

Back to the Future

Energy Revealed
Moving Goods Cards Printout
Grade Level: 4-7



Using the Moving Goods Cards

The Task

Each Moving Goods Card profiles a mode of transportation and tells a story of how goods are moved. Each card includes an image and a number of variables for each mode of transportation. As they study the cards, learners explore the transportation of goods from different perspectives. The cards are intended to stimulate thinking and to support learners in identifying and exploring patterns.

Using the descriptive and visual clues provided, the cards can be sequenced by:

- History: The cards can be grouped into the categories present, recent past and distant past. Learners can also attempt to sort the cards within those categories. Some cards clearly depict a time period and others are deliberately ambiguous.
- Speed: The cards can be sequenced from slowest to fastest or grouped into low, medium and high speed.
- Pollution: The cards can be grouped by low, medium or high levels of pollution.
- Greenhouse Gas Emissions Intensity: The cards can be grouped by low, medium or high levels of greenhouse gas emissions.
- Maximum load: The cards can be sequenced by increasing or decreasing maximum load.

We recommend that learners sequence or group the cards in three ways: by history, speed and pollution.

Card Legend

- Maximum Capacity: The weight that can be carried at once (kg = kilograms). The technical term is Transportation Load Capacity.
- Speed: The distance travelled in a day varies by mode. For ships, rail and airplanes, travel times of 12+ hours per day are possible and extend their daily range. For people-powered modes, travel times are shorter, reducing their daily range.
- Greenhouse Gas Intensity: The greenhouse gas emissions for each kilogram transported. A large vessel can create a lot of emissions in total but if it carries a great amount, the level of emissions per item can be lowered.
- Pollution: The amount of air and water pollution resulting from this mode of transportation. Pollution includes greenhouse gases, particulates (e.g., soot), as well as toxic materials that spill into water. This value indicates the typical impact a shipment of goods using this mode would have. Fossil-fuel-based modes and large-scale modes will have more overall impact.

Answer Keys

- **Historical Sequence:** Both the date of origin for a mode of transportation and the end date of each mode (where relevant) is included in the answer key. The range in dates may create some variation in how learners choose to sequence the cards. The range in their approach to the cards can serve as a useful discussion point on sustainable transportation solutions.

Moving Goods Cards

- 1** A steamship from Britain's White Star company arrives in New York full of goods and immigrants bound for Ontario and Quebec.



Maximum Capacity: 150,000 kg
Speed: 300 km/day
Greenhouse Gas Intensity: Medium
Pollution: High

- 2** A truck transports paper and stationary supplies from a plant in Calgary to Saskatchewan.



Maximum Capacity: 58,000 kg
Speed: 1,000 km/day
Greenhouse Gas Intensity: Medium
Pollution: High

3 Four horses haul a Conestoga wagon full of goods across the continent.



Maximum Capacity: 7,000 kg
Speed: 25 km/day
Greenhouse Gas Intensity: Near zero
Pollution: Near zero

4 A “Long John” freight bicycle delivers packages to homes and businesses in the city.



Maximum Capacity: 100 kg
Speed: 50 km/day
Greenhouse Gas Intensity: Near zero
Pollution: Near zero

5 The Skyhook airship/helicopter lifts heavy loads for construction in remote areas.



Maximum Capacity: 40,000 kg
Speed: 350 km/day
Greenhouse Gas Intensity: Low
Pollution: Low

6 Compagnie de Transport Maritime à la Voile (CTMV) charters sailing ships (e.g. the Belem) to transport fair-trade coffee, jam and wine.



Maximum Capacity: 250,000 kg
Speed: 150 km/day
Greenhouse Gas Intensity: Near Zero
Pollution: Near zero

7 Coal-powered freight rail hauls lumber from the Pacific coast to Eastern Canada.



Maximum Capacity: 40,000 kg
Speed: 200 km/day
Greenhouse Gas Intensity: Medium
Pollution: High

8 Kwakiutl women haul gear with 23-meter long, cedar dugout, ocean-going canoes.



Maximum Capacity: 5,000 kg
Speed: 100 km/day
Greenhouse Gas Intensity: Near zero
Pollution: Near zero

9 An electric transport truck delivers school supplies.



Maximum Capacity: 4,000 kg
Speed: 150 km/day
Greenhouse Gas Intensity: Low
Pollution: Low

10 French Voyageurs near Québec travel by canoe with beaver pelts for North West Company.



Maximum Capacity: 3,000 kg
Speed: 150 km/day
Greenhouse Gas Intensity: Near Zero
Pollution: Near zero

11 Diesel-powered rail transports coal from Alberta-based mines to coastal ports.



Maximum Capacity: 12,000,000 kg
Speed: 500 km/day
Greenhouse Gas Intensity: Low
Pollution: Medium

12 Inuit transport seal meat by dogsled in Northern Labrador, Nunavut.



Maximum Capacity: 100 kg
Speed: 130 km/day
Greenhouse Gas Intensity: Near zero
Pollution: Near zero

13 Time sensitive goods are delivered by a 747 cargo plane.



Maximum Capacity: 250,000 kg
Speed: 14,000 km/day
Greenhouse Gas Intensity: High
Pollution: High

14 The ZIM Djibouti container ship arrives on the West Coast from South Korea with up to 10,000 shipping containers.



Maximum Capacity: 116,000,000 kg
Speed: 1,000 km/day
Greenhouse Gas Intensity: Low
Pollution: Medium

15

First Nations Lillooet traders travel by foot from south-central British Columbia to the interior, trading cedar and seashells for dried salmon and salmon oil.



Maximum Capacity: 40 kg

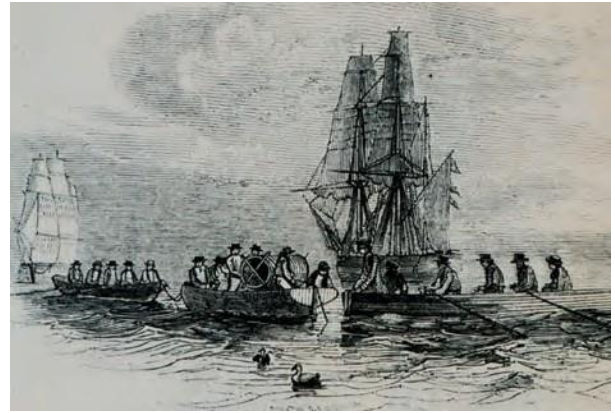
Speed: 200 km/day

Greenhouse Gas Intensity: Near zero

Pollution: Near zero

16

John Franklin's Expedition sailing ships Erebus and Terror set sail to explore the Northwest Passage.



Maximum Capacity: 30,000 kg

Speed: 200 km/day

Greenhouse Gas Intensity: Near zero

Pollution: Near zero

Answer Keys

Historical Sequence

Card	Description	Date	Until
12	Inuit dogsled	-12000	2010
8	Kwakiutl dugout canoe	1000	2010
15	Lillooet traders on foot	1000	1850
10	Voyageurs' canoe	1796	
3	Horses and wagon	1820	
16	Northwest Passage sailing ships	1845	
7	Coal-powered freight rail	1880	
1	British steamship	1900	
4	Freight bicycle	1900	2010
11	Diesel rail transport	1900	2010
2	Freight truck	1950	2010
13	Cargo plane	1970	2010
9	Electric truck transport	2000	2010
6	Sailing ship transport	2008	2010
14	Container ship	2009	2010
5	Skyhook airship/helicopter	2014	2014

Photo Credits

#1: Public domain. Source: Maritime Digital Archive Encyclopedia; #2: Dmitry Kalinovsky, <https://www.dreamstime.com/>; #3: Unsplash, <https://unsplash.com/photos/QFhIVIX9wTs>; #4: Kai-Martin Knaak; #5: Boeing; #6: Laure Condé; #7: Courtesy of the California Room, San Jose Public Library; #8: Ben W. Leeson photo, Vancouver Public Library, VPL 14101A; #9: Courtesy of Zero Truck; #10: Library and Archives Canada, Acc. No. 1989- 401-2; #11: CN; #12: Richard Harrington, Library and Archives Canada, PA-129937; #13: Tak; #14: Justin McDonald; #15: Vancouver Public Library, Special Collections, VPL 48164; #16: NOAA Central Library.

Other Card Values

Card	Description	Maximum Capacity (kg)	Speed (km/day)	GHG Intensity	Pollution
1	British steamship	150,000	300	Medium	High
2	Freight truck	58,000	1,000	Medium	High
3	Horses and wagon	7,000	25	Near zero	Near zero
4	Freight bicycle	100	50	Near zero	Near zero
5	Skyhook airship/helicopter	40,000	350	Low	Low
6	Sailing ship transport	250,000	150	Near zero	Near zero
7	Coal-powered freight rail	40,000	200	Medium	High
8	Kwakiutl dugout canoe	5,000	100	Near zero	Near zero
9	Electric truck transport	4,000	150	Low	Low
10	Voyageurs' canoe	3,000	150	Near zero	Near zero
11	Diesel rail transport	12,000,000	500	Low	Medium
12	Inuit dogsled	100	130	Near zero	Near zero
13	Cargo plane	250,000	14,000	High	High
14	Container ship	116,000,000	1,000	Low	Medium
15	Lillooet traders on foot	40	30	Near zero	Near zero
16	Northwest Passage sailing ships	30,000	200	Near zero	Low