Ages: 8+    Players: 2-4

To win: Gain 12 product points.

Materials:
- Game board: download at: landsat.gsfc.nasa.gov/ESW2020
- Raw Material tokens and Product cards
- Player pieces - one per player
- Manufacturing Costs chart
- Disaster Spinner
- Paperclip and paper tack or pencil
- One six-sided die

Assembly instructions: Cut out the Raw Material tokens, Product cards, and the Disaster Spinner. Make the spinner by attaching a paper clip to the center of the spinner with a paper tack (or hold in place with a pencil so the paper clip spins freely). Place the Manufacturing Costs chart near the board for everyone’s reference.

Objective: Collect raw materials and manufacture products at factories to earn points.

Setup: Stack the Product cards on their matching factories and place the supplies of Raw Material tokens on their matching resource descriptions. Each player places their piece on any resource hexagon (hex). Players may not occupy the same hex.

To play:
- Youngest player goes first. Each turn, a player rolls the die, moves that number of hexes, and collects ONE raw material token from the hex landed on. Players cannot land on an occupied hex or the hex they started on at the beginning of their turn.
- To earn product cards, players must land on a factory hex and trade in the raw materials required for that product. More than one product can be made on one turn. Products can be manufactured until all of the cards are gone.
- If a player rolls a 6, a disaster occurs. The player does NOT move their piece, but instead spins the Disaster Spinner. Every player must then return all Raw Material tokens of that type to the supply.
- Play continues until a player manufactures 12 points worth of products.
### Manufacturing Costs - Raw Materials needed to manufacture products

<table>
<thead>
<tr>
<th>Product</th>
<th>Points</th>
<th>Materials needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>2</td>
<td>Wood, Mineral (Graphite), Mineral (Clay)</td>
</tr>
<tr>
<td>Playdough</td>
<td>2</td>
<td>Salt, Wheat, Wheat</td>
</tr>
<tr>
<td>Chalk</td>
<td>2</td>
<td>Stone (Limestone), Gypsum, Gypsum</td>
</tr>
<tr>
<td>Crayon</td>
<td>3</td>
<td>Soy, Wood, Wood (Paper), Mineral (Colorant)</td>
</tr>
<tr>
<td>Baseball</td>
<td>4</td>
<td>Wood (Cork), Cattle (Cowhide), Sheep (Wool), Soy (Ink)</td>
</tr>
<tr>
<td>Fish sticks</td>
<td>4</td>
<td>Fish, Fish, Wheat (Flour), Salt</td>
</tr>
</tbody>
</table>
Player Pieces
Cut out each piece on the dashed lines. Then cut the dashed line slit on each piece and insert the stand on the bottom of the triangle.
<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>2</td>
</tr>
<tr>
<td>Playdough</td>
<td>2</td>
</tr>
<tr>
<td>Chalk</td>
<td>2</td>
</tr>
<tr>
<td>Crayon</td>
<td>3</td>
</tr>
<tr>
<td>Pencil</td>
<td>2</td>
</tr>
<tr>
<td>Playdough</td>
<td>2</td>
</tr>
<tr>
<td>Chalk</td>
<td>2</td>
</tr>
<tr>
<td>Crayon</td>
<td>3</td>
</tr>
<tr>
<td>Baseball</td>
<td>4</td>
</tr>
<tr>
<td>Fish Sticks</td>
<td>4</td>
</tr>
</tbody>
</table>
Satellite Image Descriptions & Locations

1. **Northern Argentina**
   - Areas cleared for cropland and ranging appear as a grid on the landscape in northern Argentina.
   - Coordinates: -26.239, -60.872

2. **Vanua Levu, Fiji**
   - The waters surrounding Fiji are sources of fish such as wahoo, tuna, sailfish and marlin.
   - Coordinates: -16.337, 179.066

3. **Los Banos, California, US**
   - Landsat and Sentinel-2 data of cropland near Los Banos, CA. Colors represent 3 periods of the 2018 growing season.
   - Coordinates: 37.128, -120.630

4. **Great Bahama Bank**
   - The shallow bank of wave-shaped ripples of sand and seagrass is next to a 2,000 meter drop that is home to more than 160 fish and coral species.
   - Coordinates: 23.563, -76.443

5. **Beni River, Bolivia**
   - The Beni River in Bolivia meanders through forests (dark green) and grassland and sparse forests (lighter green).
   - Coordinates: -12.660, -56.5796

6. **San Francisco Bay, California, US**
   - The different colors of salt ponds in San Francisco Bay are attributed to levels of salinity, different depths of water, and different types of algae and microorganisms.
   - Coordinates: 37.503, -122.034

7. **British Columbia, Canada**
   - Mount Polley Mine in Canada is an open pit copper and gold mine.
   - Coordinates: 52.543, -121.632

8. **Phalaborwa, South Africa**
   - South Africa’s largest open-pit mine near Phalaborwa and Kruger National Park is the source of copper and iron.
   - Coordinates: -24.001, 31.116

9. **Salar de Atacama, Chile**
   - Chile’s Salar de Atacama has the world’s largest reserve of lithium, which is a key ingredient in rechargeable batteries.
   - Coordinates: -23.547, -68.393

10. **Gulf of Mexico**
    - Amidst the sediment suspended in the waters off the coast of Louisiana are a variety of fish including red snapper, tuna and wahoo.
    - Coordinates: 28.917, -90.503

11. **Roswell, New Mexico**
    - Landsat-derived map of water use by center pivot irrigation fields in Roswell, New Mexico.
    - Coordinates: 33.188, -104.372

12. **Meegrowa, Saudi Arabia**
    - Crop fields in Roswell, New Mexico. Use by center pivot irrigation systems.
    - Coordinates: 21.850, 72.190

13. **Egmont Nt’l Park, New Zealand**
    - Forest surrounding Mt. St. Helens is slowly growing back since the volcano’s eruption in 1980.
    - Coordinates: 46.191, -122.188

14. **Qarhan Playa, China**
    - A rim of crystal salts surrounds Qarhan Salt Lake, the largest salt lake playa in China and a significant source of minerals, including table salt, potassium for fertilizer, bromine, halite, gypsum, and magnesium chloride.
    - Coordinates: 36.828, 95.230

15. **Egmont Nt’l Park, New Zealand**
    - Egmont National Park in New Zealand is a protected forest (dark green areas) surrounded by once-forested pasturelands (light and brown green).
    - Coordinates: -39.300, 174.065

16. **Kalahari Deser, Botswana**
    - Makgadikgadi Pan in Botswana is one of the largest salt flats in the world and a major source for soda ash (sodium carbonate), which is used in making glass, in metallurgy, in the detergent industry, and in chemical manufacture.
    - Coordinates: -20.509, 26.078

17. **Coahuila, Mexico**
    - A severe drought that affected Texas in 2011 produced wildfires south of the border in Mexico.
    - Coordinates: 28.874, -102.882

18. **Dead Sea, Southwestern Asia**
    - Salt evaporation ponds south of the Dead Sea are used to extract sodium chloride and potassium salts for the manufacturing of polyvinyl chloride (PVC) and other chemicals.
    - Coordinates: 31.147, 35.438

19. **Garden City, Kansas, US**
    - Common crops from these center-pivot irrigated crops near Garden City, Kansas include corn, wheat, and sorghum.
    - Coordinates: 37.897, -100.949

20. **Northern Sweden**
    - Sweden is Europe’s biggest iron producer and the Kiruna mine is the largest underground iron ore mine in the world.
    - Coordinates: 67.842, 20.161

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24. **Southern Uzbekistan**
    - Irrigated crops in southern Uzbekistan are major sources for cotton. Other crops include grains, vegetables and grapes.
    - Coordinates: 37.65306, 67.123464

25. **Gujarat, India**
    - Salt ponds near city of Bhavnagar accounts for nearly three-quarters of India’s annual salt production.
    - Coordinates: 21.850, 72.190

26. **Western Nebraska, US**
    - Rangelands occupy nearly half of Nebraska’s ecosystems and contribute heavily to US cattle production.
    - Coordinates: 41.7650, -102.2551

27. **Eastern Maryland, US**
    - A patchwork of croplands at various stages of harvest are visible in the rural areas around Easton, Maryland.
    - Coordinates: 38.822, -75.973

    - In Utah, rangelands cover 80% of the land and represent diverse topography from desert canyons to mountains with lakes and streams.
    - Coordinates: 37.480, -112.973

29. **Northeast Siberia**
    - Mines around Noril’sk are Russia’s major source for metals (platinum, nickel, and copper) as well as sandstone, limestone, and dolomite.
    - Coordinates: 69.353, 88.188

    - In the summer of 1988, wildfires tore through forests and left large burn scars across Yellowstone National Park.
    - Coordinates: 44.531, -110.928