kinia

Age:
10+

Activity Guide

Unlock the Future with a Combination Safe Lock!

Category: **STEAM**
Topic: **Maker**
Level: **Medium**
Duration: **60 mins**

Activity Description

The key lock is one of the most basic forms of security, but today, we have advanced to combination locks, where a simple series of numbers can unlock the device. Modern locks now use various methods such as mechanical, electronic, swipe, fingerprint, voice print, and even face recognition. Learn the fundamentals of these technologies by building your own model Combination Safe Lock.

Learning Outcomes

- Understand conductive materials and how electricity is transferred.
- Apply design thinking to build a functional combination safe lock.
- Explore the principles of circuitry and electrical systems.
- Learn about conductivity and its applications.

21st-Century Skills Developed

- **Collaboration:** Work together to solve challenges and assemble the lock.
- **Communication:** Share and refine ideas effectively in team-based tasks.
- **Creativity and Innovation:** Design and customise the combination lock using creative solutions.
- **Critical Thinking and Problem-Solving:** Analyse issues and optimise the design for efficient functioning.

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

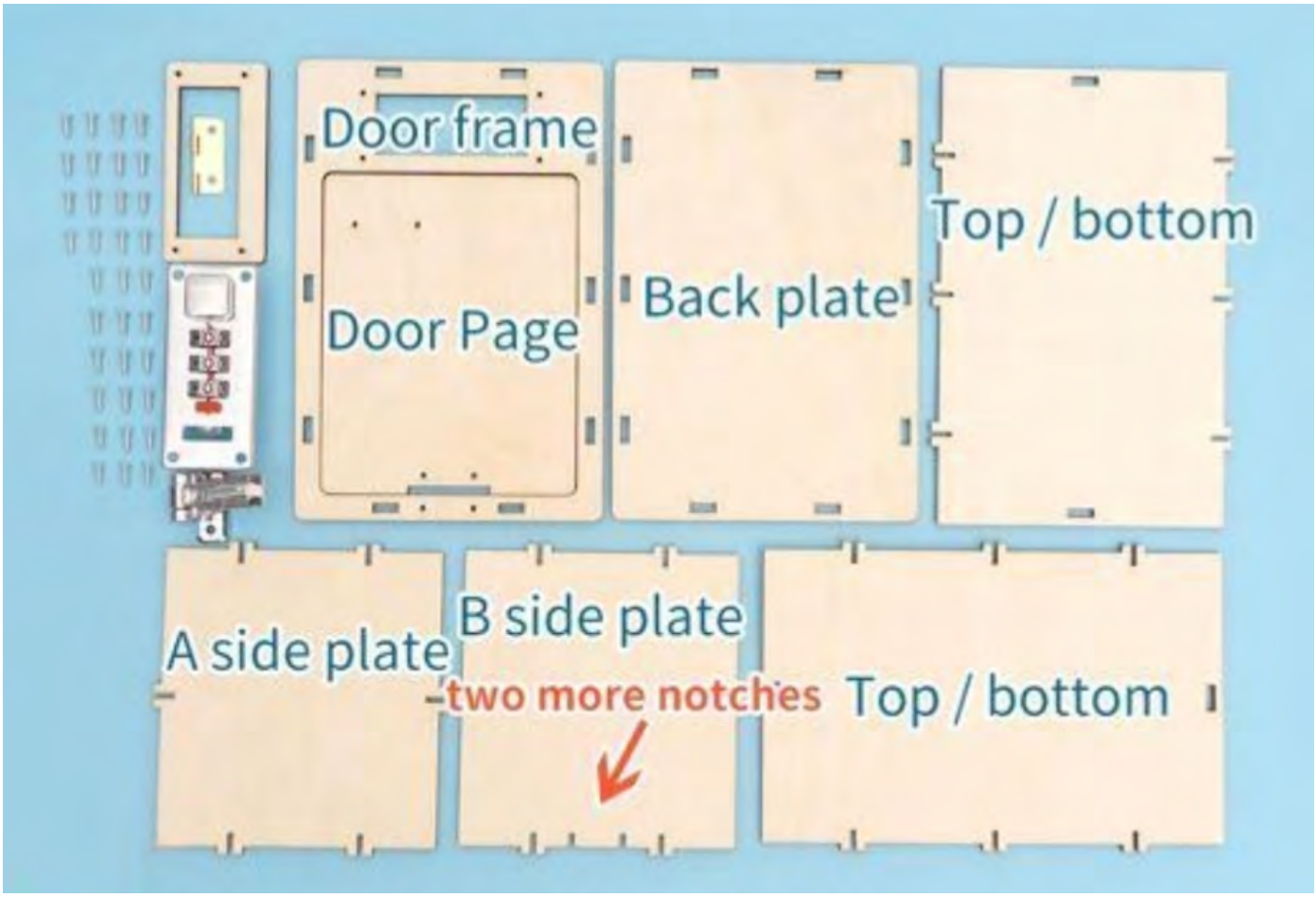
- Print out the guide, starting with the **Step-by-Step Instructions**, for young people to follow along. This allows you to focus on deepening their understanding and engagement with the activity.
- Use the **Glossary of Terms** to help build young people's Science and Technical vocabulary as they progress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

Follow-On Activity

- Explore additional information provided for upskilling or for more advanced activities to extend the learning experience.

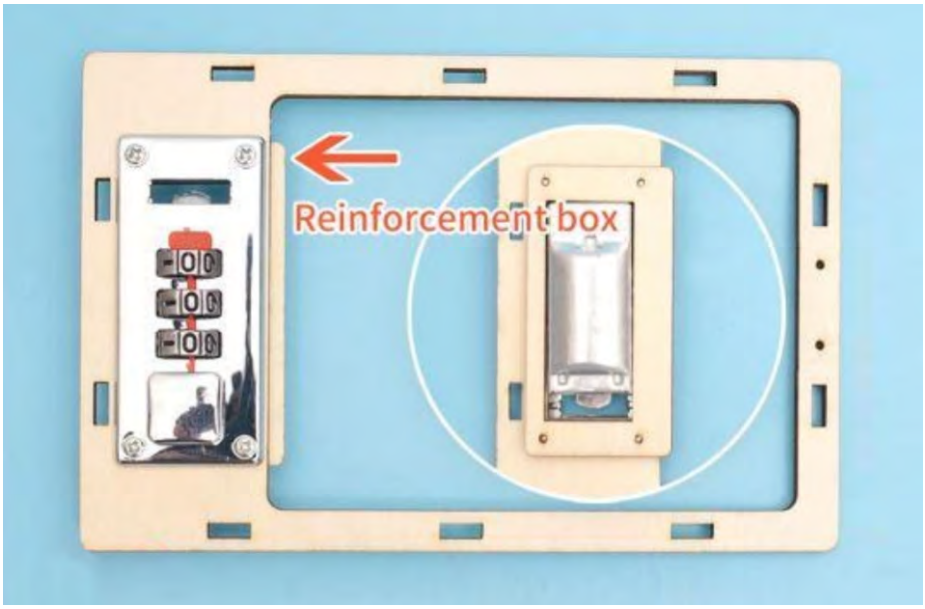
Step-by-Step Instructions

Step 1:
Layout all assembly parts.



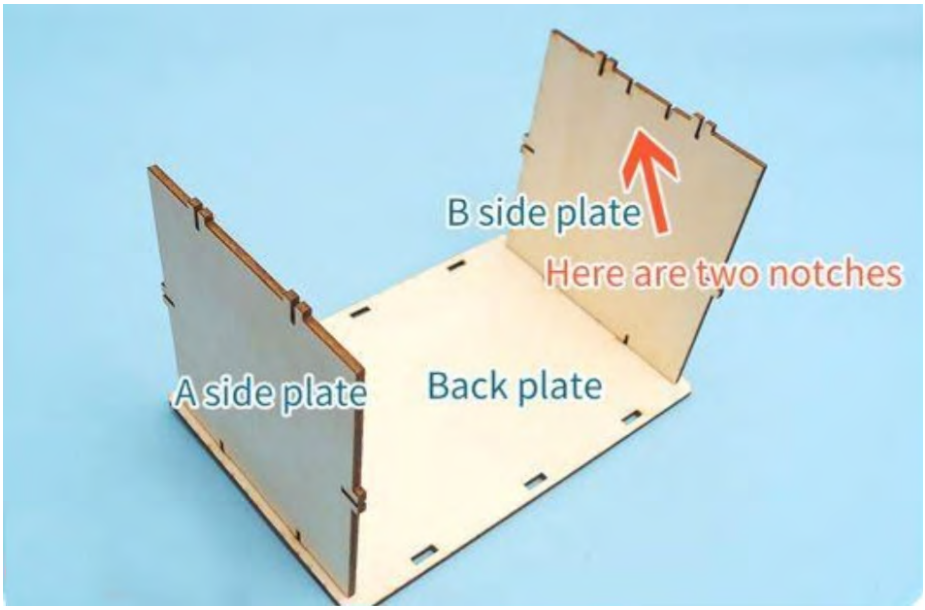
Step 2:

Use a length 7mm screw to install the lock. When installing the lock, put a reinforcing frame inside, and then install the screw. The wide side of the reinforcement frame faces the door frame.



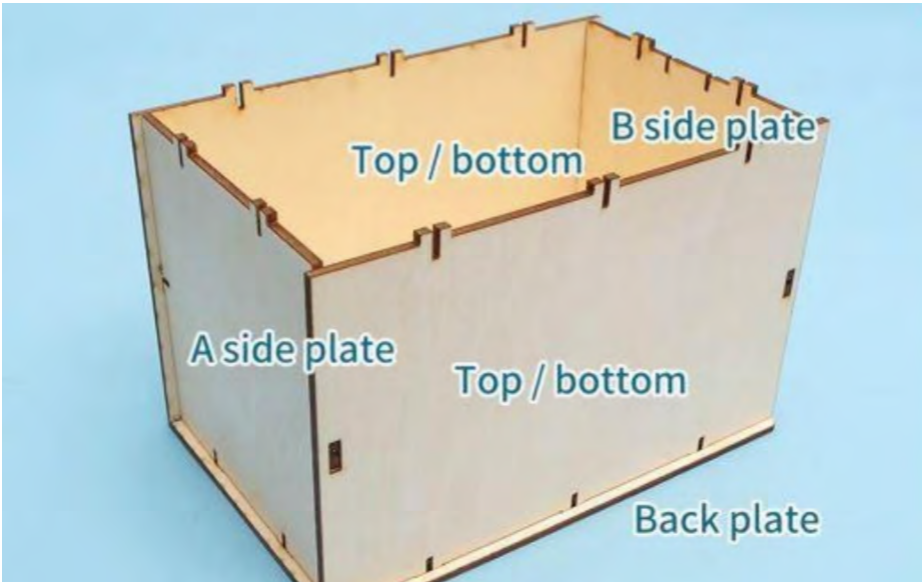
Step 3:

Referring to the figure on the right, first insert the AB side plate into the rear plate. Note that the B side plate has two more notches, and this side faces outward.



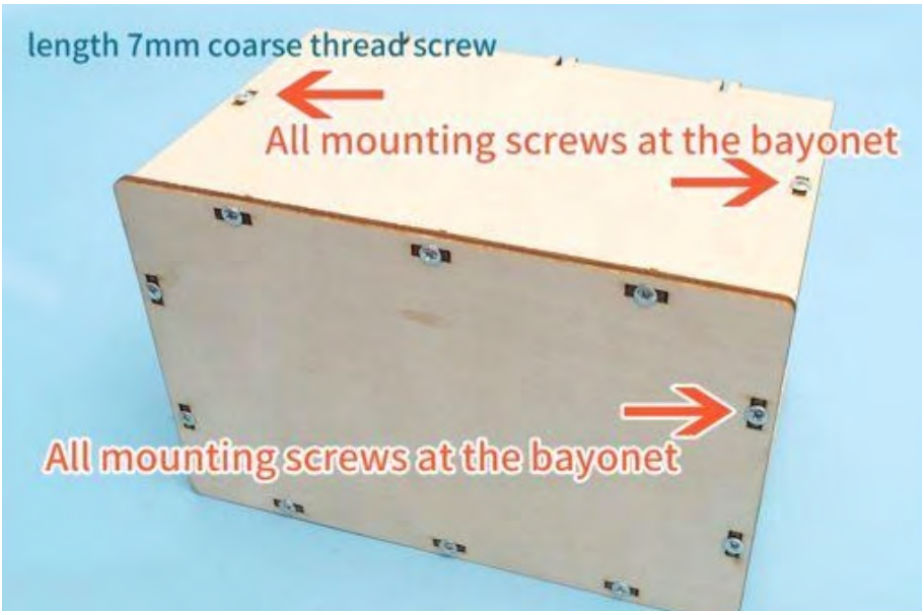
Step 4:

Referring to the figure on the right, assemble the top / bottom plate with the rear plate and AB side plate.



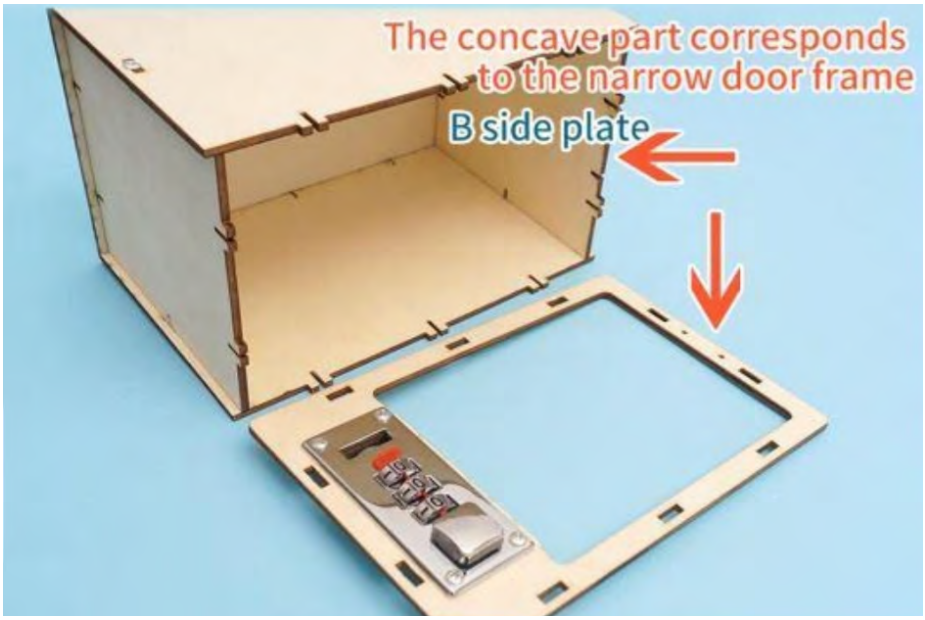
Step 5:

Fasten the assembled box with length 7mm screws.



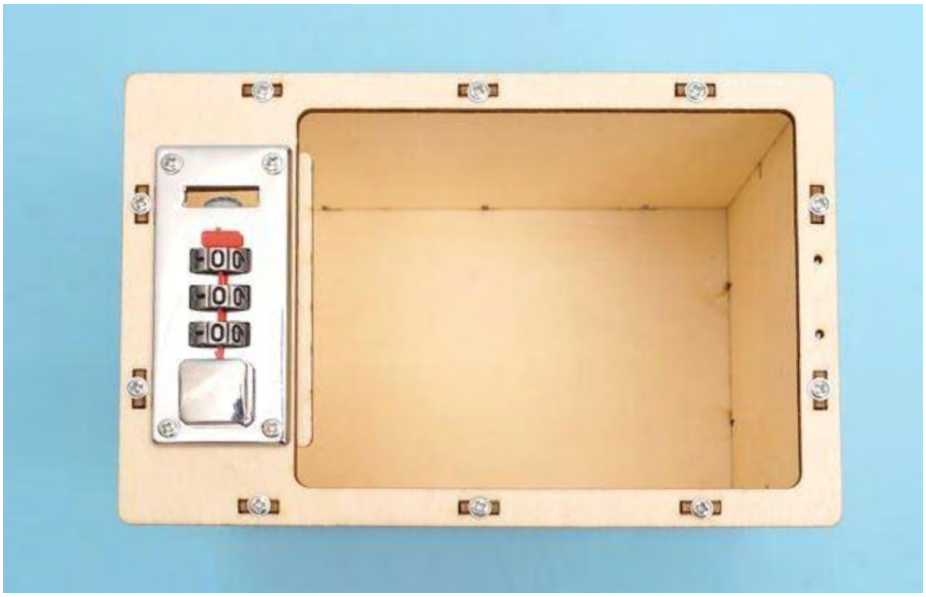
Step 6:

Before installing the door frame plate, check the installation direction of the door frame. The notch of side plate B corresponds to the narrow frame of the door frame.



Step 7:

Install the door frame on the box and fasten it with 7mm long screws.

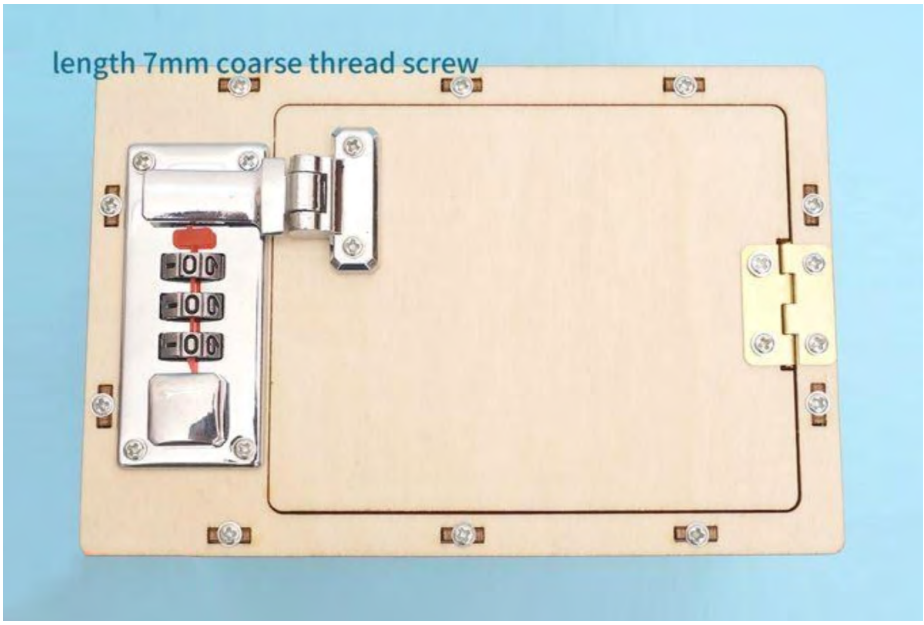


Step 8:

First install the lock clasp with 7mm long screws; then install the hinge with 7mm long screws.

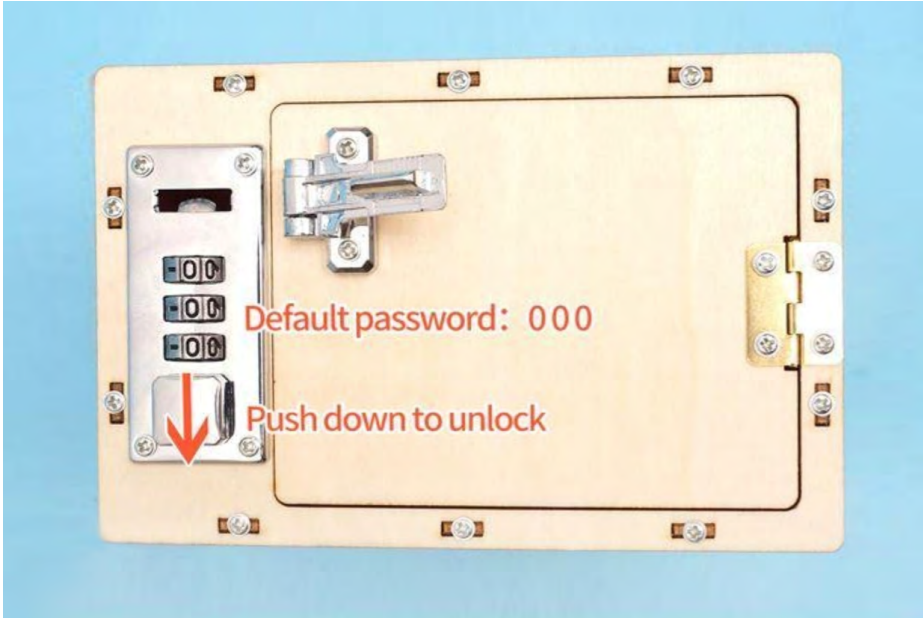
Step 9:

The door panel is installed on the door frame with 7mm long screws, and the mechanical password box is completed.



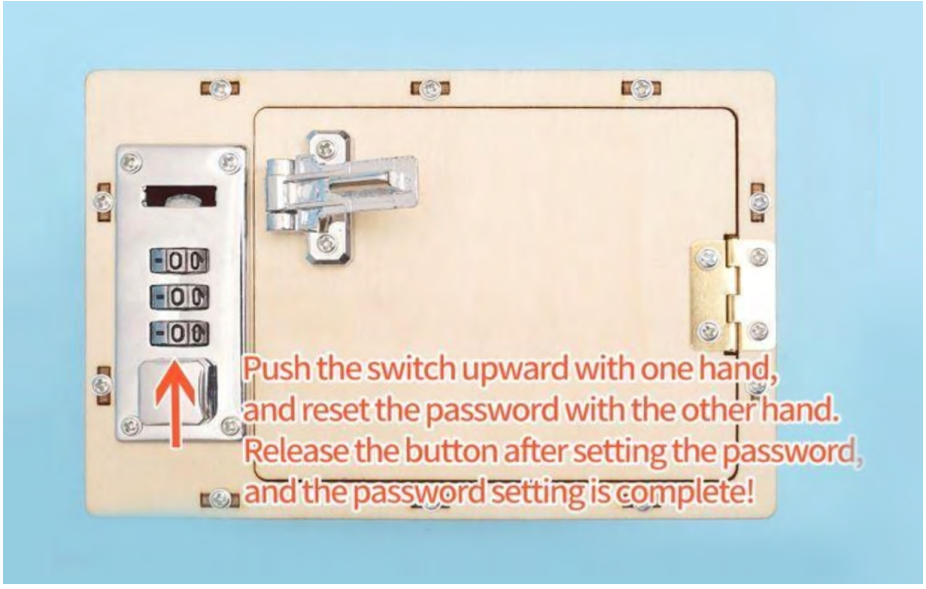
Step 10:

Push down the switch to unlock, and remove the password protection bar. The default password is 000.



Step 11:

Reset the password: first set the correct password, then push the switch upward with one hand, reset the password with the other hand, release the button after setting the password, and the password setting is complete!



REMEMBER:

Don't forget your password once you set a new one.

Other locks with passwords

Electronic passwrd
+ Fingerprint password door lock

Face recognition door lock

Fingerprint password padlock

Computer fingerprint lock

Key + mechanical
password safe

Electronic password
+ fingerprint password safe

Think about it?

Key locks, mechanical password locks, electronic password locks, fingerprint password locks, face recognition password locks, which types of password locks are more secure and convenient to use together?

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.