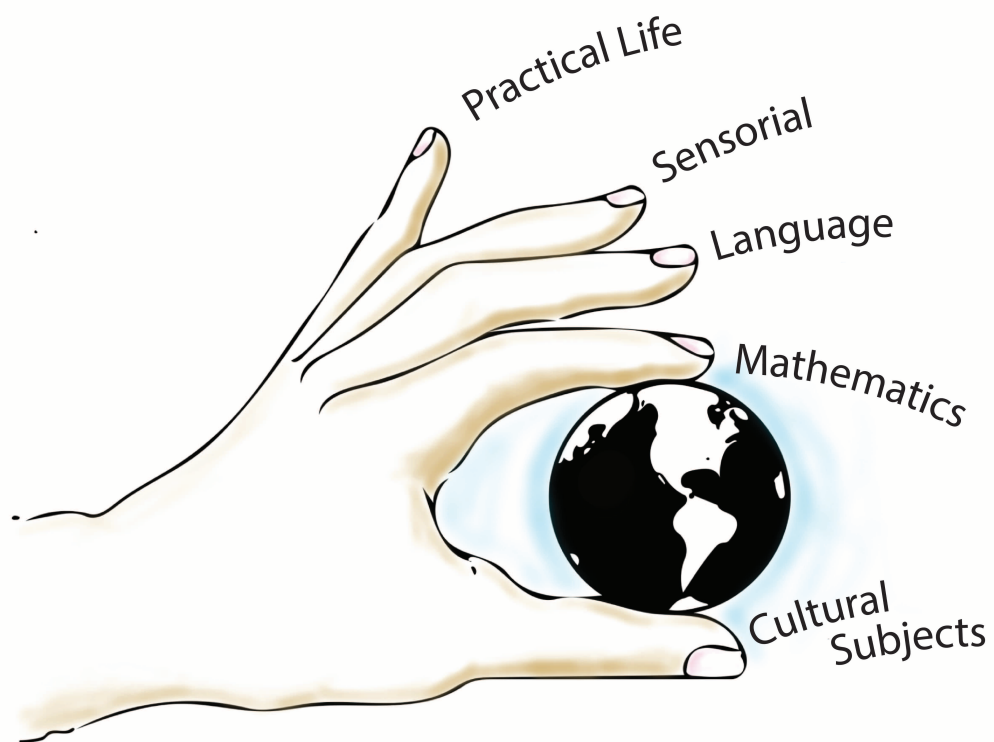


# Montessori Educators International, Inc.



Geography

Early Childhood

Teacher Manual

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# Table of Contents

Land and Water Globe .....	1
Continent Globe .....	3
Land and Water Forms .....	5
Puzzle Map of the World .....	7
Puzzle Maps of Each Continent .....	9
Flags of Countries of the World and Child's Country's Divisions .....	11
Finding Positions on Earth .....	13
Climate Zones .....	14
Major Land and Water Forms on the World Map .....	16
Advanced Land and Water Forms .....	18
Physical Features of Continents .....	20
The Desert .....	23
Glaciers .....	24
Map Legend .....	25
Our Solar System .....	27
The Earth .....	30
Climate and Winds .....	34
Climate and Rainfall .....	35
Climate and Weather .....	37
The Seasons .....	38
Earth's Moon .....	40

## Instructions for Material Preparation

Preparation of Pictures for Continents .....	41
Preparation of Land and Water Form Diagrams .....	41
Preparation of Materials for Geography .....	42
Book Preparation for Books with Spines .....	42

## Finding Positions on Earth

Preparation of Transparencies .....	44
Directions for Advanced Land and Water Form Booklet .....	44
Directions for Preparation of Materials for Map legend .....	44
Preparation of Materials for Earth's Interior .....	45
Preparation of Materials for Seasons .....	46

Material	Number of pages
Small Maps for Picture Packets .....	1
Diagrams for Primary Land and Water Forms .....	1
Maps for Land and Water Forms .....	2
Labels and Information Booklet for Land and Water Forms .....	7
Example of Information Booklet on State (Tennessee) .....	6
Labels and Definitions for Parts of Flag .....	3
Latitude and Longitude Overlays .....	2
Latitude and Longitude Diagram .....	2
Labels and Information Booklets for Latitude and Longitude .....	3
Maps and Overlays for Temperature Zones .....	2
Labels, Definitions, Information Booklet for Temperature Zones .....	3
Diagram for Advanced Land and Water Forms .....	1
Labels and Definitions for Advanced Land and Water Forms .....	5
Maps of Continents .....	7
Labels for Rivers, Cities, Mountains, Deserts, Plains .....	7
Map Symbols .....	8
Diagrams for Parts of the River .....	1
Labels and Definitions for Rivers .....	3
Booklet on Work of Rivers .....	3
Hydrologic Cycle Diagram and Labels .....	1
Hydrologic Cycle Information Cards .....	1
Diagrams of Types of Mountains .....	2
Labels, Definitions, Information Booklet for Mountains .....	4
Plate Tectonics Diagrams .....	4
Labels, Information Booklet for Plate Tectonics.....	4
Diagrams of Major and Minor Plates .....	4
Diagrams for Deserts .....	2
Labels, Definitions, Information Booklet for Deserts .....	4
Diagrams of Glaciers .....	1
Labels, Definitions, Information Booklet for Glaciers .....	7

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<b>Material</b>	<b>Number of pages</b>
Information Booklet on Cities .....	2
Diagrams of the Solar System .....	4
Labels and Information for the Solar System .....	15
Parts of the Telescope .....	3
Labels and Information Booklet for Earth's Interior .....	6
Diagrams for Earth's Interior .....	2
Diagrams of Earth's Atmosphere .....	2
Labels and Information for Earth's Atmosphere .....	3
Diagrams for Volcanoes .....	2
Labels, Definitions, Information Booklet on Volcanoes .....	6
Transparency and Map for Seismic Belts .....	2
Diagrams of Rocks .....	1
Information Booklet on Rocks .....	1
Information Booklet on Minerals .....	1
Labels, Definitions, Information Booklet on Fossils .....	4
Wind Diagrams .....	2
Transparency for Winds .....	1
Labels, Definitions, Information Booklet on Winds .....	6
Diagrams for Clouds .....	3
Labels and Information for Clouds .....	3
Rainfall Transparency .....	2
Weather Symbols .....	1
Diagrams for Weather and Barometer Booklets .....	4
Labels and Information for Booklets on Weather and Barometers.....	9
Diagrams on Orbit and Tilt of Earth (Seasons) .....	2
Labels, Definitions, Information Booklet for Seasons .....	5
Information Booklet for Climate .....	2
Diagrams for Formation of Earth's Moon .....	1
Information Booklet for Formation of Earth's Moon .....	4
Diagrams for Near and Far Sides of Earth's Moon .....	2
Labels for Lunar Areas .....	2
Diagrams for Moon Phases, Orbits and Tides .....	3
Information Booklet on Phases of Earth's Moon .....	2
Information Booklet on Tides and Earth's Moon .....	2
Diagrams for Eclipses .....	1
Information Booklet on Eclipses .....	2

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# Land and Water Globe

## Purposes:

- To develop awareness of the distribution of land masses and bodies of water on our planet Earth through tactile and visual sensorial experiences
- To prepare for the study of physical geography
- To learn the parts of the globe
- To develop appropriate vocabulary

## Preliminary Exercises:

- Practice in carrying objects
- Work with materials for tactile exercises

## Materials:

Globe representing Earth with land masses in rough texture, colored brown or tan, and bodies of water in smooth texture, colored blue

Note: A conventional metal globe with a circumference of about twenty-eight and one half inches at the equator may be prepared by painting all the bodies of water blue with acrylic paint and by mixing fine sand with brown or tan acrylic paint, then using it to paint the land masses. The paint will adhere better if the globe is lightly sanded first. A coat of clear acrylic paint will protect the surface of the prepared globe.

## Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done.
2. Place the land and water globe on the table in front of the child who is seated on your dominant side.
3. Invite the child to feel the land masses and bodies of water with the first two fingers of the dominant hand.
4. As the child feels the land masses, say, "Land." As the bodies of water are felt, say, "Water." Repeat the words as long as the child continues to feel the globe. (This is the first period of the three period lesson.)
5. If interest is sustained, proceed with the second period of the lesson. Ask the child to feel the land, then to feel the water, randomly asking for either to be felt as the lesson continues. If the child is unable to recognize land and water, terminate the lesson immediately. Upon presenting another lesson at a future time with the globe, start with the first period, naming land and water.
6. If the child was able to recognize land and water in the second period of the lesson, proceed to the third period by pointing to either a land mass or a body of water and saying, "Feel this and tell me what it is." Repeat several times, randomly asking for land or water.
7. At the conclusion of the lesson at any stage, thank the child and say that the land and water globe may be chosen. Stand, replace chair and return globe to its storage place.

## Control of Error:

- Tactile sensation of the rough texture for land and smooth texture for water
- Visual discrimination between land and water by color difference
- The teacher

Observations:

- Touching technique
- Fingers used in touching
- Handling of material
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

- Use the terms land mass and body of water in subsequent lessons.
- By the three period lesson, teach the terms and locations of North Pole, South Pole and equator with the globe.
- By the three period lesson, teach the terms and locations of Northern Hemisphere and Southern Hemisphere with the globe.

Vocabulary:

globe Earth land land mass water body of water North Pole equator  
South Pole Northern Hemisphere Southern Hemisphere



# Continent Globe

## Purposes:

- To learn to identify the continents by name
- To become familiar with the locations of the continents
- To prepare for future work in geography
- To develop appropriate vocabulary

## Preliminary Exercise:

Work with the land and water globe

## Materials:

Globe identical in size to the land and water globe with each continent painted a different color. The bodies of water are blue as on the first globe.

Note: The continent globe may be painted according to the color scheme selected since it varies among different manufacturers. The color scheme used in this course will be orange for North America, pink for South America, red for Europe, yellow for Asia, green for Africa, brown for Australia, white for Antarctica.

Color-coded containers of eight pictures on color of continent for each continent

Note: Pictures should depict homes, people in native costume, famous landmarks such as buildings or geographical formations, animals and plants specific to that continent. Directions for preparation follow.

Puzzle map of the world

## Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done.
2. Place the continent globe on the table in front of the child who is seated on your dominant side. Get the puzzle map of the world and place it on your non-dominant side.
3. Point to each continent on the globe as you give its name. Remove a continent from the world puzzle map and place it in front of the globe. Tell the child its name and point to that same continent on the globe, saying the name again. Return that continent to the puzzle map and repeat the process with another continent. Remove the globe to your non-dominant side.
4. By the three period lesson, teach the names of the continents. Place a continent from the world puzzle map before the child and say its name. Place a different continent from the world puzzle map before the child and say its name. Repeat as often as judged necessary, using the same two continents.
5. Place both of the continent puzzle pieces used for the first period of the lesson before the child. Ask the child to show the continent as you say its name. The number of repetitions will depend upon the child. Remember to stop the lesson if the child is unable to select the continent named.
6. Place one of the continents used for the first and second periods of the lesson before the child and ask that it be named. Terminate the lesson if the continent cannot be named, and start over at another time.
7. Stand, replace chair, thank the child and say that the globe may be chosen and that other lessons will be given with it. Have the child return the globe to its storage place while you return the puzzle map.

Control of Error:

Different color for each continent  
The teacher

Observations:

Handling of material  
Length of work time and number of repetitions  
Length of period of contemplation  
Degree of interest and concentration

Variations:

Introduce a container of pictures for the child's own continent or for one in which particular interest is shown. Lay out the pictures and let the child examine them. Give information about the picture or read it from the back of the picture. Demonstrate how to return the pictures to the container. Any of the containers may be chosen by the child.

By the three period lesson, teach the names of the oceans.

By the three period lesson, teach the terms Oceania to designate the islands of central and South Pacific, Eurasia to designate Europe and Asia considered as a whole and Australasia to designate Australia and the surrounding islands.

Vocabulary:

Europe Asia Africa Australia Australasia Antarctica North America  
South America Atlantic Ocean Pacific Ocean Indian Ocean  
Arctic Ocean Oceania Eurasia words used with the pictures

## Land and Water Forms

### Purposes:

- To present the principal land and water forms in three dimensional form
- To relate three dimensional forms to two dimensional diagrams
- To establish a basis for the study of more complex physical features of Earth
- To arouse interest in the study of geography
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with land and water globe
- Practice in pouring water

### Materials:

- Container of photographs of actual land and water forms, mounted on blue cover stock if a water form, brown if a land form
- Three dimensional models of the following pairs of land and water forms: island, lake; cape, bay; peninsula, gulf; isthmus, strait
- Note: The pairs are exact opposites of each other, having water colored blue and land brown or tan to match the colors of the land and water globe.
- Pitcher large enough to hold sufficient water to pour into the forms
- Bucket in which to pour water from the models upon completion of work
- Floor mat large enough to hold all eight models
- Cloth for drying models
- Control and mute diagrams which exactly match the three dimensional models with land and water in the same colors as on the models, container of separate labels with the names of water forms on blue, land forms on brown or tan to match the colors of the models and diagrams
- Booklet with diagram on left page, colored as on previous diagrams, definition on right page
- Container of separate definition cards

### Procedure with Photographs:

1. Invite a child to the lesson once the preliminary exercises have been done. Place the container of photographs on your non-dominant side, and have the child sit on your dominant side. Remove one photograph and place before the child, giving information about it relative to the land or water form shown. Remove this photograph and place face down on your non-dominant side. Place another photograph before the child and follow the previous procedure.
2. Replace the photographs in the container, thank the child and say that the photographs may be chosen. Stand, replace chair and return container to the shelf.

#### Procedure with Forms:

1. Invite a child to the lesson once the photographs have been examined. Have the child spread the mat on the floor and place one pair of land and water forms on the mat with the pairs together, one below the other.
2. Tell the child to get water in the pitcher, then to pour it into the depressions in each form.
3. By the three period lesson, teach the names of the pair of forms.
4. When the work is completed, have the child pour the water into the bucket, then dry the models with the cloth before returning to the shelf. Have the child dry the mat if necessary and return it to its proper storage space if no more forms are to be presented.
5. Continue with other pairs of forms, one pair at a time as long as interest is shown or continue at another time to teach the names of the land and water forms.
6. At the conclusion of the lesson, thank the child and say that land and water forms, one pair at a time, may be chosen.

#### Procedure with Diagrams:

1. After the names of the land and water forms are learned, have the child place the control diagrams to the right of the models.
2. Leave and observe unobtrusively.

#### Control of Error:

Control diagrams and booklet  
Colors of land and water

#### Observations:

Arrangement of land and water forms  
Pouring of water  
Placement of materials  
Handling of materials  
Child's reaction to error  
Length of work time and number of repetitions  
Length of period of contemplation  
Degree of interest and concentration

#### Variations:

Invite the child to place labels on diagrams or forms without reference to the controls until work is complete.

Invite the child to place the definition cards with the appropriate diagrams. Tell the child to check the work with the booklet.

Invite the child who has learned the land and water forms names to trace the diagrams and make a booklet, using appropriate colors. An alternate method is to make a tracing of each diagram, then to place the tracing over the appropriate brown or blue paper for pin pricking the land or water form. This is torn along the perforations and glued to either blue or brown paper as appropriate.

#### Vocabulary:

island    lake    cape    bay    peninsula    gulf    isthmus    strait

## Puzzle Map of the World

### Purposes:

- To further reinforce knowledge of locations of each continent
- To prepare for future work in geography
- To develop appropriate vocabulary

### Preliminary Exercises:

- Extensive practice with the geometric cabinet and cards
- Work with the continent globe

### Materials:

- Puzzle map of the world with each continent removable, having an arrow at the top of the frame which points toward the top of the board with N to denote north at the point of the arrow
- Control with each continent location outlined in the exact size and position as on the puzzle map, having the name of each continent written thereon and with the arrow having the N at its point at the top of the control
- Control with each ocean labeled
- Brown container of labels with the name of each continent mounted on brown
- Blue container of labels with the name of each ocean mounted on blue

### Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done. Place the map on a table to the child's left and the control to the right of the map. Call attention to the arrow and the N at the top of both puzzle map and control, say that N is the abbreviation for north and that north is always placed away from the front edge of the table.
2. Invite the child to remove the continents from the puzzle map, one at a time, and to place each on the control map immediately upon removal from the puzzle map. Tell the child to return the continents to the puzzle map upon completion of work.
3. Leave and observe unobtrusively.

### Control of Error:

- Control map
- Directional arrow to ensure correct orientation of map and control

### Observations:

- Placement of map and control
- Placement of continent pieces
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

If the child can read phonograms, invite the use of the labels to be placed on the puzzle map. Once there has been practice using the puzzle map and the names of the continents are known, invite the child to trace the control map which may be colored and labeled. Invite the child to trace around the puzzle pieces (with a ball-point pen) onto appropriately colored paper, to pin prick the shape which is then punched out so that the continent shape may be mounted in a booklet or on blue circles of paper to make yet another world map. Note: See the Handwork section for details on the pin pricking procedure. Invite the child to place labels on the oceans according to the control. Invite the child to place the labels on continents and oceans without referring to the control until the work is complete.

Vocabulary:

puzzle map    control map    north    directional arrow

## Puzzle Maps of Each Continent

### Purposes:

- To provide knowledge of names and locations of the countries of each continent
- To prepare for future work in geography
- To develop appropriate vocabulary

### Preliminary Exercises:

Work with the puzzle map of the world

### Materials:

- Puzzle map of each continent with removable countries, having an arrow which points toward the top of the board with N to denote north at the point of the arrow
- Control for each continent with countries outlined in the exact size and position as on the puzzle map, having the name of each country written thereon and with the arrow having the N at its point at the top of the control
- Container of labels with the name of each country on the color of the continent in which the country is located
- Note: Labels for countries and states may be purchased from Nienhuis. Trim the width and length (where possible), mount on appropriate color and laminate.
- Puzzle map, control and labels for the child's country, for example, the United States, and for as many other countries as available
- Note: If puzzle maps for separate countries are not available, prepare two outline maps for each country, one labeled with the names of the states, districts, provinces or divisions, the second map unlabeled (mute) with separate labels.

### Procedure:

1. Invite a child to a the puzzle map and control for any continent according to the same procedure used for the world puzzle map.
  2. Tell the child that any of the country maps, either puzzle or outline, may be chosen after the country's continent map has been used.
- Note: If the child cannot read, teach names of countries by the three period lesson by placing puzzle pieces on the control map.

### Control of Error:

- Control map
- Directional arrow to ensure correct orientation of map and control

### Observations:

- Placement of map and control
- Placement of puzzle pieces
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

- If the child can read phonograms, invite the use of the labels to be placed on the puzzle map, using the control if necessary.
- Invite the child to place the labels without referral to the control until the work is completed and verification is needed.
- Once there has been practice using the puzzle map, invite the child to trace the control map which may be colored and labeled.
- Invite the child to trace around the puzzle pieces onto appropriately colored paper, then to pin prick the shape which is then punched out so that the shape may be mounted in a booklet or on paper to make yet another map.

Vocabulary:

- names of countries of all the continents
- names of states, provinces, districts or divisions of countries within each continent



# Flags of Countries of the World and Child's Country's Divisions

## Purposes:

- To acquaint the child with the flags of each country
- To provide materials for learning the parts of the flag

## Preliminary Exercises:

- Work with puzzle maps of the continents

## Materials:

- Small flags, identical in size, for each country for which available
- Separate flag stand for flags of countries of each continent, each stand colored to match the continent color on the world puzzle map
- Separate country labels which were used with the puzzle maps
- Control booklets or cards for the countries of each continent, the cover or card in the color of the continent, with a flag on each page or card and the name of the country below it
- Small flags for each state in the U.S.A. in an orange flag stand to denote North America
- Separate labels for each state
- A control booklet for each state with picture of flag, small map of the state with the location of the capital marked by a star, information about the state such as the state bird and flower
- Control cards, mute cards and container of separate labels for parts of the flag

## Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done.
2. Have the child select any continent flag stand and take it to a table. If the child can read, the control booklet for that continent is also taken to the table and placed on the child's dominant side.
3. The child who cannot read may be taught to identify the flags by the three period lesson.
4. The child who can read uses the control booklet to learn to identify the flags. With the child seated on your dominant side, tell the child to place the country label in front of the appropriate flag in the stand according to the control booklet.
5. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

## Control of Error:

- Color of flag stand, separate country labels and control booklet cover or card
- Control booklet or card

## Observations:

- Placement of labels
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

- Invite the child to place the country labels in front of the flags without referring to the control booklet until checking the completed work.
- Invite the child to place the flag and country label with the puzzle piece representing the country.
- Invite the child to use the puzzle map, control and flags for the country of residence, for example, the state flags for the United States, the province flags for Canada.
- Invite the child to read the information about each state, province or whatever the divisions of the country.
- Invite the child to use the control cards, mute cards and separate labels to learn the parts of the flag, or give the parts by the three period lesson.

Vocabulary:

flagpole flagstaff staff mast halyard hoist truck finial canton  
union fly end fly foot field ground emblem badge device

## Finding Positions on Earth

### Purposes:

- To develop an understanding of the system by which exact position can be determined any place on Earth
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with continent globe and puzzle maps of continents

### Materials:

- Globe marked with latitude lines and longitude lines showing Earth's grid
- World maps and controls of eastern and western hemispheres showing continents
- Transparent diagram with latitude lines drawn, the equator marked with a heavier line, to fit over the world map control
- Transparent diagram with longitude lines drawn, the prime or first meridian marked with a heavier line, to fit over the world map control
- Container of labels for eastern and western hemispheres, latitude, longitude, equator, prime meridian, mounted on white
- Information booklet about finding positions on Earth

### Procedure for Grid Lines:

1. Invite a child to the lesson once the preliminary exercises have been done.
2. Take the globe with latitude and longitude lines to a table and place in front of the child who is seated on your dominant side.
3. Explain that the lines going from pole to pole are called longitude lines or meridians and that the lines paralleling the equator are called latitude lines or parallels of latitude.
4. Set the globe to your non-dominant side and have the child get the control map showing the continents. Place on a table with the transparent maps for latitude and longitude above the control. Ask the child to place the latitude transparency over the world map on one hemisphere at a time, then to remove those and replace with the longitude transparency.
5. Place the control map on your non-dominant side. Using the transparencies for latitude and longitude, teach the terms by the three period lesson.

Note: These transparent diagrams are used so that each concept may be isolated to give the three period lesson, rather than using the globe with no isolation possible.

6. Thank the child say that latitude and longitude materials may be chosen. Stand, replace chair and return materials to shelf.

### Control of Error:

- The teacher
- Separate diagrams for latitude and for longitude

### Variations:

- Invite the child to use the labels for latitude, longitude , prime meridian and equator on the maps with transparencies.
- Invite child to read information booklet on finding positions by latitude and longitude.

### Vocabulary:

- grid latitude parallel longitude meridian prime meridian

# Climate Zones

## Purposes:

- To introduce the parallels of latitude which divide Earth into the temperature zones
- To present the three temperature zones relative to the globe
- To develop appropriate vocabulary

## Preliminary Exercises:

- Work with materials for learning parts of the globe
- Exercises to promote understanding of latitude and longitude
- Practice with phonograms

## Materials:

- Control diagram with names of parallels of latitude which divide Earth into zones, mute map and container of separate labels for Arctic Circle, Tropic of Cancer, equator, Tropic of Capricorn, Antarctic Circle
  - Control diagram with names and locations of zones colored as follows: Frigid Zones, white; Temperate Zones, green; Torrid Zones, red; mute map colored the same as the control, container of separate labels for names of zones
  - World map of eastern and western hemispheres having countries labeled and colored according to their temperature zone or zones, with major cities located and labeled
- Note: A colored transparency for zones may be used to place over world maps with countries and principal cities labeled.

## Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done. Place the control map with names of parallels of latitude indicating temperature zones on the table at left center of the child who is seated on your dominant side. Place the mute map to the right of the control with the container of labels in front of it.
2. Ask the child to read the names of the parallels of latitude indicating temperature zones on the control diagram, then to place the labels on the mute diagram appropriately.
3. Tell the child that the diagrams showing the temperature zones may be used once the parallels of latitude are known.
4. Leave and observe unobtrusively.

## Control of Error:

- Control maps
- Colors of zones

## Observations:

- Placement of labels
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

Invite the child to use the world map of eastern and western hemispheres having countries labeled and colored according to their temperature zone or zones, with major cities located and labeled, or to use the transparencies with the labeled hemisphere maps showing countries and cities.

Invite the child make a booklet in which to list major countries and cities in each temperature zone.

Vocabulary:

frigid   temperate   torrid   zone   Arctic Circle   Tropic of Cancer   equator  
Tropic of Capricorn   Antarctic Circle

# Major Land and Water Forms on the World Map

## Purposes:

- To locate major land and water forms on the world map
- To relate land and water forms to political geography
- To arouse further interest in the study of geography
- To develop appropriate vocabulary

## Preliminary Exercises:

- Practice with land and water form models and diagrams
- Work with puzzle map of the world
- Exercises with phonogram materials

## Materials:

- Two outline maps of the world with principal islands colored brown, one map labeled with names of islands, separate labels in a container
- Two maps of the world with principal lakes colored blue, one map labeled with names of lakes, separate labels in a container
- Two outline maps of the world with principal capes colored brown, one map labeled with names of capes, separate labels in a container
- Two outline maps of the world with principal bays colored blue, one map labeled with names of bays, separate labels in a container
- Two outline maps of the world with principal peninsulas colored brown, one map labeled with names of peninsulas, separate labels in a container
- Two maps of the world with principal gulfs colored blue, one map labeled with names of gulfs, separate labels in a container
- Two outline maps of the world with principal isthmuses colored brown, one map labeled with names of isthmuses, separate labels in a container
- Two maps of the world with principal straits colored blue, one map labeled with names of straits, separate labels in a container
- Atlas or collection of maps of continents and countries

## Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done. Ask the child to choose any set of land or water form world maps and labels.
2. Have the child place the labeled control map at the left side of a table and the mute map to its right with enough space to allow placement of the labels at random in a row below the maps.
3. Tell the child to choose any location on the control map, then to find the corresponding label which is placed on the mute map in the appropriate place.
4. Tell the child to continue placing labels on the mute maps by referring to the control.
5. Leave and observe unobtrusively.

## Control of Error:

- Control map

Observations:

- Handling of materials
- Placement of labels
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

- Invite the child to place the labels without referring to controls until work is completed.

- Invite the child to color a separate world outline map for each form, label appropriately.

- Invite the child to locate and list in a small booklet the major land and water forms and the countries in which each is located.

- Invite the child to use the atlas or regular maps to locate major land and water forms.

Vocabulary:

- Names of countries in which land and water forms are located

## Advanced Land and Water Forms

### Purposes:

- To introduce advanced land and water forms
- To associate advanced land and water forms with those on world maps
- To relate land and water forms to political geography, climate and vegetation
- To arouse further interest in the study of geography
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with land and water forms
- Exercises with world maps illustrating principal land and water forms
- Practice with phonogram material

### Materials:

- Blue container with simplified drawings for parts of the river: source, meander, estuary, delta, tributary
- Brown container with simplified drawing relating to land: alluvial plain, swamp, plain, mountain, volcano, watershed, divide, range, massif, landslide, strata, cliff, butte, plateau, tableland, mesa, dome, fold, fault, ridge, valley, scarp, escarpment, slope
- Photographs of advanced land forms mounted on blue for water and on brown for land with the name of the form and a small outline map of a continent on the reverse
- Blue control booklet for advanced water forms with drawing on left page and definition on right page, facing the drawing
- Brown control booklet for advanced land forms with drawing on left page and definition on right page, facing the drawing
- Labels for each advanced land form on brown and water form on blue
- Separate definition cards for advanced land and water forms
- Clay for preparing forms

### Procedure:

1. Invite the child to the lesson, choosing either booklet and the appropriate separate drawings, labels and definition cards.
2. Ask the child to read the booklet as the control for placing labels and definition cards below the drawings of the advanced forms chosen.
3. Leave and observe unobtrusively.

### Control of Error:

- Control booklets

### Observations:

- Placement of labels and definition cards
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration



Variations:

Invite the child to use the other set of advanced forms.

Invite the child to place labels and definition cards without using the control booklet.

Invite the child to use clay to prepare three dimensional models of the advanced forms according to the drawings previously used.

Invite the child to look at the photographs of actual advanced land and water forms and to place the appropriate labels below them.

Vocabulary:

alluvial plain    swamp    plain    mountain    volcano    watershed    divide  
range    fold    massif    landslide    strata    cliff    butte    plateau  
tableland    mesa    dome    fold    fault    ridge    valley    scarp  
escarpment    slope    source    meander    estuary    delta    tributary

## Physical Features of Continents

### Purposes:

- To provide practice in map reading skills
- To offer a means for learning the physical features of each continent
- To develop understanding of the relationship between civilizations and physical features of Earth
- To arouse further interest in the study of geography
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with advanced land and water forms

### Materials:

- Container of photographs of scenes of principal rivers, mounted on blue paper with name of river and a small outline map of the continent on the reverse
  - Control map of each continent with rivers labeled, mute map with rivers, container the color of the continent or labeled with continent name to hold small blue flags mounted on heavy pins, each labeled with the name of a river
  - Illustrated information booklet on work of rivers
  - Control diagram of hydrologic cycle, mute diagram, separate labels
  - Illustrated information booklet on the hydrologic cycle
  - Container of control and mute diagrams of cloud formations, separate labels
  - Information booklet on clouds (Refer to Climate.)
  - Container of photographs of scenes of principal mountain ranges mounted on brown paper with name of range and a small outline map of the continent on the reverse
  - Control map of each continent with mountains labeled, mute map with mountains, container the color of the continent or labeled with the continent name to hold small brown flags mounted on heavy pins, each labeled with the name of the mountain range
  - Illustrated information booklet on formation of mountains: continental drift, volcanic action (Refer to Earth.)
  - Maps of the world showing continental drift over the centuries
  - Information booklet on continental drift
  - Container of photographs of scenes of principal deserts mounted on yellow paper with name of desert and a small outline map of the continent on reverse
  - Control map of each continent with mountains indicated in shades of brown and deserts, colored yellow, labeled, mute map with mountains and deserts, container the color of the continent or labeled with the name of the continent to hold small yellow flags mounted on heavy pins, each labeled with the name of a desert
  - Illustrated information booklet on formation of deserts (Refer to Deserts.)
  - Container of photographs of scenes of principal plains mounted on green paper with the name of the plain and a small outline map on the reverse.
  - Control map of each continent with plains labeled, mute map with plains, container the color of the continent or labeled with the name of the continent to hold small green flags mounted on heavy pins, each labeled with the name of the plain
- Note: Mute maps may be made on transparent vinyl for placement one on top of the other, thus showing the relationships among the physical features.

Container of photographs of scenes of principal cities mounted on red paper with name of city and a small outline map of the continent on the reverse

Control map of each continent with oceans, rivers and mountains shown but only cities labeled, mute map with cities, container the color of the continent or labeled with the name of the continent to hold small red markers mounted on heavy pins, each labeled with the name of the city

Note: Capital cities are indicated by black stars, other cities by black dots.

#### Procedure with Pictures:

1. Invite a child to the lesson. Take the container of photographs of rivers to a table. Explain that the outline map on the reverse denotes the continent on which the river is found.
2. Tell the child the name of each river, showing one picture at a time. If reading phonograms, have the child read the names on the reverse. Return the pictures to the container.
3. Thank the child and say that any containers of photographs may be chosen whenever desired.
4. Stand, replace chair, and return container to the shelf.

#### Procedure with Maps:

1. Invite a child to the lesson. Take the control and mute maps with flags for rivers of the child's continent to a table. Explain that the outline map on the reverse denotes the continent on which the river is located. Place the control on the left with the mute to its right.
2. Tell the child to look at the control and to choose any river, then to find the name of that river on one of the flags. Have the child locate the corresponding river on the mute map and place the flag to label it.
3. Ask the child to continue choosing and labeling rivers on that continent.
4. Thank the child and say that the maps for rivers of the other continents may be chosen whenever desired. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

#### Procedure for Hydrological Cycle:

1. Invite a child to the lesson.
2. Show the child the control and mute diagrams depicting the hydrological cycle and invite the placement of labels on the mute diagrams by referring to the controls.
3. Leave and observe unobtrusively.

#### Control of Error:

Color on which photographs are mounted  
Control maps and diagrams

#### Observations:

Placement of labels or flags  
Handling of materials  
Child's reaction to error  
Length of work time and number of repetitions  
Length of period of contemplation  
Degree of interest and concentration

Variations:

Invite the child use materials for the hydrologic cycle and work of rivers.

Invite the child to use materials about cloud formation.

After use of the materials on rivers and the hydrologic cycle, invite the child to use the same procedures with materials for other physical features of the continents in the same sequence: photographs, control and mute maps with flags.

Note: Materials for deserts must follow work on mountains.

Invite the child to read information booklets.

Invite the child to place labels without referring to the control, then to use the control to check placement.

Invite the child to trace the maps and diagrams once the labels can be placed independently.

Vocabulary:

names of rivers, mountain ranges, deserts, plains, cities hydrological cycle clouds

names of cloud formations evaporation condensation water vapor

erosion continental drift volcano names of volcano parts

# The Desert

## Purposes:

- To acquaint the child with characteristics of deserts
- To develop an understanding of the causes of deserts
- To arouse further interest in geography
- To add to the understanding of forces that change Earth
- To develop appropriate vocabulary

## Preliminary Exercises:

- Exercises with phonograms
- Work with materials to learn advanced land and water forms
- Use of globes for learning parts of Earth and continents

## Materials:

- Container of control and mute cards with labels for terms relative to deserts
- Definition cards
- Information booklet on deserts

## Procedure:

1. Invite a child who can read phonograms to the lesson. Place the container of materials in front of the child who is seated on your dominant side.
2. Ask the child to remove the cards and to make a row of control cards from left to right near the center of the table, in any order.
3. Tell the child to read the first control card, then to find the matching mute card and appropriate label. Place them under the control card. Have the child continue the procedure.
4. Leave when it is apparent that the procedure is understood, observe unobtrusively.

## Control of Error:

- Control cards
- Information booklet

## Observations:

- Handling of materials
- Placement of cards and labels
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

## Variations:

- Invite the child to place the labels with the mute cards without referring to controls until work is complete.
- Invite the child to read the information booklet.
- Invite the child to place definition cards with mute cards and labels.

## Vocabulary:

desert   cold desert   hot desert   lee   windward   dune   oasis   desertification

# Glaciers

## Purposes:

- To acquaint the child with glaciers and their effects
- To arouse further interest in geography
- To add to the understanding of forces that change Earth
- To develop appropriate vocabulary

## Preliminary Exercises:

- Exercises with phonograms
- Work with materials to learn advanced land and water forms
- Use of globes for learning parts of Earth and continents

## Materials:

- Control and mute cards with labels for parts of glacier
- Container of definition cards for parts of the glacier
- Information booklet on glaciers

## Procedure:

1. Invite a child who can read phonograms to the lesson. Place the container of materials in front of the child who is seated on your dominant side.
2. Ask the child to remove the cards and to make a row of control cards from left to right near the center of the table, in any order.
3. Tell the child to match the mute cards with control cards, then to place the appropriate labels under the mute cards.
4. Leave when it is apparent that the procedure is understood, observe unobtrusively.

## Control of Error:

- Control cards
- Information booklet

## Observations:

- Handling of materials
- Placement of cards and labels
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

## Variations:

- Invite the child to place the labels with the mute cards without referring to controls until work is complete.
- Invite the child to read the information booklet.
- Invite the child to place definition cards with mute cards and labels.

## Vocabulary:

glacier Pleistocene Epoch Ice Age valley glacier piedmont glacier  
ice sheet glacial ice firn crevasse glaciated valley glaciated mountain  
fiord till drumlin terminus terminal moraine lateral moraine  
medial moraine melt-water outwash kettle esker cirque

## Map Legend

### Purposes:

- To learn the significance of symbols on maps
- To develop map reading skills
- To arouse further interest in maps and geography
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with advanced land and water forms
- Exercises with phonogram reading materials

### Materials:

Five containers of control and mute cards with labels for symbols used on maps as follows: inhabited localities symbols and boundaries in one container; transportation symbols in another container; symbols for water forms, mountains and pass in another; symbols indicating man-made locations in another; symbols for scale, time zones and direction in the fifth.

Note: There is not agreement among publishers of atlases concerning symbols, so use those from the atlas in your classroom.

Simplified paper maps on which the child can write labels to accompany each of the containers

### Procedure:

1. Invite a child who can read phonograms to the lesson. Take the container of map symbols for boundaries and inhabited localities to a table and place in front of the child who is seated on your dominant side.
2. Ask the child to remove the cards and to make a row of control cards from left to right near the center of the table, in any order.
3. Tell the child to match the symbols on the mute cards with the controls, then to read and place the labels appropriately.
4. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

### Control of Error:

Control cards

### Observations:

- Handling of material
- Placement of cards and labels
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

### Variations:

- Invite the child to place labels on mute cards without referring to controls until layout is complete.
- Invite the child to write labels on paper maps.
- Invite the child to use the other containers of map legend materials according to the previous procedure.

Vocabulary:

legend symbol scale compass rose lock cemetery castle ruin  
site mine pass rapids canal dam battlefield time zone boundary  
ferry campsite interstate highway U.S. highway tunnel  
state highway secondary highway county trunk highway trail toll road  
four lane divided highway super highway principal highway boundaries  
metropolitan area capital



# Our Solar System

## Purposes:

- To learn about the planets in our solar system
- To become acquainted with scientific developments leading to understanding of our solar system
- To arouse further interest in the study of geography
- To develop appropriate vocabulary

## Preliminary Exercises:

Work with phonogram exercises to be able to use written materials

## Materials:

- Three dimensional scale model of sun and planets.
- Container of control and mute drawings or photographs with labels for each separate planet and the sun, in relative sizes and mounted on black
- Note: The control should be fastened together and folded accordion-style. The sun is first on the left with the planets in order of their position from the sun: Mercury, Venus, Earth, Mars, Asteroids, Jupiter, Saturn, Uranus, Neptune, Pluto.
- Container with separate information cards for each planet and for the sun, including periods of rotation, important characteristics
- Separate information booklets for each planet and for the sun, including periods of rotation, important characteristics
- Container with control map of the Solar System, showing planets in relative sizes with the orbit of each indicated; mute map showing orbits; movable planets and labels
- Note: It is not practical to show the orbits to scale. If the sun were shown as an inch in diameter, Pluto would be approximately 353 feet away.
- Time lines and booklets about exploration of space: astronauts, space craft (to be covered in History)
- Telescope
- Container of pictures and/or diagrams of various types of telescopes, numbered on the reverse to show the sequence of development
- Time line showing the development of the telescope (to be covered in History)
- Container of control and mute diagrams with separate labels, showing parts of a telescope

## Procedure for Model:

1. Invite a child to the lesson and show the model, naming the planets and the sun.
  2. If the child cannot read, teach the names of the planets by the three period lesson, over the period of time needed.
  3. Thank the child and say that additional names will be learned later.
- Note: Children who read phonograms learn the names from written materials.

#### Procedure for Planet Names:

1. Invite a child to the lesson and place the container of control and mute cards for each planet in front of the child, near the back of a table.
2. Have the child remove the control and unfold, then match and place the mute cards below appropriately.
3. Ask the child to read the labels and place appropriately.
4. Leave as soon as it is apparent that the procedure is understood. Observe unobtrusively.

#### Procedure for Information Cards:

1. Invite a child to the lesson once the names of the planets are learned.
2. Take the materials for learning planet names and the information cards to a table.
3. Ask the child to lay out the mute cards and labels, then to read the information cards and place under the appropriate planet, checking against the information booklet.
4. Leave as soon as it is apparent that the procedure is understood. Observe unobtrusively.

#### Procedure for Orbits:

1. Invite a child to the lesson and lay the control map of our solar system on a floor mat with the mute map below it. Place the container of planets and labels on the child's dominant side.
2. Ask the child to place planets and their labels appropriately by referring to control.
3. Leave as soon as it is apparent that the procedure is understood. Observe unobtrusively.

#### Procedure for Telescope:

1. Invite several children to the lesson, take the telescope outside and demonstrate its use.
2. Have each child who is interested attempt to focus it on distant objects.
3. Thank the children and say that use of the telescope may be requested.

#### Procedure for Telescope Pictures:

1. Invite a child to the lesson and place the container of pictures of different types of telescopes on the table.
2. Remove one picture at a time and give information which is on the back. Starting with the earliest form of telescope, present in sequence, laying out the pictures from left to right. Call attention to the numerals on the reverse which act as a control for the sequence. Return the pictures to the container.
3. Thank the child, and say that the pictures of telescopes may be chosen.
4. Stand, replace chair and return container to the shelf.

#### Procedure for Parts of the Telescope:

1. Invite a child to the lesson and place the container on the table at the child's dominant side.
2. Have the child lay out the control cards in a row, then place the matching mute cards and appropriate labels below.
3. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

Control of Error:  
Control cards

Observations:  
Placement of mute cards and labels  
Handling of materials  
Child's reaction to error  
Length of work time and number of repetitions  
Length of period of contemplation  
Degree of interest and concentration

Variations:  
Invite the child to lay out mute cards and labels without referring to controls until work is completed.  
Invite the child to use time lines.

Vocabulary:  
names of planets rotation gravity orbit telescope  
names of parts of telescope (See "white pages")

# The Earth

## Purposes:

- To provide information on Earth's interior and atmosphere
- To give insight into the movements of Earth and their importance
- To understand the forces which change Earth
- To arouse further interest in the study of geography and geology
- To develop appropriate vocabulary

## Preliminary Exercises:

- Practice with globes
- Use of puzzle map of the world
- Work with solar system materials

## Materials:

- Model showing interior of Earth
- Container of control and mute cards with labels for interior parts of Earth
- Container of information cards for each part of Earth's interior
- Information booklet on Earth's interior
- Container of control and mute cards with labels for parts of the atmosphere
- Container of information cards for each part of Earth's atmosphere
- Information booklet on Earth's atmosphere
- Information booklet on the orbit and tilt of Earth
- Container of photographs of volcanoes
- Model showing interior and exterior of volcano
- Container of control and mute cards with labels for parts of the volcano
- Container of information cards for each part of the volcano
- Information booklet on volcanoes
- Map of world showing major seismic belts
- Container of numbered rocks with corresponding labels numbered on the back
- Information booklet on rocks in the collection
- Container of numbered minerals with corresponding labels numbered on the back
- Information booklet on minerals in the collection
- Container of pictures of rock formations
- Container of control cards, mute cards and labels for igneous, metamorphic and sedimentary rock formations
- Container of definition cards for rock formations
- Information booklet on rock formations
- Container of diagrams showing parts of the mountain, mute cards and labels
- Geologic time line showing mountain building (to be covered in History)
- Geologic time line showing fossils of each era (to be covered in History)
- Container of numbered fossils with corresponding labels
- Booklet on formation of fossils
- Booklet on causes, effects, locating, detection and recording of earthquakes
- Seismograph model, if possible
- Maps of world on time line showing position of continents in different eras (to be covered in History)

Procedure for Earth's Interior:

1. Invite a child to the lesson and place the model showing Earth's interior on a table in front of the child who is seated on your dominant side.
2. Name the parts of Earth's interior while pointing to them.
3. If the child cannot read, teach the names of the parts by the three-period lesson.
4. If able to read, invite the child to use the control and mute cards with labels for learning the names of the parts.
5. Thank the child, stand, replace chair, return model and say that the material may be chosen.

Procedure for Atmosphere:

1. Invite a child to the lesson and place the container of atmosphere cards on a table in front of the child who is seated on your dominant side.
  2. Remove the control card and name the parts of Earth's atmosphere while pointing to them.
  3. If the child cannot read, teach the names of the parts by the three-period lesson.
  4. If able to read, invite the child to use the control and mute cards with labels for learning the names of the parts. Return materials to the container.
  5. Thank the child, stand, replace chair, return container and say that the material may be chosen.
- Note: The same procedure is used for parts of a mountain and of glaciers.

Procedure for Volcano:

1. Invite a child to the lesson and place the container of volcano pictures on a table in front of the child who is seated on your dominant side.
2. Remove the pictures, one at a time, and give information about each from the reverse of the picture.
3. Thank the child, stand, replace chair, return container and say that the material may be chosen.

Procedure for Volcano Model:

1. Invite a child to the lesson and place the model of the volcano on a table in front of the child who is seated on your dominant side.
2. Name the parts of volcano's interior while pointing to them.
3. If the child cannot read, teach the names of the parts by the three-period lesson.
4. If able to read, invite the child to use the control and mute cards with labels for learning the names of the parts.
5. Thank the child, stand, replace chair, return model and say that the material may be chosen.

Procedure for Seismic Belts:

1. Invite a child to the lesson and place the map of the world showing major seismic belts on a table in front of the child who is seated on your dominant side.
2. Ask the child to locate countries in which the belts are found.
3. Thank the child, stand, replace chair, return map and say that it may be chosen.

Procedure for Seismograph:

1. Invite several children to the lesson who have used the map and booklet about earthquakes.
2. Take the model of the seismograph to a table around which the children are seated.
3. Show how the model works and answer questions which arise.
4. Thank the children and say that the model may be examined. Stand, replace chair and return model to its place.

Procedure for Rocks:

1. Invite a child to the lesson and place the container of rocks on a table in front of the child who is seated on your dominant side.
2. Point to each rock and name it.
3. If the child cannot read, teach the names of the rocks by the three-period lesson.
4. If able to read, invite the child to use the container of rocks with labels for learning the names of the rocks.
5. Thank the child, stand, replace chair and say that the material may be chosen. Return the container to the shelf.

Note: The same procedure is used for minerals and for fossils

Control of Error:

The teacher  
Control cards

Observations:

Placement of control cards, mute cards and labels  
Handling of materials  
Child's reaction to error  
Length of work time and number of repetitions  
Length of period of contemplation  
Degree of interest and concentration

Variations:

Invite the child to read the information booklet about Earth's interior.  
Invite the child to place information cards about Earth's interior on mute cards.  
Invite the child to read the information booklet about Earth's atmosphere.  
Invite the child to place information cards about Earth's atmosphere on mute cards.  
Invite the child to read the information booklet about Earth's orbit and tilt.  
Invite the child to read the information booklet about volcanoes.  
Invite the child to place information cards about volcanoes on mute cards.  
Invite the child to read the information booklet about rocks, minerals and fossils.  
Invite the child to look at pictures rock formations.  
Invite the child to use control cards, mute cards and labels to learn about rock formations.  
Invite the child to read the information booklet about rock formations.  
Invite the child to place information cards about rock formations on mute cards.  
Invite the child to read the information booklet about fossil formation.  
Invite the child to read the information booklet about earthquakes.  
Invite the child to use the commands involving the use of materials for the Earth.

Vocabulary:

inner core      outer core      lower mantle      transition zone      upper mantle  
troposphere      stratosphere      mesosphere      thermosphere      ionosphere  
exosphere      orbit      tilt      volcano      magma      lava      crater      cone      caldera  
vent      dome      spines      names of kinds of rocks in collection  
names of kinds of minerals in collection      igneous      metamorphic      sedimentary  
cirque      folding      faulting      deformation  
names of fossils in collection      seismic      earthquake

## Climate and Winds

### Purposes:

- To develop understanding of causes of winds
- To become aware of the effects of wind
- To relate climate to winds
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with materials about rotation, orbit and tilt of Earth
- Exercises on water cycle
- Practice with maps for mountains, deserts and climate zones

### Materials:

- Science experiments to demonstrate the fact that warm air rises and cold air descends (to be covered in Experimental Science)
- Control maps of both hemispheres showing primary winds; mute maps and container of labels
- Control maps of both hemispheres showing air circulation at equator; mute maps and container of labels
- Control maps of both hemispheres showing secondary circulation systems including land-sea winds, mountain-valley winds by day and night; mute maps and container of labels
- Information booklets on wind causes and effects

### Procedure:

1. Invite a child to the lesson once the preliminary exercises have been done.
2. Ask the child to bring the materials for primary winds to a table and place the control map at the left center with the mute map to its right. The container of labels is arranged on the child's dominant side.
3. Tell the child to place labels on the mute map according to the control. Leave and observe unobtrusively.

### Control of Error:

- Control map

### Observations:

- Placement of mute cards and labels
- Handling of materials
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

### Variations:

- Invite the child to use the materials concerning air circulation at the equator.
- Invite the child to use materials concerning secondary circulation systems.
- Invite the child to read information booklets about winds.

### Vocabulary:

- |               |                       |                       |                            |
|---------------|-----------------------|-----------------------|----------------------------|
| primary winds | air circulation       | secondary circulation | land-sea winds             |
| monsoon       | mountain-valley winds |                       | names of the primary winds |



# Climate and Rainfall

## Purposes:

- To develop understanding of causes of rain
- To become aware of the effects of rainfall
- To relate climate to rainfall
- To develop appropriate vocabulary

## Preliminary Exercises:

- Work with materials for physical features of continents
- Use of materials concerning winds
- Lessons on making graphs

## Materials:

- Rain gauge, cup of water and chart on which to record rainfall amounts
- Weather page of daily paper
- Container with control diagrams of cloud formations, mute diagrams and labels: cirrus, cirrostratus, cirrocumulus, altostratus, altocumulus, stratocumulus, stratus, nimbostratus, cumulus, cumulonimbus, tornado, cyclone
- Booklet about cloud formations
- Transparent overlays for eastern hemisphere and for western hemisphere showing areas of rainfall over 40 inches per year
- Note: The overlays match the control maps for each hemisphere used in previous exercises.

## Procedure for Recording Rainfall:

1. Invite several children to the lesson and, taking a cup of water and a practice chart, go to the rain gauge which has been positioned in an appropriate place outside.
2. Point to the numbers on the gauge which indicate the amount of rainfall, add some water to the container. Invite a child to read the numeral indicated by the meniscus and to record it on the practice chart to indicate rainfall. Continue adding more water, having children read the numerals and practice recording.
3. Empty the gauge, dispose of the practice chart and tell the children that the gauge may be read any time there has been rainfall, recording the amount on the chart along with the date.

## Procedure for Cloud Formations:

1. Invite a child to the lesson and take the container of cloud formation materials to a table.
2. Ask the child to lay out the control diagrams in a row at the center of the table, then to place matching mute cards under the controls with appropriate labels.
3. Leave as soon as it is observed that the procedure is understood, and observe unobtrusively.

## Control of Error:

- The teacher in the lesson with the rain gauge
- Control diagrams

Observations:

- Reading of gauge
- Recording of numerals on chart
- Placement of mute diagrams and labels
- Handling of materials
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

Variations:

- Invite the child to make a graph of the rainfall recorded each month.
- Invite the child to collect rainfall data from the daily newspaper for any city or for several cities every day. Once a month, have the child make a graph from the collected data.
- Invite the child to read the cloud formation booklet.
- Invite the child to use the world-wide rainfall transparencies with the control maps of each hemisphere.

Vocabulary:

cirrus   cirrostratus   cirrocumulus   altostratus   altocumulus  
stratocumulus   stratus   nimbostratus   cumulus   cumulonimbus  
tornado   cyclone   rain gauge   graph   rainfall

# Climate and Weather

## Purposes:

- To develop understanding of causes of weather changes
- To become aware of the effects of weather
- To relate climate to weather
- To develop appropriate vocabulary

## Preliminary Exercises:

- Work with temperature zone maps
- Use of materials on rainfall

## Materials:

- Container of control weather symbols, mute cards and labels
- Information booklet about movement of fronts, high and low pressure systems
- Weather page from daily newspaper

## Procedure:

1. Invite a child to the lesson and take the container of weather symbols to a table.
2. Have the child lay out the controls in a row at the center of the table, then place the matching mute cards and labels appropriately under the controls.
3. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

## Control of Error:

- Control cards

## Observations:

- Placement of mute cards and labels
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

## Variations:

- Invite the child to use mute cards and labels without referring to the control until work is complete.
- Invite the child to read the information booklet.
- Invite the child to examine the weather map in the daily newspaper to become aware of the movement of fronts.

## Vocabulary:

- names of weather symbols    front    low pressure    high pressure

# The Seasons

## Purposes:

- To acquaint the child with the causes of seasons
- To arouse further interest in geography
- To add to the understanding of climate and weather
- To develop appropriate vocabulary

## Preliminary Exercises:

- Exercises with phonograms
- Work with materials to learn months of the year
- Use of globes for learning parts of Earth

## Materials:

- Container of color-coded pictures for each season
- Container of pictures for each season mounted on tan cover stock with a colored dot on the reverse to indicate the season, labels for each season mounted on the appropriate color
- Container with circular time line of seasons and labels
- Container of definition cards for terms relative to seasons
- Information booklet on seasons
- Container of cards showing tilt of Earth relative to seasons
- Information booklet on climate

## Procedure for Pictures:

1. Invite several children to the lesson and have them sit at a table.
2. Take a container of pictures for one season to the table. Remove the pictures and place face down in front of you on top of the container.
3. Show one picture at a time, giving brief information about the content of each relative to the season depicted.
4. Return the pictures to the container and say that the containers of pictures may be chosen. Thank the children. Stand, replace chair and return container to the shelf.

## Procedure for Time Line:

1. Invite a child to the lesson who has examined the pictures for seasons.
2. Place the container with time line and labels on your non-dominant side. Remove the time line and labels.
3. Invite the child to read the labels and to place them on the appropriate season. Show the child that the color on the reverse of the label indicates the season.
4. Have the child return the materials to the container. Thank the child and say that the season time line may be chosen. Stand, replace chair and ask the child to return the material to the shelf.

## Procedure for Information Booklet:

1. Invite a child who can read phonograms and who has used the time line for seasons to read the information booklet about seasons.

Procedure for Definition Cards:

1. Invite a child who has read the information booklet to the lesson. Place the container of materials in front of the child who is seated on your dominant side.
2. Ask the child to remove the cards and to place in a row from left to right near the center of the table, in any order.
3. Tell the child to read the definition card, then to place the appropriate label in front of it. Referral to the information booklet may be made. Have the child continue the procedure.
4. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

Procedure for Tilt of Earth Cards:

1. Invite a child to the lesson who has used the definition cards. Ask the child to place the circular time line of the seasons and the labels on a table.
2. Bring the container of cards showing tilt of the Earth to the table. Sit on the child's non-dominant side.
3. Ask the child to place the cards under the dates on the circular time line, matching the color of the card to that on the time line.
4. Leave as soon as it is apparent that the procedure is understood and observe unobtrusively.

Control of Error:

Color coding  
Information booklet

Observations:

Handling of materials  
Placement of cards and labels  
Child's reaction to error  
Length of work time and number of repetitions  
Length of period of contemplation  
Degree of interest and concentration

Variations:

Invite the child to sort the pictures mounted on tan cover stock under appropriate seasonal labels.  
Invite the child to place the labels with the definition cards without referring to the information booklet until work is complete.

Vocabulary:

winter spring summer autumn axis vernal equinox summer solstice  
autumnal equinox winter solstice orbit pole inclination perpendicular  
equinox solstice

## Earth's Moon

### Purposes:

- To become acquainted with features of the moon
- To develop understanding of the effects of the moon on Earth
- To develop appropriate vocabulary

### Preliminary Exercises:

- Work with materials on Earth's movements

### Materials:

- Model of the moon
- Information booklet on theories of moon's formation
- Control diagrams, mute diagrams and labels of both hemispheres of the moon showing principal features
- Control diagrams, mute diagrams and labels showing orbit of moon
- Information booklet on phases of the moon
- Control diagrams, mute diagrams and labels relating moon's orbit to tides
- Booklet of diagrams and information about lunar eclipses

### Procedure:

1. Invite a child to the lesson and place the model of the moon on a table in front of the child. Point out the principal features of the moon.
2. Thank the child and say that the model of the moon may be used with the diagrams showing the principal features of the moon.

### Control of Error:

- The teacher
- Control diagrams

### Observations:

- Placement of mute cards and labels
- Handling of materials
- Child's reaction to error
- Length of work time and number of repetitions
- Length of period of contemplation
- Degree of interest and concentration

### Variations:

- Invite the child to read the information booklet on theories of moon's formation.
- Invite the child to use the control diagrams, mute diagrams and labels showing orbit of moon.
- Invite the child to read the information booklet on phases of the moon.
- Invite the child to use the control diagrams, mute diagrams and labels relating moon's orbit to tides.
- Invite the child to read the booklet of diagrams and information about lunar eclipses.

### Vocabulary:

- names of principal features of the moon   tides   lunar   eclipse   orbit   phases

# INSTRUCTIONS FOR MATERIAL PREPARATION

## Preparation of Pictures for Continents

1. Procure cover stock in colors to match the continents on your globe, paper size to be either 8 1/2" by 11" or 8 1/2" by 5 1/2".
2. Collect pictures for each continent depicting homes, people in native costume, famous landmarks such as buildings or geographical formations, animals and plants specific to that continent with information which can be placed on the reverse of the picture. Trim pictures on a paper cutter.
3. Sort pictures according to continent and place in labeled folders or envelopes until needed. No picture may be larger than 8" by 10 1/2".
4. Check the pictures for size to determine the number of the pieces of colored mounting paper needed in each of the two sizes. No matter how small the picture, it will be mounted on the 5 1/2" by 8 1/2" size. Only one picture is mounted on each piece of paper.
5. Attach the outline of the continent in the top left corner on the appropriate size and color of mounting paper and mark the specific area depicted in the picture. Copy the information either by hand, typewriter or computer, cut and mount on the side of the paper with the continent outline.
6. Place the picture corresponding to the information on the other side so that the proportions are pleasing. Usually, a wider margin at the bottom is more attractive. Side margins should be equal. Make light pencil marks at the corners, then remove the picture and turn it over.
7. Using glue stick or spray adhesive on the reverse of the picture, mount the picture according to the previous marks on the colored paper.
8. After all the pictures for one continent are mounted with information on the reverse, laminate both sides.
9. Place eight pictures in a container, color-coded to match picture mounting, and file the remaining pictures to replace those in about two weeks. On-going picture collection and preparation are urged so that there can be a constant supply of new pictures throughout the year.

## Preparation of Land and Water Form Diagrams

1. Modify the outline drawings to match your land and water form models. The diagrams should be exactly like the models.
2. Use cover stock in blue and tan or brown which matches the color of your land and water form models. Cut 8 pieces of blue 5 1/4" by 6 3/4". Cut four pieces of brown or tan 4 1/4" by 4 1/4".
3. Trace the outline of each pattern onto brown or tan and cut carefully.
4. Mount each cut brown or tan piece on blue so that the water form is the exact opposite of the land form, leaving a 1/4" border at top and sides.
5. Copy 2 sets of labels onto matching blue paper if a water form and matching brown or tan paper if a land form. Cut labels to be 1" by 4 1/4".
6. Mount one set on labels under appropriate forms. Mount the other set on strips 5 1/4" wide and 2" high.
7. Laminate all materials. Place in container labeled **Land and Water Forms**.

## Preparation of Materials for Geography

1. Copy material for labels, control cards, mute cards and definitions onto white paper.
2. Map labels must be small enough to fit space on map. Cut the mounting cover stock 1/2" by 2". Cut the printed label slightly longer than the word. Try to cut all words the same width of 1/4", but make them slightly larger if you are unable to make such a narrow cut. Carefully center and mount the words on the appropriate color cover stock, then laminate.
3. Cut labels for mute cards 1" by 4 1/4". Carefully center and mount labels on the appropriate color of cover stock 2" by 5 1/4". Laminate.
4. Cut definition cards 2 1/2" by 4 1/4". Carefully center and mount each definition on the appropriate color of cover stock 3 1/2" by 5 1/4". Laminate.
5. Cut diagrams or drawings for control and mute cards 4 1/2" by 4 1/2". Cut cover stock 6 3/4" by 5 1/4". Mount diagrams or drawings so that there is a 1/4" boarder at top and sides. On the control card, mount the label which has been cut to 1" by 4 1/4" so that there is a 1/4" boarder at the bottom of the card. Laminate the control and mute cards.
6. Cut booklet pages on white paper 10 1/2" by 6 1/2". When folded, pages will be 6 1/2" by 5 1/4". Diagrams or pictures are mounted on the left page with the information facing it on the right page. Cut the diagrams or pictures 4 1/4" by 4 1/4". Cut information text 4 1/4" by 4 1/4". Lay out the text and drawings very carefully to ensure that the pages are in sequence and that the drawings match the text. Mount the drawings and text so that there is a 1/4" boarder at the top and sides. Laminate booklet pages.
7. Cut cover stock 11" by 7" in appropriate color for contents of booklet.. Fold to make booklet cover 5 1/2" by 7". Label the front cover and laminate. Insert folded booklet pages and check again to be sure the sequence is correct. Sew as previously instructed.

## Book Preparation for Books with Spines

1. If there are more than ten pages, count the number of pictures to determine how many pages will be need. Then divide into groups of no more than six pages. Fold the paper to make groups of pages with not more than six pages per group. Determine the sequence of drawings and information. Mount on the pages appropriately and laminate both sides of each page. Restablish sequence of pages in each group and the sequence of groups.
- ..2. Place the groups of pages together and measure the thickness at the folded edge to determine the width of the spine.
3. Cut a front and a back cover 7" by 5 1/2", adding on to the 5 1/2" dimension the width of the spine which is folded so that both covers are now 7 1/2" by 5 1/2".
4. Label the front cover. Overlap the two folded edges and glue together to form a spine.
5. After the glue has dried laminate both sides of the cover.
6. Refold to form the spine again.
7. Sew the first group of folded pages into the spine near the left side of the spine. Repeat with other groups of pages, keeping the groups in sequence. There will be parallel line of stiches showing along the spine.



Suggested color scheme for mounting:

deserts	yellow	glaciers	white
fossils	gray	seasons	light green
moon	black	solar system	black
soil	brown	climate	light blue
flags	tan		

Maps

Copy the number of copies of maps needed, color appropriately as given in the Materials section under the topic. Mount on durable material such as thin Masonite, matte board or poster board and laminate. Check carefully before laminating, to be sure that all markings are in place or that all coloring has been done. Maps may be stored in a vertical file or horizontally in a rack.

Mute Maps

When flags on pins are to be placed on a mute map, mount the mute map on self-sealing corkboard or dense plastic material that will be rigid and durable, yet easy to insert pins without the deterioration of the mounting material.

Plastic flag pins may be purchased at office supply stores or they may be made by using banker's pins with colored plastic tape folded around the top of the pin and doubled onto itself. Use a permanent pen to label each flag. Use the color scheme as given in the text under Materials.

## **Finding Positions on Earth**

### **Preparation of Transparencies**

1. Make photocopies of drawings for latitude and longitude onto special transparent film.
2. If photocopies are not available, cut four circles the size of the control maps of the world from heavy transparent vinyl such as that used to cover chairs.
3. Test permanent black markers to find one which will not smear or bleed.
4. Using the example given in the "white pages," carefully draw lines of latitude on one vinyl circle, making the equator a heavier line.
5. Using the example given in the "white pages," carefully draw lines of longitude on one vinyl circle, making the prime meridian a heavier line.
6. Using the example given in the "white pages," carefully draw lines showing time zones for Eastern Hemisphere on one vinyl circle and for Western Hemisphere on another vinyl circle.

### **Directions for Advanced Land and Water Form Booklet**

Reduce the drawing of the land and water forms diagram to 4 1/4" by 4 1/4". Make 24 copies, one for each form given, and color each appropriately to match the text facing it.

### **Directions for Preparation of Materials for Map Legend**

1. Copy material on white cover stock, or copy on white paper and mount on cover stock.
2. Make controls with word and symbol on one card 1 1/2" by 6 1/4".
3. Make mute cards with one symbol per 1 1/2" by 6 1/4" card.
4. Make label for each mute card 1 1/2" by 3 1/4".  
Note: There is not agreement among publishers on color or symbols so choose those in the atlas to be used in the classroom.
5. Choose either the dotted or dashed line according to the atlas to be used. Color boundaries on either side of the line pale green, light gray or pink.
6. Color symbol for metropolitan area light orange or gray.
7. Color super highway yellow or medium blue.
8. Color toll road green.
9. Color four-lane divided highway yellow, if not used for super highway.
10. Color principal highways red.
11. Color other highways gray.
12. Using a light blue, color rivers, lakes, rapids, canals, water behind dam, lines indicating swamp.
13. Color parks light green.

## Preparation of Materials for Earth's Interior

1. Make 18 copies of the diagram of Earth's interior and cut to size 4 1/4" by 4 1/4". Make 2 copies of each label 1" by 4 1/4".
2. Cut 12 pieces of brown or dark tan cover stock 6 3/4" by 5 1/4"
3. Cut 12 pieces 2" by 5 1/4" in the same color as used in step 2.
4. Color the outside part of the Earth blue and green to represent land and water.
5. Color 3 diagrams completely to show the lithosphere as follows: crust, brown; upper mantle, dark red; lower mantle, light red; outer core, orange; inner core, yellow.
6. Color the crust in 3 diagrams brown, leaving the remainder of the diagram uncolored.
7. Color the upper mantle in 3 diagrams dark red, leaving the remainder of the diagram uncolored.
8. Color the lower mantle in 3 diagrams light red, leaving the remainder of the diagram uncolored.
9. Color the outer core in 3 diagrams orange, leaving the remainder of the diagram uncolored.
10. Color the inner core in 3 diagrams yellow, leaving the remainder of the diagram uncolored.
11. Mount 6 pairs of colored cards on the brown or tan 6 3/4" by 5 1/4". On one of each pair of cards, mount the appropriate label under the diagram. Mount the remaining labels on 2" by 5 1/4" inch brown or tan cover stock. Laminate cards and labels. Place in a container.
12. Make the booklet with information on the right pages. Place the remaining colored diagrams on the left pages to correspond to the information. Make a cover, label it **Earth's Interior** and sew booklet within the cover as previously instructed.

## Preparation of Materials for Seasons

1. Collect at least 8 pictures for each season showing scenes in either northern or southern hemisphere, depending upon where the child lives.
2. Procure cover stock in the following colors: white for winter, green for spring, yellow for summer and orange for autumn in the northern hemisphere or reverse for southern hemisphere; tan cover stock
3. Mount at least 4 pictures for each season on appropriate colors of cover stock either 8 1/2" by 11" or 5 1/2" by 8 1/2". Laminate and place in a separate container for each season.
4. Mount four pictures for each season on tan cover stock on sizes given in step 3. Place a dot in an appropriate color on the reverse to indicate the season. Laminate and place in a single container.
5. Copy the arcs representing the seasons on cover stock in the appropriate colors: white for the arc with December 21 on the left end; green for the arc with March 20 on the left end; yellow for the arc with June 21 on the left end; orange for the arc with September 23 on the left end. Cut arcs and mount on tan cover stock so that the white arc has the orange arc at its left and the green arc at its right. The yellow arc is between the green and the orange arcs. Laminate. Place in container.
6. Make 2 copies of each season's label and cut to be 1" by 4 1/4". Mount one for each season on 2" by 5 1/4" coverstock in the appropriate color to indicate the season. Mount the remaining labels on tan cover stock 2" by 5 1/4". Place a dot in an appropriate color on the reverse to indicate the season. Laminate and place each set in an envelope or small container labeled Seasons. Place the labels mounted on tan with the pictures of seasons mounted on tan.
7. Copy definitions, cut to 2 1/2" by 4 1/4" and mount on appropriate seasonal colors of cover stock 3 1/2" by 5 1/4". Laminate and place in a container.
8. Copy the four drawings of Earth with dates. Mount on tan. Laminate. Place in an envelope or small container labeled Seasonal Tilt of Earth.
9. Prepare booklet according to directions previously given.

