Permaculture for Kids: The Cycle Super-System

Materials Needed:

- One large, clear glass jar with a lid (a large pickle jar or canning jar works great)
- Small pebbles or gravel
- A small piece of mesh screen or activated charcoal (optional, for filtration)
- Potting soil
- A small, hardy plant that likes humidity (e.g., moss, a fern, or a spider plant cutting)
- A few "decomposer recruits": 1-2 earthworms from the garden
- Organic matter for the "nutrient engine": small bits of vegetable scraps (lettuce, carrot peelings), crushed eggshells, used coffee grounds
- A spray bottle with water
- A notebook or journal for observations ("Permaculture Detective's Log")
- Drawing supplies (crayons, colored pencils)

Lesson Plan & Activities

Part 1: The Detective's Briefing - What are Cycles? (10-15 minutes)

Goal: To activate prior knowledge and introduce the concept of natural cycles as interconnected systems.

1. **Opening Question:** Start with a fun question: "If the Earth is like a giant recycling machine, what does it recycle?" Guide the conversation towards things that go around and around, like the seasons, the cycle of day and night, or how a seed becomes a plant, which makes more seeds.
2. **Introducing the Two Big Cycles:** Briefly explain the two "super-cycles" we'll be working with today. Use simple, clear language:
    - **The Water Cycle:** "Water is a world traveler! It flies up into the air (evaporation), forms clouds (condensation), and then falls back down as rain to give plants a drink (precipitation). It's a perfect loop!"
    - **The Nutrient Cycle:** "Nature never wastes anything! When leaves fall or an apple core gets tossed, tiny helpers like worms and bacteria break it down. This turns old stuff into super-food for the soil, which then feeds new plants. This is the ultimate recycling program!"
3. **The Permaculture Connection:** Explain the big idea. "Permaculture is about being a smart designer who works *with* these cycles instead of against them. Today, we are going to become permaculture designers and build a tiny world where these cycles work together perfectly."

Part 2: The Main Mission - Build a World in a Jar (30-45 minutes)

Goal: To creatively apply knowledge of the water and nutrient cycles by building a self-sustaining mini-ecosystem (a closed terrarium).

Follow these steps, explaining the "why" behind each layer. This is the core of the lesson!

1. **Step 1: The Drainage Layer.**
   Place a 1-inch layer of pebbles at the bottom of the jar.

Why? "*This layer prevents the plant's roots from getting too wet and rotting. It's like a little reservoir at the bottom of our world.*"

2. **Step 2: The Filter Layer (Optional).**
   Place the small piece of mesh or a thin layer of charcoal on top of the pebbles.
   Why? "*This keeps the soil from falling into our reservoir and helps keep the water clean as it cycles through.*"
3. **Step 3: The Soil Foundation.**
   Add a 2-3 inch layer of potting soil.
   Why? "*This is the pantry and the home for our plant. It holds all the water and nutrients the plant will need to grow strong.*"
4. **Step 4: Plant Your Hero.**
   Gently dig a small hole and place your plant inside. Pat the soil around its base.
   Why? "*Our plant is the star of the show! It will drink the water, breathe the air, and use the food from the soil.*"
5. **Step 5: Install the Nutrient Engine.**
   On one side of the jar, dig a small pocket in the soil. Place your vegetable scraps, eggshells, and coffee grounds inside and cover it lightly with soil.
   Why? "*This is our secret compost pile! It's the starting point for the nutrient cycle. As this breaks down, it will release food for the plant.*"
6. **Step 6: Recruit the Decomposers.**
   Gently add your earthworms to the jar. Watch them wiggle down into the soil.
   Why? "*These are our recycling crew! Their job is to eat the scraps in our nutrient engine and turn them into amazing fertilizer for the plant.*"
7. **Step 7: Make It Rain!**
   Use the spray bottle to lightly mist the inside of the jar and the soil until it's damp but not soaking wet.
   Why? "*We are starting the water cycle. This is the only water our little world will need for a long time!*"
8. **Step 8: Seal the World.**
   Put the lid on the jar tightly. Place your "World in a Jar" in a spot with bright, indirect sunlight (a sunny window might cook it!).

Part 3: The Detective's Log - Observation and Discovery (Ongoing)

Goal: To assess understanding through long-term observation, critical thinking, and creative expression.

1. **Set up the Journal:** Title the first page of the notebook "My World in a Jar: Observation Log." Date the entry.
2. **First Entry:** Draw a detailed picture of the jar exactly as it looks today. Label all the parts: pebbles, soil, plant, nutrient engine, and worms (even if you can't see them).
3. **Observation Prompts:** Over the next few days and weeks, use these questions to guide observations.
   - What do you see on the inside walls of the jar? (Look for condensation - the water cycle in action!)
   - Is the soil still damp? Where do you think the water is coming from?
   - Can you see the worms? What do you think they are doing?
   - Has the plant changed? Is it growing?
   - What is happening to the food scraps in your "nutrient engine"?
4. **Making Connections:** After a week, sit down together and review the log. Ask: "How is our little world taking care of itself? How are the water cycle and the nutrient cycle working together to

help the plant?"

Extension & Deeper Thinking

- **Design a Garden:** On a large piece of paper, design a dream permaculture garden. Where would the compost pile go to feed the garden beds? How would you collect rainwater to water the plants?
- **Meet the Decomposers:** Research other "decomposer heroes" like pill bugs, millipedes, and beneficial fungi. Create a trading card for each one with their "superpower."
- **Real-World Connection:** Start a real (but small) compost bin for your kitchen scraps and see the nutrient cycle happen on a larger scale.