

Activity Guide

Look to the Stars with the Creative Night Sky Kit!

Category: **STEAM**

Topic: **Maker**

Level: **Easy**

Duration: **60 mins**



Activity Description

This **Night Sky Kit** is not only colourful and decorative but also a fun and educational project. Build your night sky display and explore the wonders of the stars while learning valuable skills in science and design.

Learning Outcomes

- Learn the basics of electricity and how it powers the night sky display.
- Apply design thinking principles to construct their own Night Sky Kit.
- Explore circuitry and understand how electricity flows through the system.
- Discover the concept of conductivity and its role in creating functional circuits.

21st-Century Skills Developed

- **Collaboration:** Work together to design and assemble the night sky display, sharing ideas and solving challenges as a team.
- **Communication:** Express and discuss ideas while building the Night Sky Kit, improving both verbal and non-verbal communication skills.
- **Creativity and Innovation:** Bring creative ideas to life by customising and designing the night sky display.
- **Critical Thinking and Problem-Solving:** Troubleshoot technical issues and find solutions during the assembly and electrical setup process.

Collectively Creating
Opportunity for Children,
Young People and their
Communities



How to Use This Activity Guide

For Educators

- Use the learning outcomes and competencies to help build programme plans, logic models, sessions, and lesson plans.
- Refer to the equipment list to ensure you have all the materials and resources needed for the activity.
- Share the guide with colleagues and volunteers to help them learn how to effectively facilitate the activity.

For Everyone

- Print out the guide, starting with the **Step-by-Step Instructions**, for young people to follow along. This allows you to focus on deepening their understanding and engagement with the activity.
- Use the **Glossary of Terms** to help build young people's Science and Technical vocabulary.



Equipment

Components

- Laptop/PC with speakers
- Arts & Crafts Materials
- A small screwdriver
- A lighter
- A small scissors
- 2 AA batteries

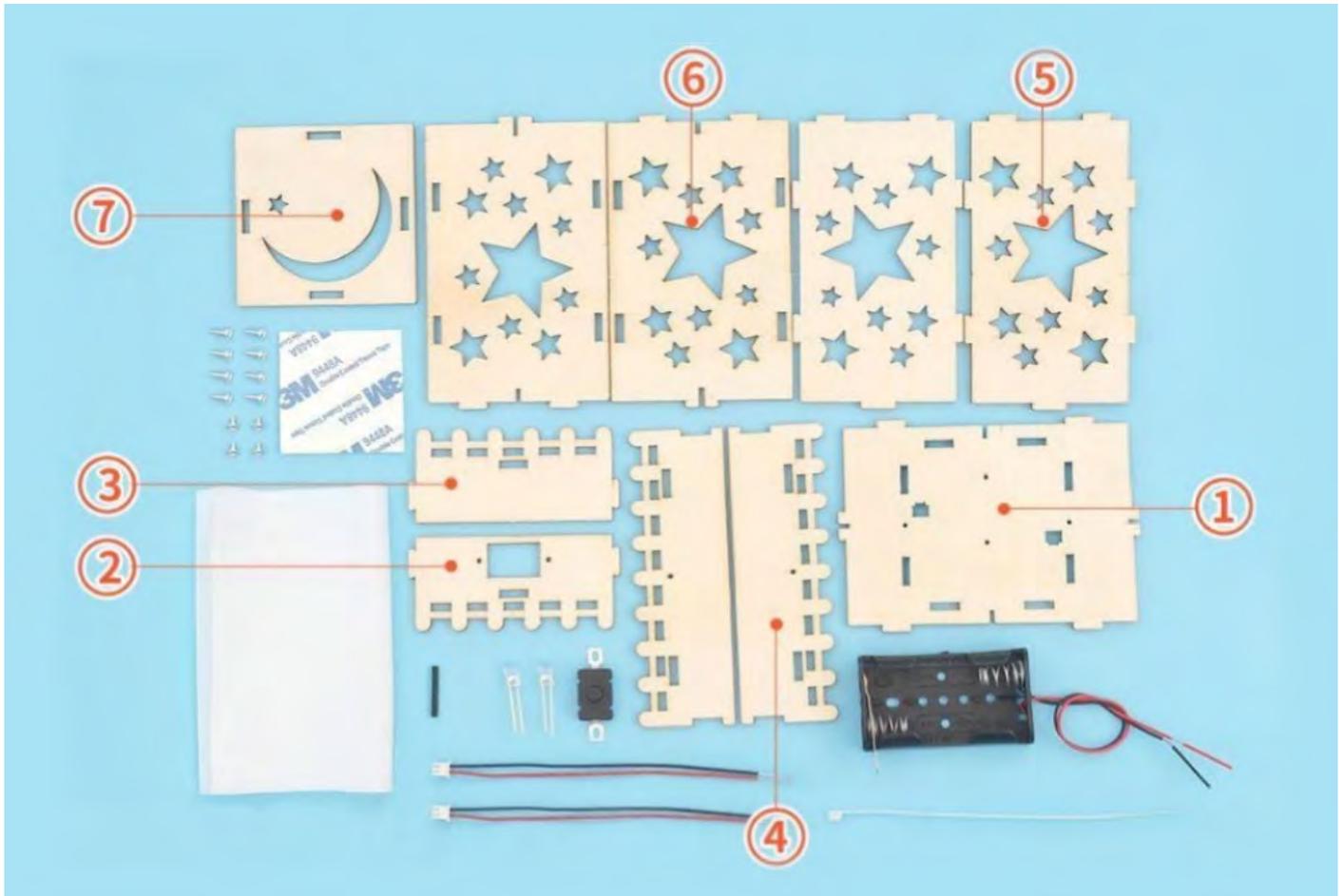
Instructions

- During the build process, a screwdriver should be used to install the screws; a lighter should be used to bake the heat shrinkable tube; a scissors should be used to trim the light-transmitting film and double sided tape.



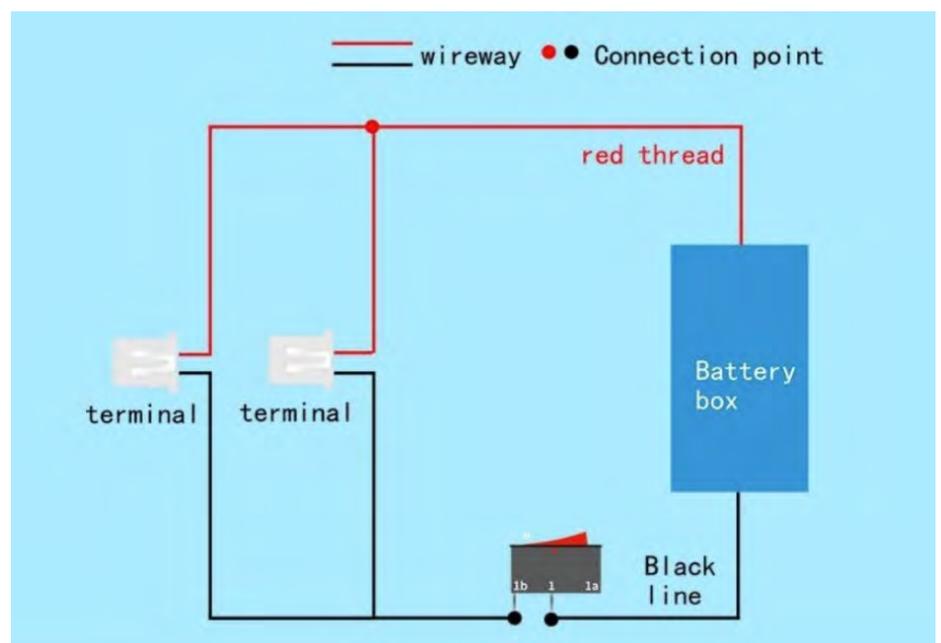
Step-by-Step Instructions

Step 1: Layout assembly pieces



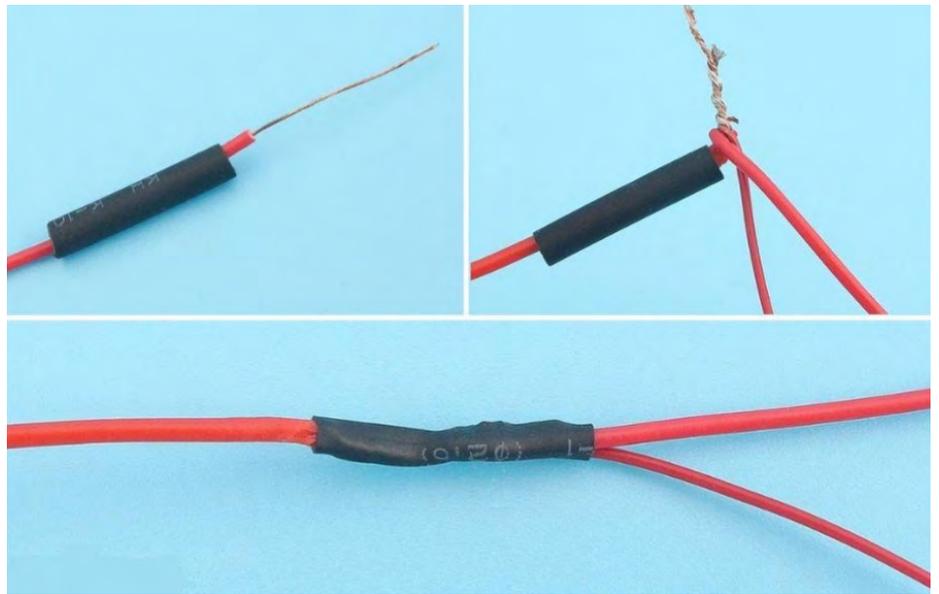
Step 2:

Refer to the circuit wiring diagram.



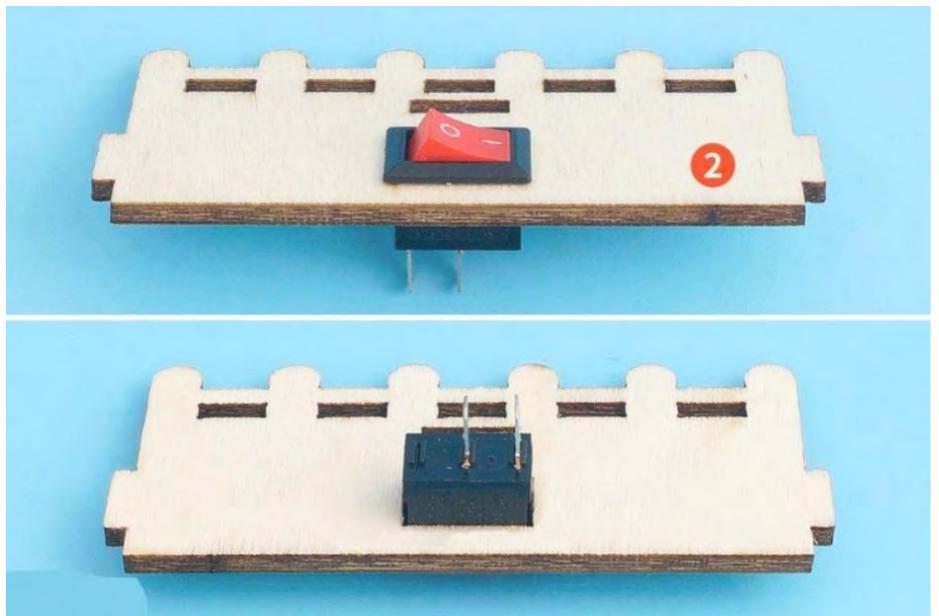
Step 3:

Refer to the circuit wiring diagram of STEP2, first put the heat shrink tube on the red wire, then connect the wire cores together, and then completely cover the wire core with the heat shrink tube, and bake the heat shrink tube with a lighter to shrink it.



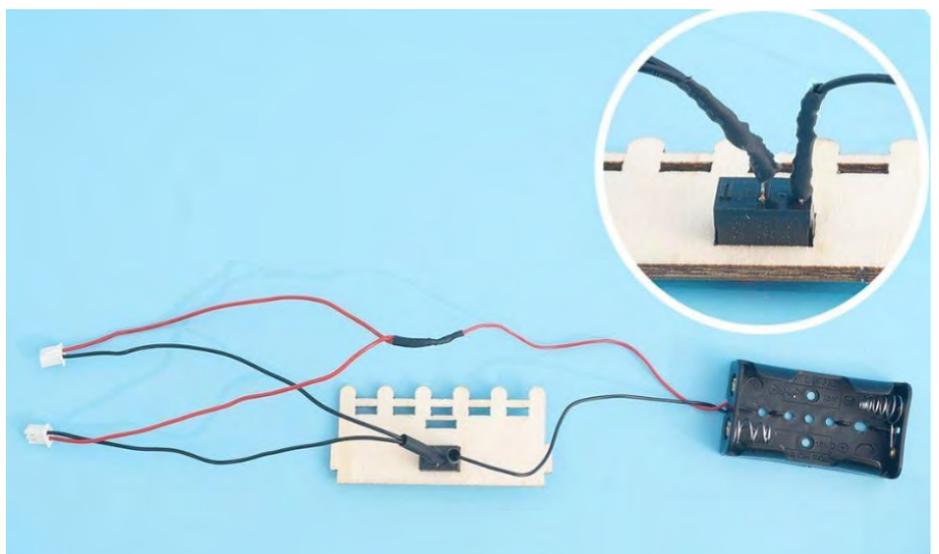
Step 4:

Refer to the figure on the right and install the rocker switch on board #2.



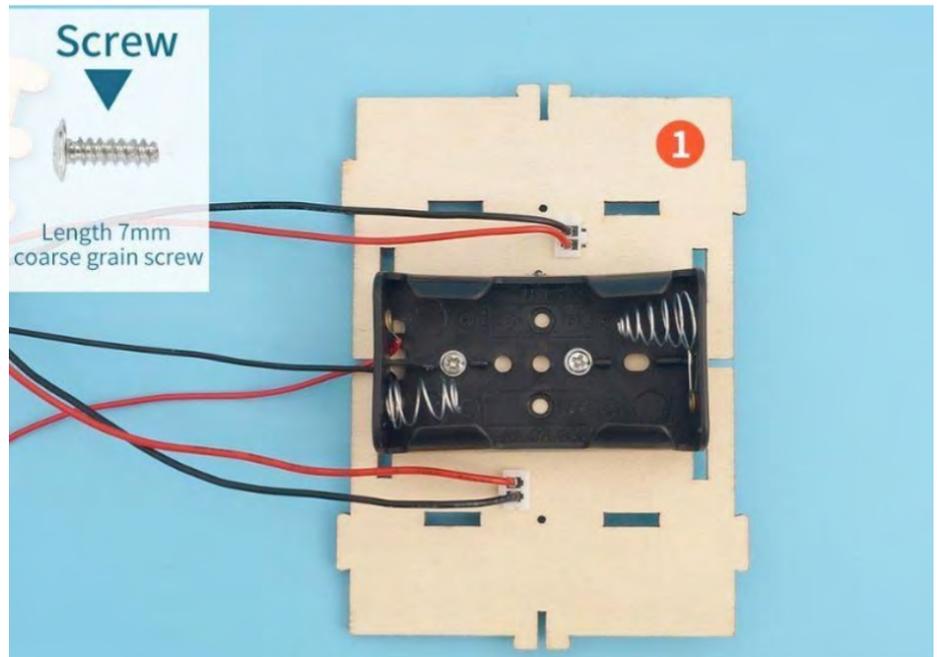
Step 5:

Refer to the STEP2 wiring diagram to connect the wires. First put the heat shrinkable tube on the black wire, then connect the wire core to the rocker switch, and then completely cover the heat shrinkable tube, and finally bake the heat shrinkable tube with a lighter to make it shrink.



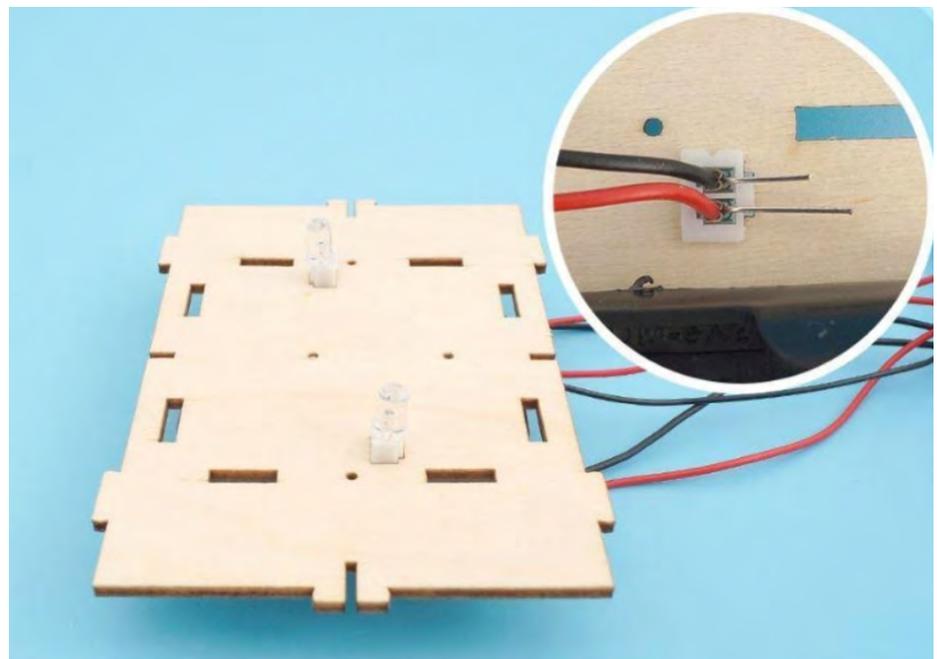
Step 6:

Refer to the figure on the right, install the battery box on board #1, with 7mm coarse-grained screws, and then insert the white terminal wire into the terminal slot of board #1.



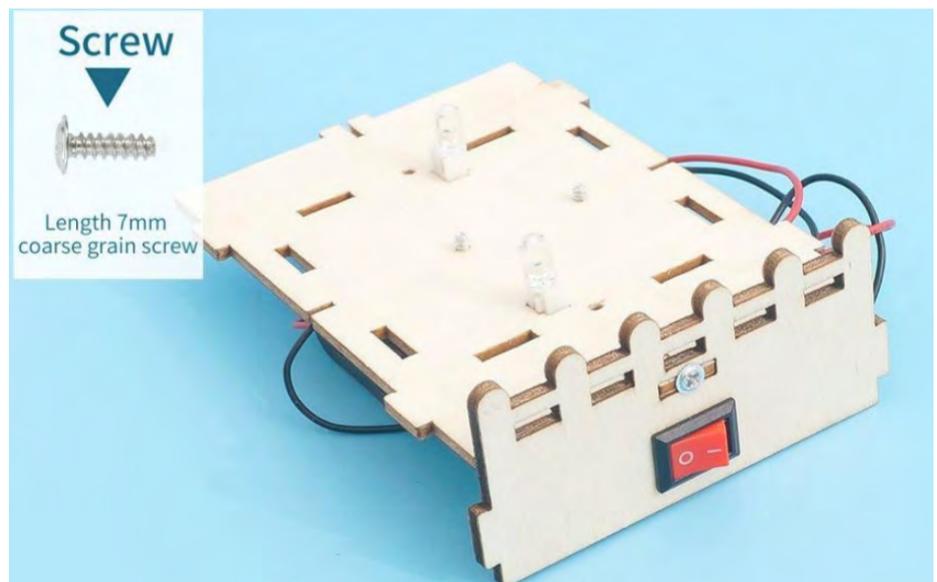
Step 7:

Refer to the figure on the right, install the LED light on the white terminal wire, connect the long pin into the white terminal and the red wire port, and the short pin to the white terminal and black wire port.



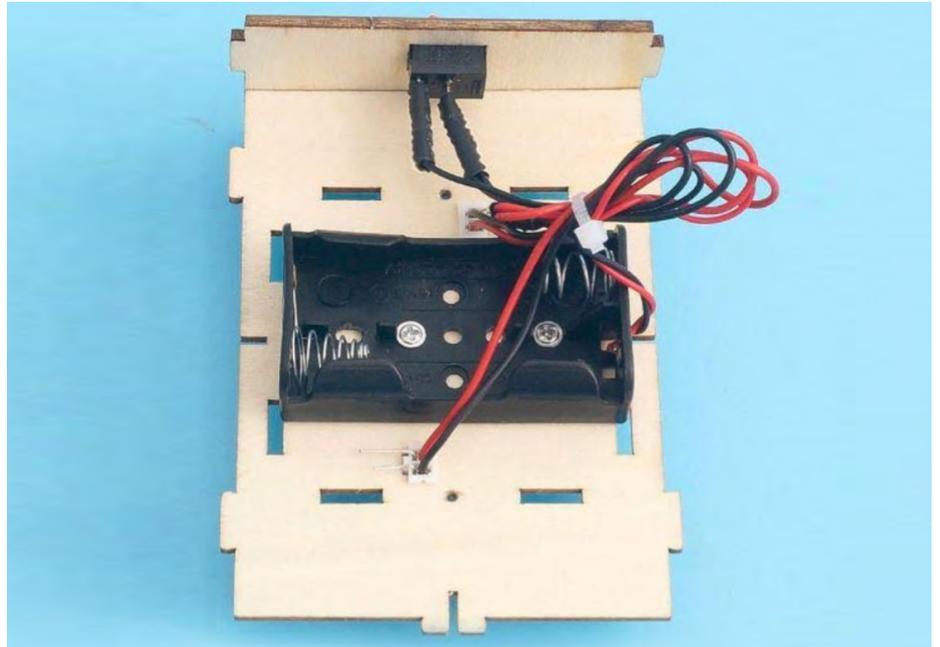
Step 8:

Refer to the figure on the right, install the #2 board white terminal wire, connect the long pin to the white the #1 board with 7mm coarse-grain screws



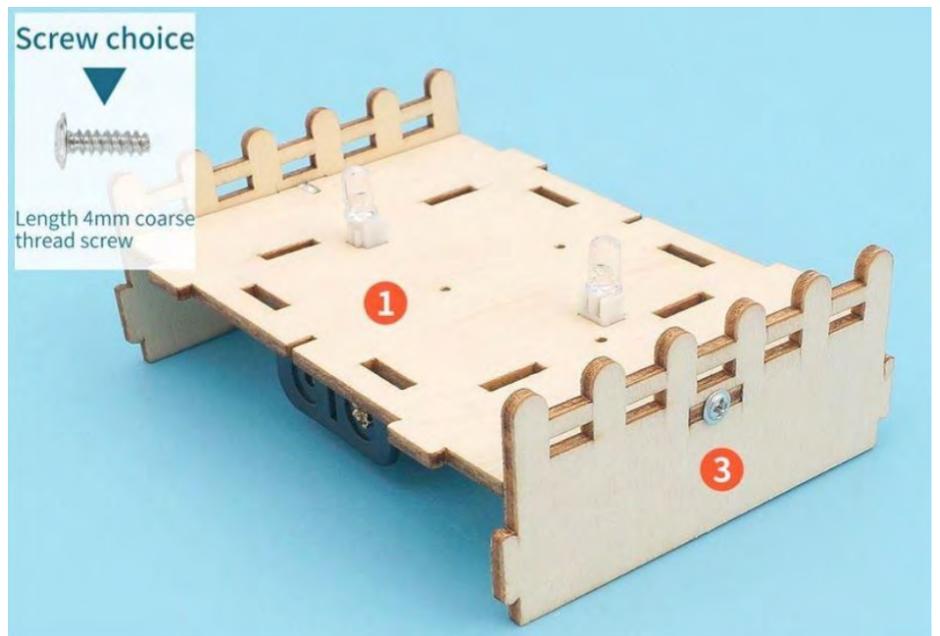
Step 9:

Use cable ties to arrange the wires, and trim off the excess cable ties with scissors. Please be careful when arranging the wires to avoid breaking



Step 10:

Refer to the figure on the right, use 7mm coarse-grained screws to install the #3, board on the #1 board.



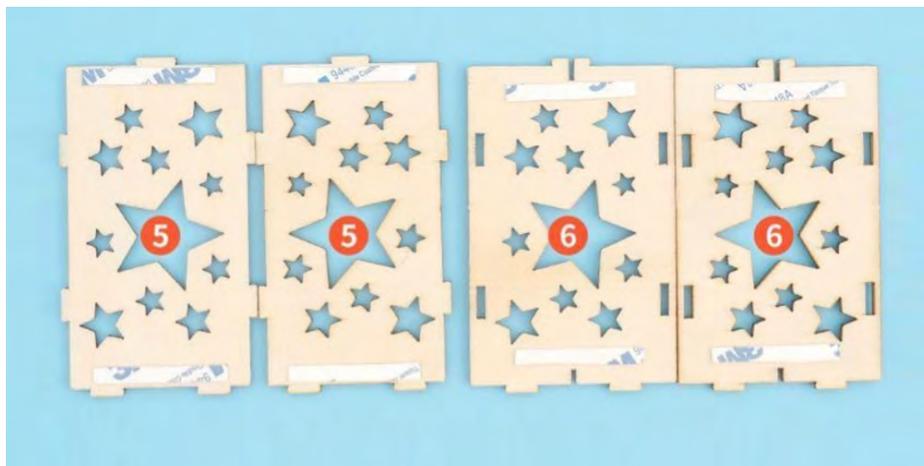
Step 11:

Use 7mm coarse-grained screws to install two #4 boards on the #1 plate, and the lamp holder is finished.



Step 12:

First use scissors to cut the 1x4cm double-sided tape into two 0.5x4cm pieces, and then stick the double-sided tape on the #5 and #6 boards referring to the above picture.



Step 13:

First use scissors to cut out four pieces of 5x10cm of the light-transmitting film, and then stick them on the plates #5 and #6.



Step 14:

Refer to the figure on the right to install the #5 board on the #6 board. Note that the protruding position in the middle of plate 5 and 6 faces upward, and the side with light-transmitting film faces inward.



Step 15:

Refer to the figure on the right to install the #5 and #6 boards on the other side. Note that the protruding position in the middle of plate #5 and 6 faces upward, and the side with light-transmitting film faces inward.



Step 16:

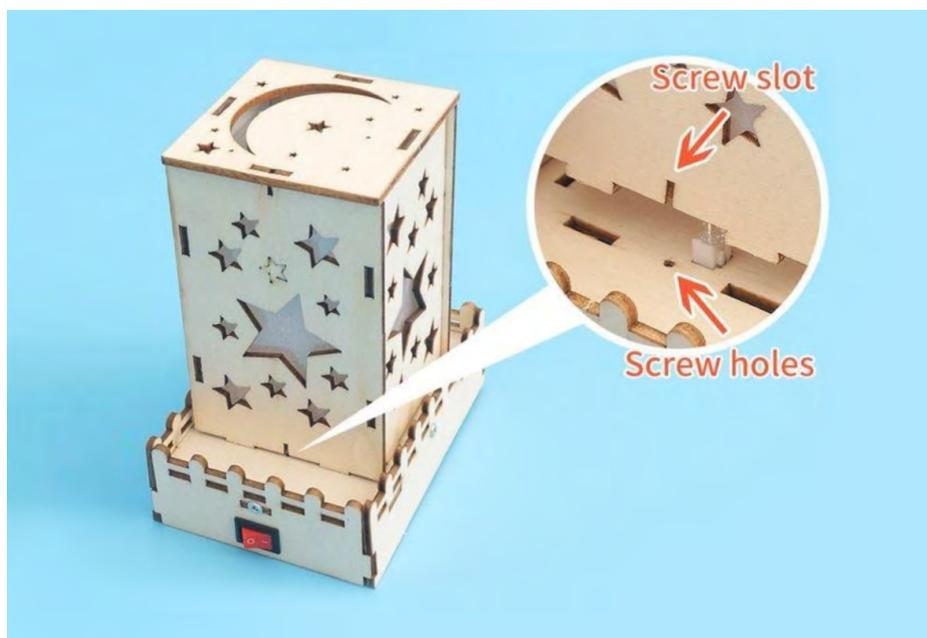
Install the #7 plate with 7mm coarse-grain screws, and the night sky is finished.



Step 17:

Install the lampshade on the lamp holder.

Note that the screw groove of the #6 board is aligned with the screw hole of the #1 board.



Step 18:

Fix the night sky with 7mm coarse-grained screws at the bottom of the number plate #1. Install the battery on the battery box, turn on the switch, and see the stars light up!





Potential Troubleshooting

If the night sky doesn't light up:

1. Check whether the wires are connected correctly, please refer to the STEP2 circuit wiring reference diagram.
2. Check whether the battery is low, it is recommended to replace the battery with a new one.
3. Check whether the pins of the LED light are plugged in the wrong way. The long pins are inserted into the red wire port and the short pins are inserted into the black wire port.
4. Check whether the wire connection is loose, and it is recommended to reconnect the wire.



Glossary of Terms

DC	Direct Current
DC Motor	MM10 low torque 3V DC motor, ideal for models and educational applications. Nominal voltage 3.0V with operating range 1.5 to 4.5V. The two flat sides enable easy mounting onto a panel or printed circuit board (PCB). Rotation is counterclockwise.
Electrical Charge	Can be positive or negative. Like charges (+ and + or - and -) repel but unlike charges (+ and -) attract each other



Battery type

Only use Zinc Chloride Cell batteries while using this kit.

Warning! Battery Box:



1. The supply terminals are not to be short-circuited
2. Insert batteries with the correct polarity
3. Remove batteries when not in use
4. Do not use rechargeable batteries
5. Different types of batteries of new and old are not to be mixed
6. Only use Zinc Chloride Cell Batteries

Battery Safety Warning

Batteries, such as the AA batteries used with this teaching kit, are a source of electrical energy and must be handled with care. To ensure your safety and the proper functioning of your STEM activities, please adhere to the following guidelines:



Keep Away from Heat

Avoid exposing the battery to direct heat sources or prolonged sunlight, as excessive heat can affect its performance and safety.



Avoid Short Circuits

Do not connect the battery box terminals to each other, as this can cause the battery and wire to become extremely hot. Always use the designated connectors and components. Always use the provided connectors, wires, or components as intended.



Polarity

Ensure that you insert the battery with the correct polarity, aligning the positive (+) and negative (-) terminals accordingly.



Dispose of Properly

When your battery is no longer in use, dispose of it in accordance with your local regulations and guidelines for battery recycling.



Inspect for Damage

Before use, carefully inspect the battery for any visible damage, such as leaks, dents, or corrosion. Do not use a damaged battery.



Adult Supervision

Always have an adult supervise your use of batteries and electrical components.