

Student Guide to Activity 3: Determining the Rate of Rotation and the Period of Rotation for an Object.



Problem: How can we determine the rate (speed) of rotation and the period of rotation for a sphere with identifiable surface features?

Introduction

In ancient times the idea of a spinning (rotating) Earth was considered quite absurd. People may have asked: “If the Earth were indeed spinning like a top, why do we not feel this motion? Why do things including us not go flying off of the planet?” (How would you answer these questions?)

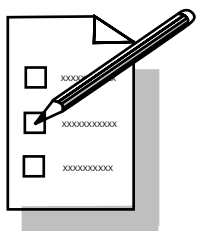
Today we know that the heavens are filled with spherical objects that orbit other celestial bodies (revolve) and spin about an axis (rotate). Astronomers have discovered these motions not by taking fantastic space voyages, flying through the Cosmos or visiting strange planets. Rather, they have reached their conclusions by observing distant objects through telescopes.

We can simulate their discoveries on a small scale by observing a rotating object in the classroom. Because astronomers are not able to actually visit the objects that they observe, you too will need to view the rotating object from a remote location. This means that all observations for your model must be made from your lab table or desk. Your task will be to observe the rotating object, making both qualitative (without numbers) and quantitative (with numbers) statements about its motion.



The McMath solar telescope at the Kitt Peak Solar Observatory
(courtesy of the National Optical Astronomy Observatories)

ACTIVITY 3 STUDENT WORKSHEET



Procedure:

1. Use the model to observe as many characteristics of rotation as possible. Include both your qualitative and quantitative observations.

Characteristics of Rotation

2. Use your knowledge of astronomy or familiar objects on Earth to write a definition and give an example of the following three terms: **Rotation**, **Rate of Rotation** and **Period of Rotation**.

	Definition	Example
Rotation		
Rate of Rotation		
Period of Rotation		

3. Working individually, observe the rotating object in your model. Determine the **rate of rotation** and write your answer in the space below. Include several sentences that describe your method.

4. With a group of two other students, compare your answers and your methods. Are all of the answers the same? If not, why?

5. With your group, determine a method to find the object's **period of rotation**. Record your step-by-step procedure below. Then use your procedure to actually calculate the object's **period of rotation**. Be prepared to share your results with the class.

Your Step-by-Step Procedure

Your Actual Calculation

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Questions:

Find a picture of a planet or other celestial object. Make a copy or drawing of it. Answer the questions below:

1. Explain how you could estimate its **rate of rotation** or **period of rotation**.
(Hint: Does the object have a distinguishing feature that may be helpful?)

2. What is the officially reported **period of rotation**?

3. Are there any objects for which estimating the **rate of rotation** would be difficult?
(Explain your answer.)