Space Weather Monitor ("SID") Project

Developer: Deborah Scherrer
Audience: Formal Education, students and teachers, grades 6-12
Format: CD, Scientific instrument plus various manuals and educational guides.

Final Recommendation: *Recommended.*

This product was recommended and may be used for its intended audience as it was submitted. The recommendations listed in weaknesses and suggestions below are improvements that may be considered when this product is next updated. They are not required revisions.

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Following is the summary of the individual reviews that was distributed to the reviewers prior to the panel discussion by telecon. This information was used to guide the panel discussion; it is included here to provide a complete report of the review process.

Reviewer	Overall Rating	Recommendation
Education Reviewer	Outstanding	Recommended
Education Reviewer	Outstanding	Recommended
Education Reviewer	Outstanding	Recommended
Science Reviewer	Outstanding	Recommended - Distribution through Teacher Workshops
Science Reviewer	Outstanding	Recommended as is, with Revisions on next printing/edition
Science Reviewer	Very Good	Recommended – Limited Audience

Strengths

- Very clear directions are provided for the lessons. They appear to be very well thought out. The inclusion of graph templates, Stonyhurst disks and sample SOHO grams are very helpful.
- Installation manual complete and user-friendly. Data browser was good. Mentoring was also an aspect that could be utilized. Judges liked the Spot Plots and Flarecast activities. The production quality is high, as is the effort at editing. The layout is clean.
- The preamp is well built and the instructions for completion are excellent with enough illustrations to take out the guesswork. Excellent step by step instructions with screen shots.
- The website was well designed.
- Several of the activities require access to on-line databases and make use of graphing packages.
- Hits on all levels: classroom construction, computer interface, and web connections.
- The teacher may select a range of complexity. Resources are sited for variety and depth of study. Example of depth not seen elsewhere: Use of Stoneyhurst disks. Combined with the use of the SID receiver would take this product into full on Science Study rather than studying ABOUT science. Students LOVE this and more products should be designed this way.
- Students will actually make their own antenna and "buy in" to monitoring solar activity. Activities used a variety of materials. Monitor using computer. Must have knowledge of hardware and software as well as installation and making of the monitor.
- Data Browser was updated daily and easy to use. Everything seemed accurate. Information pages were clear. There were no glaring omissions or errors.
- Good background information and references on the Research and Data Guide. Website has good resources as well. Liked the section on further activities and research.
- The activities use solar and solar wind data from a variety of NASA missions.
- Students take responsibility for data collection, they can self check their data by checking other uploaded data. It makes the connection of the Earth in Space in the minds of the students.
- Students will love doing actual research. All material relevant to NASA's science mission and SMD Helio study.
- Students have Data Base so that they can access it easily. They also have a blog.
- Although it depends on how the instructor uses the project and organizes the students, the project is prime for cross-curricular activities and lends itself to team oriented teaching.
- This is well thought out. For any given lesson, the set-up of What You Will Do, Materials and Skills, Thing to Think About, Background, Step-By-Step, and Analysis are in place to guide and aid the

learner through the lesson. Appropriate worksheets are also provided. The Glossary is appreciated: too often a glossary is either weak or not included at all.
- The product is very hands-on in design. It includes several activities for students to work with. Good material to read. There are many different types of activities.
- The Curriculum Guide, the web page, and the data browser worked are professionally done and provide the opportunity for students to make real observations and share their data with others.
- Standards were identified easily for science.
- By looking at other data sets, students will begin to hone their skills and ability to interpret what their data is showing. It is a great way to have students make solar observations and introduce them to space weather.
- The product is designed with appropriate assessments in place. Also, a teacher should find it fairly easy to generate their own with the given materials.
- Data analysis sheet was very good for assessment. Sunrise/sunset good activity for assessment.
- The students will love working with the monitors. The activities help the students learn about the sun. Information pages are good.

Weaknesses

- CD did not work on several computers. The Stonyhurst disks were difficult to use.
- It was difficult to find how to install the monitor to the computer. You had to go into 3 folders before finding it. It should be front and center so that people can download it easily. This can't be used with Macs. Data guide was in MS Excel format and was difficult to read.
- Typos and broken links:
    - Page 58: "...data are" in Bullet 3 and on line 6 of "Improving your Forecast."
    - Page 61. SEC has changed its name to SWPC, but the link automatically redirects.
    - Page 67, old SEC name and bad hyperlink.
    - Page 73, again old link to SEC .
    - Page 75, Glossary - Aurora: Aurora are generated by both excited ions AND neutral gasses.
    - Page 79. Glossary- Sunspot: missing degree symbol with respect to Celsius temps.
- Space Weather Curriculum:
    - Page 42. On Problem 4, it says that a student can either scroll down or print. Get rid of "print". There are a lot of pages there. Don't give the students that option.
    - Page 68. Say solar wind instead of selected topics. On the top of the page, since this page is about solar wind, clarify that, instead of "selected topics". Makes it easier on the teacher doing lesson plans.
    - The heliographic latitude on the Stonyhurst disks should be written as Bo, not BO.
    - Glossary--auroras--name the two types. The do say Northern and Southern. Should give the scientific terms *"Aurora Borealis" and "Aurora Australis."*
- Some links need updating: they are not current (AAVSO).
- The product lacks suggested rubrics.

Suggestions/Comments

- It is rather easy for a teacher with technical experience, however some teachers with less background may be intimidated to take on such a project. Teacher should probably be trained via Workshops if they feel the need to implement this in class. This should not be kept from teachers who have the background and ability to use this product, however it may be good to have distribution through teacher workshops since that would insure proper and efficient use of funds.
- One reviewer stated, "This might be the most well put together resource I have ever reviewed!"
- Could be difficult to know what you are receiving and if you are receiving what you are supposed to. The procedure requires patience. Sometimes, due to signal strength, the data could be hard to

interpret.

- Suggest including more inference questions (open-ended) e.g.; Why do you think...? The pre-activity survey would be better as post-activity.
- Suggest that the kit include a torroid to dampen unwanted RFI. These electronics are very susceptible to RF noise so it is non-trivial to set this up.
- Suggest including some sample audio files for students to hear what they are graphing.
- One judge thought that the analogy between flares and chickens was stretching it a bit.
- Was the title on page 42 meant to be "Far Sight" as it talks about the sun's Far Side?
- This product allows students with different talents to become involved in the project; it also lends itself to long-term participation similar to S'COOL program.
- Pre-survey was seen as lengthy--might be better as a post.
- Appendix A: VLF station list. Frequency is in kHz. Power should be listed in watts not as listed in kHz.
- One reviewer commented, "I introduced a SID monitor into my daughter's 6th grade class about 5 years ago. There was a small cohort of students that took ownership of the instrument and built the antenna and took data for about a month. Did not have them use the curriculum guide and it was prior to the development of the web-based tools. I think the web-based data archive and browser lowers the barrier for broader participation significantly. Impressed with the clarity and meaningful activities using solar images (from page 38-74)."
- A reviewer remarked, "This is so good, I plan to buy a SuperSID receiver to use with this product at the end of this year's classes."