Integrating Literacy In Science Fairs

Science fair projects integrate investigative science and technology skills with key literacy skills.

Skill Areas within Experimentation, Research & Technological Problem-Solving	Language Curriculum
Initiate & Plan	Reading
Perform & Record	Writing
Analyze & Interpret	Oral Communication
Communicate	Media Literacy

Students must effectively apply literacy and numeracy skills to capably plan, implement and share results of their science fair projects.

Teachers can support the development of literacy, numeracy and investigative skills through explicit instruction and modelling.

Effective integration of Language and Science & Technology curricula comes in knowing ***when and how*** to focus on science investigation skills, literacy skills or numeracy skills so that these domains enhance, rather than detract from each other.

The following link demonstrates the connection between the literacy skills of reading, writing, speaking & listening with the investigative skill areas of initiate & plan, perform & record, analyze & interpret, and communicate.

- The Literacy-Investigation Connection

Non-Fiction Writing in Science Fairs

> *"…..writing improves learning in all areas. When students increase their writing abilities, they increase their ability to think and reason."*
>
> (Linking Science & Literacy in the K-8 Classroom, pg. 150)

Consider:
What writing opportunities are natural parts of science investigations/science fairs?
How do students engage with scientific learning in a written form?

Forms/Modes of Writing

(Language Curriculum Writing Expectation(s): 2.1)

Science fairs provide opportunities for writing in various modes or forms. These non-fiction forms should be explicitly taught during language arts, and then reinforced in the context of doing science, which gives meaning and purpose to the writing. The forms of writing span the different skill areas within experimentation, research and/or technological problem-solving (i.e., initiate & plan, perform & record, analyze & interpret, communication).

Form/ Mode	Sample Format
Description	**Technical Descriptions** • systematically describe objects, events, phenomena, based on observations • allows writer to show rather than tell about the "thing"
Expository	**Procedural** • plans for carrying out an investigation to answer a question
	Explanatory • an account of how something works or why something happens
Persuasive	**Logical Argument** • convincing readers that the claims are supported by evidence and are therefore reasonable
Narrative	**Recount** • factual - retelling in chronological order an event or series of events that took place

Purpose and Audience

(Language Curriculum Writing Expectation(s): 1.1)

With whom are the students communicating when they write in science?

- The purpose of writing in science is to inform peers (i.e., people with the same education and experience) of the methodology used for an investigation. Therefore, the writing format should be

age-appropriate (which in senior grades follows APA guidelines - the accepted style guide for all scientific reporting).
- Students should be aware that the audience of their writing could be other scientists and the standards of communication are those of science.

Elements of Writing

(Language Curriculum Writing Expectation(s): 1.2, 1.5, 2.2, 2.3, 2.4, 3.1-3.5, 3.8)

- Generally writing in S&T will be rough-drafts. Thus, students will focus on three elements/traits (i.e., ideas, organization, word choice).
- In pre-writing, students engage in discussions and create organizers (e.g., class tables, t-charts, graphs) to help them think about and organize what they will write.
- If teachers or students choose to take an entry through the entire writing process (e.g., publishing an entry as a scientific article, creating a science fair display board), then students edit and revise the entry in terms of other 3 elements (i.e., sentence fluency, voice, conventions).

	ROUGH DRAFTS			REVISE & EDIT - INTENT TO PUBLISH		
	Ideas	Organization	Word Choice	Sentence Fluency	Voice	Conventions
Elements of Writing in S&T	– addresses scientific content or conceptual understanding - conveys an explanation of results collected during an investigation - descriptive but concise details support ideas - all details are noted	- includes scientific thinking and the structure of different types of scientific writing (e.g., conclusions, observations, comparisons)	– includes accurate use of scientific vocabulary - "flowery" or overly descriptive language should be avoided	- sentences should be clear, concise and to the point	- a sense of scientific authority that a student expresses through writing - voice is not particularly important in technical writing - usually very impersonal - almost always written in the third person (never in 2nd person)	– adhere to all standard writing conventions - sources should be credited when appropriate - uses appropriate elements of effective presentation in the finished product, including print, different fonts, graphics and layout specific to text form

References:

Campbell, Brian & Fulton, Lori (2003). *Science Notebooks - Writing About Inquiry*. Portsmouth, NH: Heinemann.

Chugach School District (Spring 2001) *Teacher's Resource Manual - Applying Six Traits to Scientific Writing*. Retrieved January 27, 2009, from http://wiki.bssd.org/images_up/9/98/Scientific_6_Trait.doc

Douglas, R., Klentschy, M., & Worth, K. (Eds.). (2006). *Linking Science and Literacy in the K-8 Classroom*. U.S.A.: NSTA Press.

Rupp-Fulwiler, Betsy (2007). *Writing in Science - How to Scaffold Instruction to Support Learning*. Portsmouth, NH: Heinemann

The Ontario Curriculum Grades 1-8: Language, 2006. Toronto, ON: Queen's Printer for Ontario