

# The Right Tool for Observational Astronomy

---

**Equipment  
needed:  
Horizon Globe  
with all  
accessories**

The Horizon Globe will show you where objects are in the sky, so you can go outside and find them for yourself.

Everything has its place. When you first use your Horizon Globe, you may want to try out putting everything where it goes, before getting down to learning how it all works.

Each constellation disk has its own labeled slot. Try putting them all where they go. You need to flex the constellation discs a bit to get them into the slots. There are 16 constellations included with the Horizon Globe.

The *Sun*, *moons* (full, gibbous, quarter, crescent), and *planets* (Venus, Mars, Jupiter, Saturn) all belong on the outer ring, the one that is printed with the months. Don't worry about where on the ring to put them right now, just make sure they are all on the printed outer ring.

After everything is in its place, try turning the globe. Notice how everything moves together. Also notice that the Observer can see everything above the plate he's standing on, but that he can't see anything below the plate.

We can see everything on the globe, above and below the platform that the Observer is standing on. The hapless Observer is stuck in a place where he can only see what is above and not what is below.

## Exercise

1. Put each constellation disc in its labeled slot.
2. Put everything else on the outer ring with the months printed on it
3. Spin the globe. Notice:
  - a) everything moves together
  - b) the Observer (you!) can only see what's above the platform.

*Self-education is, I firmly believe, the only kind of education there is.*

— Isaac Asimov



1

Put all the accessories on the globe



2

Spin the globe and notice:

- a) that everything moves together
- b) that the Observer can only see what's above

## Horizon Globe Features

---

Let's take a look at some of the features of the Horizon Globe.



### **OBSERVER**

The little man who stands in the center of the globe is the Observer. He represents you, watching the celestial objects that move across the sky.

### **HORIZON PLATE**

The round, flat circle that the Observer is standing on is the Horizon plate. When you go outside and look around, it seems as though you are standing on a plate like this. Your horizon is where the sky seems to meet the ground.



*Astronomy is older than physics. In fact, it got physics started by showing the beautiful simplicity of the motion of the stars and planets, the understanding of which was the beginning of physics.*

-Richard P. Feynman



## ECLIPTIC RING

The outermost ring of the globe, the one printed with the months and Zodiac constellations is called the ecliptic ring. The Sun, Moon and Planets always travel on this ring. It is called the ecliptic because lunar and solar eclipses always occur on this ring.

## NORTH POLE

The wooden star at the tip-top of the globe is the North Pole. When you spin the globe, the star doesn't move, it just rotates.



Have  
you  
noticed?

**When you turn the globe, the North Pole (and the North Star) don't move, they only rotate. Is this really true? Is the North Star always in the same place?**

**Have you ever noticed that when you go outside, it seems like you are standing on a flat plate? In ancient times, some people thought the world was a flat plate that you could fall off if you traveled too far.**

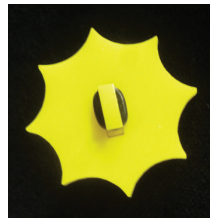
## Horizon Globe Accessories

---

The Horizon Globe SE comes equipped with one sun, four moons, four planets, and 16 constellations. Let's get acquainted with these globe accessories.

### SUN

The big yellow disc.

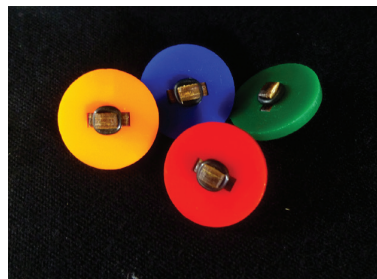


### MOON

The 4 white discs are the various moon shapes: full, gibbous, quarter, and crescent. We'll talk the meaning of the moon shapes in a later chapter.

### PLANETS

The 4 colored discs represent planets: Venus, Mars, Jupiter, and Saturn.



*Explore the globe accessories:  
the sun, moon, planets, and constellations*

## CONSTELLATIONS

The 16 clear disks are constellations. They have star patterns and names etched on them. Twelve of these disks belong to a group that has a unique name that you might be familiar with. Later we'll introduce these plus four more special constellations that we call *guideposts*.



**Zodiac Constellations**



**Guidepost Constellations**

# Hmmmm

Have you ever seen a planet? Bet you have, even if you didn't know it.  
Do you know your astrological sign? Your sign depends on which constellation was in a special place when you were born.  
Have you ever seen the Big Dipper? How about Orion?

## Getting Started - Day and Night

---

**Equipment  
needed:  
Horizon Globe  
and sun**

Place the Sun anywhere on the *ecliptic ring*, which is the outer ring that has months printed on it:



**Sun**



**Ecliptic Ring**

Give the globe a few turns. Notice how the Sun is sometimes above the Horizon Plate and sometimes below. The Observer can see the Sun when it is above the Horizon Plate but not when it is below.



**Observer**



**Horizon Plate**

(The Observer stands on it)

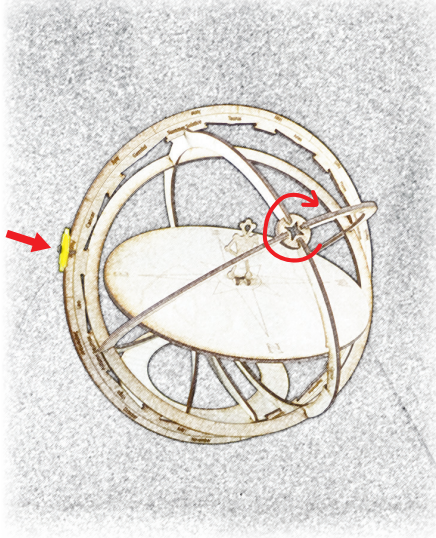
This makes the Observer just like you: when you go outside, you can see the Sun when it's above the horizon. We call this *daytime*. If the Sun is below the horizon it is *night*.

The same is true for the Horizon Globe. When the Sun is above the Horizon Plate it is day and when the Sun is below the plate it is night.

### Exercise

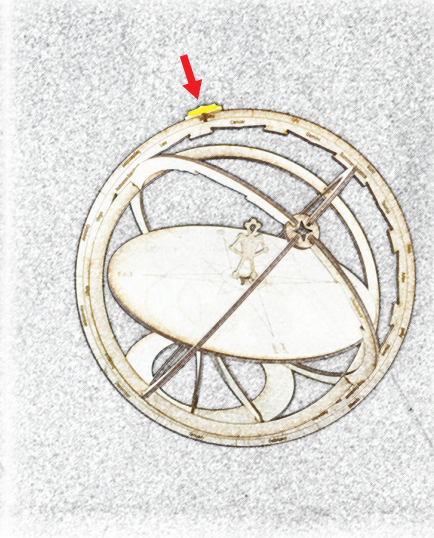
1. Put the Sun on the ecliptic ring.
2. Spin the globe.
3. Notice what the Observer can and can't see.
4. Notice day and night.

*Begin using the Horizon Globe  
Observe day and night*



1

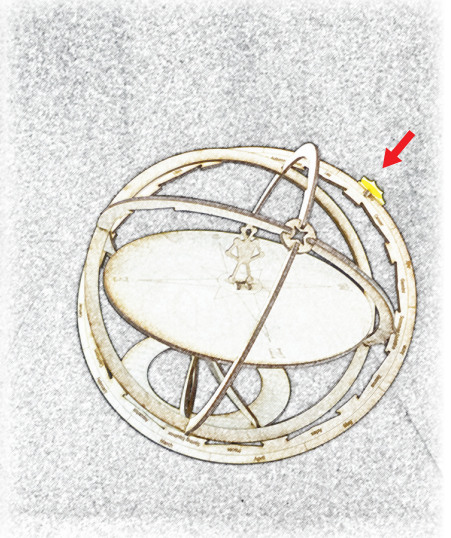
Put the Sun anywhere on ecliptic ring (shown here in mid-August)



2

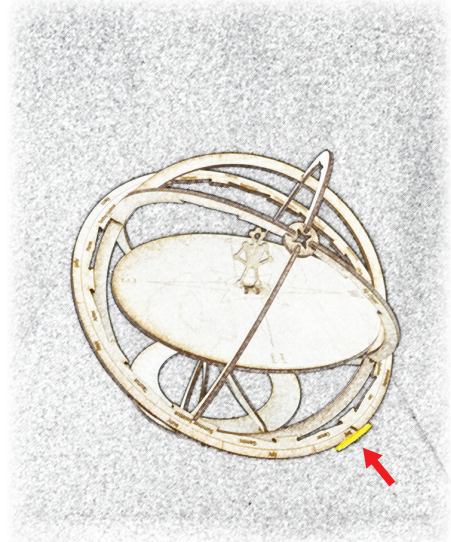
Spin the globe and watch the Sun move across the sky

(Remember, do not remove Sun from ecliptic ring--spin the globe to move the Sun)



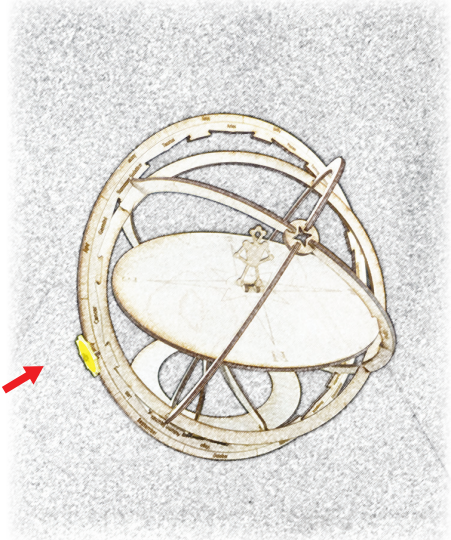
3

Keep spinning globe and watch Sun go below the horizon plate. What can the Observer see? What is hidden from his view?



4

Remember:  
Sun above Horizon Plate = Daytime  
Sun below Horizon Plate = Night



What do you think?

**Do you think the Sun really does continue on its path after it sinks below the horizon at sunset? Where else would it go? How does it get back over to the sunrise side?**



## Spin the Globe Clockwise


---



**Equipment  
needed:  
Horizon Globe  
and sun**

Celestial objects are moving all the time, that's why we need the Horizon Globe to model where they are and where they're going. Let's make sure we spin the globe the same way the sky turns.

Place the Sun anywhere on the Ecliptic Ring. Spin the globe around and around so that the Sun rises and sets, rises and sets. Is it rising on the side labeled East? If not, spin the globe in the other direction. We want the Sun to rise on the East side and set on the West side. (East and West are marked by the letters "E" and "W" etched on the Horizon Plate.)



Spinning the globe the right way is easier if you look at the globe with the North Pole pointed toward you, as shown in the photos on the next page. When the North Pole is toward you, if you turn the globe clockwise the Sun rises on your left and sets on your right, just like the hands on a clock. Double-check that the Sun rises in the East and sets in the West (maybe not exactly East-West, but from the side labeled East to the side labeled West). This is the most important part of learning to use your new Horizon Globe! From here we'll see that the Moon and stars and planets all move in a similar way.

Remember, the Sun is placed on the ecliptic ring and the motion of the Sun is shown by spinning the globe. (A common mistake is to remove the Sun from the globe and place it in a new location on the ecliptic ring to make it "move". The Sun *does* move on the ecliptic, but we'll wait to talk about that until we get to seasons. For now, make sure you spin the globe to move the Sun.)

### Exercise

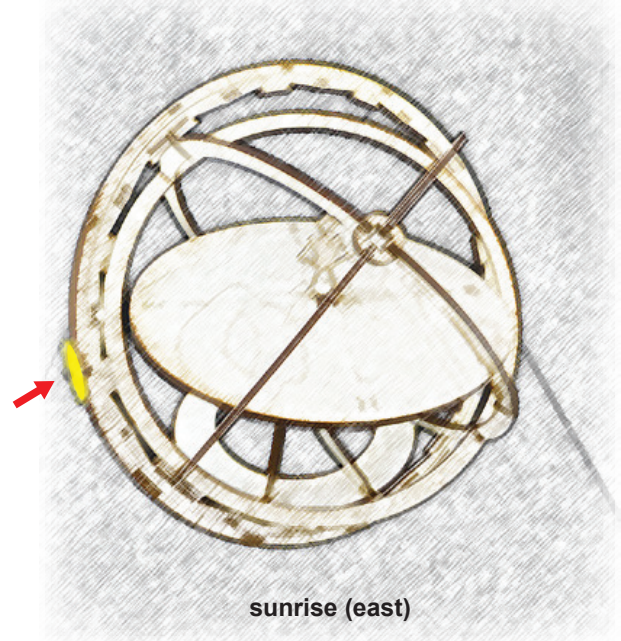
1. Start with North Pole pointed toward you and the Sun on ecliptic ring.
2. Spin the globe clockwise. Make sure the Sun rises on the East side and sets on the West side.

*Wheel in the sky keeps on turnin'*

— Journey

1

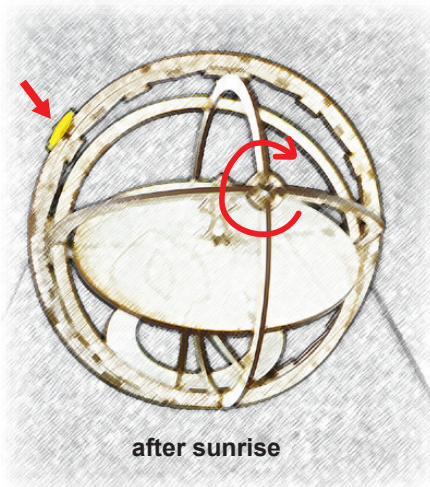
- Start with:
- the North Star pointing at you
  - the Sun on the ecliptic
  - the sun positioned at sunrise



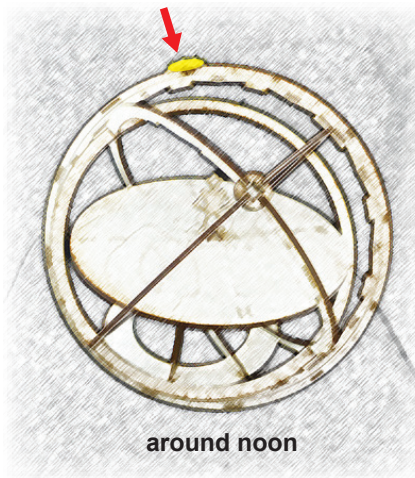
sunrise (east)

2

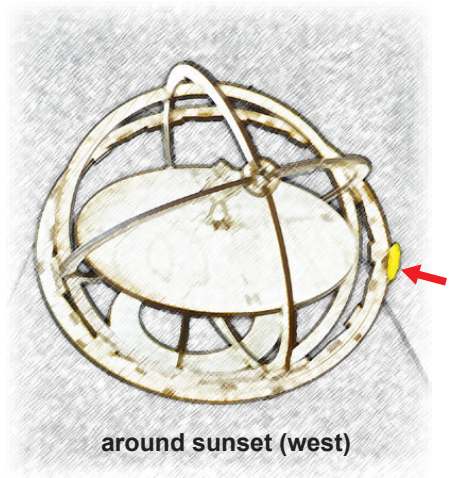
- Spin globe clockwise, watch the Sun move across the sky from east to west



after sunrise



around noon



around sunset (west)

Where does the sun rise?

Did you notice that clockwise means a different direction depending on which way the globe is facing? Make sure the North Pole is facing you and the Sun rises on the East side.