

Turn It Loose

The Scientist in Absolutely Everybody

written by Diane Swanson

genre: NON-FICTION, SCIENCE

themes: INFORMATION/SCIENTIFIC LITERACY
MEDIA AWARENESS
SCIENTIFIC METHOD
SCIENCE AND NATURE
PROBLEM SOLVING
ENVIRONMENT
MATH CONNECTIONS
INVESTIGATING
OBSERVATIONS
GOAL SETTING
CREATIVE THINKING
ANALYZING
PERSISTENCE
COMMUNICATION
MUSIC

suitable for: GRADES 4–8

Everyone has an inner scientist. Your inner scientist influences much of what you do today. It's the part of you that automatically observes the direction a ball is moving, estimates its speed, and figures out where you need to be to catch it—all in an instant. This ability to think like a scientist helps you develop the aptitude for reasoning and understanding.

Turn It Loose: The Scientist in Absolutely Everybody discusses all the various tools and techniques that scientists use to be successful, and tells stories about the people who made them important in their lives—from childhood on. By exercising their inner scientists, they found it easier to become what mattered to them—be it a hockey star like Wayne Gretzky, a musician like Louis Armstrong, or a scientist like Albert Einstein. The diverse and creative exercises presented in ***Turn It Loose*** will unleash the scientist in absolutely anybody.

Diane Swanson bio: Diane has made a career of writing fun and informative non-fiction books for kids. She credits the astonishing natural world as the inspiration behind her writing. Diane has published over 50 books for children and has been recognized for her work with several awards, including the *B.C. 2000 Award*, the *Orbis Pictus Award for Outstanding Nonfiction for Children*, and the *International Youth Library's White Raven Award*. Diane lives in Victoria, B.C., with her family. When not working on writing projects, she often visits schools and attends conferences.

The following activity ideas ...

... are only a start. There are many possibilities for helping students construct meaning from text.

Comprehension activities:

- help readers to extend their general knowledge from prior experience
- develop reading strategies for comprehension
- bring relevance to the act of reading
- foster discussion and reflection through response to the text and illustrations

Before

STARTING THE BOOK

Activities to build the context and to introduce the topic of the book, establish prior knowledge and interest, and develop predictions of what the text will be about.

- A1. •Point out Diane Swanson's acknowledgments. Have students consider and write down what experts, friends, and mentors they would acknowledge when writing their life story. Ask what qualities these people have that the student admires.

- A2. Brainstorming session: Have students consider the following questions:
What is a scientist? What does a scientist do? How does a scientist think? What are the qualities of a scientist? Inventor? Explorer?

- A3. Put the qualities described in the book (pages 13, 114) on signs with a large title, "Keep your inner scientist alive!" If possible, assign this to a student computer/design expert. Post the signs around the room. Have a student artist or students in small groups graphically illustrate the qualities as they are discussed.

READING THE BOOK

Activities to check on comprehension, stimulate interest, involve readers in reflection as they read, and encourage consideration of other readers' reactions.

- B1. Read one of the brief biographical accounts from the book at the beginning of class every few weeks. Before revealing the person's last name, ask for guesses. Ask for qualities demonstrated by the person and refer to the posted sign of the quality being highlighted.

Ask students to think of their own experience and find examples of when they have needed and/or demonstrated the quality. In an atmosphere where co-operation is encouraged, you could ask when they have observed the quality in a classmate. Encourage students to consider situations in different subject areas and extracurricular events.

- B2. As the year progresses, ask students to point out what quality is required for the task at hand. Remind students of stories read: "Remember when Eugenie Clark was left at the aquarium? What quality did she demonstrate that we could use now?"
Use qualities as encouragement during subsequent lessons (e.g. "Now is when persistence is needed" or "I like your use of imagination here!").

CHAPTER THREE: "LOOK TO THE STARS"

- B3. Brainstorm or pair up to come up with ideas we could wonder about. Refer to the author's list on page 17 to help give an idea of the kinds of questions students can ask. Repeat the activity in subsequent classes and ask the students if they are getting better at coming up with questions.

CHAPTER FOUR: "WHY, WHY, WHY?"

- B4. Read the story about Michael Faraday. Divide the class into small groups. Present them with a picture related to a recent newspaper article or a topic studied in class (e.g. an example of an optical illusion when studying the eye, a picture of a hydroelectric dam when studying electricity or a sarcophagus when studying ancient Egypt). Have students brainstorm as many questions as possible. Ask students if hearing one question helped them think of another. Get them to try again with a new subject and ask them to be aware of examples of building on earlier questions. Have a recorder keep track of the questions. When back together as a class, ask for successful examples of questions leading to new ideas or conclusions.
- B5. Have students bring in action comic books and work in groups to question superpowered feats such as the Spiderman example described in Brainplay. Identify areas for possible study and challenge students to find answers on the Internet.

CHAPTER FIVE: “BREAKING THROUGH”

- B6. Have students choose from a list of everyday household or classroom items. Ask the students what problem the item solves and what questions were asked to develop the item. Also have them consider what problems the inventor might have faced in developing the item, and what observations and questions might have helped him or her to overcome these problems.

CHAPTER SEVEN: “NEVER SAY DIE”

- B7. Have students set personal goals, aiming for completion in a month. The goals can be varied and decided upon by each student as they answer the question *What would you like to work on, to improve, over the next month?* Examples might include: running faster, making fewer spelling mistakes when writing stories, improving his/her mark on the next test in a specific subject, remembering to bring supplies to class, etc. Have students keep a log recording their successes, failures, and feelings. Talk about their progress as the month proceeds and highlight examples of persistence. Compare students' experiences with those of the individuals described in the chapter. At the end of the exercise ask the students to consider choosing a goal they might want to work towards for a year.

CHAPTER ELEVEN: “WALK ON!”

- B8. Using topics from the curriculum, have students complete research and present their findings using Venn diagrams to compare characteristics (e.g. respiratory/circulatory system of different species, different planets, or life in Canada and Nigeria).

CHAPTER THIRTEEN: “HEAR THE HARMONY”

- B9. Use this chapter as an introduction to a series of explorations of patterns and relationships in math classes. Activities can include practice with tangrams or tessellations. Bring in examples of M.C. Escher's work for students to observe. Seasonal additions might include paper snowflake designs or Ukrainian Easter eggs.

CHAPTER FOURTEEN: “PIGEON ON HORSEBACK”

- B10. Have students trace the history of calculators and computers. Each student pair takes a step in the process, briefly describing how the new discovery works and drawing a picture. Add the items to a timeline. As a class, discuss the effect on the world of these discoveries.

CHAPTER TWENTY-THREE: “TELL THE WORLD”

- B11. Have students choose a topic they know well (horses, games, endangered animals, favorite holiday spots, etc). Have them prepare a presentation with the

purpose of informing their class about the topic. It can be presented orally, visually, or in written form. Provide time for students to identify sub-topics (concept mapping), complete research for supporting information, and design effective organization for the presentation.

Later, have students present the same topic with a different purpose (e.g. to entertain or persuade). Discuss what strategies are useful for each purpose.

- B12. Present students with a problem: global warming, pollution, earthquake preparedness. Have students come up with creative solutions. Have them include drawings where possible. Interrupt the process periodically and have students consider the process they are following. *What steps are you taking to solve this problem? What qualities are crucial for success?* Relate this experience to daily life (e.g. gymnastics practice, snowboarding, designing a costume for Halloween). *How do you solve other problems? What steps do you take?*
- B13. Use quotes from the book's sidebars for a "Quote of the Week" display on the board.

After

READING THE BOOK

Activities to inspire continued reflection and response to the text, bring conclusion to the experience of reading this particular text, and stimulate further extensions.

- C1. Frequently ask the question *What did you do yesterday/this weekend to keep your inner scientist alive?*
- C2. Periodically have an "Imagination Minute" at the beginning or end of class. Use the ideas from Brainplay on page 31. Have students list as many creative uses for a common item as they can in 30 seconds. In the next 30 seconds, make a common list of creative uses on chart paper. Discuss strategies for finding creative responses. Display and compare answers as the year progresses.
- C3. Hold a convention with the title "Keeping the (Inner) Scientist Alive." Assign, or have students choose, a person from those mentioned in **Turn It Loose** or an approved alternative. Have students research their person and plan a display of artifacts from the person's life and work, as well as an appropriate costume. Set up displays in the classroom or library, and invite parents or another class to ask the famous individuals questions about their discoveries and lives.
- C4. Divide students into pairs and have them choose two famous persons to research. The students should then plan and write a script for a conversation

between their characters. Students must develop a theme for the conversation. For example, if the individuals are from similar fields but different historical times, the conversation could point out how science has progressed. Or the characters could be women from different fields who talk about the barriers they faced in their careers. Or if they are from the same historical time but different fields, they could compare or contrast their methods of solving problems. All conversations could identify the personal qualities that led to the individual's success.

- C5. Brainstorming session: Have students answer the following questions:
What is a scientist? What does a scientist do? How does a scientist think? What are the qualities of a scientist? Inventor? Explorer? Musician? Writer? Teacher?
Have the answers changed from the first time these questions were asked, before the book was read?