Title of Unit	Unit 2 – The Ecliptic	Grade Level	11 & 12
Curriculum Area	Astronomy	Time Frame	2 weeks
Developed By	Shelly Gould Burgess		

Identify Desired Results (Stage 1)

Content Standards

By the end of the unit, students will be able to…

1. Distinguish between Earth's rotation and revolution.
2. Explain what the ecliptic phenomenon is and why it occurs.
3. Identify and recreate sun arcs for the summer and winter solstices and the equinoxes at various latitudes.
4. Explain the reason for these sun arcs.
5. Relate these sun arcs to climate.
6. Identify perihelion and aphelion and relate these to the summer and winter solstices.

Please scroll down to page 2.

Understandings	Essential Questions	
Overarching Understanding	**Overarching**	**Topical**
Students will understand how and why the sun appears to move diurnally and annually from various latitudes.	• What is the difference between Earth's rotation and revolution? • What is the ecliptic phenomenon? • What are the solstices and equinoxes?	• What are the characteristics of Earth's rotation? • What are the characteristics of Earth's revolution? • How does the sun's position in the sky change annually? • Why does the sun's position in the sky change annually? • What is the sun's position in the sky during the solstices and equinoxes at various latitudes? • What is the alignment of the sun and Earth during the solstices and equinoxes? • How does light intensity/directness vary annually with the equinoxes and solstices at various latitudes? • How does light intensity/directness affect climate? • How do perihelion and aphelion relate to the solstices?
Related Misconceptions		
• Many common misconceptions about solar motion will be cleared up as a result of mastering this unit.		

Knowledge Students will know…	Skills Students will be able to…
• About Earth's rotation and revolution. • What the ecliptic phenomenon is and how/why it works. • The alignment of Earth and Sun during the solstices and equinoxes. • When perihelion and aphelion occur.	• Identify and create diurnal sun arcs for the solstices and equinoxes at various latitudes. • Identify and create diagrams showing the alignment of Earth and Sun during the solstices and equinoxes. • View a sun arc in the planetarium and identify the approximate latitude and time of year during which that sun arc might occur. • Relate the ecliptic phenomenon to climate.

From: Wiggins, Grant and J. Mc Tighe. (1998). *Understanding by Design*, Association for Supervision and Curriculum Development ISBN # 0-87120-313-8 (ppk)

Lesson 1

I. Objectives: Students will be able to…

- Distinguish between Earth's rotation and revolution.
- Explain what the ecliptic phenomenon is and why it occurs.

II. Materials: Classroom set of computers with ActivStudio; planetarium

III. Procedure:

A. Hook ~ Inquiry Lab: In the planetarium show the sun at different times of the year while students note observations.

B. Discovery activity: Flipchart: *Ecliptic Introductory Activity*

C. Notes: pp. 1 – 7

- Use ABC grouping to break information into small "chunks".
- Use domes and meridian diagram blanks to practice at strategic points.

IV. Evaluation: Performance on activities; quiz

Lesson 2

I. Objectives: Students will be able to…

- Identify and recreate sun arcs for the summer and winter solstices and the equinoxes at various latitudes.
- Explain the reason for these sun arcs.
- Relate these sun arcs to climate.
- Identify perihelion and aphelion and relate these to the summer and winter solstices.

II. Materials: Classroom set of computers with ActivStudio; planetarium

III. Procedure:

A. Homework: Podcast minutes 19 – 30 followed by quiz

B. Debrief podcast (notes pages pp. 8 – 28)

- Small "chunks" breaks are built into the flipchart.
- Use of domes and meridian diagrams are built into the flipchart.

C. Activity: *The Sun's Path: Equinoxes and Solstices around the World*

D. Lab activity (optional): In the planetarium (for darkness) *Me and my Shadow*

E. Activity: *Equinoxes, Solstices, and the World Map*

F. Activity: *Solar Radiation throughout the Year*

G. Homework: *The Sun and The Seasons Graphic Organizer*

IV. Evaluation:

A. Performance on activities

B. Quizzes

- Cumulative Project: Unit 2 Outdoor Astronomy Lab
- Unit Reading Assignment: Scanned reading document on student shared drive
- Unit 2 Homework