



Campus: Princeton High School

Author: Tanya Summers

Date Created / Revised: January 8, 2019

Six Weeks Period: 5th

Grade Level & Course: 12 - Astronomy

Timeline: Days 10  
Feb. 25 - March 8

Unit Title: Unit 11 - Galaxies

Lesson 1

Stated Objectives:  
TEK # and SE

**(12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:**

**(A) describe characteristics of galaxies;**

**(B) recognize the type, structure, and components of our Milky Way galaxy and location of our solar system within it; and**

**(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.**

See Instructional Focus Document (IFD) for TEK Specificity

Key Understandings

- Describe the basic properties of normal galaxies.
- Discuss the distance-measurement techniques that enable astronomers to map the universe beyond the Milky Way.
- Describe how galaxies are observed to clump into clusters.
- State Hubbles law and explain how it is used to derive distances to the most remote objects in the observable universe.
- Specify the basic differences between active and normal galaxies.
- Describe some important features of active galaxies.
- Explain what drives the central engine thought to power all active galaxies.

Misconceptions

- 

Key Vocabulary

Active galaxies	Active galactic nucleus	Barred spiral galaxy
Cosmological redshift	Elliptical galaxy	Galaxy cluster
Hubble classification	Hubble constant	Hubble's law
Irregular galaxy	Local group	Quasars
Radio galaxy	Radio lobe	S0 galaxy
SB0 galaxy	Seyfert galaxy	Spiral galaxy
Standard candles	Synchrotron radiation	Tully-Fisher relation

Suggested Day  
5E Model

Instructional Procedures  
(Engage, Explore, Explain, Extend/Elaborate, Evaluate)

Materials, Resources, Notes

<p><b>Day 1</b></p>	<p><b>Topic: Galaxy formation and classification (Intro)</b>  <b>Objective:</b> Describe the basic properties of normal galaxies.</p> <ul style="list-style-type: none"> <li>Discuss the distance-measurement techniques that enable astronomers to map the universe beyond the Milky Way.</li> </ul> <p><b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b>  <b>(A) describe characteristics of galaxies;</b>  <b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p> <p><b>Engage: Video clip discussion</b>  <b>Extend: Power point notes</b>  <b>Closing: Identify classes of galaxies</b></p>	<p><b>Instructional Notes:</b></p> <p><b>Resources: Chapter 25.3 for the galaxy formation Ch 24.1</b></p> <p><b>Materials:</b></p>
<p><b>Day 2 &amp; 3</b></p>	<p><b>Topic: Galaxy formation and classification (Student Research)</b>  <b>Objective:</b> Describe the basic properties of normal galaxies.</p> <ul style="list-style-type: none"> <li>Discuss the distance-measurement techniques that enable astronomers to map the universe beyond the Milky Way.</li> </ul> <p><b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b>  <b>(A) describe characteristics of galaxies;</b>  <b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p> <p><b>Engage: Video clip discussion</b>  <b>Extend: Power point notes</b>  <b>Closing: Identify classes of galaxies</b></p>	
<p><b>Day 4</b></p>	<p><b>Topic: Student construct galaxy</b>  <b>Objective:</b> Discuss the different types of galaxies.  <b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b>  <b>(A) describe characteristics of galaxies;</b>  <b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p>	
<p><b>Day 5</b></p>	<p><b>Topic: Distribution in space</b>  <b>Objective:</b> Discuss the distance-measurement techniques that enable astronomers to map the universe beyond the Milky Way.</p> <ul style="list-style-type: none"> <li>Describe how galaxies are observed to clump into clusters.</li> </ul>	<p><b>Instructional Notes:</b></p> <p><b>Resources: Ch 24.2</b></p> <p><b>Materials:</b></p>

	<p><b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b></p> <p><b>(A) describe characteristics of galaxies;</b></p> <p><b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p> <p><b>Engage: Video clip discussion</b>  <b>Extend: Power point notes</b>  <b>Closing: Evaluate the galactic distances</b></p>	
Day 6	<p><b>Topic: Hubbles law</b></p> <p><b>Objective:</b> State Hubbles law and explain how it is used to derive distances to the most remote objects in the observable universe.</p> <p><b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b></p> <p><b>(A) describe characteristics of galaxies;</b></p> <p><b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p> <p><b>Engage: Video clip discussion</b>  <b>Extend: Power point notes</b>  <b>Closing: Apply Hubble's law</b></p>	<p><b>Instructional Notes:</b></p> <p><b>Resources: Ch 24.3</b></p> <p><b>Materials:</b></p>
Day 7	<p><b>Topic: Active galactic nuclei</b></p> <p><b>Objective:</b> Specify the basic differences between active and normal galaxies.</p> <ul style="list-style-type: none"> <li>Describe some important features of active galaxies.</li> </ul> <p><b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b></p> <p><b>(A) describe characteristics of galaxies;</b></p> <p><b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p> <p><b>Engage: Video clip discussion</b>  <b>Extend: Power point notes</b>  <b>Closing: Determine what makes a galaxy active</b></p>	<p><b>Instructional Notes:</b></p> <p><b>Resources: Ch 24.4</b></p> <p><b>Materials:</b></p>
Day 8	<p><b>Topic: Central engine of active galaxies</b></p> <p><b>Objective:</b> Explain what drives the central engine thought to power all active galaxies.</p> <p><b>TEK/SE: (12) Science concepts. The student knows the variety and properties of galaxies. The student is expected to:</b></p> <p><b>(A) describe characteristics of galaxies;</b></p>	<p><b>Instructional Notes:</b></p> <p><b>Resources: Ch 24.5</b></p> <p><b>Materials:</b></p>

	<p><b>(C) compare and contrast the different types of galaxies, including spiral, elliptical, irregular, and dwarf.</b></p> <p>Engage: Video clip discussion          Extend: Power point notes  <b>Closing: Identify what fuels a galaxy in its core</b></p>	
Day 9	<p>Topic: Unit 11 Vocab test  <b>Objective:</b>          TEK/SE:          Evaluate/Elaborate: Unit 11 vocab test/kahoots unit 11 review  <b>Closing: Kahoots review for unit 11 test</b></p>	<p>Instructional Notes:          Resources:          Materials:</p>
Day 10	<p>Topic: Unit 11 test  <b>Objective:</b>          TEK/SE:          Evaluate: Unit 11 test  <b>Closing: start unit 12 vocab</b></p>	<p>Instructional Notes:          Resources:          Materials:</p>

**Accommodations for Special Populations**

Accommodations for instruction will be provided as stated on each student's (IEP) Individual Education Plan for special education, 504, at risk, and ESL/Bilingual.