High School Science: A physicist’s perspective.

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Purpose

- Challenge students to do a wide reading in the areas of science.
- Understanding of basic principles, the history & philosophy of sciences as well as new discoveries.
- Foster a sense of enthusiasm about science and how it affects our daily lives.
The Science Contest

- Biology, Chemistry & Physics all combined on one exam.
- The Contest helps to promote a broad base of knowledge and better understanding.
- The contest models degree requirements at most Universities.
- Many current areas of research are in interdisciplinary fields.
Contest Structure

- 60 Multiple Choice Questions
- Divided into 20 of each topic Biology, Chemistry & Physics
- There are five answer options per question A, B, C, D, & E
- Contestants are given 6 pts. for a correct answer, 0 pts. for unanswered questions, and lose 2 pts. for incorrect answers.
- Possible wrong answers ±5%
Things to keep in mind ...

- The contest is hard!
- However, the top scores at the State Contest will be nearly perfect in every topic.
- There needs to be a clear cut winner and this will require a selection of hard questions on the contest.
- All schools divisions 1A – 5A compete with the same contest, but the scores are only compared with schools in the same division.
- But there are benefits for all of that effort spent in preparing for the contest.
Contest Awards by Division

- Top individual topic scores
- Top overall scores
- Top team scores
Some Contest Rules

- Contestants have up to 2 hours, but must remain for at least 30 minutes.
- You may use additional scratch paper provided by the contest director.
- Calculators without built in or stored scientific information are allowed, but the memory must be cleared before the beginning of the contest.
Biology Text

Biological Science
6th ed.
by Gould & Keeton
Chemistry Texts

Chemistry: The Central Science
by Brown, LeMay & Bursten
Chemistry Texts

- General Chemistry
  by Whitten, Davis & Peck
Physics Texts

Physics
by Giancoli
Physics Texts

Conceptual Physics
by Hewitt
Physics Texts

*Physics for Scientists and Engineers* by Serway & Jewett
Physics Texts

The Feynman Lectures on Physics by Feynman, Leighton & Sands
God’s Equation: Einstein, Relativity, and the Expanding Universe
by Amir D. Aczel
Not in C&CR but will be posted on UIL site shortly!
FAQs on Texts

Options:
- Half-price books / Online book sellers
- Interlibrary loan

Do I need to get these exact texts?
- Does it need to be the same edition?

What about other texts?

Does the text matter?
Other “Book” Options

Kinetic Books & Thinkwell
Online Options

With features for both students and coaches, the Khan Academy's library of over 2400 videos and resources (which cover math and science topics such as biology, chemistry, and physics) are available to you completely free of charge.

http://www.khanacademy.org/
Let’s play 20 questions!

- Too many topics and what is done.
- Spacing through the material.
  - 70/30 to 50/50 for Physics
- Order of the questions.
- Restrictions in Physics ....
  - No Calculus
  - only simple AC circuits (no phasors)
My 20 questions:

- ~4 Directed Study Questions ⇒ From “God’s Equation” by Aczel
- Variety of Question Types: Conceptual, Symbolic, and Numeric Questions
- Range of Difficulty both per Contest and over the Contest Season
“God’s Equation” Questions

- Invitational A – chapters 1 & 2
- Invitational B – chapters 3 & 4
- District 1 – chapters 5, 6 & 7
- District 2 – chapters 8, 9 & 10
- Regional – chapters 11, 12 & 13
- State – chapters 14, 15 & 16
Online Resources

http://www.uil.utexas.edu/academics/
- UIL Academics home page
- Academic Contests: Science

Note from the Physics Contest Director
- The new directed study information presented here will be posted shortly.
Some Contest Strategies

- Watch units!
- Make diagrams with labels.
- Look for order of magnitude answers.
- Problem identification...
  Quick, Easy, Moderate or Hard
  - Use these to identify how to work on speed
  - Recognize when to come back later
Coaches/Team Suggestions

- Goal setting for student moral is very, very important!
- Have students solve old contests UIL or TMSCA exams & help out other students.
- Practice as if you were in a contest
  - to time or not to time?
- Attend TMSCA contests.
- If possible coordinate with other teachers to arrange for help when needed.