

6

Science Standard  
6.6.c.



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 Initiative Curriculum is a cooperative endeavor of the following entities:**

California Environmental Protection Agency  
California Natural Resources Agency  
California State Board of Education  
California Department of Education  
Department of Resources Recycling and Recovery (CalRecycle)

### **Key Partners:**

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## **Lesson 4 Meet the Extractors and Harvesters**

None required for this lesson.

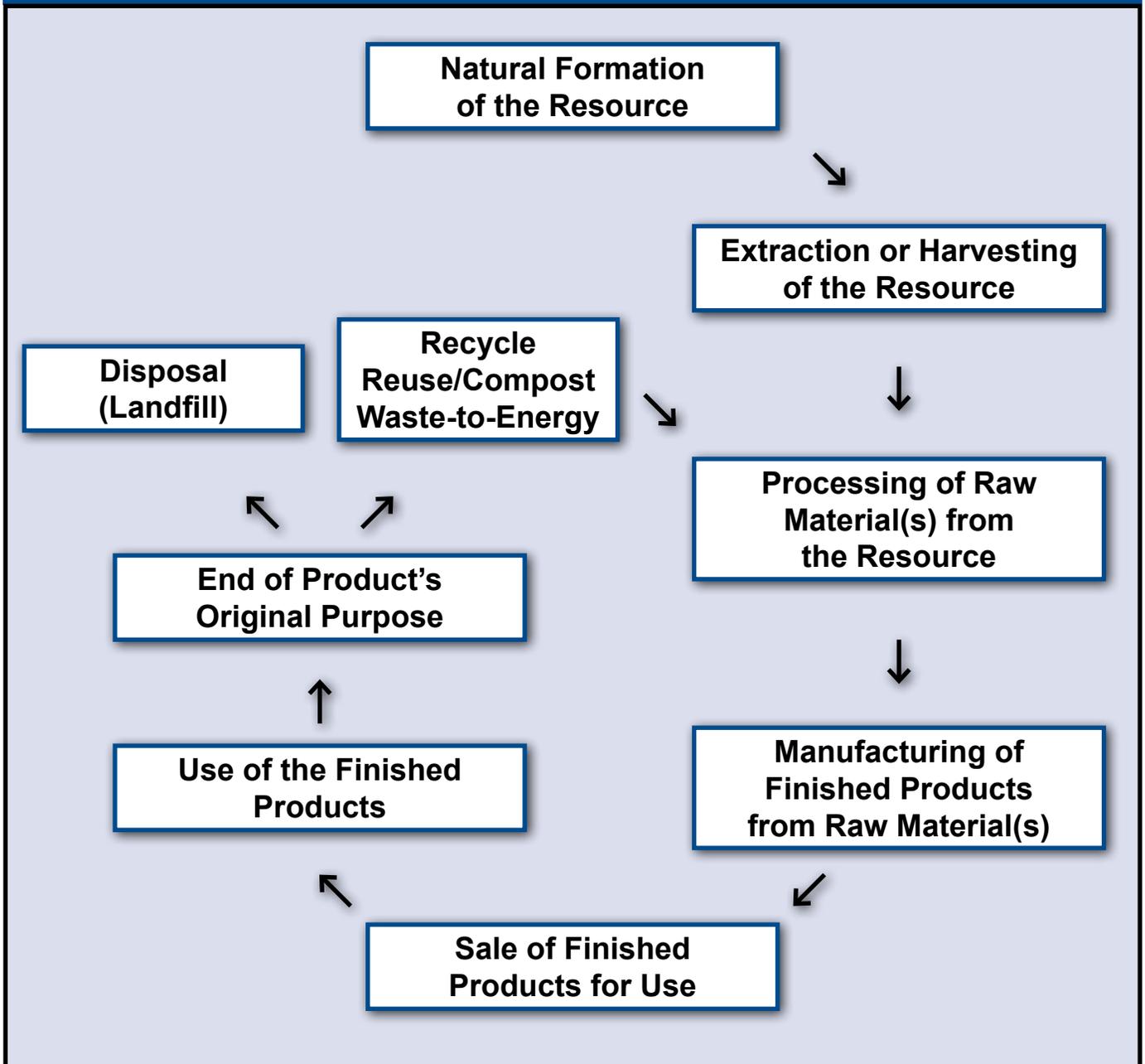
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## **LESSON 6 What Does It Cost?**

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
<b>Bauxite</b>	Mineral ore	Aluminum objects	Surface mining
<b>Clay</b>	Mineral ore	Dinnerware, pottery, tiles for floors and walls, buildings	Surface mining
<b>Copper</b>	Mineral ore	Electrical wires, batteries, cookware, plumbing pipes, coins	Surface mining
<b>Cotton</b>	Plant	Thread, fabric, batting, oil (cottonseed), cottonseed meal (used in livestock feed)	Collecting the seed pod from the plant
<b>Gelatin</b>	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
<b>Graphite</b>	Mineral ore	Pencil lead (which contains graphite, not lead), batteries, lubricants, and paint	Surface mining
<b>Iron</b>	Mineral ore	Frames for buildings, bridges, and other structures; tools; cookware; steel; batteries; and magnets	Surface mining
<b>Leather</b>	Animal	Clothing, bags, fasteners	Skinning the hide from dead livestock
<b>Limestone</b>	Mineral ore	Fiberglass, building, roads, landscaping, and cement	Surface mining
<b>Petroleum</b>	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
<b>Resin (rosin)</b>	Plant	Shellacs, cements, musical instrument strings	Collecting the sap from living trees
<b>Rubber (natural)</b>	Plant	Tires, gaskets, insulation, elastic fabrics and fasteners, foams, hoses	Collecting the sap from living trees
<b>Silica/Quartz</b>	Mineral ore	Glass (and fiberglass), silicon for computer chips, jewelry, lenses, concrete, electronics, abrasives	Surface mining
<b>Soda ash</b>	Mineral ore	Glass (and fiberglass), and food sweetener	Underground mining
<b>Tin</b>	Mineral ore	Cans, containers, soldering material	Surface mining
<b>Wood/timber/pulp</b>	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:

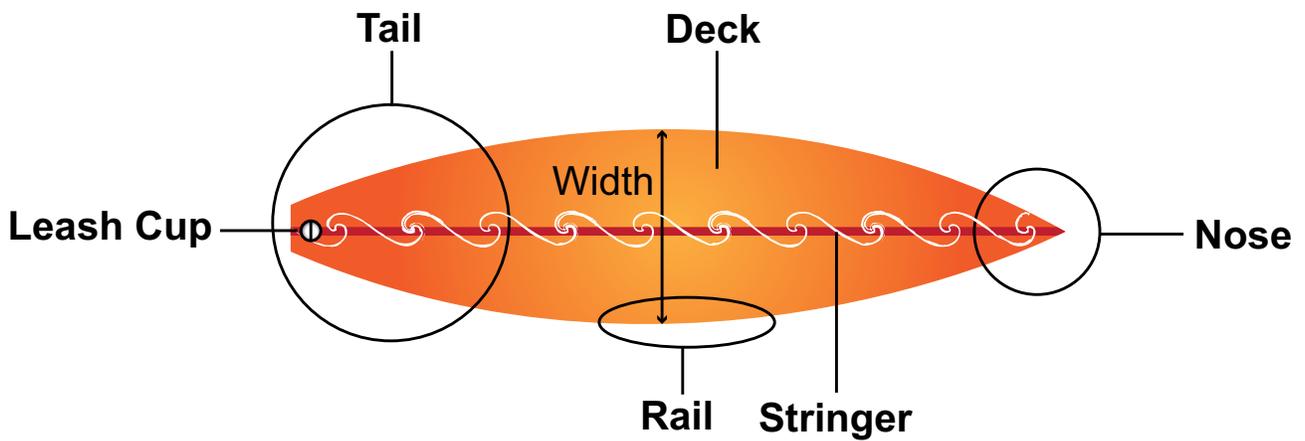
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2. List the parts of your toy in the first column below. Make sure you include at least three parts. Using the **Origins Chart** on pages 3–4 as a guide, identify the raw materials and natural resources you might use to make each part of your toy.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

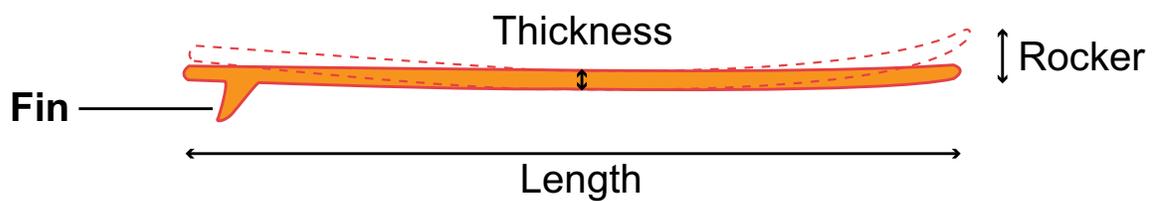
Parts of Toy	Natural Resources/Raw Materials Needed for Parts

## VA #6 Surfboard Design Blueprint 1

### Map View

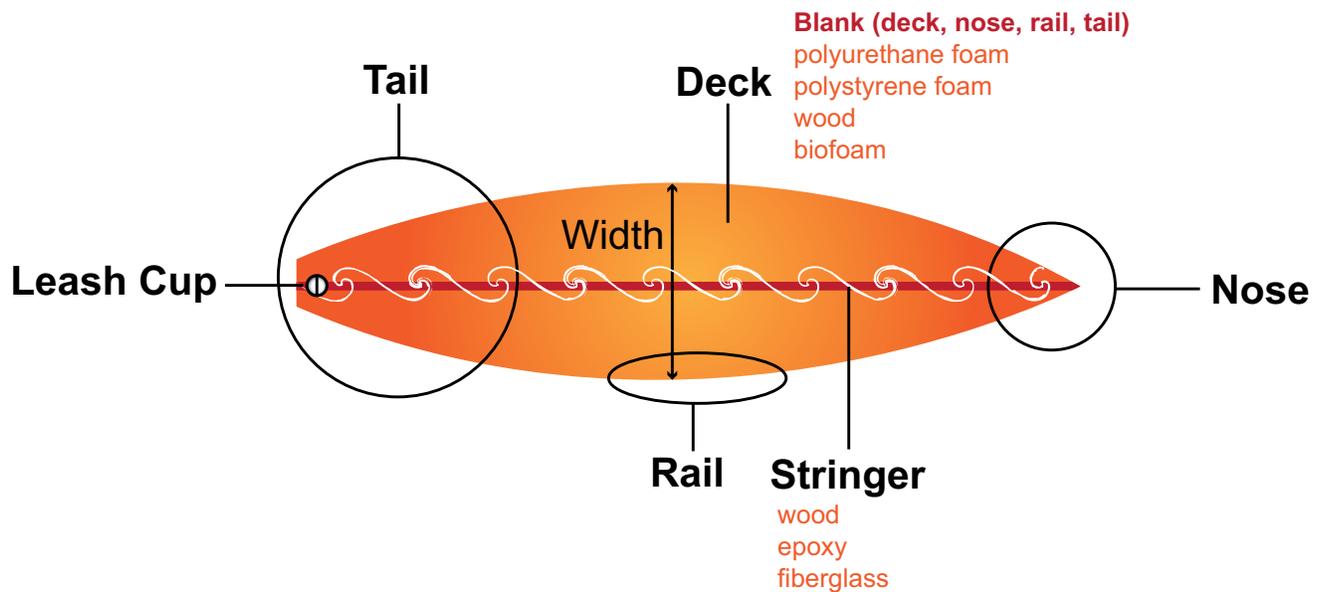


### Profile View

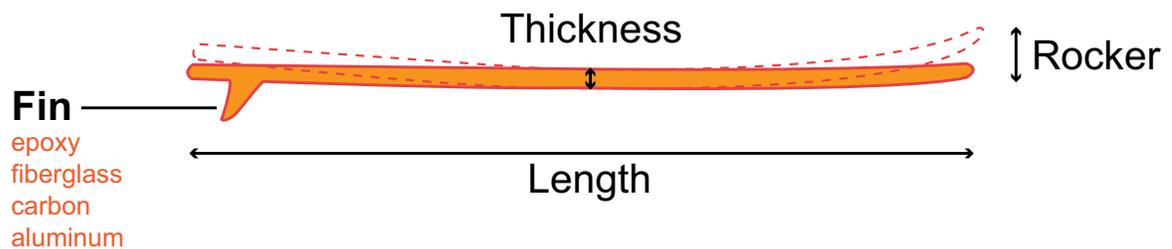


## VA #7 Surfboard Design Blueprint 2

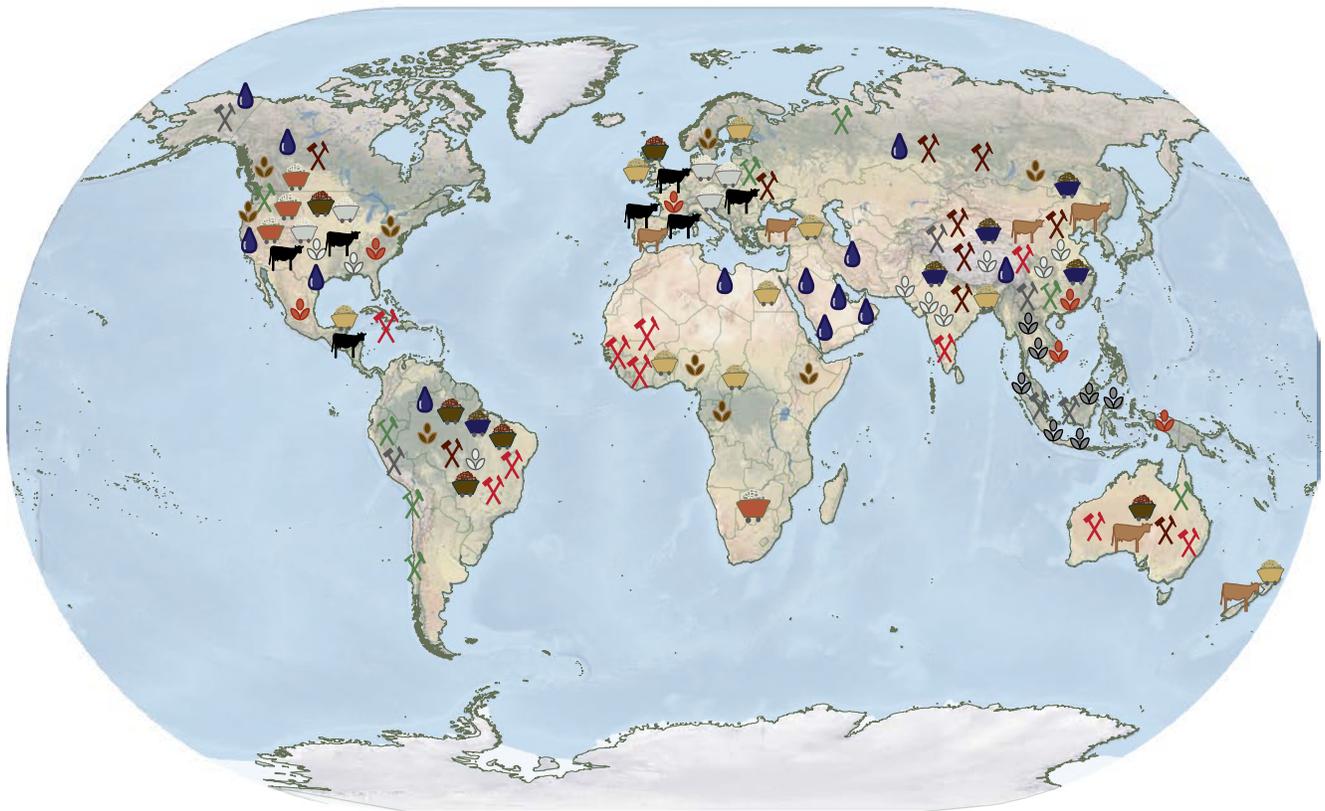
### Map View



### 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

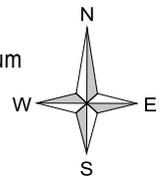
ANIMALS

- Gelatin
- Leather

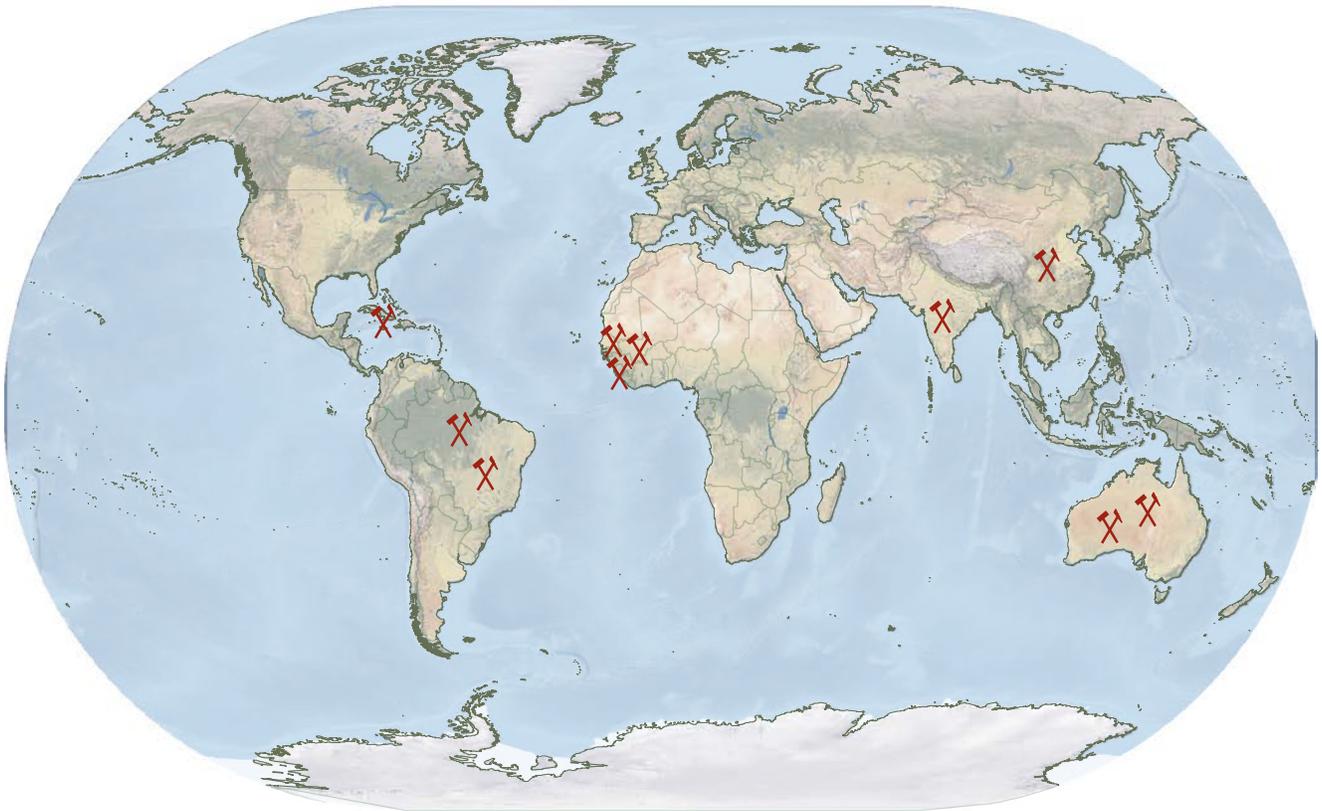
FOSSIL FUEL

- Petroleum

0 1,000 2,000 4,000 Miles

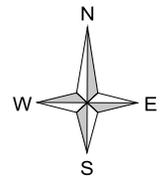


### VA #9 World Bauxite Distribution

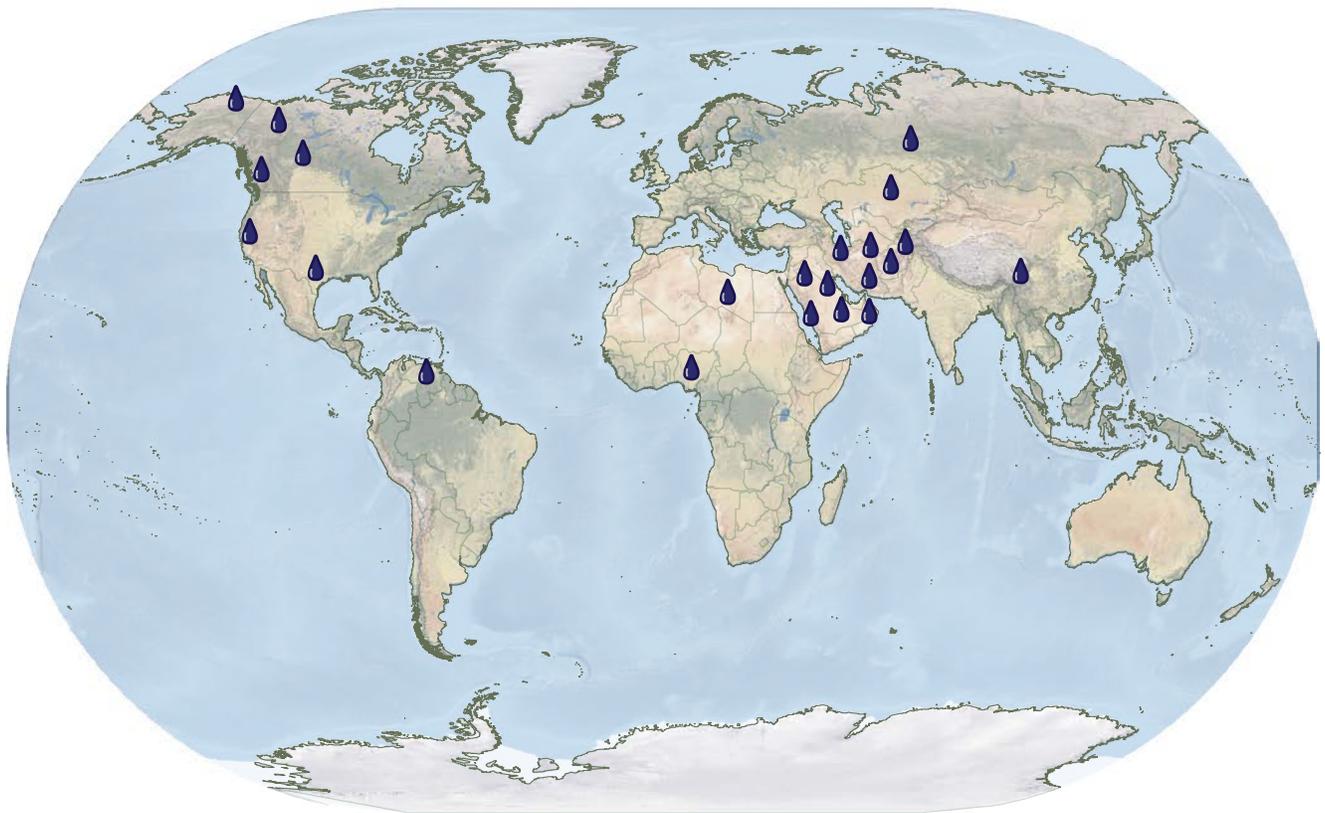


 Major bauxite mines

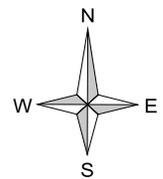
0 1,000 2,000 4,000 Miles



### VA #10 World Petroleum Distribution



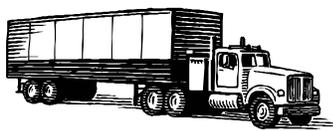
 Major petroleum extraction sites



0 1,000 2,000 4,000 Miles

## VA #11 Modes of Transportation in Industry

## Percent use of large vehicles in industry



49%



27%



15%



9%

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

Before



After



VA #14 Before and After: Cotton Farming

Before



After



VA #15 Before and After: Oil Drilling

Before



After

VA #16 Before and After: Silica Mining

Before



After



## VA #17 Before and After: Forest Clearcutting

Before



After



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

## VA #18 Air Pollution







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