The Ultimate Pinhole Planetarium Instructions for Assembling and Operating

Assembling the Pedestal

1. Pull out the lead wires from the bulb socket and set the socket in the shaft B. Pay attention not to mistake the shaft A for the shaft B.

2. Cover the shaft B with the shaft A and screw at two points. Be sure to pull out the lead wires from the concavity.

3. Put the shaft between the column A and the column B and then insert the bolt, put the nut knob and then the nut and screw these on. Pay attention not to mistake the column A for the column B.

Things you will need

- Phillips screwdriver (3mm in diameter)
- Scissors, new size AA battery

CAUTION

- Please read the following instructions before assembling this kit.

- Use caution when handling any metallic parts that are made thin and sharp functionally. Improper use may cause injury.

- To avoid the risk of suffocation, use caution not to swallow small parts.

- Remove batteries after using the kit and keep away from babies and children.

- tow size AA batteries are required. Improper use of the batteries may cause the generation of heat, explosion or leaks. The following precautions should be taken:
  - Do not use rechargeable batteries such as nickel cadmium batteries or oxide batteries.
  - Ensure that the positive and negative terminals on the batteries are facing the right way.
  - If liquid leaked from batteries goes into an eye, rinse it well in a lot of water immediately and consult a doctor. When liquid stick to skin or clothes, wash it up with water immediately.

- Remove batteries after an experiment.

- Please read the assembly instructions and cautions carefully before using the kit.

- Instructions and cautions in this booklet should always be followed for safety. Do not use any materials that have become damaged or deformed while in use.

- Keep this kit away from babies and children.

- The plastic materials used in this kit
  - body (black) · HPS stellar sheet (black) · PP
  - Vinyl chloride resin is used for the covers of the lead wires.

- The metallic materials used in this kit
  - battery contact: nickel-plated iron, screw, bolt, and nut: chrome-plated iron

- When disposing of this kit, please follow the recycling regulations in your area.

- Transparent protective films are covering the stellar sheets. Do not peel off these until the finishing process.
Putting on the Month and the Time Sticker

4. Put on the time sticker so that the 18 line comes on the mark. Then put the left part around first and the right part around next, and finally cut it at the dotted line to join.

5. Put the month sticker on the base. Bring the mark at the 3 on the month sticker to the notch at the projecting ring of the base. Then, put the left part around first and the right part around next, and finally cut it at the dotted line to join likewise.

Assembling the Base

6. Insert the switch in the base.

7. Set the switch at the off position and hold it with a hand and turn it over.

Attach the parts to the base in the order.

1. Set the slide switch holding the switch at off. Keep the black switch part of the slide switch left-most while setting.
2. Set the concavity of the switch catch on the black switch part of the slide switch.
3. Fasten the switch catch with a screw and then fasten the slide switch with screws with collar.

8. Attach more parts to the base in the order.
4. Insert battery contact(+) into the battery box.
5. Insert battery contact(−) into the battery box.
6. Insert battery contact(+) into the battery box.

※Pay attention not to insert the battery contacts upside-down.

※Insert in the slot.

※The battery contacts are thin. Apply something such as a piece of cloth when pushing these in to avoid cutting your fingers.
9 Attach the battery stopper with screws with collar.

12 Connect the plug of the bulb socket to the receptacle of the slide switch. Connect them firmly.

Attaching the Pedestal to the

10 Set the pedestal assembled on the base. First, put the plug through the round hole in the base and insert the pedestal so that the projections of the pedestal fit in the holes in the base.

13 Put the new AA batteries in so that they matches with the marks of the battery box and fasten with the battery stopper.

11 Turn over the base and fasten the pedestal with screws with collar.

14 Screw the light bulb in the socket. Make sure the bulb lights up turning the switch on and off.

※ Be sure to use new batteries. (Alkaline batteries are recommended)

※ Do not screw the light bulb too tight.
Assembling the Stellar Globe

15 Fold the boundary lines around the pentagons of the stellar sheets a couple of times to make creases.

Fold every boundary between the pentagons and the alphabetical parts a couple of times tightly.

It is easier to fold toward the sides without protective film first.

16 Put both side adhesive tapes on the reverse side and without protective film. Put the adhesive tapes on either one of each two letters from A to R because the same letters are stuck together.

Put the both side adhesive tape on the glossy side without the protective film.

17 Adhere stellar sheets together. Put the parts of the same letters together so that the letters can be read from the outside. First, get on in A→B→C order for easy procedure. Then find the parts that can be easily stuck together. Do as 18 to adhere neatly.

The side with the protective film comes to the outside.

The half-assembled globe after A, B and C are stuck.

How to put the both side adhesive sheets neatly.

1. Peel off the quarter of the separating sheet and fold it.
2. Adhere the ripped quarter.
3. Peel off the rest of the separating sheet slowly.

After the globe is assembled, trim the edges in half (about 5mm) with scissors.

Trim off.
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20 Set the globe base in the stellar globe. Hold the globe base as shown in the figure below and tilt it to put into the stellar globe. Pull it out to fit the pentagon shape, and the stellar globe and the globe base are fastened by the hooks.

21 Set the assembled stellar globe on the pedestal.

Q: The joints of the stellar globe stuck with both adhesive tapes are coming off. How can I mend these parts?
A: Use Scotch Tape to mend the opening as shown in the right figure. Cut the scotch tape as small as possible to finish fine. If it doesn’t work, use stapler to fasten.

Q: The miniature lamp has burned out. Can I buy the replacement?
A: You can use miniature lamp on the market. Use a 0.5A/2.5V spot light bulb.

Q: The stars are not round. How to make it better?
A: The pinhole planetarium projects the shape of the filament as it is and the shape becomes conspicuous as the distance from the screen becomes longer. The stars become round when the screen and the filament is vertical. Adjust the direction to find the best position.

Q: There are linear places without stars. Why?
A: These are shadows of the rims of the stellar globe. Adjust the position of the rims so that the shadows disappear.

Trouble Shooting

Q: The joints of the stellar globe stuck with both adhesive tapes are coming off. How can I mend these parts?
A: Use Scotch Tape to mend the opening as shown in the right figure. Cut the scotch tape as small as possible to finish fine. If it doesn’t work, use stapler to fasten.

Q: The miniature lamp has burned out. Can I buy the replacement?
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Q: There are linear places without stars. Why?
A: These are shadows of the rims of the stellar globe. Adjust the position of the rims so that the shadows disappear.

22 Set the latitude to the place you live. Set the time you want to observe the stars at the date you like. The stars of the time and the date will be projected.

To project the stars clean, make the room as dark as possible and choose a white surface such as a wall or a ceiling as a screen. The closer the screen is, the cleaner the stars are projected.

The dotted line shows the horizon. The stars under the dotted line are not really visible.