



## Science Update to Texas Teachers Regarding Planets and the Solar System

We have had many inquiries regarding the newly released status of Pluto by the International Astronomical Union and its affect on the TEKS, TAKS, textbooks, instructional materials and classroom instruction.

***Q: What's the latest information on Pluto? Did the scientists vote Pluto out?***

A: It is important to teach that scientists didn't really vote Pluto "out". Science is not a democracy, but rather, science is based on empirical data. Astronomers voted on a new definition of the term "Planet" based on new knowledge of our solar system.

The International Astronomical Union (IAU) members agreed that a "planet" is defined as a celestial body that:

- (a) is in orbit around the Sun,
- (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and
- (c) has cleared the neighborhood around its orbit.

To be admitted to the "dwarf planet" category, an object must have only two of those traits -- it must orbit the sun and have a nearly round shape (moons don't count as dwarf planets).

In addition to Pluto, Ceres and UB313 (temporary name: Xena), are classified as dwarf planets. The astronomical union has a dozen potential "dwarf planets" on its watch list, which keeps changing as new objects are found and the physics of the existing candidates becomes better known. Additionally, the IAU has decided that most asteroids, comets and other small objects will be called "small solar-system bodies."

***Q: Should we probably still teach the Solar System the old way?***

A: We encourage teachers to teach the most current science. These changes and reevaluations are an important part of science and give the students a window into how science is conducted.

***Q: How long will it take the state to take Pluto off the TEKS?***

A: Actually, the Science TEKS do not name the planets. At the Elementary Level, TEKS 3.11C states: (The student is expected to) identify the planets of the Solar System and their position in relation to the sun; and in middle school, TEKS Grade 6: The student knows the Components of our Solar System. The student is expected to: (A) Identify characteristics of objects in our solar system including the sun, planets, meteorites, comets, asteroids, and moons.

***Q: How will the new definition of planets affect our TAKS?***

A: Students will not be asked TAKS questions about Pluto in the short term, and we will evaluate any questions on the Solar System carefully. This year we pulled all hurricane questions in deference to the many that were affected by Katrina and Rita.

Of course, we will issue updates and most science teachers need some professional development on this new information that drastically departs from old models of the Solar System.

***Q: What will we do about material in science books?***

A: Teachers will be requesting some guidance. Resources like textbooks will always lag behind the pace of scientific advances. Science is so dynamic that after a textbook is released invariably some information has been replaced by new knowledge!

It will most likely take many years to change textbooks, encyclopedias; school charts, and models unless it is a concerted effort by the schools. Yesterday, NBC “senior analysts” all agreed books will take years to reflect the changes...and we aren’t losing a planet, we are gaining three dwarf planets (at least)!

While such discrepancies offer challenges, we already deal with at least two other major discrepancies: in Biology the Kingdom of Archaeobacteria is included in our TAKS. Some scientists even argue the existence of more Kingdoms! Texas has adopted the six Kingdom classification system for our Biology TAKS. The other discrepancy on our science TAKS is teaching the Plate Tectonic Theory instead of the old notion of continental drift. We have handled both of these examples as updates to our TAKS Information Booklets and with wide dissemination of TEA science updates.

Well folks, don’t you love science! I’ve already come up with a new Texas mnemonic to help students learn the 8 planets: My Very Educated Mother Just Served Us Nachos (to replace: My Very Educated Mother Just Served Us Nine Pizza-Pies).

Thank you for your passion for science education in Texas!

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