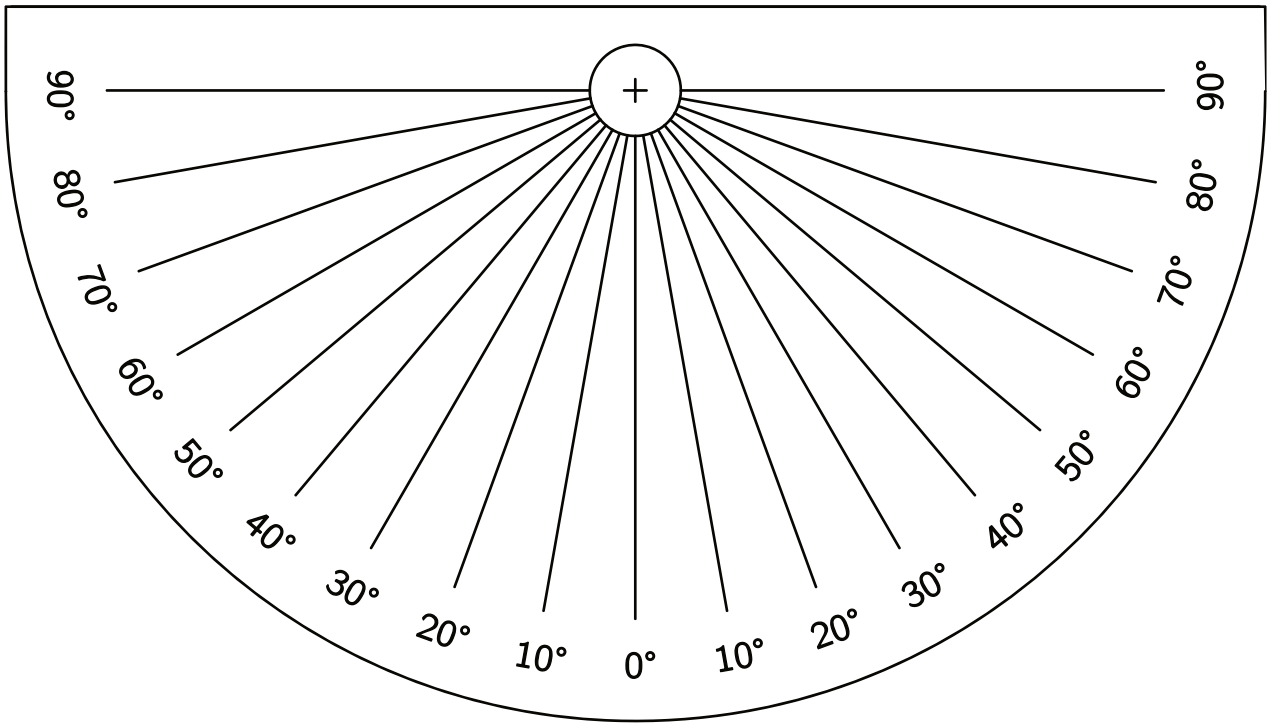
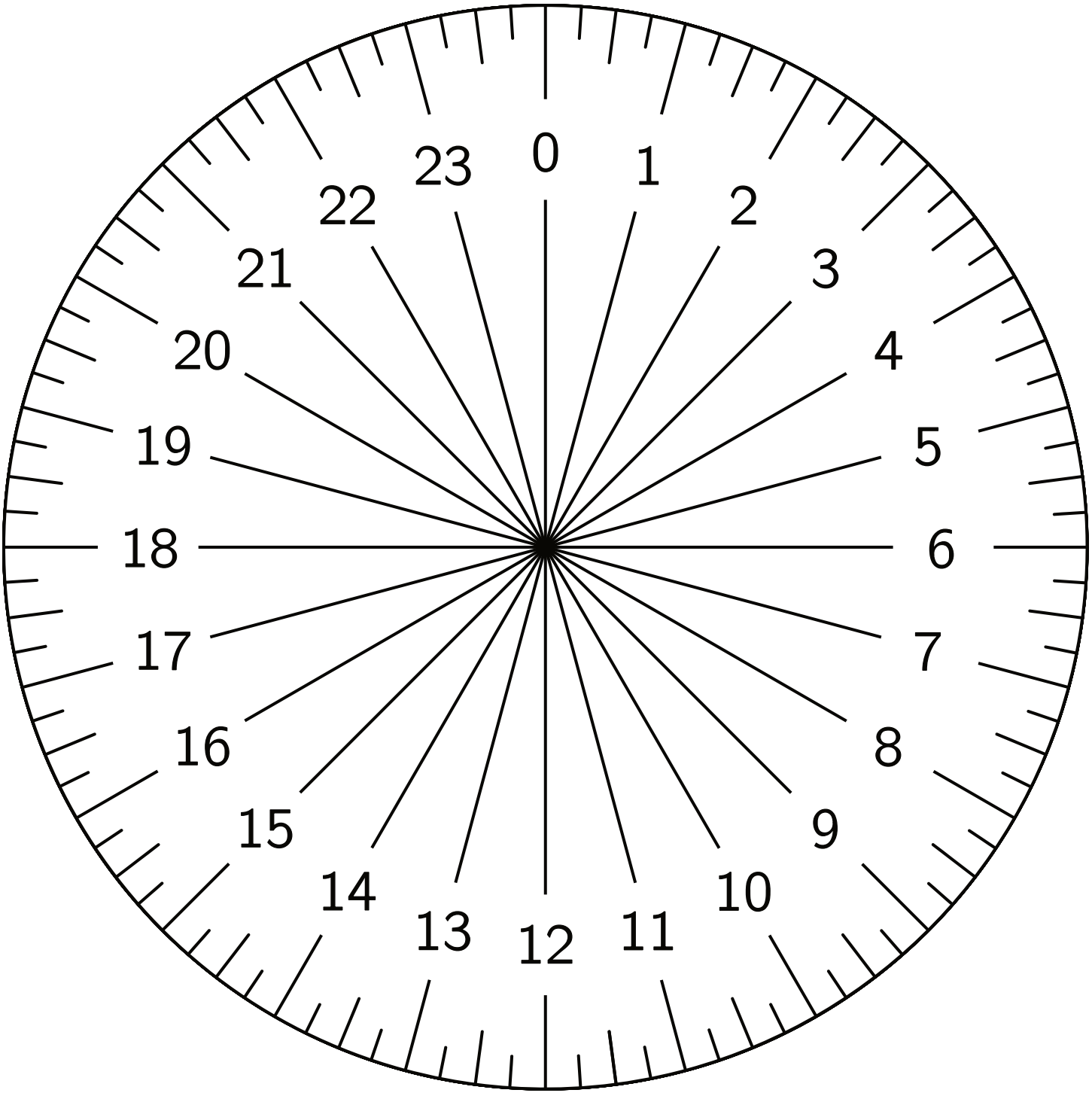
# APPENDIX

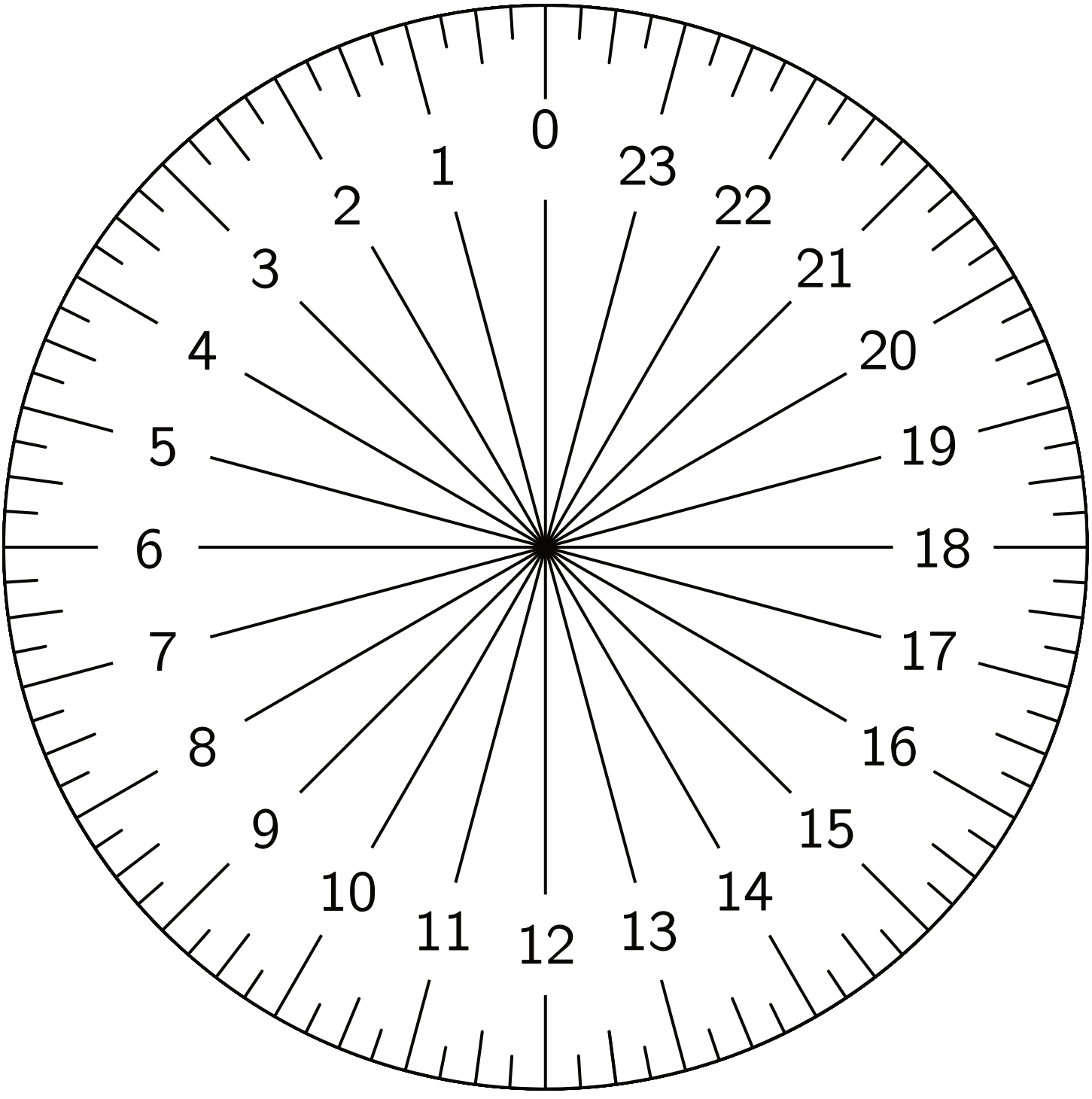
Protractor Template for **Measure Your Latitude** Activity



North Facing Sundial Template for **DIY Equatorial Sundial** Activity



South Facing Sundial Template for **DIY Equatorial Sundial** Activity



# Planet Templates for the Step Scale Model of the Solar System

Cut these out and use them to create your step-scale model of the solar system! You can place them on the ground at the various locations indicated by the step-scale chart, or you can assign a person to stand at each location and hold that particular paper.

If we scale the solar system down by a factor of 10 billion, the Sun would have the diameter of 70 mm. That's as large as this circle (providing this page is printed on standard 8.5x11 paper).

## The Sun (Sol)

But how far apart would the planets be? Cut out these papers and use the step scale to find out! Measure your steps and see if you can walk in a way that approximates 2 steps per meter. If stepping is too inconsistent, you could use a yardstick or tape measure instead.

## 1. Mercury

Using a scale factor of 1/10,000,000,000 the planet Mercury would be 0.24 mm in diameter (as big as the dot in this box). It would be 3 meters from the Sun.

6 Steps from the Sun

·
Mercury

## 2. Venus

Using a scale factor of one ten billionth, the planet Venus would be 0.61 mm in diameter (as big as the dot in this box) and be 6.5 meters from the Sun.

11 Steps from the Sun, 5 steps from Mercury

·
Venus

## 3. Earth

Using a scale factor of 1/10,000,000,000, the planet Earth would be 0.63 mm in diameter (as big as the dot in this box). It would be 7.5 meters from the Sun.

15 Steps from the Sun, 4 steps from Venus

·
Earth

## 4. Mars

Using a scale factor of one ten billionth, the planet Mars would be 0.34 mm in diameter (as big as the dot in this box) and be 11.5 meters from the Sun.

23 Steps from the Sun, 8 steps from Earth

·
Mars

## 5. Jupiter

Using a scale factor of 1/10,000,000,000, the planet Jupiter would be 7 mm in diameter (as big as the circle in this box). It would be 39 meters from the Sun.

78 Steps from the Sun, 55 steps from Mars

Jupiter

## 6. Saturn

Using a scale factor of one ten billionth, the planet Saturn would be 6 mm in diameter (as big as the figure in this box) and be 71.5 meters from the Sun.

143 Steps from the Sun, 65 steps from Jupiter

Saturn

## 7. Uranus

Using a scale factor of 1/10,000,000,000, the planet Uranus would be 2.6 mm in diameter (as big as the circle in this box) and be 143.5 meters from the Sun.

287 Steps from the Sun, 144 steps from Saturn

Uranus

## 8. Neptune

Using a scale factor of one ten billionth, the planet Neptune would be 2.5 mm in diameter (as big as the circle in this box) and be 224.5 meters from the Sun.

451 Steps from the Sun, 164 steps from Uranus

Neptune

## 9. Kuiper Belt

Using a scale factor of 1/10,000,000,000, the most famous object in the Kuiper Belt (Pluto) would be 0.12 mm in diameter and 295.5 meters from the Sun.

591 Steps from the Sun, 140 steps from Neptune

Pluto

## 10. Oort Cloud

Using a scale factor of one ten billionth, the Oort cloud would begin approximately 75 km from the Sun; that's 150,000 steps! The end of the Oort cloud may stretch to as much as 1,500 kilometers from the Sun. Can you identify a city or landmark that is approximately 75 kilometers from your model Sun?

75 kilometers or 46.6 miles

## The closest star system

Using a scaling factor of 1/10,000,000,000, Alpha Centauri, the nearest star system to the Sun, would be 4,131 kilometers away! That's approximately the distance from LA to Boston, or from Beijing, China to Kabul, Afghanistan.

It takes commercial airplanes about 5 hours to cover that distance. Walking would take about 35 days with no sleep!

4,131 kilometers or 2,567 miles