

Students will be able to:

Science Teaching and Philosophy

1. State the two primary documents that address scientific literacy.
2. Select appropriate teaching methods for instruction in the science classroom.
3. Apply Piagetian and Vygotskian theory to the teaching of science.
4. Explain what Gallagher means by a new paradigm for science teaching and learning. (Gallagher Ch. 1)
5. According to Gallagher students must develop science understanding at three levels. Apply the levels to a unit or series of lessons in the high school physics classroom. (Gallagher Ch. 1)
6. List and give examples of the minimum four dimension of science necessary for the scientifically literate student to understand. (Gallagher Ch. 2)
7. Given one of Wiggins & McTighe's six facets of understanding, develop a paragraph applying the facet to the high school science classroom. (Gallagher Ch. 2)

Planning and Teaching

8. Prepare, implement and reflect upon lesson plans utilizing the KTIP format.
9. Prepare Teacher Work Sample documents reflecting professional development in preparation for student teaching.
10. Discuss the role of humanistic education and values education in the teaching of science and explain personal insights into traditional vs. social issues-related science instruction.
11. Examine the myth of a scientific method with specific classroom examples.
12. Analyze the impact of technology and interdisciplinary study on science research.
13. Given an activity or lesson plan, assess the experience using the seven Project 2061 criteria for evaluating instructional materials.
14. Sketch a diagram to demonstrate the priorities of different types of knowledge.
15. React to Gallagher's statement "Science is rarely taught effectively." (Gallagher Ch. 1 p. 7)
16. Discuss the importance of considering unit and lesson objectives prior to planning activities. (Gallagher Ch. 10)

Curriculum

17. Apply the seven steps for redesign and implementation of curriculum.
18. Examine the units of study for Active Physics and predict the success of this program in the high school setting.
19. Define and give an example of pedagogical content knowledge. (Gallagher Ch. 1)
20. Explain the difference between performance-based and more traditional learning. (Burz & Marshall)
21. Interpret (and elaborate on) the Performance-based Learning Actions Wheel (when provided a copy).

Inquiry and Questioning

22. Given the standards identify appropriate Project 2061 content and NSES content standards for the 8-12 science classroom.
23. Identify and connect NSES inquiry standards to the 8-12 science classroom.
24. Discuss strategies for promoting conceptual change in the sciences.
25. Identify and also create high-level and low-level questions (according to Bloom) and convergent and divergent questions.
26. Evaluate the use of questioning and discussion in the science classroom.
27. Propose two or three creative tasks students might accomplish in the 8-12 science classroom.

Student Learners

28. Discuss important characteristics and advantages of middle schools vs. junior high schools.
29. Analyze Gollub's simple rules for physics teachers.
30. Discuss the learning characteristics of middle school students. (EDU 349 notes)
31. List and explain characteristics of intelligent behavior. (EDU 349 notes)
32. Discuss the importance of students' prior knowledge and experiences when teaching a lesson. (Gallagher Ch. 10)
33. Examine the use of video or teleteaching in the physics classroom (both high school and college level). (Feder)

Problem Solving and Laboratory Work

34. Compare and contrast free and guided inquiry with specific classroom examples.
35. Formulate a plan for a science demonstration.
36. Summarize the five categories of skills developed in the science classroom laboratory.
37. Defend or criticize the use of student laboratory assistants in the 8-12 science classroom.
38. Develop and explain strategies to ensure a safe physical science classroom.
39. Evaluate experiments/activities selected from science resource materials.

Assessment

40. Compare and contrast diagnostic, formative and summative evaluation. (TSSS Ch. 18)
41. Construct objectives appropriate for the physical science classroom in each of three domains. (TSSS Ch. 18)
42. Create test items given a physical science subject area and the type of question. (TSSS Ch. 18)
43. Evaluate the use of written laboratory reports and laboratory practicals in the 8-12 science classroom. (TSSS Ch. 18)
44. Describe and evaluate methods teachers utilize to deemphasize testing and grading. (TSSS Ch. 18)
45. Describe and evaluate the formative assessment cycle. (Gallagher Ch. 7)
46. Discuss current trends in assessment and evaluation (and compare to more traditional assessment practices). (Hassard Ch. 8)
47. List student traits indicating s/he has actually learned. (Hassard Ch. 8)

48. List and explain forms of assessment on the spectrum from informal to formal. (Hassard Ch. 8)
49. Create checklists and rubrics for use by the foreign language teacher. (RubiStar and assessment readings)
50. Identify and create objectives in each of the three domains. (Trowbridge and EDU 335)
51. Compare and contrast new and traditional assessment strategies. (Hassard Ch. 8)
52. Describe indicators that students have learned. (Hassard Ch. 8)

Classroom Management

53. Discuss the role of peer pressure in improving classroom behavior. (TSSS Ch. 23)
54. Interpret Seeman's five components that influence alienation in relation to the science classroom. (TSSS Ch. 23)
55. Illustrate classroom management recommendations for science teachers with specific examples. (TSSS Ch. 23)
56. Assess a conflict scenario and determine an appropriate response to the incident. (TSSS Ch. 23)