

The manual of Model of Sun-Moon-Earth

Our company specializes in designing and manufacturing the model of sun-Moon-Earth with whole-hearted, absorbing the advantages out of the other similar products. Testing proves that it has the merits of: precision & stability of operation, easy manipulation, decent construction design, durability and reliability.

I. Application:

The Model of Sun-Moon-Earth visualizes the relative motion regular among the Sun-Moon-Earth, which simulates the relative position among Sun-Moon-Earth in the space, images the moving status of Earth-Moon, and scientifically elaborates the natural phenomenon of the motion here from. Hence, the model becomes the indispensable auxiliary instrument for overcoming the abstract tutoring effects, helping the students deep mastering the knowledge of variation regular of celestial body motion, and popularizing the astronomic science.

II. Structure:

1. Solar: symbolizes as the red plastic ball, which has the centre as high as the Earth's.

- 1. Earth: on it, visible for seven continents, four oceans, south and north polar circle, tropic of Capricorn, tropic of Cancer, the equator, the international date line, plus three light cursors for easy to depict the collimation radial and dawn-dusk timing, with the angel vertial to the Earth's surface.**
- 2. Moon: has the average height as high as the Earth's centre. The instrument is unable to make under the same scale as the realistic size of Sun-Moon-Earth, in this manner, ecliptic line-lunar orbit intersection angle $5^{\circ} 9'$ is properly enlarged.**
- 3. Four-season panel: indicates the time and order of the Four seasons and 24 calendar city.**
- 4. Moon's phases panel : indicates the location of Moon's phase and Earth's day and night.**
- 5. Indicator: when Earth revolution acts, shows the seasons and calendar city of Earth.**
- 6. Circumgyration module: mounted under the base shaft for rotating, one end is handling, tile other is the gear group.**
- 7. Circumgyration panel: to support the body of entire instt ument.**
- 8. push shaft: connected to tile central pipe shroud activating the push shaft to make the assembly rotating for presentation**

- 1. when unpacking the instrument out of the package, hold the both ends of base in case not to break up due to over-pressure**
- 2. in application, after unpacking and wiping clean, be aware of the lubricating oil exists the operation section, if dry out, please adds a bit.**
- 3. When demonstrating, manipulating smoothly, not to rotate at a high speed or impact force, otherwise, the using life will be shortened or even damaged soon.**
- 4. When demonstrating, it's correct to make the pushing shaft circling clockwise; otherwise, it may damage the transmitting apparatus.**
- 5. When demonstrating the phenomenon of Solar eclipse and lunar eclipse, be first to check if the power works inside the Solar ball, considering the time-saving issue, line up the Earth, Moon, and Solar at the same level in advance then lift up the lunar cursor same height as the center of sun Earth, and Solar eclipse or lunar eclipse emerges. If done, please check if the cursor nails to the scale of "summer solstice", and if the Earth's axis nails to the Solar, otherwise, please loosen the bolt under the Four-season panel, re-adjust and tighten again.**
- 6. When finished, please put back into the carton, no up-side down and placedry.**

III.Demonstration:

1. The rotation and revolution of Earth:

when Earth acts the rotation centralized its axis, meanwhile, spins around the Solar, the former is called as Earth rotation, the last one is called Earth's revolution. Rotation for a circle takes 24 hrs, revolution for a circle takes the whole year (365 days - 1/4), the angle of inclination and orientation remains unchanged permanently.

2. Moon's revolution

When demonstrating the Earth's rotation and revolution, it could be observed that Moon turns around the Earth reversely, simultaneously, turns around Solar (revolution for a circle means a plenilune).

3. The day and night, dawn and dusk at the same place:

When turning the cursor from dark side to bright side, it symbolizes "dawn", just pointing to Solar symbolizes "middle noon", away from Solar into dark side symbolizes "dusk", during this period, it indicates the day time, while night emerges when the cursor goes in to the dark side.

4. The day and night, dawn and dusk at the same moment:

When Earth is spinning around, the day comes at the place where points to the Solar at the same moment, in reverse, opposite to the Solar comes the night, some spot comes the dawn, some comes the dusk. The arctic pole and Antarctic pole are shrouded by half-year time of darkness except for the vernal equinox and autumn equinox.

5. Due to the declination of its body acting rotation and revolution, the northern

hemisphere acts the rule of prolonged-night and shortened daytime in winter, prolonged-daytime and shortened-night in summer. However, the southern hemisphere acts the opposite.

6. The variation of Four-season and winter-summer time:

For the northern hemisphere concerns, at the point of Summer solstice, the daylight directly shoots at the Tropic of Cancer. Meantime, the area of bright side overwhelms the dark side, in this manner, it acts the rule of prolonged-daytime and shortened-night, together with the hot weather. When winter solstice coming, the direct sunlight shoots at the tropic of cancer, the area of dark side overwhelms the bright side, which causes the prolonged-night and shortened daytime, together with the cold weather. However, the southern hemisphere acts just the opposite. At the moment of vernal and autumn equinox, the sunlight directly shoots at the circle of equator, which causes the daylight illumination shares the similar volume, and at the middle scale of summer and winter, hence, comes the equinox of day and night, with the mild and warm climate.

7. The variation of Moon's wax and wane :

The Moon is not the luminophor itself, which could be observed is just the semi-sphere lightened by tire Solar light, the same as Earth, whenever it turns (lunar eclipse excluded), semi-sphere is lightened all the time, due to its interruptedly circling around Earth, the entire lightened area, occasionally, faces us or back on us, that's why the variation of Moon's wax and wane occurs, which is also named by the astronomy.

By the experiment, turn on the power first, position Moon in the middle of Solar and Earth, When the backlight side faces Earth, the phase of Moon is called as "su"—equivalent to the 1st day of Chinese lunar year. Keeping turning the Moon to the spot between "First quarter" and "Su", the light gradually illuminates the edge tilting to the semi-sphere of Earth, in that case, it's visible for the "first quarter", and when observing the "last quarter", it's visible for western side to the semi-sphere of "first quarter", The 15th of the Chinese lunar month is the full Moon and in the morning of 22nd and 23rd of Chinese lunar month, the phenomenon of wax and wane of Moon could be observed at the eastern side of semi-lunar.

8. The eclipse of Solar and lunar

When Moon lines in the middle of Solar and Earth, the Solar eclipse occurs, which basically happens at the moment of first period of Chinese lunar month(that's "Su" period),when Earth lines in the middle of Solar and lunar, the "lunar eclipse" occurs, at the moment of middle Chinese lunar month.

9. 24-Solar terms

Earth circles round the Solar starting from the point of vernal equinox, moving per 15° symbolizes a Solar term, when revolving an entire circle of 360°degrees, that's the 24 Solar terms, which also not only the natural regular mastered by our ancient farm workers, but the magnificent deeds putting into the actions of farming.

10.Contents included in the model :

- A, International date line**
- B. The equator, the tropic of cancer and Capricorn, the arctic and Antarctic pole**
- C. The 5 climate-variation zones**
- D. The 7 continents and 5 oceans**

JV. Maintenance and cautions: