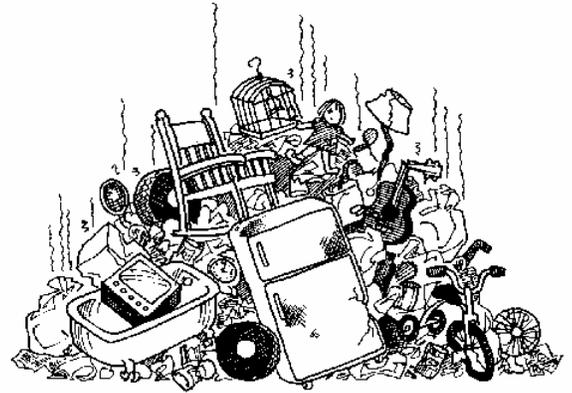


The Reality of Trash: Aluminum cans, plastic soda bottles, and newspapers can easily be recycled. Magazines can be taken to the library so that others may read it. Still, even with recycling, there will be wastes that can't be recycled. These wastes end up in our landfills. Landfills are not bottomless pits. Eventually they get filled to their capacities. Before that happens, the county council decides where the next landfill will be built. When a new location for a landfill is decided, you can bet that a lot of time and consideration went into it.



Scenario: Humans generate much trash. Although we recycle some of it and burn some of it at H-Power, there is still a lot of household trash that needs to be put somewhere. The current landfill on your island is nearing its capacity. A new landfill needs to be built, but where? This problem needs to be tackled and a resolution immediately suggested. You and your classmates can help to resolve this dilemma.

How to Play:

- 1) As a class, students should study the EPA's criteria on location restrictions for landfills:
 - Landfills cannot be built near an airport (birds are attracted to landfills for food and nesting; they could get in the way of planes),
 - on floodplains, including flood-prone areas (can't have our wastes wash away in a flood),
 - wetlands and aquifers (water supplies, habitats for wildlife),
 - fault areas,
 - seismic impact zones, and
 - unstable areas (areas with soils that make poor foundations, areas that are subject to mass movement such as steep slopes, location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill).

The topography of potential landfill sites should be considered. Landfills are usually built in gulches because they can easily be covered with soil after they've reached their capacities. Imagine if we had a landfill on flat land. That would be some mountain of trash!

Landfills can emit odorous and hazardous gases into the air or through the ground. Landfills must have gas collection systems in it to address the gas problem. When the gases are emitted into the air, winds can carry the gases to nearby residential areas. Certain types of gases in high concentrations can produce explosions! Imagine if a park was built above a landfill without gas control measures in place and someone decided to light a cigarette! Kaboom!

- 2) Based on the criteria above, students should study the list of possible locations and map of the island. Students should also consider what will become of the landfill after it reaches maximum capacity. For instance, some landfills are converted to parks such as Kaka'ako Waterfront Park in Honolulu. There will be restrictions on what you can build over a landfill. Landfills are not solid ground. A tall building on a landfill will sink under its weight. Groundwater monitoring is required after a landfill.

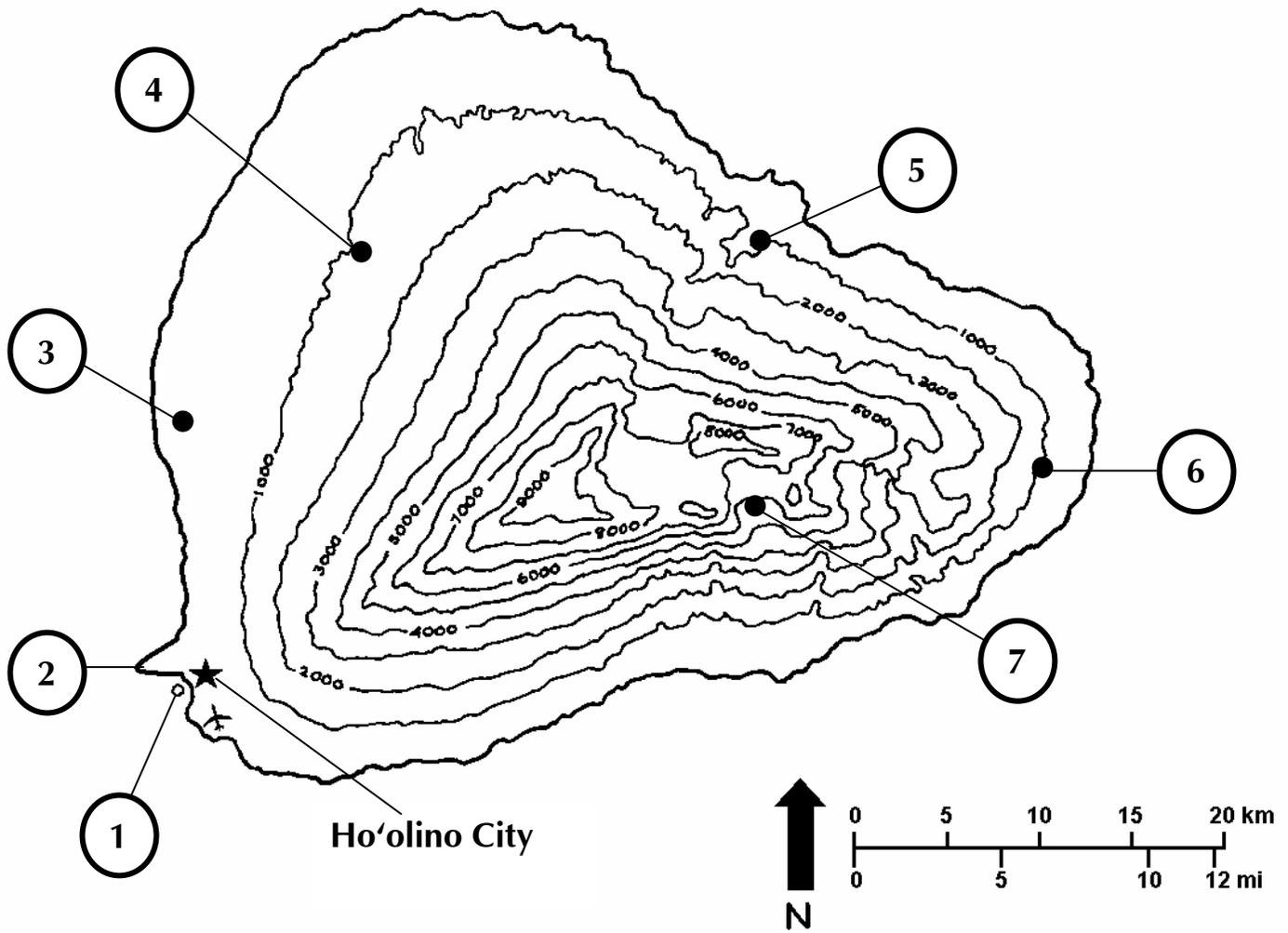
- 3) After a location is chosen, students are divided into the various interest groups listed below. Have students discuss the new landfill location as it relates to their groups. Reconvene the groups to discuss whether the new landfill location is a good one. The teacher should be the facilitator. The facilitator ensures that the interest groups stick to the issue and ensures order.

Interest Groups:

- ✓ County Council: ultimately decides where the new landfill will be built; comes up with two alternative sites
 - ✓ Residents: the general public
 - ✓ EPA, DOH: help enforce and regulate laws to protect the environment and our health
 - ✓ Environmental organizations: protect the ecosystem and all its native plants and animals
 - ✓ Scientists: study native and invasive species, need access to land and threatened and endangered species through protection of land
 - ✓ Transportation company: transports wastes from everywhere to the landfill. The greater the time and distance of transport, the more it costs taxpayers to dispose the waste at the landfill. Freeways allow faster speeds and a straighter route for transportation compared to winding, two-lane, rural roads.
 - ✓ County Water Board: island freshwater supply largely comes from groundwater recharge through watershed in each county.
 - ✓ Geologist: studies the integrity of the land where potential landfills could be located;
 - ✓ Resort owners: prefers that the area surrounding the resorts remain beautiful, lush, and isolated from the rat race and any environmental blights.
- 4) Students should gather facts then plan a strategy to resolve the problem. Students should keep the roles they are playing in their minds and attempt to tailor their responses and strategies to their particular roles. To help with their strategy planning, each interest group should answer the questions below.
- What will become of the landfill after it's filled to capacity? Will there be a new park?
 - What are the impacts that this new location will have on the environment?
 - Are there any incentives for communities to decide whether the landfill will be in their backyards?
- 5) When it is time for reconvening, the class seating should be divided according to the different interest groups. Each group should have a spokesman to present their strategy. The teacher will be the facilitator to ensure that the meeting is run orderly and that all sides have a chance to present. A chart should be kept to show the different stances of the different interest groups. The amount of time it takes to resolve will depend upon the parties; however, it might be easy to establish a time limit such as two class periods. The class should come up with a realistic action plan that incorporates the ideas presented.

Possible landfill locations to choose from:

Location	Type of land/zone	Rainfall	Description
1) Moku 'Ōpala	Island, leeward coastal	20 in/year	Across from Ho'olino Harbor; accessible by bridge; recycling plant already there; .5 mile offshore from main island; 1 mile away from Ho'olino International Airport; koa haole, kiawe, and ironwood; hardly anyone goes there except a few Native Hawaiian fishermen.
2) Kawela Mauka Gulch	Isolated leeward coastal area	20 in/year	On peninsula; coastal; fishing; small boat harbor; Kawela Mauka Heiau; isolated; accessible by dirt road from freeway; abandoned vehicles and appliances; surrounded by some kiawe and koa haole, not visual from highway due to blockage of kiawe and koa haole; several acres in area; nearest community is Kawela Kai.
3) Kawela Kai	Leeward coastal	20 in/year	Situated 15 km N of Ho'olino City; freeway accessible; young affluent bedroom community.
4) Kawela Kai Gulch	Isolated leeward dryland forest	20 in/year	Accessible by dirt road 2 mi from freeway; nearest community is Kawela Kai; aquifer below.
5) Wainui Quarry	Windward wetlands	100 in/year	Adjacent marsh provides habitat for endangered wildlife; quarry is near Wainui Town; accessible by 2-lane road off of main highway to Wainui Town; marsh empties into beach 3 miles ma kai of quarry.
6) Ironwood Gulch	Isolated windward dryland gulch	60 in/year mostly in winter	Mostly ironwood, some Norfolk, a few gullies, beach is 2.5 miles down; accessible by a one-lane road that meets up with the main highway, which is a 2-lane road; nearest community is Wainui Town.
7) Mauna Nui	Isolated gulch in area where alpine and rainforest zones meet	100 in/year, intermittent snow at summit	Accessible by 4WD only on a 2-lane road through lava field and pristine rainforest; seismic activity; no drinking water; inaccessible aquifer below; Ho'olino City is 32 km away.



Topographic map of possible landfill locations.

- 1) Moku 'Opala
- 2) Kawela Mauka Gulch
- 3) Kawela Kai
- 4) Kawela Kai Gulch
- 5) Wainui Quarry
- 6) Ironwood Gulch
- 7) Mauna Nui