htm About Alpacas

7. www.altavista.com Search Engine
- B. For Students:
1. Geography of South America- 2nd grade Core Knowledge Sequence
 2. History of the Earth- 4th grade Core Knowledge Sequence
(This would be helpful to already have touched on this topic, so the students will be familiar with the Pangea Theory of the Earth development into the continents.)
- Internet Resources:
1. www.nationalgeographic.com
 2. www.sci.geo.earthquakes Earth Science
 3. www.walrus.wr.usgs.gov Ask-A-Geologist

IV. RESOURCES

- A. Hirsch, E.D. Jr. Books to Build On: A Grade-by-Grade Resource Guide for Parents and Teachers. Dell Publishing: New York, NY, 1996. ISBN 0-385-31640-2
- B. Hirsch, E.D. Jr. A First Dictionary of Cultural Literacy. Houghton Mifflin: Boston, 1991. ISBN 0-395-59901-6
- C. Hirsch, E.D. Jr. What Your 4th Grader Needs to Know. Dell Publishing: New York, NY, 1992. ISBN 0-385-31260-1
- D. Waltzer-Hackett, Winnie. Teach Them Spanish! Instructional Fair-TS Denison: Grand Rapids, MI, 1998. ISBN 1-56822-681-0

V. LESSONS

Pre-Lesson Activity: [one day]

- A. Materials:
 1. Folder or file folder
 2. pretend passport (for traveling purposes)
 3. paper
 4. pencil
 5. colors
 6. Appendices A and B
- B. Procedure:
 1. Allow the students time to make a folder suitcase to keep all of their notes and papers.
 2. Also create a passport to use as evidence of their “travels” through the Andean countries and a record keeper for the completion of unit projects. [see Appendix A and B]

Lesson One: Layers of the Earth [one day]

- A. *Daily Objectives:*
 1. *Lesson Content:*
 - a. Grade 4- Science: Geology: The Earth and Its Changes , A. The Earth’s Layers. [CK Sequence: Science IV. A]
 2. *Concept Objective:*
 - a. Develop an awareness of place and the characteristics of that place.
 3. *Skill Objective:*
 - a. Measure distances using map scales.
- B. *Materials:*
 1. Model of the Earth’s Layers
 2. 4 colors of clay
 3. toothpicks
 4. paper
 5. pencil

6. tape
 7. sentence strip
 8. Appendix C
- D. *Key vocabulary:*
1. Crust
 2. Mantle
 3. Outer Core
 4. Inner Core
 5. Phrase: *Through thick and thin*
- E. *Procedures/Activities:*
1. Use the 4th Grader CK book to introduce the idea that the earth is made of different layers and they are called the crust, mantle, and core. Have a model of this idea on a poster or enlarged photo of page 334.
 2. On the chalkboard, write the information about the different layers thickness: crust- 3-34 miles thick, mantle- 1800 miles thick, 2200 miles thick. Allow the students to work in groups to determine a scale they could use to draw their own picture of the Earth's layers. Explain they can use a scale just like a map scale would be used.
 3. Once the students have made a paper version of the Earth. Let them use the four colors of clay to make a small scale of the Earth. Label the Earth's layers with the toothpicks and paper, cut like little flags.
 4. Write the Core Phrase, *Through thick and thin*, on a sentence strip. Let the students talk about what they think it may mean as related to the Earth's layers and then to what it really suggest about friendship and dependability.
- F. *Evaluation/Assessment:*
1. Check their models for accuracy.
 2. Give them an Earth's Layers sheet- label the layers with 100% accuracy.

Lesson Two: Earthquakes and Volcanoes- Changes in the Earth. [2 days]

- A. Daily Objectives:
1. *Lesson Content:*
 - a. Earthquakes and Volcanoes [CK Sequence p 105 (IV. A and B)]
 2. *Concept Objectives:*
 - a. Develop an awareness of place and the characteristics of that place.
 3. *Skill Objectives:*
 1. The students will be able to identify reasons an earthquake occurs.
 2. The students will identify parts of a volcano.
 3. Students will know theories of how the continents and oceans were formed.
- B. *Materials:*
1. claydough
 2. 20oz pop bottle
 3. large pan
 4. baking soda
 5. vinegar
 6. potting soil
 7. paper
 8. pencil
 9. scissors
 10. map (from any Social Studies book or Atlas)
 11. sentence strip
 12. books on Earthquakes and Volcanoes (titles located in Bibliography under Science)

13. Appendices D and E

C. *Background notes:*

D. *Key Vocabulary:*

1. Earthquake
2. Epicenter
3. Fault
4. Volcano
5. Magma
6. Lava
7. ash
8. CK Phrase: *Once in a blue moon*

E. *Procedures/Activities:*

1. Give students a ball of claydough. Have them smash it out flat onto a piece of wax paper. Then give directions to push the sides together and have the students comment on what happens to their “land”. They should experience cracks and buckles in the clay, similar to what happens in an earthquake. Discuss fault lines and how they contribute to an earthquake.
2. Have students refer back to their drawing of the earth’s layers in their folders. Explain to them how volcanoes are formed from the magma forcing its way through the layers of earth. Give a demonstration of volcanic activity. You may prefer to do this activity yourself and have students watch. Use J. VanCleave’s *Book of Volcanoes* (in bibliography) to demonstrate. Have the students comment on the results. Talk about the lava and the lava flow. Explain to students the three types of volcanoes: Active, dormant, or extinct.
3. Use a map and paper to trace the continents of the world. Have the students cut the continents. Have the students work to put the continents together like they would put together a puzzle. Explain to the students once they have completed this task, that there is a theory that the continents were once connected and that it was named Pangaea. Let the students speculate about how much time it took to break apart. Let them use encyclopedias or books listed in the bibliography to come up with some answers about how this occurred. Use their prior knowledge of the Periods of the Earth [see CK Sequence-Geological Time (V.B.)].
4. Introduce the Core Knowledge Phrase, *Once in a blue moon*, talking to the students about what that means to them. Refer to 4th grader book for details about how it means things that don’t happen very often. Major earthquakes and volcanic eruptions do not happen every day.

F. *Evaluation/Assessment:*

1. Appendix D and E
2. Other projects from J. VanCleave’s books on Earthquakes and Volcanoes (see bibliography).

Lesson Three: Ain’t Know Mountain High Enough (that’s a song)...at Least in South America.[4 days]

A. *Daily Objectives:*

1. *Lesson Content:*
 - a. Mountains
 - b. Geography of the Andes
2. *Concept Objective:*
 - a. Develop an awareness of place and the characteristics of that place
3. *Skill Objective:*
 - a. Read and Write numbers (in digits and words) up to nine digits.
 - b. Create and interpret bar graphs and/or line graphs.

B. *Materials:*

1. Paper
2. Pencil
3. claydough,
4. cardboard
5. books in the bibliography
6. encyclopedias
7. atlas
8. graph paper
9. Appendices F and G

C. *Vocabulary:*

1. Folded mountain
2. fault-block mountain
3. dome-shaped mountain
4. volcanic mountain
5. metamorphic
6. igneous
7. sedimentary rock

D. *Procedures/Activities:*

1. Allow students to explore a map South America. Ask them what they notice about the area? Do they notice the different colors used in the map? Use the class map to locate the direction of the Andes Mountains. Have students take a blank map [Appendix F] and label the Andes Mountains and the countries which contain the mountains.
2. Talk to the students about how mountains are formed use books from the bibliography on mountains. If possible allow the students time to research pictures of different mountain ranges in the Andes, ask the students to determine which type of mountain is present.
3. Describe the three types of rocks that are present in mountains. Through research the students will know the types of rocks and minerals that are in the Andes. Use the book (Peakcock and Jesson) Geology: Science Activities p. 12-14. Conduct the experiments with rocks. Have the students use the scientific method. This could be set up like a science station or conducted as a class.
4. The Andes mountains are characterized by 3 sections based on height: Northern, Central, Southern. The older parts of the mountain are shorter do to weathering. This can be discovered by the students using a display of built up top soil in a pan. Build up a mound of dirt and pour water over it from a watering can, then use a fan to blow over it. Let the students come up with the reasons this would make older mountains- shorter.
5. Give students the worksheet on the height of certain peaks in South America [Appendix G]. Students will order the peaks from greatest to least in height. Then have the students write the number word for the mountain heights.
6. Using graph paper have the students make a graph of the highest elevations of each country. Have the students analyze the data.
7. Give students claydough (different colors or allow the students to use markers when the clay has dried). On the cardboard squares (12" x 24" min.), let the students make a model of S. America. Once it dries, students can use markers to define boundaries, rivers, etc. The students should elevate the mountain range.

E. *Evaluation/Assessment:*

1. Grade the worksheets in this lesson.
2. South American project
3. Experiments

Lesson Four: *Afternoon on a Hill* [one day]

A. *Daily Objectives:*

1. *Lesson Content:* Poem:
 - a. *Afternoon on a Hill* by Edna St. Vincent Millay
2. *Concept Objective:*
 - a. Recognize that literature and language reflect the inner life of people.
3. *Skill Objective:*
 - a. Memorization
 - b. Parts of Speech

B. *Materials:*

1. Copy of Poem: *Afternoon on a Hill* from What Your 4th grader Needs to Know, pencil

C. *Vocabulary:*

1. Review Parts of Speech (interjections, noun, verb, adjective, adverb, conjunction)

D. *Procedures/Activities:*

1. Read the poem line by line with students. Have them read the poem again. Pick out the parts of speech that you have been studying throughout the year. Make a code to id the parts of speech.
2. Have students read the poem and visualize a scene in their head atop a “hill” -mountain- of the Andes that you have been studying. Have students describe what they see. They can write a journal entry for their suitcase. Share with the class.
3. Students memorize the poem.

E. *Evaluation/Assessment:*

1. Memorization
2. Check parts of Speech
3. Read journal entry

Lesson Five: *Language of the Mountains* [two days]

A. *Daily Objectives:*

1. *Lesson Content:*
 - a. The Spanish and Quechua Language
2. *Concept Objective:*
 - a. Recognize that literature and language reflect the inner life of people.
3. *Skill Objective:*
 - a. Spanish and Quechua Language

B. *Materials:*

1. pencil
2. paper
3. colors
4. construction paper
5. Candyland game board
6. ball
7. craft sticks
8. Appendices H and I

C. *Vocabulary:* (see appendices H and I)

D. *Procedures/Activities:*

1. Go over the chart of the target languages [Appendix H]. After practicing the pronunciation and vocabulary, give the students practice time with some of the following activities:
 - a. Color/ number bingo
 - b. Candyland [students must say color and number in Sp. Or Quechua to move]
 - c. Make a color/number game of their own.

2. Give students the vocabulary for their cardinal directions in Spanish. Point out that these directions are not capitalized in Spanish. Do one of the following activities to reinforce the vocabulary:
 - a. Make a compass rose with the craft sticks. Label in Spanish with a pen or marker.
 - b. Use a student atlas. Ask the students, "What direction would you move from one location to another in South America?"
 - c. Command the students to Mueva _____ [fill in a Spanish direction]. This means Move north or south, etc.
- E. *Evaluation/Assessment:*
1. Teacher evaluation/observation.
 2. Student understanding of activities.

Lesson Six: Culture of the Mountains [one or two days]

- A. *Daily Objectives:*
1. *Lesson Content:*
 - a. History and culture of the Mountains
 2. *Concept Objective:*
 - a. Recognize that literature and language reflect the inner life of people.
- B. *Materials:*
1. Bibliography books
 2. internet source: www.andes.org
- C. *Vocabulary:* (explained as needed in the stories)
- D. *Procedures/Activities:*
1. Read stories individually or as a group about the Inca Indians and one of their great cities, Machu Picchu. Students will be intrigued with the Inca Empire.
Some stories from the Internet source will give students an opportunity to hear how children live in the Mountain countries.
- E. *Evaluation/Assessment:*
1. Teacher/Student discussion.

Lesson Seven: Andean Reports [on going throughout the unit]

- A. *Daily Objectives:*
1. *Lesson Content:*
 - a. Andean Reports
 2. *Concept Objective:*
 - a. Recognize that literature and language reflect the inner life of people.
 3. *Skill Objective:*
 1. Writing Process
 2. Main Idea and Details
- B. *Materials:*
1. Bibliography books
 3. encyclopedias
 4. note cards
 5. pencil
 6. paper
 7. internet access [this would be a plus]
- C. *Vocabulary:* (varies)
- D. *Procedures/Activities:*
1. Students will be required to write a research paper on a topic related to the Andes Mountains. You can choose or let the student, which ever works best with your group. Let the topics

- range from countries, culture, animals, volcanoes, or the mountains themselves.
2. Students will make a minimum of 5 bibliography cards with 5 facts from each resource. This will help students get their thoughts together and will help with main idea and details.
 3. Students will develop a draft and work through the rest of the writing process. Finally, the students will present their report to the class.

E. *Evaluation/Assessment:*

1. Students written report
2. Oral presentation

VI. CULMINATING ACTIVITY

A. Trip to the Zoo.

The class will be responsible for finding all of the different animals that inhabit the South American Andes. In groups, the students will fill out a “seek and find” sheet with important information. [See Appendix J]

B. Andes Presentation.

Students will present their Andes projects from this unit. This would include their journals, volcano and earthquake projects, maps of South America, country reports, and Andes project.

VII. HANDOUTS/WORKSHEETS

- Appendix A- Suitcase
- Appendix B- Passport
- Appendix C- Layers of the Earth
- Appendix D- Label an Earthquake
- Appendix E- Label a Volcano
- Appendix F- South America
- Appendix G- How high can you go?
- Appendix H- Andean Language
- Appendix I- Spanish Directions
- Appendix J- Zoo Find

VIII. BIBLIOGRAPHY

General:

- A. Hirsch, E.D. Jr. What Your 4th Grader Needs to Know. Dell Publishing: New York, NY, 1992. ISBN 0-385-31260-1

Science:

- A. Barrett, Norman. Picture Library: Mountains. New York: Franklin Watts, 1989. ISBN 0-531-10
- B. Bramwell, Martyn. Earth Science Library: Volcanoes and Earthquakes. New York: Franklin Watts, 1986. ISBN 0-531-10177-0
- C. Morris, Neil. Mountains. New York: Crabtree Publishing, 1996. ISBN 0-86505-829-6
- D. Morris, Neil. Volcanoes. New York: Crabtree Publishing, 1996. ISBN 0-86505-826-1
- E. Peacock, Graham and Jesson, Jill. Geology: Science Activities. New York: Thomson Learning, 1995. ISBN 1-56847-193-9
- F. Sauvain, Philip. Mountains. Minneapolis: Carolrhoda Books, Inc., 1996. ISBN 0-87614-999-9
- G. Silverstein, A. Plate Tectonics. Conn.: Twenty-First Century Books, 1998. ISBN 0-7613-3225-1
- H. Simon, Seymour. Earthquakes. New York: Morrow Junior Books, 1991. ISBN 0-688-09633-6
- I. Siperia, Paul. Earthquakes: A True Book. New York: Children’s Press, 1998. ISBN 0-16-

20665-6

- J. VanCleave, Janice. Earthquakes: Mind-Boggling Experiments You Can Turn into Science Fair Projects. New York: John Wiley & Sons, Inc., 1993. ISBN 0-471-57107-5
- K. VanCleave, Janice. Volcanoes: Mind-Boggling Experiments You Can Turn into Science Fair Projects. New York: John Wiley & Sons, Inc., 1994. ISBN 0-471-30811-0
- L. Walker, Jane. Earthquakes: Natural Disasters. New York: Aladdin Books, 1992. ISBN 0-531-17360-7
- M. Walker, Jane. Fascinating Facts About Volcanoes. Connecticut: Millbrook Press, 1994. ISBN 1-56294-608-0

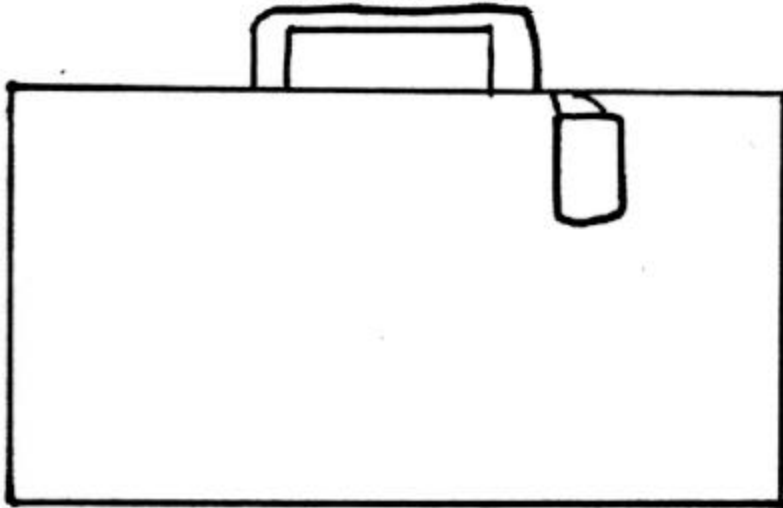
South America:

- A. Georges, D.V. South America. Chicago: Children's Press, 1986. ISBN 0-516-01296-7
- B. Grolier Press. Fiesta: Peru. Connecticut: Grolier Educational, 1997. ISBN 0-7172-9106-5
- C. Jacobs, William J. Pizarro: Conqueror of Peru. New York: Franklin Watts, 1994. ISBN 0-531-20107-4
- D. Jacobsen, Karen. Bolivia. Chicago: Childrens Press, 1991. ISBN 0-516-01122-7
- E. Kendall, Sarita. The Incas: Worlds of the Past. New York: Macmillan Publishing, 1992. ISBN 0-02-750160-4
- F. Macdonald, Fiona. Inca Town. Connecticut: Franklin Watts, 1998. ISBN 0-531-14480-1
- G. Markham, Lois. Colombia: The Gateway to South America. New York: Benchmark Books, 1997 ISBN 0-7614-0140-7
- H. Morrison, Marion. Indians of the Andes. Florida: Rourke Publications, Inc., 1987. ISBN 0-086625-260-6
- I. McKissack, Pat. The Inca. Chicago: Childrens Press, 1985. ISBN 0-516-01268-1
- J. Newman, Shirlee P. The Incas. New York: Franklin Watts, 1992. ISBN 0-531-20004-3
- K. Parker, Edward. Peru. New York: Steck-Vaughn Company, 1997. ISBN 0-8172-4525-1
- L. Peterson, David. South America. Chicago: Childrens Press, 1998. ISBN 0-516-20769-5
- M. Pitkanen, Matti A. The Grandchildren of the Incas. Minneapolis: Carolrhoda Books, Inc., 1991. ISBN 0-87614-397-4
- N. Steele, Philip. The Incas and Machu Picchu. New York: Dillon Press, 1993. ISBN 0-87518-536-3
- O. Stevens, Gareth. Bolivia. New York: Grolier Educational Corp., 1988. ISBN 1-55532-346-4

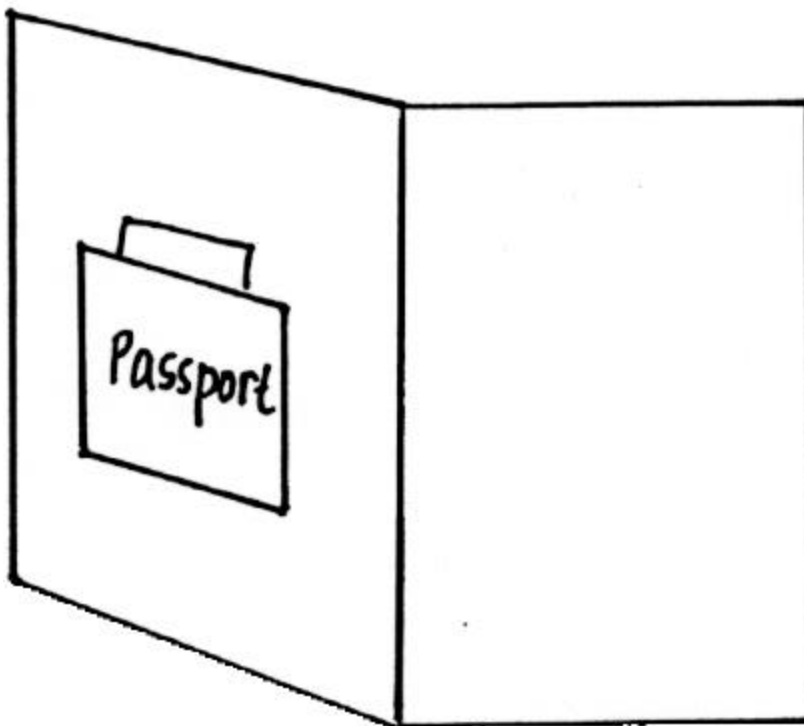
[Appendix

Suitcase

use a manilla folder



Attach a pocket to the inside to keep the students passport.



[Appendix B]

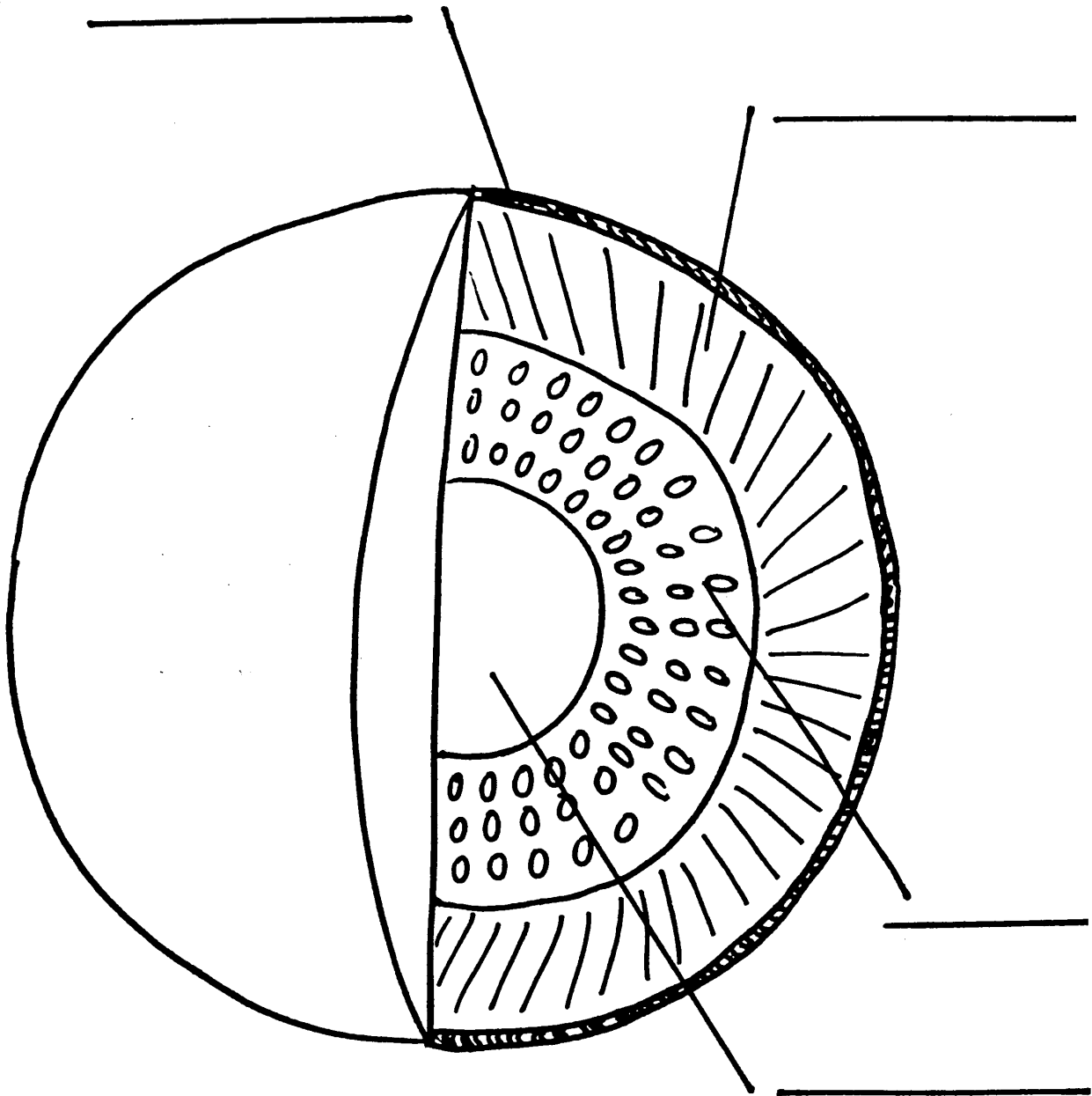
Passport Pattern

Name: DOB: Country:		

[Appendix C]

The Layers of the Earth

Directions: Draw and Label the parts of the earth: mantle, outer core, crust, inner core



[Appendix D]

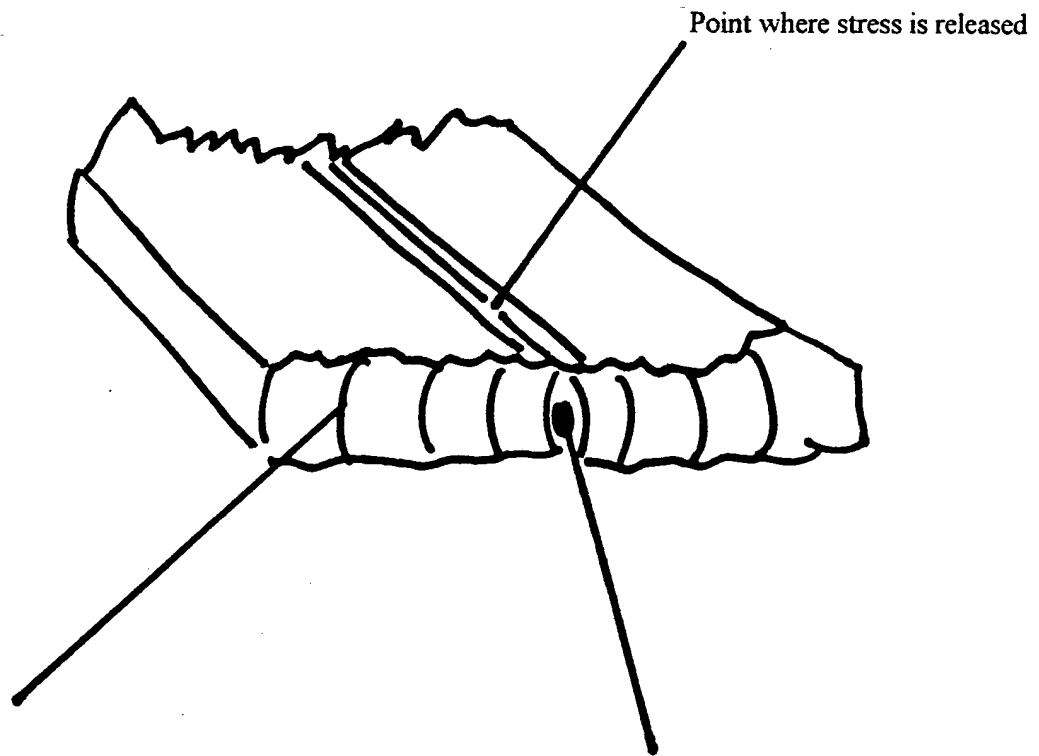
Earthquake

Directions: Draw and label the main components of an earthquake.

epicenter

shockwave

focus



vibrations from the stress

The shock waves begin at this location.

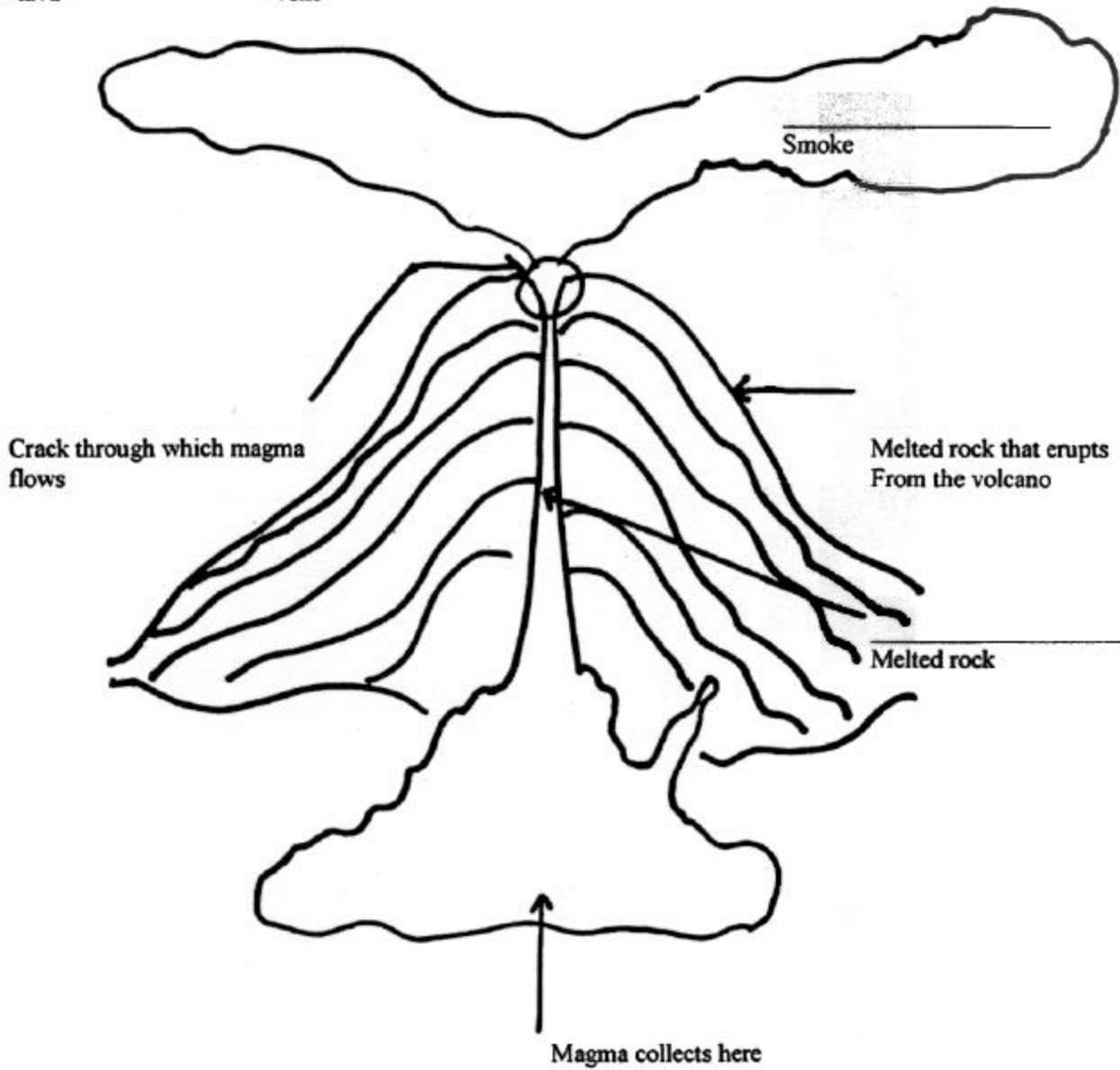
Name a location of a serious earthquake we have discussed that occurred in the Andes Mountains.

[Appendix E]

Parts of a Volcano

Directions: Draw and label the parts of a volcano.

- magma chamber
- lava
- ash
- vent
- magma



Name a famous volcano in the Andes Mountains. _____

[Appendix F]

South America

Directions: Label the following:

Chile, Ecuador, Bolivia, Venezuela, Colombia, Peru, Andes Mountains, Mount Aconagua, Amazon River



Make a key:

- _____ Mountain
- ~~~~~ River
- - - - - Andean Countries
- - - - - Highest peak of the Andes

[Appendix G]

How high can you go?

Directions:

Arrange the following elevations from least to greatest. Then, write their height in number words on the line below. Example: 5 five

<u>Country</u>	<u>Highest elevation</u>
Chile	22,572 ft.
Colombia	19,000 ft.
Ecuador	20,561 ft.
Peru	22,205 ft.
Bolivia	22,700 ft.

1. _____

Number word: _____

2. _____

Number word: _____

3. _____

Number word: _____

4. _____

Number word: _____

5. _____

Number word: _____

[Appendix H]

Andean Language Sample

(Spanish and Quechua)

English

Counting:

one

two

three

four

five

six

seven

eight

nine

ten

Colors:

red

yellow

blue

green

brown

black

gray

white

purple

Spanish

Contar:

uno

dos

tres

cuatro

cinco

seis

siete

ocho

nueve

diez

Colores:

rojo

amarillo

azul

verde

café (marrón)

negro

gris

blanco

morado

Spanish pronunciation:

a-father

e-eight

I-eat

o-boat

u-boot

Quechua

Yupay:

jug (juk)

iskay (iskai)

kinsa (kimsa)

tawa

pichq'a (pisqa)

soqta

k'anchis (qanchis)

pusac (pusaq)

isqon (isk'un)

chunka

Llimpikuna:

puka

k'ello (q'ellu)

anqas (anjas)

q'omer

ch'umpi

yana

kosñi (q'osñi)

yuraq

kulli

Quechua pronunciation:

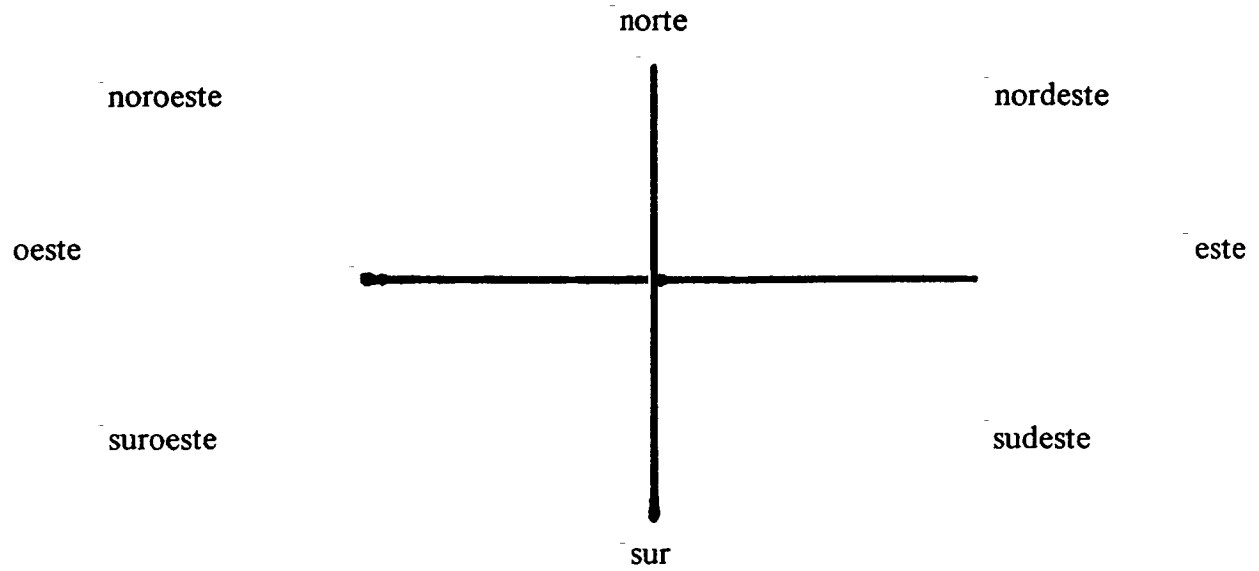
ay-eye
aw-out

ey-eight
iy-eat

oy-oink
uy-wheat

[Appendix I]

Spanish Cardinal Directions



[Appendix J]

Zoo Find

Directions: Find the following species present in the Andes Mountains and fill in the information needed to learn more about special creatures who call the Cordillera de los Andes their home.

1. _____ Llama
Original home: _____
Eats: _____
Description: _____

2. _____ Alpaca
Original home: _____
Eats: _____
Description: _____

3. _____ Chinchilla
Original home: _____
Eats: _____
Description: _____

4. _____ Andean Condor
Original home: _____
Eats: _____
Description: _____

5. _____ Vicuna
Original home: _____
Eats: _____
Description: _____

6. _____ Leopard
Original home: _____
Eats: _____
Description: _____

7. _____ Pika
Original home: _____

Eats: _____

Description: _____