Best Practices in Grades 6–8 Science

Grade 6—*Investigating Earth Systems (IES)*
Grade 7—*Science and Life Issues (SALI)*
Grade 8—*InterActions in Physical Science (IAPS)*

Look for	Best Practice	Highly Effective
Program and Lesson Components	**Plans and teaches lessons to support full implementation of district science program**	Evidence that teacher uses grade-level Teacher's Guide, DPS matrices, and embedded assessment/implementation guides to implement lessons incorporating: **Lesson Components** • **Day Starter (5–7 minutes*)** o Teacher assesses student knowledge (e.g., conceptions, misconceptions). o Teacher engages students in lessons (e.g., introduces vocabulary, connects with current events, poses "question of the day"). • **Inquiry Lesson (30–35 minutes*)** o Using multiple modalities, teacher explicitly shares learning goals, standards, and benchmarks with students. o Teacher explicitly shares posted safety procedures required in lab experiments and provides necessary safety equipment for student use. o All students experience lessons in student-centered learning environment with some teacher-directed instruction that follows the five Es learning cycle. • **Engage**—Teacher activates student curiosity about key concepts and introduces **essential** vocabulary. Teacher elicits prior knowledge of concepts. • **Explore**—Teacher poses questions (guided inquiry) for students to investigate. Students record observations and data in science notebooks. • **Explain**—Teacher leads class discussions focused on student observations and data, pressing students to justify and explain findings, focusing on lessons' concepts. • **Elaborate**—Teacher asks questions to help students connect new and former experiences around concepts and extends learning through higher-level thinking skills. • **Evaluate**—Teacher provides opportunities for students to demonstrate their understanding of concepts. o Teacher plans activities that build on concepts and skills that are differentiated (e.g., supplemented, modified, adjusted) to meet student needs. Work varies between independent, paired, group, and whole class depending on purpose for differentiation. • **Lesson Closure (5–7 minutes*)** o Students share the day's learning (e.g., exit tickets, presentations, informal assessment activities). o Homework (if assigned) is relevant, engaging, and reinforces curricular concepts. *Based on 40–50-minute class period **Differentiation** • Teacher differentiates and scaffolds individual assignments to meet student needs (e.g., ELL, gifted and talented, special education) through: o Selecting homework as practice exercises of lesson concepts, review of previously studied concepts, and/or extensions of lesson concepts based on individual learning needs. o Using accessibility strategies and/or scaffolding tools (e.g., graphic organizers, blank tables, partially completed graphs) that provide students with entry into lessons. o Providing explicit reading and vocabulary support for students. • Teacher uses small group instruction to differentiate student learning. **Pacing** Teacher follows district pacing and planning documents. Any modifications made to time allotted per unit are based on course Big Ideas.

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Classroom Environment	**Establishes physical classroom environment to support science learning**	**Rituals and Routines**
		• Teacher has established rituals and routines for:
		  o Organizing student science notebooks and supplies.
		  o Using textbooks.
		  o Using lab equipment.
		  o Student presentations and dialogues.
		  o Transitioning between lesson components to maximize student learning time.
		  o Including time for student reflective thinking and writing.
		Arrangement
		• Physical classroom arrangement supports both teacher-directed activities and student-to-student interactions and provides teacher with access to all students.
		• Teacher and students move flexibly between whole class, small group, partner, and individual activities.
		• All secondary programs are designed around four-student cooperative groups.
		Displays
		• Current unit's Big Ideas are posted in classroom.
		• Up-to-date assignment list is posted.
		• A variety of current student work revealing student thinking is displayed.
		• Science word wall for process skills terminology and current unit vocabulary is posted with visual cues.
		• Safety procedures for lab experiments are clearly posted.
		Science Tools
		• Science tools (e.g., equipment, including use of science notebooks) are readily accessible to students.
		• Program artifacts (e.g., science lab write-ups, charts, graphs, models) are available or posted.

	Establishes classroom climate or culture focused on student-centered learning	**Students' Self-Management of Learning** **Selection and Use of Strategies and Tools** • Students choose appropriate tools (e.g., lab equipment, pencil and paper, calculators, measurement tools) and use effectively to conduct lab activities and solve problems. • Students use appropriate computer activities (e.g., Internet, spreadsheet, probes) as learning resources. • Students choose appropriate solution strategies (e.g., Inquiry, claims, evidence, scientific reasoning) and are comfortable testing various solutions to problems. • Students use classroom displays for instructional guidance (e.g., interactive word walls). **Ownership of Learning** • Students take ownership of learning as evidenced by willingness and capacity to carry out their own inquiries. **Student Questions** • Students question peers frequently and focus on clarifying understanding of each others' thinking. **Group Work** • Students use group members as resources and do not rely solely on teacher for direction or clarification. • Groups focus on science as they manage their own work.

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		Teacher Support for Students' Self-Management of Learning **Safe Learning Environment** Teacher creates a classroom culture that fosters student curiosity and encourages students to freely ask questions and give answers based on their current understanding. **Purpose and Types of Teacher Questions** • Teacher asks HOT (higher-order thinking) questions that encourage students to: o Clarify and extend their thinking (How would you describe the problem in your own words? Could you explain it another way?) o Probe deeper (What would happen if…?) o Make connections (How does it relate to…?) • In addition, teacher asks questions that focus on: o Prompting scientific reflections (Does your answer seem reasonable? Why does your answer make sense?) o Deep understanding of scientific ideas (Is it true in all cases? Explain. How would you prove it?) **Cooperative Learning** Teacher ensures students have specified roles to facilitate group collaboration. **Wait Time** Teacher gives students sufficient and appropriate wait time to grapple with questions to ensure all students' accountability and participation.
Classroom Environment	**Supports scientific communication**	**Accountable Talk and Scientific Discourse** • During most lessons, students discuss scientific concepts with each other. • Students hold each other accountable, asking each other for explanations, claims, evidence, and scientific reasoning. • Students question peers frequently and focus on clarifying understanding of each others' thinking. • Determination of correctness rests with students; teacher supports this determination through facilitation. • Teacher focuses classroom talk on students' scientific thinking. • Teacher intentionally selects multiple-solution strategies and orchestrates student presentations of these strategies to build connections and support students as they make sense of these connections. **Written Scientific Communication** • Students write to explain solutions and strategies, demonstrate understanding of the science, and reflect on learning. • Teacher routinely incorporates a variety of writing assignments, including journals or logs, solutions to problems, explanations of scientific concepts or ideas, writing about thinking processes, and/or problem of the day/week. • Teacher incorporates analysis of exemplary writing examples to support improved student writing. • Teacher provides written feedback to support improved student writing.

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Program Assessment Opportunities	**Uses assessment to support student learning**	**Assessment Strategies**
		• Teacher incorporates a balance of standards-based assessments that routinely include:
		  o Informal formative assessments.
		  o Formal formative assessments.
		  o Summative assessments.
		  o Bodies of evidence that provide multiple opportunities for students to show proficiency through multiple pathways.
		  o Progress monitoring.
		• Students self-monitor their progress.
		Management and Use of Assessment Data
		• Teacher frequently uses multiple data sources to inform and adjust instruction to increase student achievement.
		• Teacher has a system to collect, manage, and analyze assessment data to monitor individual student progress.
		• Teacher closely links assessment and instruction to determine appropriate instructional strategies and support student progress and attainment of Big Ideas.
		Teacher Feedback
		Teacher provides feedback to students both as grades or scores **and** in written form that addresses specific progress toward concept attainment to extend students' learning, promote improvement, and help students self-monitor progress.
		Rubrics
		• Teacher uses rubrics to communicate expectations for high-quality work and provides student feedback.
		• Students use rubrics to understand expectations and produce work that matches these expectations.
		Assessment Tools
		• Teacher uses appropriate tools or templates [e.g., EDDs (Experimental Design Diagrams), ETs (Explanation Tools), rubrics] to assess student learning.
		• Teacher uses pre- and post-tests to assess student growth and inform instruction.
		Written Products
		• Teacher uses student writing (e.g., notebook entries, lab reports) to assess growth and inform instruction.
		• Teacher administers DPS embedded assessments.
		Observation
		• Teacher uses accountable talk and discourse to evaluate student progress.