ACTIVITY ON THE TRANSIT METHOD

INTRODUCTION

Astronomers can discover exoplanets by measuring the amount of light received from a star as a function of time. The resulting graph is called a light curve. If a planet passes between us and the star, the amount of light received decreases and we observe dips in the light curve. This is called a transit.

In this activity you get to simulate transits. By comparing the light curves obtained, you will understand the effect of the size of the planet and the characteristics of its orbit.

MATERIAL

- printed worksheet
- various coins of different sizes (10¢, 25¢, 1$)

DESCRIPTION

On the worksheet, the large circle separated into 100 small zones represents the star. Each zone has about the same area and therefore represents 1% of the star. The goal is to move a planet across the star and count the number of zones hidden at different points across the transit.

The coin represents the planet. Take a coin and choose path I or II. Place your coin on the first black marker on the path and count the number of hidden zones. For the first marker (A), it is usually 0. You must therefore indicate it in the graph under the star. Repeat for each black marker in your path and make sure to put the dots on your graph aligned with the marker. Your graph at the end represents the light curve that scientists would get if they measured the amount of light received from the star as the planet passed in front of it.

Tips

- Make sure to count fractions of zones to estimate the number of hidden zones as accurately as possible.
- Since it is difficult to count zones through the coin, draw the circle of the coin and then remove it.

ANALYSIS

Effect of the Size of the Planet

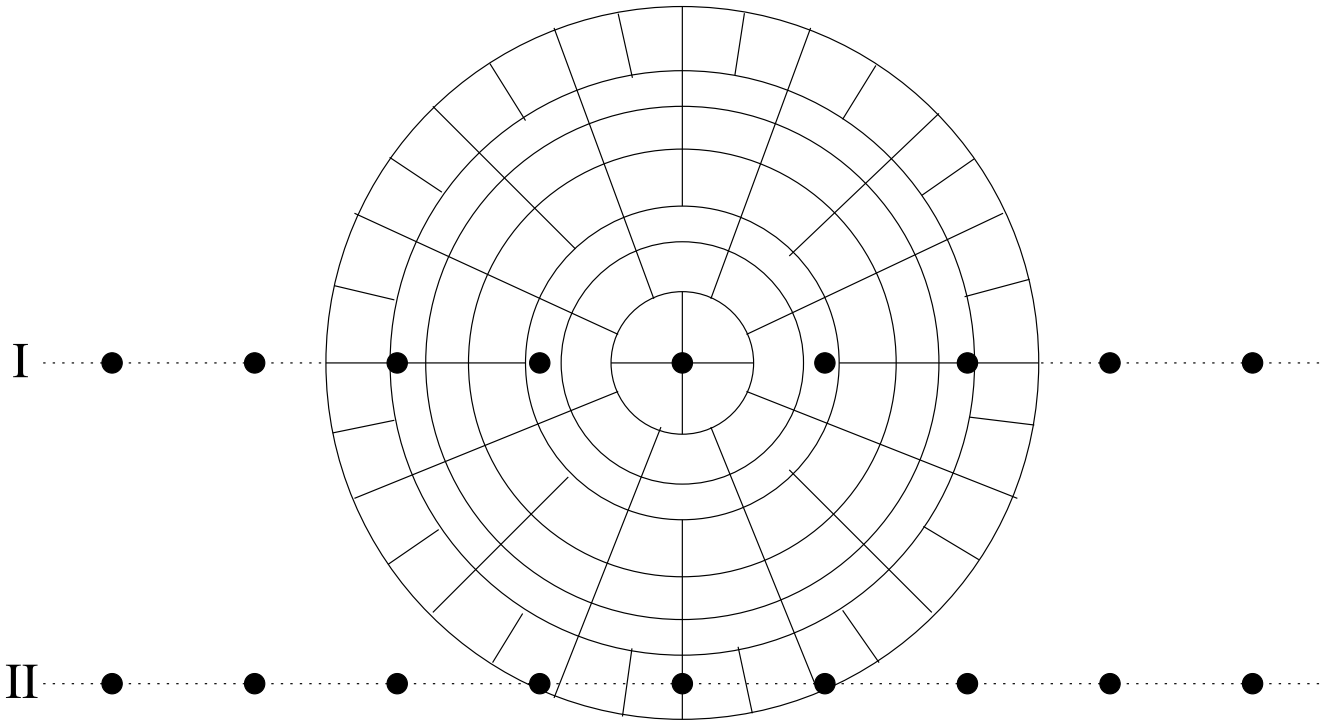
- Try coins of different sizes and compare the graph. Make sure to use the same path. How can scientists get information about the size of the planet from the light curve?

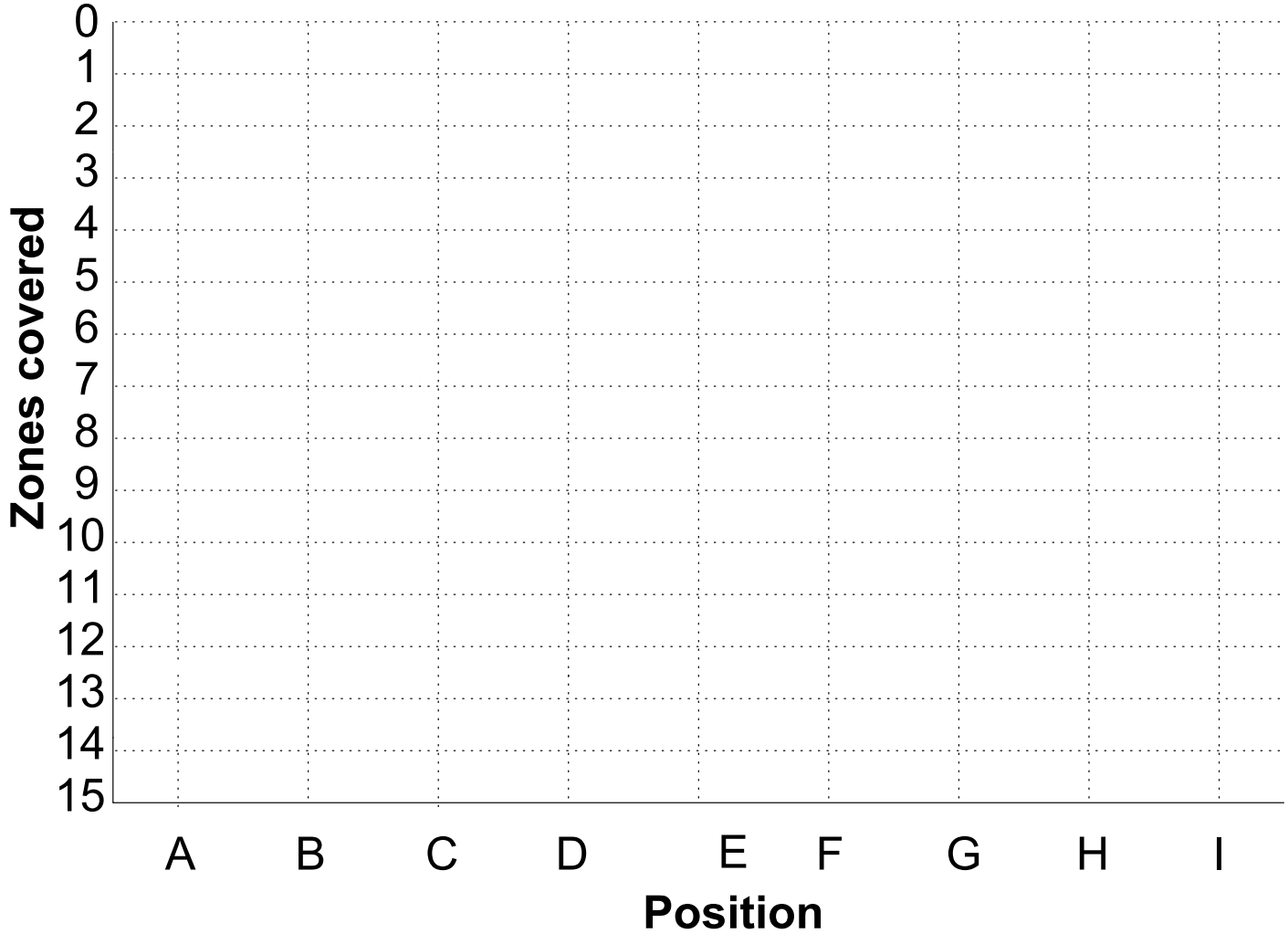
Effect of Orbital Characteristics

- With the same coin, try paths I and II and compare. How can scientists get information about the orbit of the planet from the light curve?

Thanks to Dr. Jason Rowe from Bishop's University for the original idea of this activity and the worksheet.

Name:_____


I
II


Zones covered
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
Position