Tox Land Setup

Online documents:
봐  Tox Land Leader Guide
IVERY  Tox Land sign
iev  START-END
iev  Tox Land playing cards
iev  Tox Land events
  » Chocolate Toxicity
  » Deepwater Horizon
  » The First Earth Day
  » Microbes in Bioremediation
  » Pharmaceutical Dose
  » Phosphorus in Fertilizer
iev  Poster-size game boards
iev  Tox Land Evaluation Questions

Needed Items:
봐  Print online documents in color
IVERY  Colored sheets of paper 8.5 x 11 inches (red, purple, yellow, blue, orange, green)
iev  Post or sign holder/clear paper stand
iev  Game finishing prizes (Saltwater Taffy, etc.)
iev  Masking tape
iev  Scissors
iev  Pens
iev  Game pieces (for table version)

Life-size game:

Decide where to place your START and END signs; use masking tape to attach the signs to the floor so the signs don’t move around. Use the colored sheets to design a path for the participants to follow in the color order of red, purple, yellow, blue, orange, and green; use masking tape to attach the signs to the floor. Any signs that are not reusable can be recycled along with the masking tape. The Tox Land sign can be taped to a wall near the START or hung on a post/sign holder. The Tox Land events (Global Event) can also be taped to a wall throughout the game path or hung on a post/sign holder. The game leaders should read the Tox Land Leader Guide before working with participants and will hold onto the playing cards. The game finishing prizes can be placed near the END sign and distributed by a game leader when participants complete the game. The Tox Land evaluation questions/pens kept near the END sign can be distributed to participants when they finish, alternatively a game leader can ask participants the evaluation questions and record their responses. The Tox Land evaluation questions are designed to improve the game over time and make sure the participants achieve the Learning Goals stated on the Tox Land Leader Guide. An example setup follows.
Table version game board:

**Poster-sized game board**
Print one or more of the Tox Land boards as a poster 3 x 4 feet or larger. Use masking tape to secure the poster to a table. The Tox Land sign can be taped to a wall near the START, hung on the table, or on a post/sign holder. The Tox Land events can be printed on sheets of paper and placed around the game board secured with masking tape or propped up vertically in a clear paper stand. Place the game pieces near the START sign. The game leaders should read the Tox Land Leader Guide before working with participants and will hold onto the playing cards or the cards can be placed facedown in piles around the game board. The game finishing prizes can be placed near the END sign and distributed by a game leader when participants complete the game. The Tox Land evaluation questions/pens kept near the END sign can be distributed to participants when they finish, alternatively a game leader can ask participants the evaluation questions and record their responses. The Tox Land evaluation questions are designed to improve the game over time and make sure the participants achieve the Learning Goals stated on the Tox Land Leader Guide. An example setup follows.
Game board with paper squares

Decide where to place your START and END signs; use masking tape to attach the signs to the table so the signs don’t move around. Cut the 8.5 x 11 inch colored paper into four rectangles and use the colored sheets to design a path for the participants to follow in the color order of red, purple, yellow, blue, orange, and green; use masking tape to attach the signs to the table. The Tox Land sign can be taped to a wall near the START, hung on the table, or on a post/sign holder. The Tox Land events can be printed on sheets of paper and placed around the game board secured with masking tape or propped up vertically in a clear paper stand. Place the game pieces near the START sign. The game leaders should read the Tox Land Leader Guide before working with participants and will hold onto the playing cards or the cards can be placed facedown in piles around the game board. The game finishing prizes can be placed near the END sign and distributed by a game leader when participants complete the game. The Tox Land evaluation questions/pens kept near the END sign can be distributed to participants when they finish, alternatively a game leader can ask participants the evaluation questions and record their responses. The Tox Land evaluation questions are designed to improve the game over time and make sure the participants achieve the Learning Goals stated on the Tox Land Leader Guide. An example setup follows.

Tox Land was designed by Molecular & Environmental Toxicology Center graduate students at the University of Wisconsin-Madison.
Overview:
Tox Land is a life-size or board game that takes participants on a colored pathway through toxicology related events at a local and global level.

How to lead a game of Tox Land:
Welcome participants as they line up by the START of the game. Begin by asking all the players, what is toxicology? Follow this by asking them, what are Toxicologists? Once participants respond, elaborate that toxicology is the study of chemicals and how they affect people, animals, and the environment. Another main point to make is that Toxicologists are scientist.

The first player will draw the top card and read (or be read) the phrase. The game leader will ask the participant if the action or idea on the card is good or bad for people, animals, and the environment (depending on the information given the leader could specify one benefactor – is this good or bad for people? etc.). The player who chose the card can talk with the other participants before answering the question. Card topics should be discussed and explained to the players; follow up questions such as ‘why do you think that?’ are also good to use. The first player will then advance to their colored square.

After player one has moved forward on the game board (determined by the square(s) on the card), player two can draw a card and read it (or have it read) out loud. This method will continue including the questions as described for player one with all the participants. All players continue taking turns drawing a card, reading (or being read) the phrase to the group, discussing the action/idea, and moving along the colored path until they reach the END.

As players move along from START to END they will pass by several signs that identify global situations related to toxicology and the world. Point out these story signs so participants become informed about different global events. Once players make it to the END, give them a sweet treat for finishing the game.

Learning Goals:
1. Participants understand what toxicology is and that Toxicologist are scientists.
2. Participants discuss how daily occurrences have toxicological effects on people, animals, and the environment.
3. Participants are informed about toxicologically relevant situations that have occurred at a global level.

These Learning Goals can be discussed in more depth depending on the age of the participant. Children younger than first grade can play by identifying the colored squares on the cards and moving to the appropriate board tile.

Target Audience: First grade and up

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Tox Land was designed by Molecular & Environmental Toxicology Center graduate students at the University of Wisconsin-Madison. Illustrations by Lori M. R. Blanke.
<table>
<thead>
<tr>
<th><strong>When you have leftover food, you store it in a reusable food storage container instead of using plastic wrap which will be thrown away.</strong></th>
<th><strong>You store flammable products outside your living area and far away from places where these products could start a fire.</strong></th>
<th><strong>You take unused prescription medication to a Drug Collection for disposal.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>You eat fruits and vegetables every day.</strong></th>
<th><strong>You recycle bottles, cans, and paper.</strong></th>
<th><strong>You buy products that are made from recycled materials.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>You tell your friends about reducing, reusing, and recycling.</strong></th>
<th><strong>You use baking soda to freshen air in refrigerators, garbage cans, and on carpets.</strong></th>
<th><strong>You wash fruits and vegetables before eating them to remove any dirt or pesticides acquired while growing.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>You put a bird bath and a bird feeder in your yard.</th>
<th>You use recyclable plastic cups and plates at large gatherings instead of polystyrene cups and plates which are not recyclable.</th>
<th>You take used plastic bags to a local store so they can be reused or recycled.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Bird Bath" /></td>
<td><img src="image" alt="Recyclable Cups" /></td>
<td><img src="image" alt="Used Plastic Bags" /></td>
</tr>
<tr>
<td>You open several windows when you are painting inside.</td>
<td>You clean your house to prevent and control indoor pests.</td>
<td>You keep your kitchen clean, along with other areas where food is kept to keep insects out of your living space.</td>
</tr>
<tr>
<td><img src="image" alt="Windows" /></td>
<td><img src="image" alt="Broom and Dustpan" /></td>
<td><img src="image" alt="Kitchen Sink" /></td>
</tr>
<tr>
<td>You reduce waste when you go shopping by purchasing items with less packaging.</td>
<td>You take reusable bags to the store when you go shopping.</td>
<td>You walk or ride your bike instead of using a car.</td>
</tr>
<tr>
<td><img src="image" alt="Less Packaging" /></td>
<td><img src="image" alt="Reusable Bags" /></td>
<td><img src="image" alt="Bike" /></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Action</th>
<th>Image</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>You visit rural areas to get away from light pollution.</td>
<td><img src="image1.png" alt="Castle" /></td>
<td>You switch all your incandescent light bulbs to compact fluorescent light (CFL) bulbs.</td>
</tr>
<tr>
<td>Exposure to certain items, like peanuts, may cause an allergic reaction.</td>
<td><img src="image2.png" alt="Peanuts" /></td>
<td></td>
</tr>
<tr>
<td>You read the label of chemical containers and dispose of them properly as directed.</td>
<td><img src="image3.png" alt="Chemical Container" /></td>
<td>You play outside during the summer and wear sun screen that protects you from UV rays.</td>
</tr>
<tr>
<td>You take unused chemicals to a “Hazardous Waste Collection Day”.</td>
<td><img src="image4.png" alt="Hazardous" /></td>
<td></td>
</tr>
<tr>
<td>You turn the lights off when you are not in a room to save energy.</td>
<td><img src="image5.png" alt="Light Switch" /></td>
<td>You use energy efficient appliances in your home like ovens, refrigerators, etc.</td>
</tr>
<tr>
<td>You buy food that is locally grown at the farmers market and in grocery stores.</td>
<td><img src="image6.png" alt="Food Miles" /></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>You look into the sky at night to find constellations.</th>
<th>You go camping to be surrounded by nature.</th>
<th>You use a rain barrel at your house to collect rainwater which is then used to water plants.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Stars" /></td>
<td><img src="image2.png" alt="Trees" /></td>
<td><img src="image3.png" alt="Rain Barrel" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>You turn off the faucet when you brush your teeth so water is not running when you do not need it.</td>
<td>An adult fixes a leaky faucet or a running toilet to save water.</td>
<td>You collect water dripping from a leaky faucet and use it on house plants until the faucet is fixed.</td>
</tr>
<tr>
<td><img src="image4.png" alt="Toothbrush" /></td>
<td><img src="image5.png" alt="Water Drops" /></td>
<td><img src="image6.png" alt="Leaky Faucet" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td><img src="image7.png" alt="House Plants" /></td>
</tr>
<tr>
<td>You take shorter showers to save water.</td>
<td>When you do use a plastic water bottle you make sure to recycle the bottle when the water is gone.</td>
<td>You wash your laundry in cold water instead of hot water.</td>
</tr>
<tr>
<td><img src="image8.png" alt="Shower" /></td>
<td><img src="image9.png" alt="Recycle" /></td>
<td><img src="image10.png" alt="Cold Water" /></td>
</tr>
</tbody>
</table>

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Clean river water flows into ponds, lakes, and the ocean. Dirt washes into streams and rivers after a rain fall and pollutes the water by making it murky. Regardless of the season, you exercise all year round.

As the Earth heats up, glaciers and ice sheets melt which adds water to the oceans. After washing your laundry, you air dry your clothes instead of using a dryer. An adult switches to paperless billing or electronic bills instead of paper bills sent through the mail.

You use the microwave to reheat small amounts of food instead of using a stove or oven. You use public transportation in town, like the bus system. You read the label before using a pesticide and follow the directions.
You store household chemicals away from children and pets.  

You store household chemicals in their original containers so you can read the labels.  

You and your friends carpool when you travel together.

You participate in a park cleanup on Earth Day.  

You leave ladybugs, spiders, centipedes, dragon flies, and ground beetles in your garden since they eat the insects that destroy plants.

Pesticides and household chemicals are not stored by or near food for people or animals.  

Your home is powered by renewable resources such as sunshine, wind, and flowing water.  

You put mulch around your plants so weeds do not grow.  

In your garden, you pull out weeds (including the roots) instead of using a pesticide.
<table>
<thead>
<tr>
<th>Instead of using a pesticide, you hand pick off bugs that are eating the plants in your garden.</th>
<th>You start a compost pile with plant material, like lawn clippings and fruit/vegetable waste, to make your own fertilizer.</th>
<th>You keep small plants in your house to freshen the indoor air.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="https://example.com/bug.png" alt="Image" /></td>
<td><img src="https://example.com/compost.png" alt="Image" /></td>
<td><img src="https://example.com/indoor_plant.png" alt="Image" /></td>
</tr>
<tr>
<td>Instead of using a pesticide, you put ladybugs in your garden to eat other harmful bugs.</td>
<td>You do not pour leftover chemicals on the ground, in streams, down the sink, into the toilet, or bury them in the ground because this would pollute the environment.</td>
<td>You plant a tree.</td>
</tr>
<tr>
<td><img src="https://example.com/ladybug.png" alt="Image" /></td>
<td><img src="https://example.com/no_chemicals.png" alt="Image" /></td>
<td><img src="https://example.com/tree.png" alt="Image" /></td>
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</table>

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Tox Land Evaluation Questions

1. What is one thing you learned during this activity?

2. In your own words, what do you think this game was trying to show?

3. Did this game increase your understanding about daily choices that can affect people, animals, and the environment?
   □ Yes  □ Maybe  □ No

4. Did this game increase your understanding about important global situations and how they affect the world?
   □ Yes  □ Maybe  □ No

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One day in Tox Land there was an explosion off the shore of the Gulf of Mexico. A fireball was visible for miles and miles. A couple days later Deepwater Horizon sank, creating the largest offshore oil spill in U.S. history.

Explosion on April 20, 2010

Rig sank on April 22, 2010
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In a land not so far, far away live teeny, tiny organisms called microbes. These microbes work hard to reduce the amount of oil in water or dangerous compounds in soil. This microbe method for cleaning up oil spills or soils contaminated with chemicals is economical and safe.

Microbe decomposition of hazardous chemicals is part of the bioremediation process.
“Careful children! Chocolate is toxic to cats and dogs.” says Mrs. Fundue. People are able to digest chocolate but animals are not, this is why chocolate is toxic to pets. To keep your pets safe, put your chocolate in a place where your pets can not find it.

Chocolate may be toxic or even fatal for animals
Tox Land was designed by Molecular & Environmental Toxicology Center graduate students at the University of Wisconsin-Madison. Illustrations by Lori M. R. Blanke.
Hear ye! Hear ye! Phosphorus is dangerous in bodies of water since it increases the growth of harmful algae. These algae will steal away the oxygen in water and lead to dead zones which harm aquatic life.

Out of concern for our wonderful land, several states have banned the use of phosphorus in lawn fertilizer.
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There once was a man named Senator Gaylord Nelson who was inspired to embrace the state of our planet in the politics of our country. He used the concern of the people to organize a grassroots demonstration which added the environment to the nation’s political agenda.

First Earth Day on April 22, 1970
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Once upon a time people were overdosing on pharmaceuticals. Fortunately the FDA devised a plan to limit drug prescriptions in order to balance the dose and therapeutic effects of medications. This pharmaceutical regulation reduces the toxicity of drugs in people.

MRTD = Maximum Recommended Therapeutic Dose
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