



CRS

COMMUNITY RESOURCES FOR SCIENCE
practical support for great science teaching

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Helping Students Remember and Apply Science Ideas

Emphasize Big Ideas in Standards

- Post the big idea on the classroom wall
- Web it so that students can see the learning pieces and how they connect to the big idea
- Conduct group discussions and/or writing assignments leading them through:
 - Pre-Experience:
 - *What do you think will happen? What do you already know about...?*
 - *How will this experience relate to the big idea?*
 - Post-Experience
 - *What did you do or see in the lab, on the field trip, in the reading? What surprised you?*
 - *What do you think about ... now that you have done the experiment?*
 - Unit Review
 - *What do all these activities, trips, labs have in common? What do you think this lesson/unit was about?*
 - *What were the big ideas in this unit?*
 - *Why is it important?*
- Ask groups or individuals to do writing assignments or posters that include a picture and explanation of experiences, the big ideas that link experiences, why these ideas are important.
- Select assessment ideas and rubrics that keep the focus on the big ideas, vocabulary and other goals
- Multiple input opportunities help them see that it is a big idea, not just isolated experiences

Build Memory Pathways

- Find out prior knowledge and experiences before a unit so you can address underlying misunderstandings and build new connections:
 - *Has anyone ever seen ...*
 - *What do you know about ... What do you wonder about ...*
- Provide multiple experiences to use and apply ideas and vocabulary that extend over time
- Make connections to similar experiences in math, social studies (how is this like ..)
- Refer back to past knowledge and experiences when summarizing new knowledge – What I learned ...

Build Problem-Solving Skills

Inquiry and Critical Thinking Skills

- Refer back to the inquiry process and vocabulary in different situations: objective observation, identifying testable questions, developing a hypothesis, designing a fair test, drawing evidence-based conclusions, clearly recording and sharing
- Provide guidance for problem solving in many situations, noting that the process is the same in different subjects.
 - *Identify the problem and state it in your own words*
 - *Determine what information is given and what you want to find out*
 - *Think about what you already know that relates to the problem*
 - *Determine what can help you find a solution*
 - *Work on the problem or experiment*
 - *Check to see if your answer makes sense*

Test Question Skills

- Review sample questions to get used to style and ways of using tools and logic.
- Teach some simple “thinking prompts” to ask yourself on each question:
 - *What do I recognize – familiar words, pictures? Underline them.*
 - *Have I read the whole question, including any answers?*
 - *What’s the question really asking? Underline important words.*
 - *Are there any obviously unrelated answers?*
- Tell students to choose the best answer they can using the questions above, make a note of questions they might want to come back to, and move on. They can come back later to erase guesses and think more about the question if they get a chance.

Build Science Communication Skills

- Use common science vocabulary whenever possible and make note when words are used differently in other contexts.
- Post pictures of common graphics and tools around classroom in student work or posters with labels
- Put links to websites on class computer where students can practice using tools and vocabulary
- Show videos of scientists or find real role models who can demonstrate use of tools, language and skills.
- Find math, literature or social studies connections that let you make casual reference back to vocabulary or use tools, data or ideas from science units.
- Require proper use of vocabulary and graphics in performance tasks related to the subjects
- Practice organizing data, selecting appropriate graphing techniques, and reading data charts and graphs.

- Ask students to practice explaining what they learned in the science unit to their parents

Reinforce Transfer of Knowledge

- Ask questions that help kids recognize other real-life examples of ideas they're studying:
 - *Where else do we see .. in action?*
 - *Did you see any ... today?*
- Point out and build connections between science ideas and other subjects, either in content or skills.
- Pose problems that require the application of knowledge or skills
 - *Why do you think ... happened?*
 - *What might be causing that?*
 - *An interesting question, how could we find out? Is that a fair test?*
- Do longer-term physical projects or community activities that apply the ideas and skills in new ways
- Take field trips that let them see the knowledge and skills in a new context.