Smarter Science - Investigation and Literacy

Smarter Science	Writing	Reading	Speaking and Listening
ENGAGE • question & wonder • generate curiosity • observe, notice • interact with organisms, objects, and phenomena	**Purposes** • brainstorm & generate ideas • predict • reflect **Types of writing** • note taking • descriptive • graphic organizers	**Purposes** • engage • generate questions • activate prior knowledge & make connections **Types of texts** • fiction • non-fiction • wonder • connects to students' experiences • biographies • graphic organizers **Comprehension strategies**** • inferring • building vocabulary • questioning the author • activating prior knowledge & making connections	**Purposes** • share ideas and wonder • generate questions • make predictions • activate prior knowledge & make connections • build vocabulary **Types of settings** • one-on-one • partner or small-group discussion • informal large-group discussions
EXPLORE • identify testable question • plan and implement an investigation • observe • systematically gather and organize data	**Purposes** • document process and data • record emerging thoughts **Types of writing** • procedural • descriptive • technical • graphic (e.g., table, graph, picture)	**Purposes** • provide examples of investigations • extend experience • provide information and vocabulary **Types of texts** • procedural (e.g., "how to" texts) • field guides • non-fiction, informational • graphic **Comprehension strategies**** • visualizing (use of sight, sound, smell, colour) • building vocabulary	**Purposes** • discuss strategies and ideas • clarify procedures and data collection • listen to others' ideas **Types of settings** • one-on-one • partner or small-group discussion
EXPLAIN • identify patterns and relationships • develop descriptions, explanations, and models • confirm or refute predictions using evidence • drawing conclusions • making judgements	**Purposes** • representing observations • communicate ideas • raise new questions • predict • reflect **Types of writing** • descriptive • explanation • note taking	**Purposes** • support and validate ideas • provide information • raise new questions • challenge misconceptions • draw conclusions & make judgements **Types of texts** • personal scientific journals, notes, etc. • graphic (e.g., table, graphs, picture) **Comprehension strategies**** • visualizing • inferring • making connections • determining importance	**Purposes** • organize thinking • debate based on evidence • reflect on data • challenge misconceptions • draw conclusions • confirm or refute predictions **Types of settings** • small-group analysis • small- and large- group discussion

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ELABORATE • organize and summarize findings and understandings • develop report using a variety of media • present, publish, report	**Purposes** • communicate clearly to others • elaborate • reflect **Types of writing** • reporting • formal (specific target audience) • explanation • graphic (e.g., posters for poster sessions)	**Purposes** • exemplify writing styles and presentation strategies • provide alternative models • peer review **Types of texts** • informational • scientific report • graphic • reports written by peers **Comprehension strategies**** • determining importance • inferring • making connections • synthesizing • questioning	**Purposes** • communicate formally • elaborate • reflect • listen carefully and debate respectfully • peer review • apply scientific vocabulary **Types of settings** • formal presentation • debate

(Aadapted from National Research Council (NRC). *National Science Education Standards*. Washington, DC: National Academy Press.)

****Tools to Enhance Reading Comprehension:**

Anticipation Guide
Graphic Organizers
Picture Walk
Reread
Using Features of Nonfiction
Chunking
Cloze Passage
Questioning the Author
Sketch the Stretch
Stop and Jot
Turn and Talk
RTN Chart