

Name: \_\_\_\_\_

## Intro Astro Lab Prep Quiz: Lab 11: Galaxies

**Instructions:** There are  $(10 + x)$  multiple-choice problems each worth 10 marks for a total of  $(100+10x)$  marks altogether. Choose the **BEST** answer, completion, etc., and **DARKEN** fully the appropriate circle on the table provided below. Read all responses carefully. **NOTE** long detailed responses won't depend on hidden keywords: keywords in such responses are bold-faced capitalized. This is a 10-or-so-minute quiz.

### Answer Table for the Multiple-Choice Questions

	a	b	c	d	e		a	b	c	d	e
1.	O	O	O	O	O	11.	O	O	O	O	O
2.	O	O	O	O	O	12.	O	O	O	O	O
3.	O	O	O	O	O	13.	O	O	O	O	O
4.	O	O	O	O	O	14.	O	O	O	O	O
5.	O	O	O	O	O	15.	O	O	O	O	O
6.	O	O	O	O	O	16.	O	O	O	O	O
7.	O	O	O	O	O	17.	O	O	O	O	O
8.	O	O	O	O	O	18.	O	O	O	O	O
9.	O	O	O	O	O	19.	O	O	O	O	O
10.	O	O	O	O	O	20.	O	O	O	O	O

011 qmult 00050 1 1 5 easy memory: cycle of the scientific method

1. The history of the discovery of galaxies (other than the Milky Way) can be regarded as very long, slow cycle of \_\_\_\_\_ in action.

- a) the Scientific Revolution      b) a scientific revolution      c) observation without theory  
d) theory without observation      e) the scientific method

**SUGGESTED ANSWER:** (e)

**Wrong answers:**

- a) The Scientific Revolution is the name given to the transformation from pre-modern science to modern science in period c.1543–c.1687.  
b) Scientific revolution is a technical term in Thomas Kuhn's (1922–1996) theory of the history of scientific development.

**Redaction:** Jeffery, 2013jan01

011 qmult 00060 1 4 2 easy deducto-memory: nebulae noted by Ptolemy

2. "Let's play *Jeopardy!* For \$100, the answer is: The first person in the historical record to note the existence of nebulae (historical usage)."

Who is \_\_\_\_\_, Alex?

- a) Berossos, priest of Bel Marduk (3rd century BCE)      b) Ptolemy (c.100–c.170 CE)  
c) Hypatia (c.360–415 CE)      d) Abd al-Rahman al-Sufi (903–986)  
e) Christopher Wren (1632–1723)

**SUGGESTED ANSWER:** (b)

**Wrong answers:**

- a) Berossos has a reputation as an astronomer and may have known of nebulae (historical usage), but this seems unlikely.

- c) Hypatia was an ancient Greek astronomer and she knew of nebulae (historical usage) from Ptolemy's book the *Almagest* (c.150 CE).
- d) al-Sufi is the first person in the historical record to identify the Andromeda Galaxy as a nebula (historical usage) in 964.
- e) Christopher Wren was the first person in the historical record to speculate that there were other galaxies. However, this speculation seems to have had no historical impact and was first noticed it seems in 1967 by anyone other than Christopher Wren himself and a few contemporaries.

**Redaction:** Jeffery, 2013jan01

011 qmult 00074 1 4 3 easy deducto-memory: Immanuel Kant and galaxies

3. "Let's play *Jeopardy!* For \$100, the answer is: One of the early and impactful proposers of the theory that the nebulae (historical usage) were other galaxies."

Who is \_\_\_\_\_, Alex?

- a) physicist Isaac Newton (1643–1727)
- b) mathematician and philosopher Gottfried Leibniz (1646–1716)
- c) philosopher Immanuel Kant (1724–1804)
- d) astronomer Caroline Herschel (1750–1848)
- e) composer Wolfgang Amadeus Mozart (1756–1791)

**SUGGESTED ANSWER:** (c)

**Wrong answers:**

- a) No. Newton missed out on the whole other galaxy thing though Christopher Wren (1632–1723) might have explained it to him.
- b) Leibniz missed out on the whole other galaxy thing too.
- d) Caroline Herschel (1750–1848) must have known about the idea of other galaxies, but is not noted for saying anything important about them in the historical record.
- e) Mozart was actually quite clever at mathematical games and if he had had a proper mathematical education maybe could have been another Gauss. Hey, remember William Herschel (1738–1822) was a composer before turning to science.

**Redaction:** Jeffery, 2013jan01

011 qmult 00100 1 4 5 easy deducto-memory: galaxies defined

4. "Let's play *Jeopardy!* For \$100, the answer is: They are large gravitationally bound systems of stars which have undergone multiple cycles of star formation, evolution, and death. In some cases, the cycles have nearly ended and almost all the stars are now just aging. In other cases, the cycles continue to the present epoch of cosmic time and are likely to continue for many billions of years into the future."

What are \_\_\_\_\_, Alex?

- a) planetary systems
- b) binaries
- c) globular clusters
- d) bulges
- e) galaxies

**SUGGESTED ANSWER:** (e)

**Wrong answers:**

- a) As Lurch would say AAAARGH.

**Redaction:** Jeffery, 2013jan01

011 qmult 00130 1 4 3 easy deducto-memory: Hubble's law discoverer

5. "Let's play *Jeopardy!* For \$100, the answer is: This pioneer of extragalactic astronomy is the discoverer of Hubble's law as an observational result. The mathematical statement of the law includes as a factor the relative rate of the expansion of the universe at cosmic present. The said pioneer also devised the empirical galaxy morphological classification scheme that bears his name."

Who is \_\_\_\_\_, Alex?

- a) William Parsons, 3rd Earl of Rosse (1800–1867)
- b) Vesto Slipher (1875–1969)
- c) Edwin Hubble (1889–1953)
- d) Carl Seyfert (1911–1960)
- e) Allan Sandage (1926–2010)

**SUGGESTED ANSWER:** (c)

**Wrong answers:**

a) As Lurch would say AAAARGH.

**Redaction:** Jeffery, 2013jan01

011 qmult 00150 1 4 4 easy deducto-memory: Carl Seyfert

6. “Let’s play *Jeopardy!* For \$100, the answer is: This pioneer of extragalactic astronomy was the founding director of Dyer Observatory—Dyer, not Dire—in Nashville, Tennessee.”

Who is \_\_\_\_\_, Alex?

- a) William Parsons, 3rd Earl of Rosse (1800–1867)      b) Vesto Slipher (1875–1969)  
c) Edwin Hubble (1889–1953)      d) Carl Seyfert (1911–1960)      e) Allan Sandage (1926–2010)

**SUGGESTED ANSWER:** (d)

**Wrong answers:**

a) As Lurch would say AAAARGH.

**Redaction:** Jeffery, 2013jan01

011 qmult 00200 1 1 3 easy memory: Hubble sequence

7. The \_\_\_\_\_ sequence is an empirical galaxy classification scheme that nowadays has a theoretical understanding. Its eponym (the person after which it is named) concluded it was premature to interpret the \_\_\_\_\_ sequence as an evolutionary sequence. We now know that it is not, in fact, an evolutionary sequence in a simple sense.

- a) Rosse      b) Slipher      c) Hubble      d) Seyfert      e) Sandage

**SUGGESTED ANSWER:** (c)

**Wrong answers:**

a) William Parsons, 3rd Earl of Rosse, pioneer of extragalactic astronomy.

**Redaction:** Jeffery, 2013jan01

011 qmult 00210 1 4 1 easy deducto-memory: hubble tuning fork diagram

8. The two most common galaxy morphological classification schemes are conventionally illustrated with a \_\_\_\_\_ diagram.

- a) tuning fork      b) pitchfork      c) Southfork      d) South Park      e) Gosford Park

**SUGGESTED ANSWER:** (a)

**Wrong answers:**

a) As Lurch would say AAAARGH.

**Redaction:** Jeffery, 2013jan01

011 qmult 00220 1 1 1 easy memory: main galaxy types: ellipticals

9. The 6 main galaxy types are \_\_\_\_\_, lenticulars, spirals, intermediate spirals, barred spirals, and irregulars.

- a) ellipticals      b) perpendiculars      c) spectaculars      d) chroniculars      e) consulars

**SUGGESTED ANSWER:** (a)

**Wrong answers:**

e) Named for the consuls of the Roman Republic.

**Redaction:** Jeffery, 2013jan01

011 qmult 00230 1 4 1 easy deducto-memory: ellipticals described

10. “Let’s play *Jeopardy!* For \$100, the answer is: These galaxies are spheroidal in shape, largely lack interstellar dust, and consist mainly of very old stars.”

What are \_\_\_\_\_, Alex?

- a) ellipticals      b) lenticulars      c) spirals      d) barred spirals      e) irregulars

**SUGGESTED ANSWER:** (a)

**Wrong answers:**

a) As Lurch would say AAAARGH.

**Redaction:** Jeffery, 2013jan01

011 qmult 00300 1 1 2 easy memory: galaxy clusters

11. Galaxies are often found in gravitationally bound systems called:

a) bunches.    b) clusters.    c) flocks.    d) gaggles.    e) prides.

**SUGGESTED ANSWER:** (b)

**Wrong answers:**

d) Sounds right to me.

**Redaction:** Jeffery, 2013jan01

011 qmult 00320 1 4 2 easy deducto-memory: rich and poor clusters

12. “Let’s play *Jeopardy!* For \$100, the answer is: Rich ones typically have thousands of galaxies, poor ones hundreds of galaxies.”

What are \_\_\_\_\_, Alex?

a) galaxies    b) galaxy clusters    c) binaries    d) Hubbles    e) millionaires

**SUGGESTED ANSWER:** (b)

**Wrong answers:**

e) Millions.

**Redaction:** Jeffery, 2013jan01

011 qmult 00340 1 1 5 easy memory: Virgo cluster location constellation

13. The Virgo cluster is mostly in the constellation:

a) Alien    b) Lyra    c) Norma    d) Scorpius    e) Virgo

**SUGGESTED ANSWER:** (e)

**Wrong answers:**

a) Not so mundane a constellation that you could ever find it if you tried.

**Redaction:** Jeffery, 2013jan01