Engino STL24

Engino STEAM Labs How Hydraulics Work Kit - Instruction Manual

Brand: Engino | Model: STL24

Introduction

The Engino STEAM Labs How Hydraulics Work kit is an educational construction set designed to introduce users aged 8 and up to the principles of hydraulics and fluid mechanics. This kit allows for the construction of four different models, providing a hands-on learning experience through building, drawing, experimenting, and theoretical study.

The kit emphasizes a multi-level learning system, integrating art with science, technology, engineering, and mathematics (STEAM) concepts. It features a patented connecting system for easy assembly and disassembly, along with both printed and interactive 3D instructions available via a dedicated app.

Figure 1: Overview of the four hydraulic models that can be constructed with this kit.

Safety Information

- **Age Recommendation:** This kit is suitable for users aged 8 years and older. Adult supervision is recommended for younger users.
- **Small Parts:** The kit contains small parts which may pose a choking hazard for children under 3 years. Keep all components out of reach of infants and toddlers.
- **Proper Use:** Use the components only as instructed in the manual. Do not attempt to modify or force parts together, as this may cause damage or injury.
- **Disassembly Tool:** Use the provided extraction tool carefully for disassembly to avoid pinching fingers.
- **Material Safety:** All materials are child-safe and non-toxic. However, do not ingest any parts.

What's in the Box

Upon opening the Engino STEAM Labs How Hydraulics Work kit, you should find the following components:

- Approximately 80 construction parts
- Instruction booklet (printed)

- Extraction tool for disassembly
- Sheets of paper with pre-defined sketches for model customization
- Theory & Activity book

Please check all contents against the packing list provided in the box to ensure all pieces are present before beginning assembly.

Setup and Assembly

The Engino kit utilizes a patented snap-fit connecting system for straightforward assembly. Follow the instructions carefully for each model.

1. Building the Models (Level 1)

The kit includes instructions for building four distinct models. Two models have printed instructions, while the other two can be built using the interactive 3D instructions available through the Engino kidCAD app.

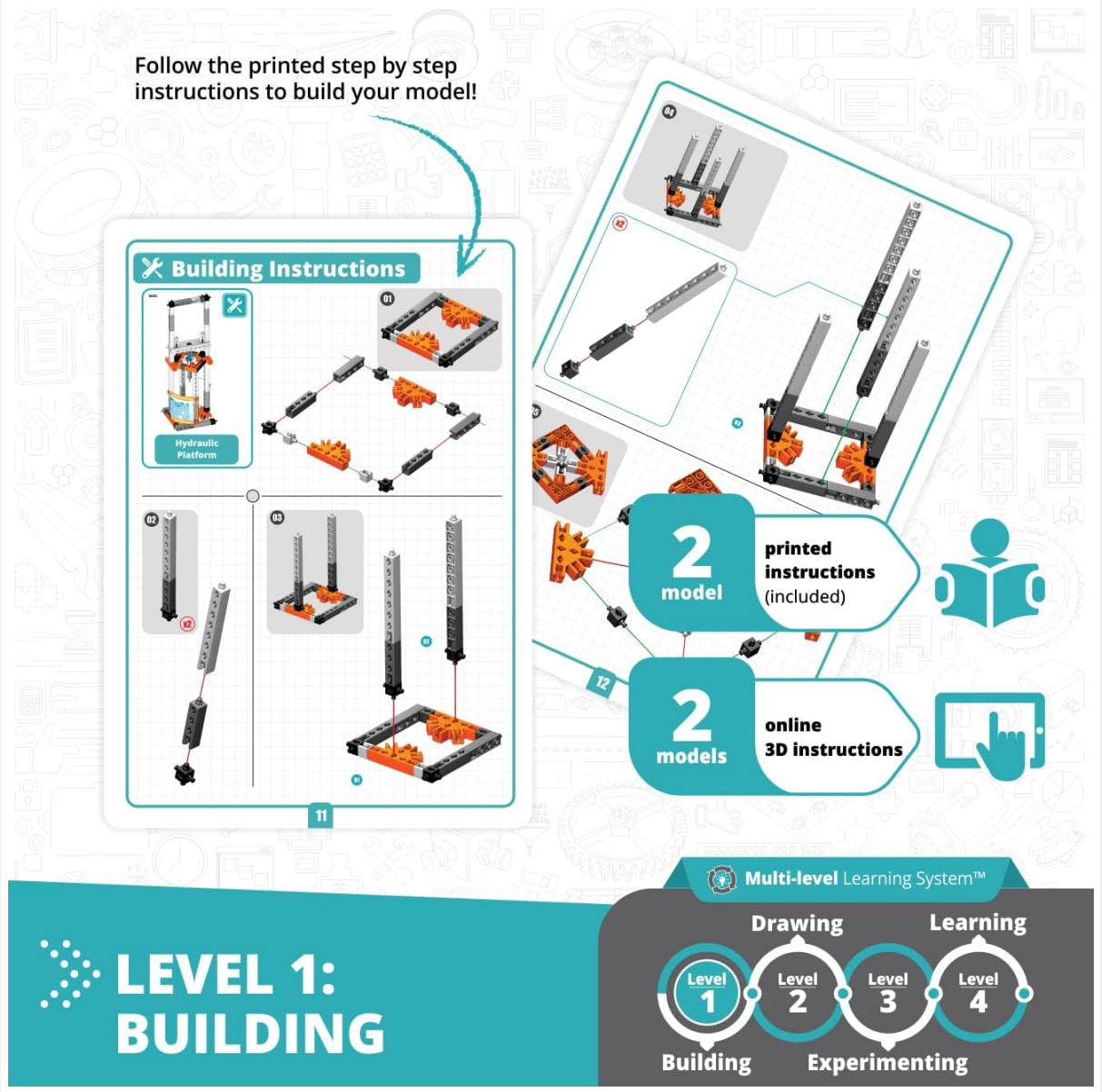

Figure 2: Example of printed building instructions for a model.

- **Printed Instructions:** Refer to the included booklet for step-by-step visual guides for the designated models.
- **3D Interactive Instructions:** Download the Engino kidCAD 3D viewer app (available on Google Play and

the App Store) for interactive 3D assembly guides. This app allows you to rotate, zoom, explode, and implode models to understand each step clearly.

Figure 3: The Engino kidCAD app provides interactive 3D building instructions.

2. Adding Surfaces (Level 2: Drawing)

Once the structural build is complete, you can customize your models using the provided paper sheets. These sheets have pre-defined sketches that can be painted, cut, and attached to your models to enhance their appearance.

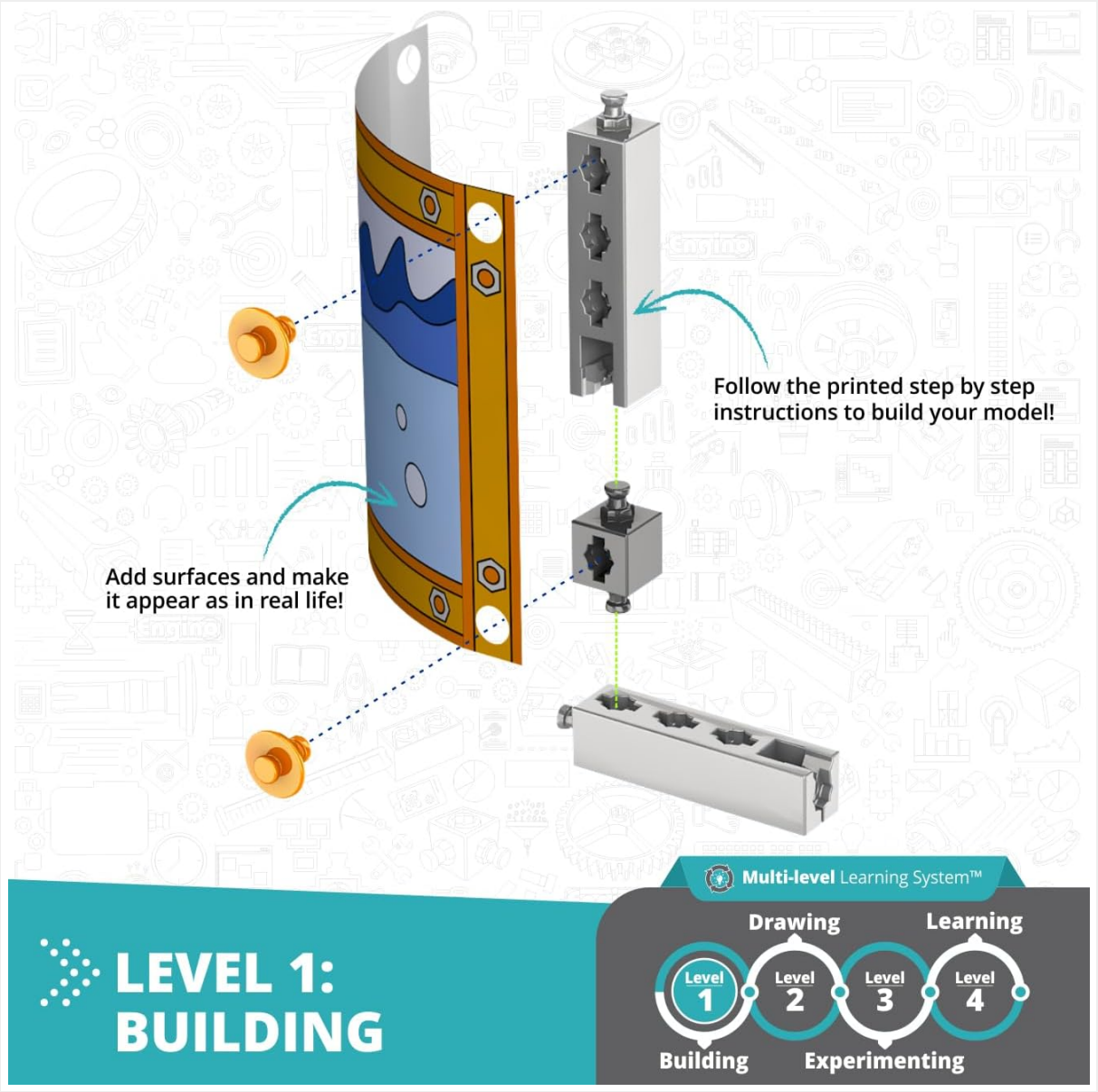

Figure 4: Attaching decorative surfaces to your model.

You can also use the blank side of these sheets or your own paper to create unique designs, fostering creativity and personal expression.

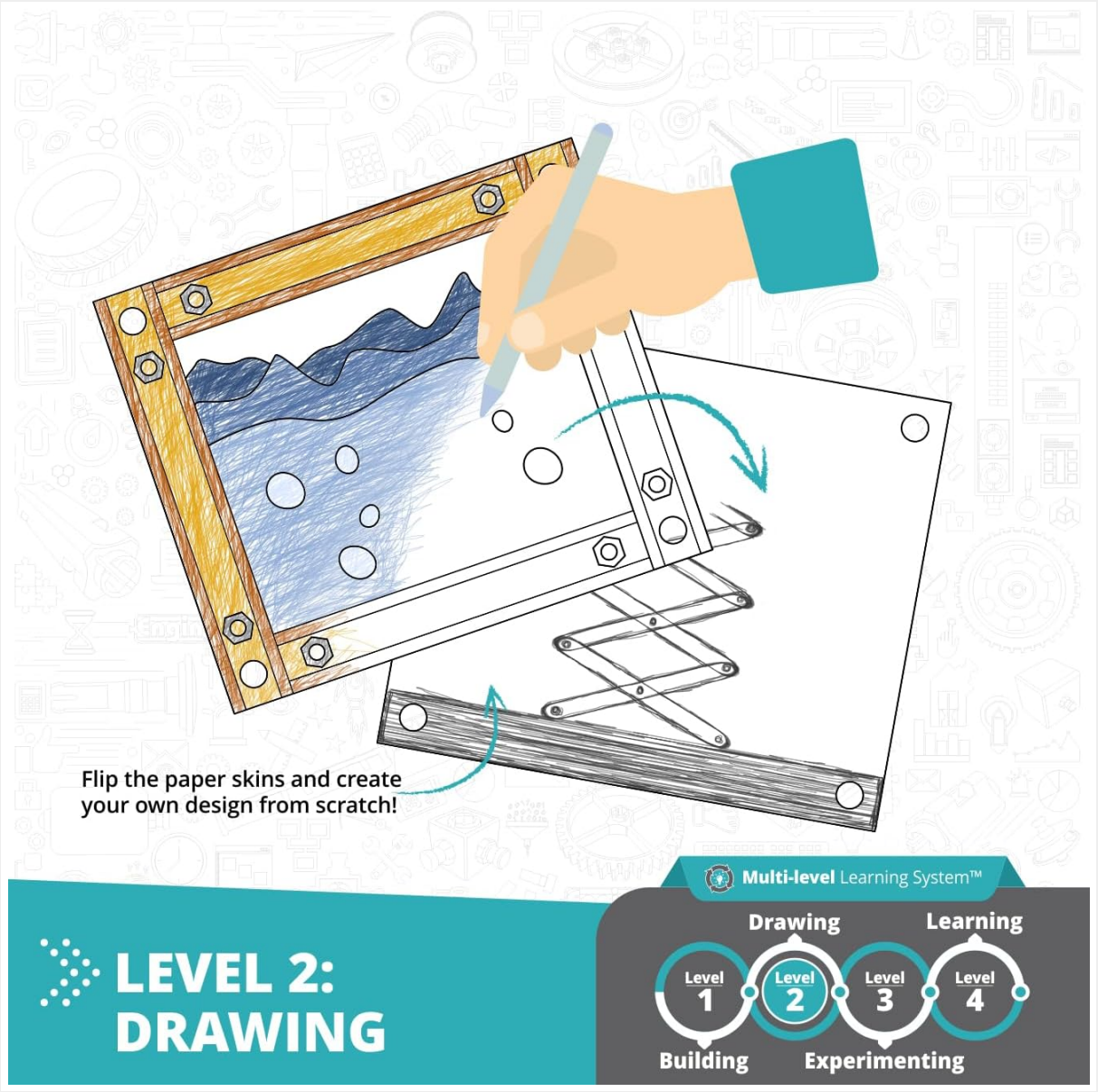

Figure 5: Customizing model appearance through drawing.

Operating Instructions (Experimentation and Learning)

This kit is designed for hands-on experimentation to understand hydraulic principles. The "Theory & Activity" book guides you through various experiments and provides background information.

1. Experimenting (Level 3)

Each model allows for specific experiments related to hydraulics. For example, with the Hydraulic Platform model, you can investigate how force applied to a small piston can lift heavier objects via a larger piston, demonstrating Pascal's principle.

Figure 6: Example of an experiment from the activity book, focusing on a hydraulic platform.

- Follow the step-by-step instructions for each experiment in the "Theory & Activity" book.
- Observe the results carefully and record your findings.
- Answer the questions provided to deepen your understanding of the concepts.

2. Learning (Level 4)

The "Theory & Activity" book also contains an introduction to the scientific principles behind hydraulics, including concepts like fluid mechanics, pressure, and historical context such as Archimedes' Principle.

Figure 7: Excerpt from the theory book explaining fluid mechanics and historical principles.

- Read the theoretical explanations to understand the science behind your experiments.
- Engage with the "Did you know?" sections and other informational tidbits to broaden your knowledge.
- The free Augmented Reality (AR) app can make the content more engaging and entertaining.

Maintenance

- **Cleaning:** Wipe parts with a dry or slightly damp cloth. Do not use harsh chemicals or abrasive cleaners.
- **Storage:** Store all components in their original packaging or a suitable container to prevent loss and damage. Keep the kit in a cool, dry place away from direct sunlight.
- **Part Integrity:** Regularly inspect parts for any signs of wear or damage. Replace any broken or severely worn parts to ensure proper function and safety.

Troubleshooting

- **Parts not fitting:** Ensure you are using the correct parts as indicated in the instructions. Engino's patented connecting system requires a firm but gentle snap. Avoid excessive force.
- **Difficulty disassembling:** Use the provided extraction tool. Squeeze the tool to disassemble small parts or push it into the hole to pop out locked parts. Refer to the instruction booklet for visual guidance on using the

tool.

- **Model instability:** Double-check all connections to ensure they are securely snapped into place. Refer to the 3D app or printed instructions to verify the correct assembly sequence.
- **Hydraulic system not working:** Ensure all tubing connections are tight and free of leaks. Verify that syringes are properly filled and connected according to the experiment instructions. Air bubbles in the system can affect performance.
- **Missing parts:** If you find any parts missing, please contact Engino customer support with your product model number (STL24) and a description of the missing components.

Specifications

Model Number	STL24
Product Dimensions	8.07 x 11.42 x 2.28 inches
Item Weight	1.01 pounds
Recommended Age	8 years and up
Number of Parts	80
Number of Models	4
Manufacturer	ENGINO-NET LIMITED
Language	English

Warranty and Support

For any questions, concerns, or support regarding your Engino STEAM Labs How Hydraulics Work kit (Model STL24), please contact ENGINO-NET LIMITED directly. Refer to the packaging or the official Engino website for the most current contact information.
Engino is committed to providing quality educational toys. If you encounter any manufacturing defects or require assistance with parts, please reach out to their customer service team.