## 🌟 Kinetic Sculpture Starter Guide

**Bringing Motion, Art, and Engineering Together**

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### 🎯 Purpose

This guide introduces students to kinetic sculpture through hands-on, scaffolded projects that blend **science, technology, engineering, art, and math (STEAM)**. The goal is to build fundamental skills while encouraging creativity and exploration.

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### 🛠️ Learning Objectives

By the end of the starter program, students will:

- Understand basic principles of **motion and mechanics**.
- Apply **electricity and circuits** in a creative project.
- Explore the **engineering design process**: ideate → prototype → test → refine.
- Develop skills in **hand tools and safe fabrication**.
- Create and showcase their own **moving sculpture**.

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### 📚 Suggested Grade Levels

- **Middle School (Grades 6–8):** Focus on lightweight materials (plastics, cardboard, simple circuits).
- **High School (Grades 9–12):** Add complexity with metalworking, welding, robotics, and computer controls.

## 🌀 Scaffolding Projects

These mini-builds gradually introduce core concepts before the final kinetic sculpture.

**Project 1: Paper Pinwheel Generator**

- *Skill Focus:* Motion from wind/airflow, energy conversion.
- Materials: Cardstock, push pin, pencil, optional small DC motor + LED.
- Students build a pinwheel and (optional) connect it to a small motor to light an LED.

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**Project 2: Rubber-Band Orthocopter**

- *Skill Focus:* Stored energy, rotational motion.
- Materials: Sticks, rubber band, plastic bottle cap, lightweight blades (plastic/cardstock).
- Students twist and release the rotor to see lift and spin.

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**Project 3: Simple Crank Mechanism (Automaton)**

- *Skill Focus:* Gears, cams, and linkages.
- Materials: Cardboard, wooden skewers, hot glue, paper figures.
- Students create a scene (e.g., a bird flapping wings) powered by turning a hand crank.

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**Project 4: Light-Up Moving Sculpture**

- *Skill Focus:* Electricity + motion.
- Materials: Repurposed plastic/metal, hobby motor, 9V battery, LEDs, toggle switch.
- Students combine motion with light to create an expressive sculpture.

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### 🔩 Final Exhibition Project:

**Design Your Own Kinetic Sculpture**

- Students apply skills from all scaffolded projects.
- Middle schoolers may use plastics, cardboard, and small electronics.
- High schoolers may integrate metal, welding, Arduino/microcontrollers, or robotics.

*Examples:*

- Strandbeest-style walker powered by wind or motor.
- A robotic flower that opens and lights up.
- Scrap-metal character with moving arms and glowing eyes.

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### ⚡ Safety Guidelines

- Always wear goggles and gloves when cutting or drilling.
- Supervise soldering, welding, and power tools.
- Use low-voltage electronics for classroom builds.

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### 🧭 Teacher Tips

- Encourage iterative design—failures are learning steps.
- Allow creative freedom in final projects to boost ownership.
- Showcase finished sculptures in a **community exhibition**.

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### 📄 Extension Ideas

- Integrate with physics lessons (energy transfer, torque).
- Connect to environmental science (reuse & recycling).
- Invite local artists/engineers for inspiration.

## 🧩 Kinetic Sculpture Student Worksheet

**Name:** _____ **Date:** _____
**Project Title:** _____

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### 1. Project Planning

**Inspiration:**
What type of motion or sculpture are you creating?

_____

_____

**Sketch your design:**
*(Draw your sculpture idea here — show what parts move and how they move)*

**Main materials:**

- _____
- _____
- _____

**Energy source:**
☐ Wind ☐ Crank ☐ Rubber Band ☐ Motor ☐ Other: _____

**What will move?**
☐ Rotation ☐ Up-and-down ☐ Lights ☐ Sound ☐ Other: _____

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### 2. Build Log & Testing

**Challenges you faced and how you solved them:**

_____

_____

**Changes you made to improve your design:**

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_____

**Test Results:**
☐ Moves smoothly ☐ Lights up ☐ Needs adjustment

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**3. Reflection**

**What part of your sculpture are you most proud of?**

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**What did you learn about how things move or how energy works?**

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**If you had more time, what would you improve or add?**

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**4. Peer Feedback**

**Reviewer's Name:** _____
**One thing I liked:** _____
**One suggestion for improvement:** _____

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**5. Teacher Notes (optional)**

| Criteria | Excellent | Good | Needs Work |
|---|---|---|---|
| Creativity | ☐ | ☐ | ☐ |
| Mechanics | ☐ | ☐ | ☐ |
| Effort | ☐ | ☐ | ☐ |
| Reflection | ☐ | ☐ | ☐ |

AscensionLearningInc.org
✉ Contact us at AscensionLearningInc@gmail.com