6

Science Standard
6.6.c.

Visual Aids

California Education and the Environment Initiative

Made from Earth: How Natural Resources Become Things We Use

California Education and the Environment Initiative

Approved by the California State Board of Education, 2010

The Education and the Environment Curriculum is a cooperative endeavor of the following entities:

California Environmental Protection Agency
California Natural Resources Agency
Office of the Secretary of Education
California State Board of Education
California Department of Education
California Integrated Waste Management Board

Key Leadership for the Education and Environment Initiative:

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Andrea Lewis, Assistant Secretary for Education and Quality Programs, California Environmental Protection Agency
Mark Leary, Executive Director, California Integrated Waste Management Board
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Key Partners:

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None required for this lesson.

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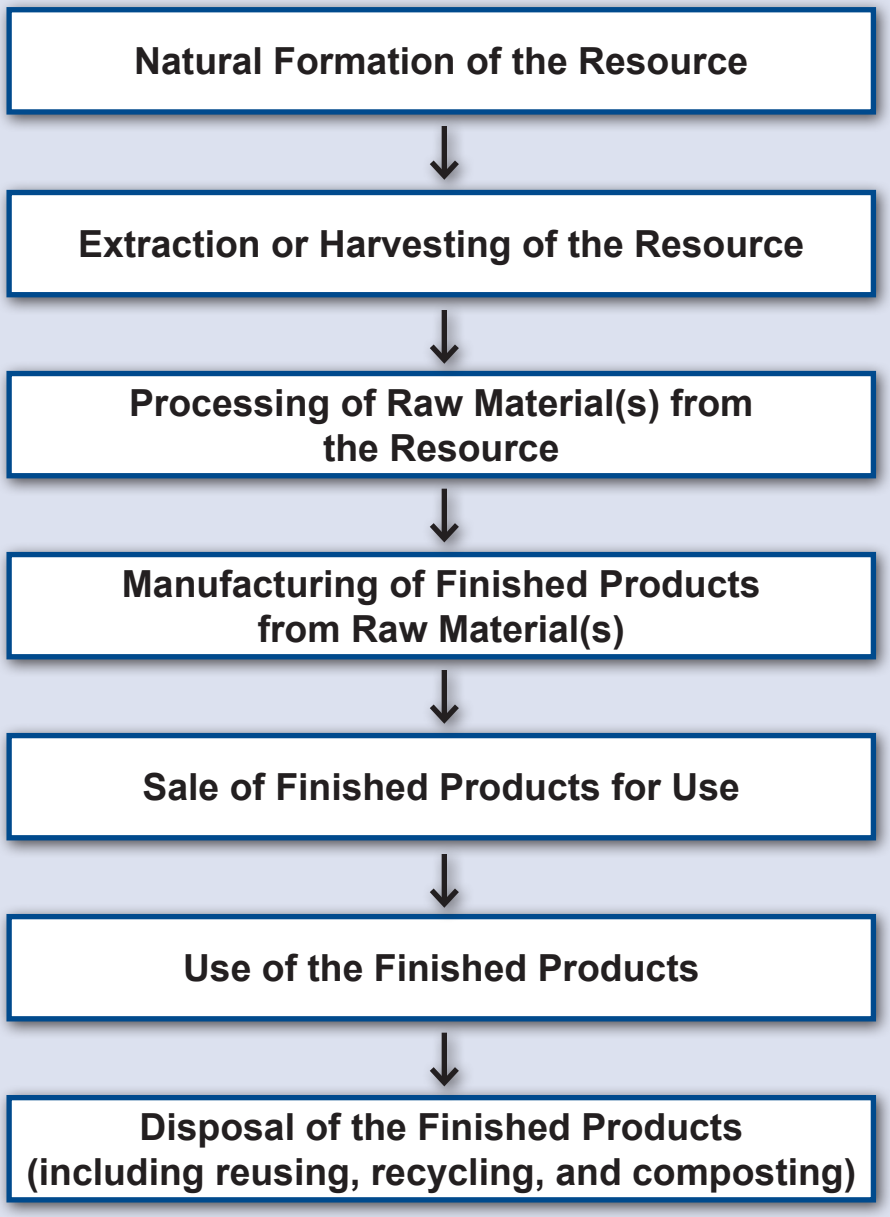
Lesson 6 What Does It Cost?

None required for this lesson.

VA #1 Natural Resource Use Flowchart



VA #2 Origins Chart 1

Raw Material	Natural Resource Category	Common Uses in Manufactured Products	Method of Extraction or Harvesting
Bauxite	Mineral ore	Aluminum objects	Surface mining
Clay	Mineral ore	Dinnerware, pottery, tiles for floors and walls, buildings	Surface mining
Copper	Mineral ore	Electrical wires, batteries, cookware, plumbing pipes, coins	Surface mining
Cotton	Plant	Thread, fabric, batting, oil (cottonseed), cottonseed meal (used in livestock feed)	Collecting the seed pod from the plant
Gelatin	Animal	Glue	Rendering animal bones

VA #3 Origins Chart 2

Raw Material	Natural Resource Category	Common Uses in Manufactured Products	Method of Extraction or Harvesting
Graphite	Mineral ore	Pencil lead (which contains graphite, not lead), batteries, lubricants, and paint	Surface mining
Iron	Mineral ore	Frames for buildings, bridges, and other structures; tools; cookware; steel; batteries; and magnets	Surface mining
Leather	Animal	Clothing, bags, fasteners	Skinning the hide from dead livestock
Limestone	Mineral ore	Fiberglass, building, roads, landscaping, and cement	Surface mining
Petroleum	Fossil fuels	Plastics, paints, synthetic fabrics (PVC), synthetic rubber, foams, thread	Deep drilling

VA #4 Origins Chart 3

Raw Material	Natural Resource Category	Common Uses in Manufactured Products	Method of Extraction or Harvesting
Resin (rosin)	Plant	Shellacs, cements, musical instrument strings	Collecting the sap from living trees
Rubber (natural)	Plant	Tires, gaskets, insulation, elastic fabrics and fasteners, foams, hoses	Collecting the sap from living trees
Silica/Quartz	Mineral ore	Glass (and fiberglass), silicon for computer chips, jewelry, lenses, concrete, electronics, abrasives	Surface mining
Soda ash	Mineral ore	Glass (and fiberglass), and food sweetener	Underground mining
Tin	Mineral ore	Cans, containers, soldering material	Surface mining
Wood/ timber/pulp	Plants	Houses, floors, furniture, tools, paper	Cutting the stalk off the root (logging)

VA #5 My Toy Company

Congratulations! You are the new owner of a toy company that makes toys for young children. The first decision you will need to make in your new job is what new toy you want to add to your toy line. Your company can make **one** of the following kinds of toys:

- **Stuffed animal** or **action figure**
- **Sports equipment** (balls, rackets, clubs, bats, and others)

Over the next few lessons, you will design a plan to produce your toy. Your plan will include all stages of manufacturing. These stages will include extracting or harvesting the natural resources and raw materials you need, getting the resources to the factory, and putting the toy together.

Instructions: Follow these steps to get started.

1. Decide on the type of toy your company will make. Write the name and type of toy here:

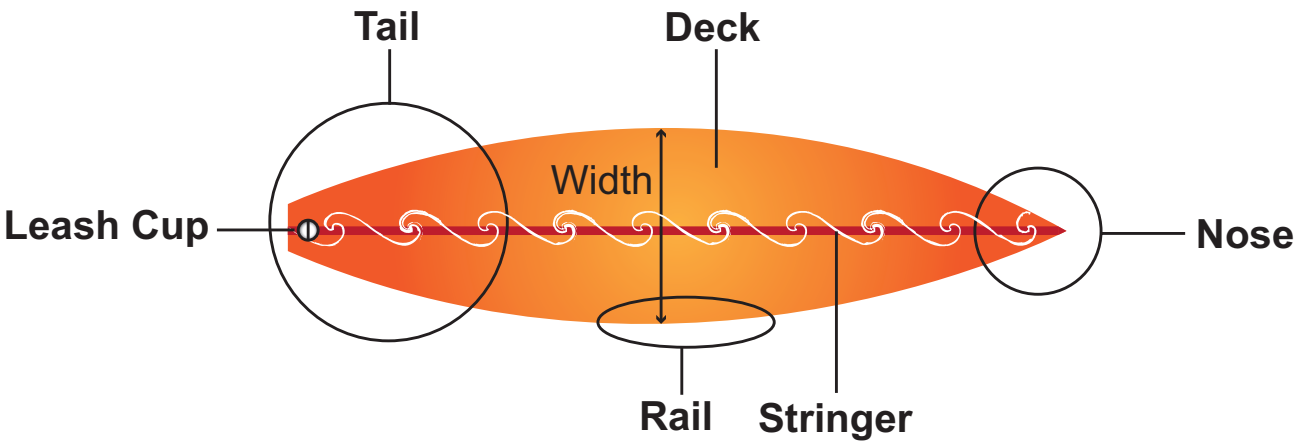
   _____

2. List the parts of your toy in the first column below. Make sure you include at least three parts. Using the **Origins Chart** on pages 3–4 as a guide, identify the raw materials and natural resources you might use to make each part of your toy. Try to think of at least two possible kinds of materials for each part. You will be able to change your choices later.

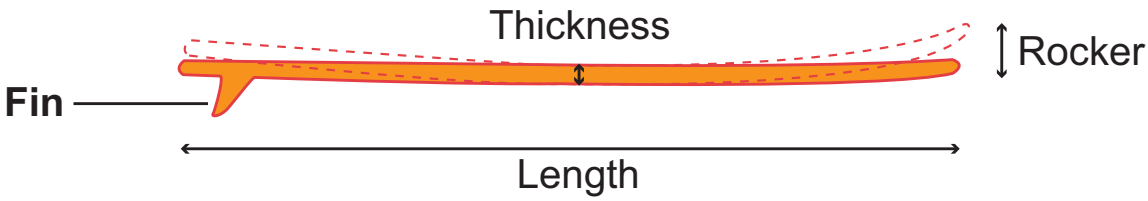
Parts of Toy	Natural Resources/Raw Materials Needed for Parts

VA #6 Surfboard Design Blueprint 1

Map View

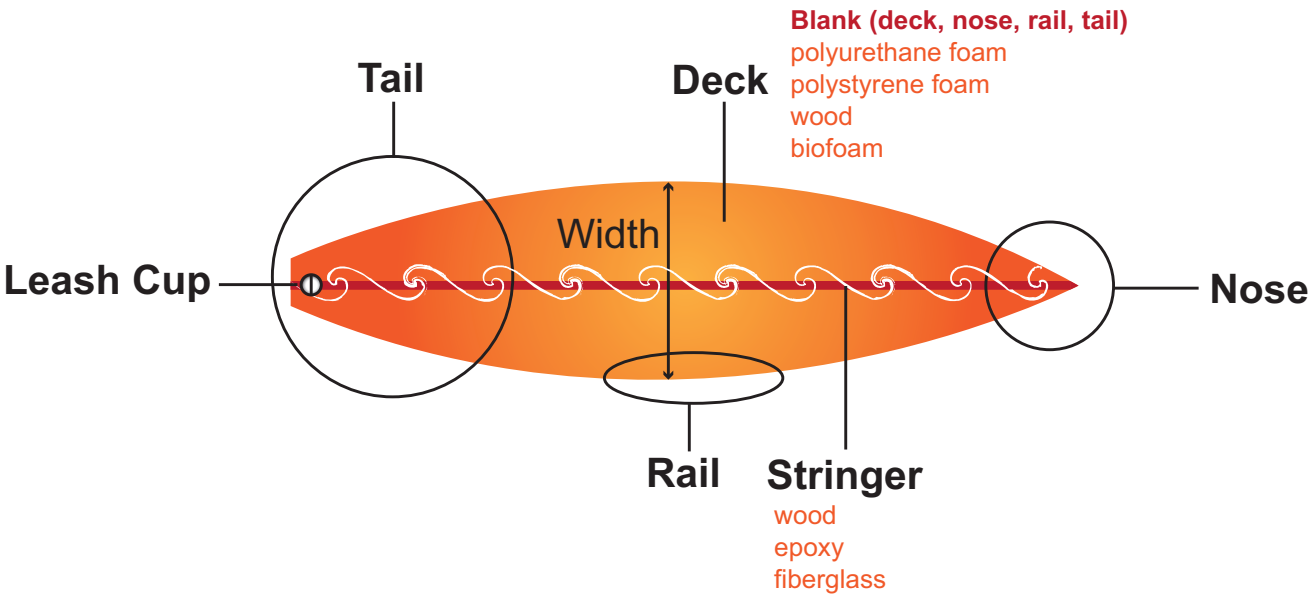


Profile View

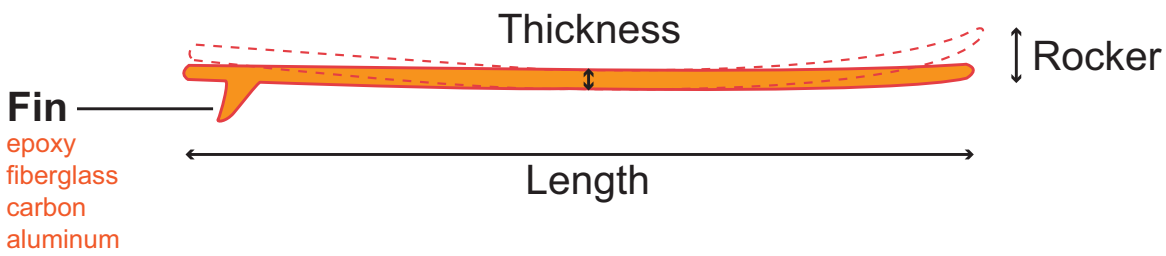


VA #7 Surfboard Design Blueprint 2

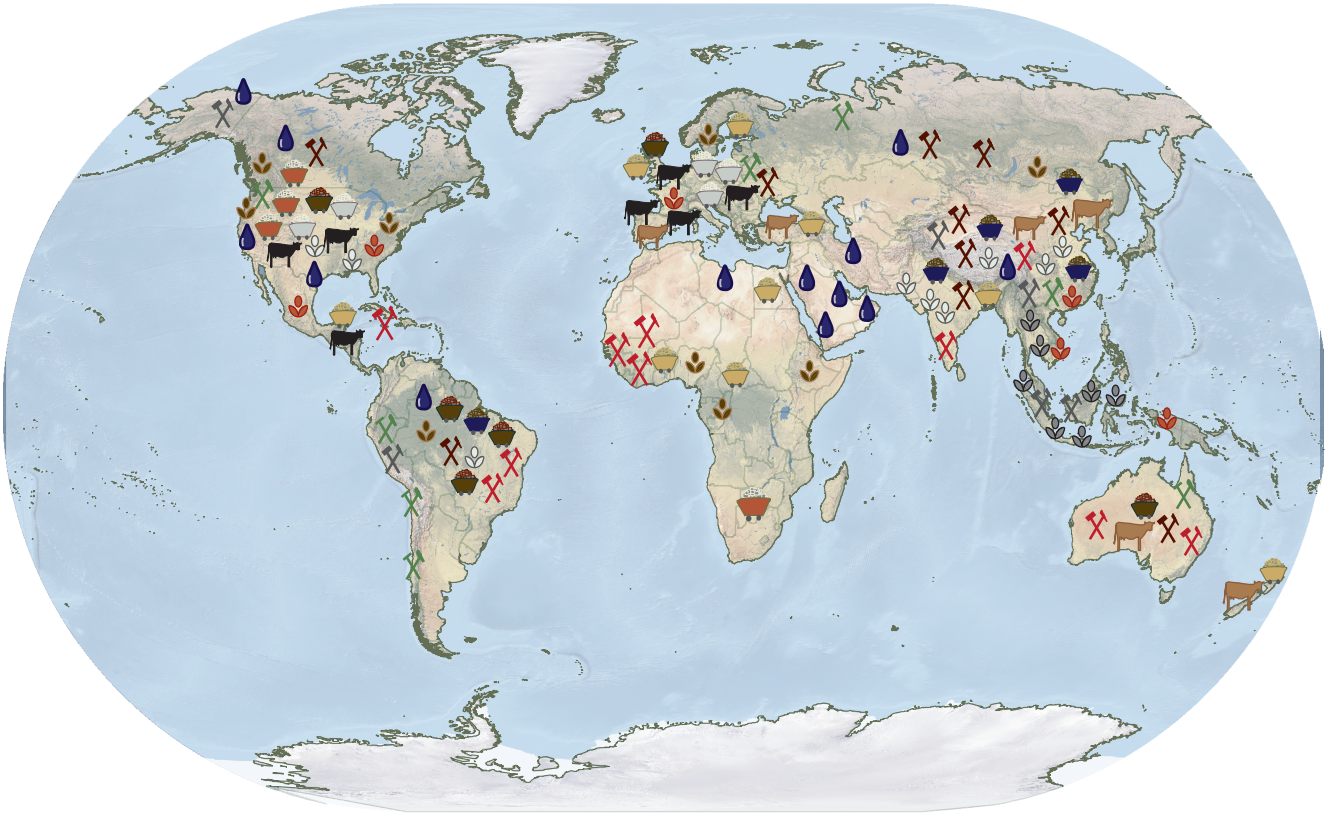
Map View



Profile View



VA #8 A World of Resources



Raw Materials Key

Metallic Mineral Ore
- Copper
- Bauxite
- Iron
- Tin

Nonmetallic Mineral Ore
- Graphite
- Silica/Quartz
- Clay
- Limestone
- Soda Ash

Plants
- Cotton
- Resin (Rosin)
- Rubber (Natural)
- Wood/Timber

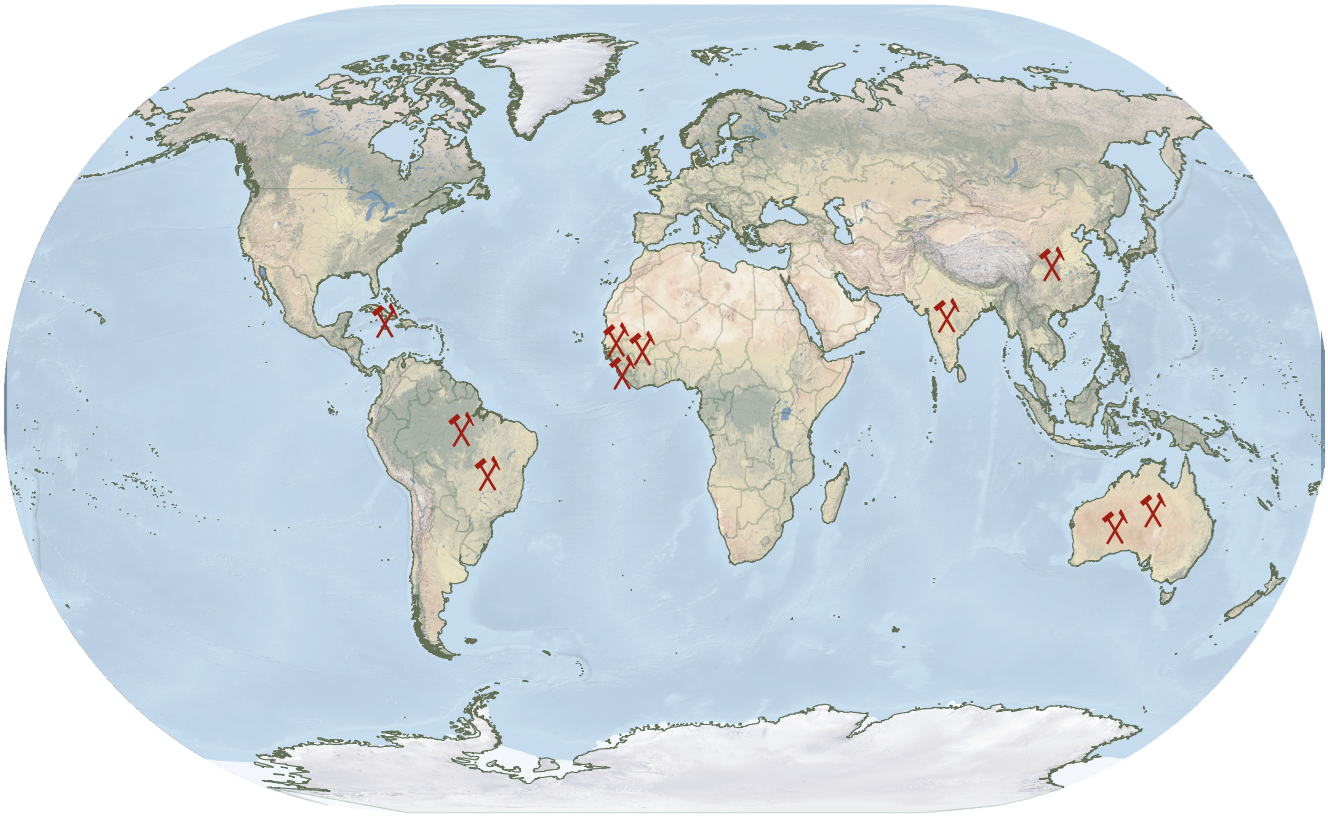
Animals
- Gelatin
- Leather

Fossil Fuel
- Petroleum

0 1,000 2,000 4,000 Miles

N W E S

VA #9 World Bauxite Distribution

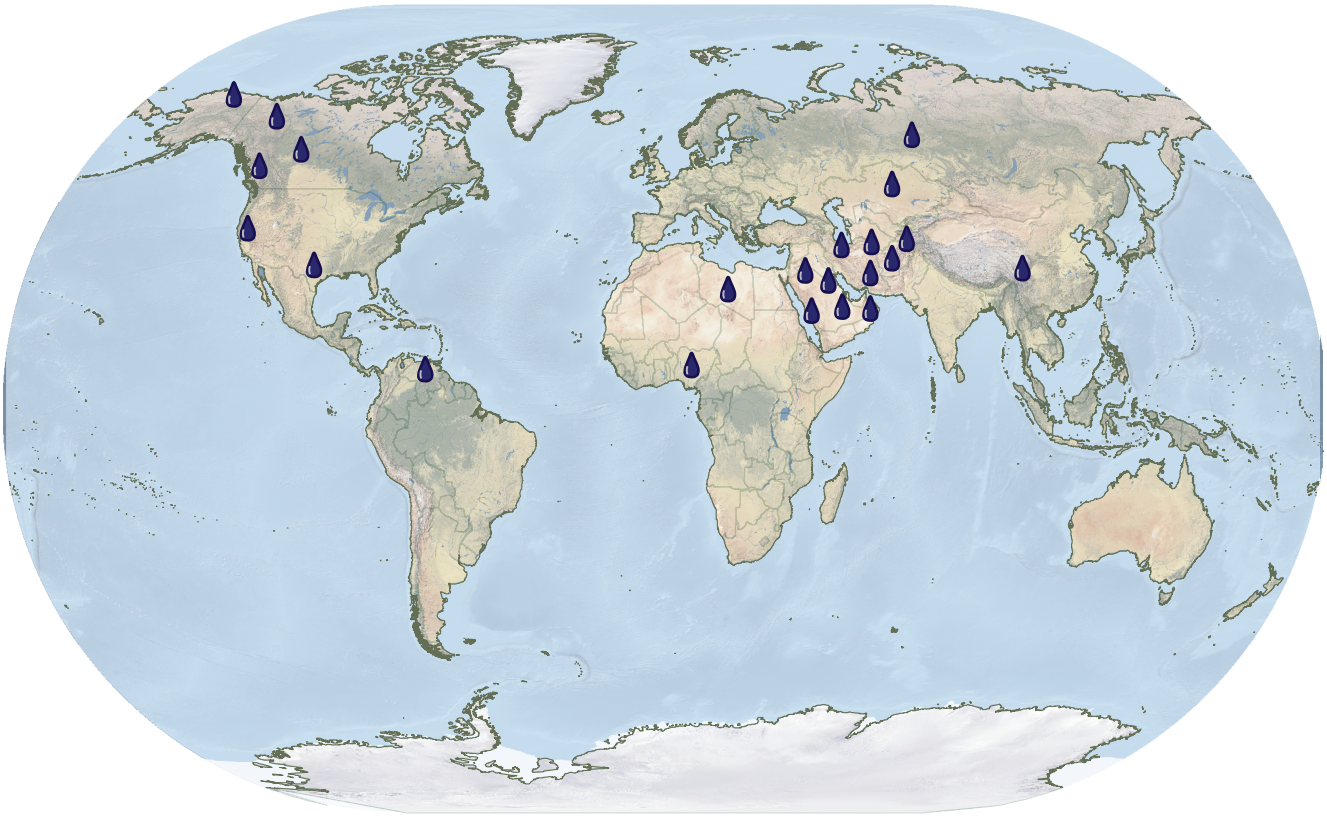


Major bauxite mines

0 1,000 2,000 4,000 Miles

N
W E
S

VA #10 World Petroleum Distribution



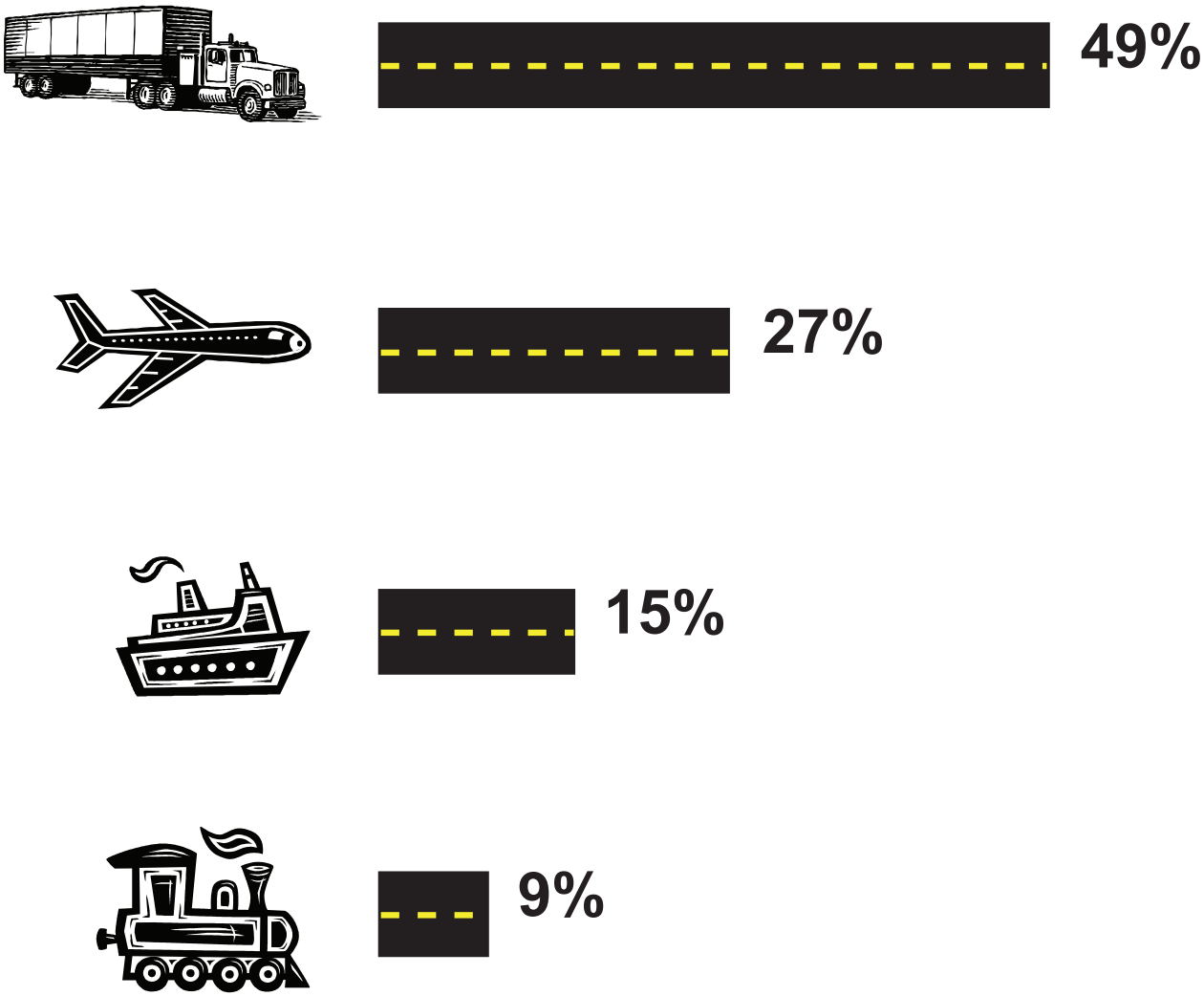
Major petroleum extraction sites

N
W E
S

0 1,000 2,000 4,000 Miles

VA #11 Modes of Transportation in Industry

Percent use of large vehicles in industry



Source: U.S. Department of Energy, Transportation Energy Data Book (*October 2007*).

VA #12 World Travelers

Natural resource #1: _____

Distance transported (estimate in miles) = _____

Type of Transportation Needed (circle one):

Truck Train Aircraft Ship

Natural resource #2: _____

Distance transported (estimate in miles) = _____

Type of Transportation Needed (circle one):

Truck Train Aircraft Ship

Natural resource #3: _____

Distance transported (estimate in miles) = _____

Type of Transportation Needed (circle one):

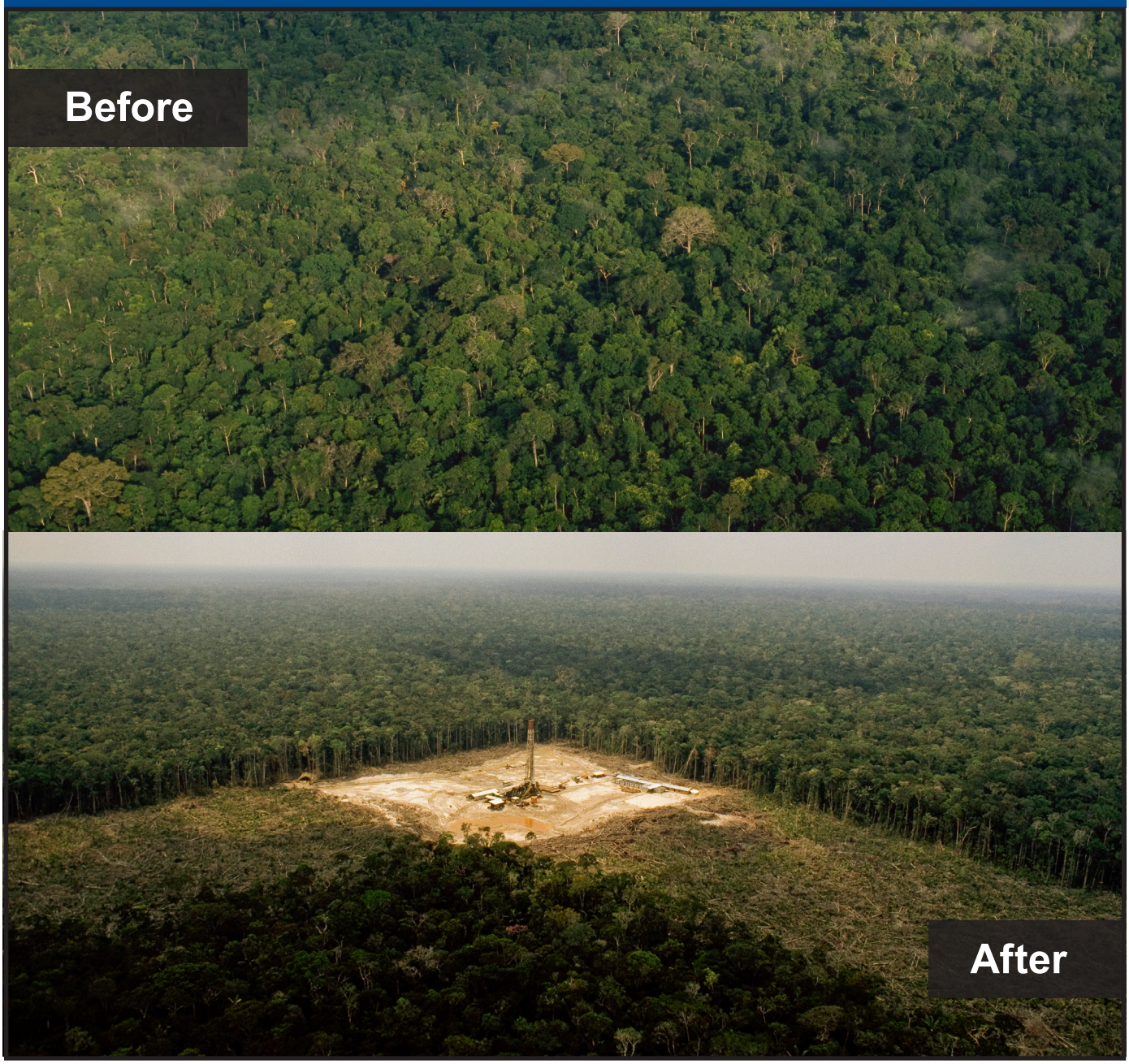
Truck Train Aircraft Ship

Total estimated distance all cargo will travel: _____ miles

VA #13 Before and After: Copper Mining

VA #14 Before and After: Cotton Farming

VA #15 Before and After: Oil Drilling



VA #16 Before and After: Silica Mining

VA #17 Before and After: Forest Clearcutting

(*Note: In California, forestry companies are required to replant trees after a timber harvest.*)

VA #18 Air Pollution

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