

Kate Norton
Center for Science Education
Portland State University
P.O. Box 751
Portland, OR 97207

October 19, 2009

Dear Student:

Hi, my name is Kate Norton. I am a science instructor in the Center for Science Education at Portland State University (PSU). I want to tell you about an exciting opportunity for juniors and seniors to earn four college credits from Portland State University. As a high school student researcher and future exhibitor at a Northwest Science Exposition System (NWSES) fair you will spend many hours formulating a research question, conducting research, analyzing your data, and communicating your results. This hard work is deserving of college credit. The PSU Center for Science Education (CSE) is offering a college-level course called "Natural Science Inquiry" (NSI) specifically for you. By completing this course you will show colleges and universities that you are serious about science research at a rigorous level. Most colleges and universities across the nation will accept these credits as PSU transfer credits in general science.

In order to complete Natural Science Inquiry you must participate in an Intel International Science and Engineering (ISEF) affiliated fair. Your school's NWSES regional science fair meets this requirement. In addition, by completing the assignments described in the NSI course syllabus you are also completing many of the steps required for participation in your regional Intel ISEF affiliated fair.

You can take HS NSI in either winter term or spring term. Taking the course in spring term will give you more time to complete the same amount of work. Taking the course in winter term means you will get your final grade in March, during college application season. Your high school teacher can help you decide which term will work best for you. You can also see the attached syllabus for a comparison of due dates.

Instructions for registering for the course are included in the attached HS NSI Registration Checklist. **The total fee for the course is \$291. A \$50 non-refundable pre-registration fee is due Monday Nov 9, 2009** and the balance of the course fee will be due early in the term you take the course—either in **January 2010** or **March 2010**.

Over the next several months we will correspond via e-mail about the progress you are making on your project. I am the college instructor for this course and will periodically evaluate your work and give you written feedback and advice. You can also e-mail me whenever you have questions or need to bounce an idea off someone.

I look forward to working with you in the coming year. In the meantime best of luck with your research! If you have questions you may contact me at knorton@pdx.edu or (503) 830-9693.

Sincerely,

Kate Norton, M.S., M.S.T

Center for Science Education

Portland State University

High School NSI Registration Checklist 2009-2010

How to register for HS NSI through PSU:

1. Pre-register for the course by **Monday, Nov 9th, 2009** using the attached form. There is a **\$50 non-refundable fee** due along with the pre-registration form. Pre-registration forms can be mailed directly to me or, in some cases, turned in to your high school teacher. Checks for the pre-registration fee should be made out to Portland State University. Forms can be mailed to:

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2. Decide whether you plan to complete the NSI course in winter term or spring term. See the attached syllabus for a comparison of assignment due dates between the two terms. Check with your high school teacher or contact me directly if you are unsure which term will work best for you.
3. Become a PSU student by filling out the 'quick entry' registration form (<http://www.pdx.edu/admissions/quick-entry-enrollment>). There is a **\$10 quick entry application fee**. Quick entry forms should be completed by **Nov 30, 2009** for winter term students or by **March 8, 2010** for spring term students.
4. Add the course to your schedule. After you become a quick entry student you will receive a PSU ID number and instructions for accessing PSU's web portal (banweb.pdx.edu) in the mail. The course can be added to you schedule through the web portal. Only students making satisfactory progress towards completing the course will be given the CRN number for adding the course. Winter term students should add the course by **Jan 10, 2010**; spring term student should add the course by **April 4, 2010**.
5. Pay the **\$200 balance of the NSI course fee and the \$41 student fee**. PSU will send you a bill in the mail.

Portland State University
SCI 201: Natural Science Inquiry (for High School research students)

Instructor: Kate Norton, M.S.T. knorton@pdx.edu (503) 830-9693

Credits: 4.0 (quarter hours)

Reading materials:

- *Students and Research: Practical Strategies for Science Classrooms and Competitions* 4th edition. J.H. Cothron, R. Giese, and R. Rezba., 2006. Your sponsoring teacher should have a copy of this book for you to refer to.
- Intel ISEF 2009 Student Handbook. Available online at: <http://www.societyforscience.org/isef/document/hbk2010.pdf>
- Northwest Science Expo website (www.nwse.org), including Tips for Students

Course Narrative: The purpose of this course is to help you improve your research skills by completing an original science research project and entering it in a Northwest Science Exposition System (NWSSES) regional science fair. By actively conducting your own research project you will not only learn more about the topic you study, but you will also learn about how science creates new knowledge.

Conducting a scientific research project involves developing a question, reviewing existing literature, forming a hypothesis, collecting data to answer the question, analyzing the data, and interpreting the data in the context of your literature review and hypothesis. Research also involves developing skills in communicating the results of your project to others and defending the knowledge claims that you make as a result of your investigation. In this course you will gain experience with scientific writing as well as visual presentation of scientific findings.

Eligibility and Registration: This course is limited to high school juniors and seniors. The program fee for the course is \$291, with a \$50 non-refundable pre-registration fee due in November 2009 and the balance due at the beginning of the term when students formally register for the course. There is an additional \$10 quick entry application fee for establishing an official record for students who have not enrolled in a PSU course before.

Grading: Grading for the course is based on successful completion of all the assignments on the schedule. Grades will be assigned based on the total percentage of points earned: 100%-94% is an A; 93%-90% is an A-; 89%-87% is a B+; 86-83% is a B; 83%-80% is a B-; 79%-70% is a C; 69% and lower is an F.

Late Assignments: Assignments must be emailed to knorton@pdx.edu by 5:00pm on the due date for full credit. Late assignments will be accepted with a 10% penalty each week the assignment is late, unless prior arrangement is made with the instructor. Assignments turned in more than two weeks late will receive a 70%. Students are strongly encouraged to contact the instructor if they feel they cannot complete an assignment by the posted due date in order to arrange an alternate due date. Arrangements for an alternate due date must be made before the assignment is due.

Course Schedule:

Winter Term	Spring Term	Registration Deadline/ Assignment Due Date	Percent of
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			Grade
Monday Nov 9, 2009	Monday Nov 9, 2009	Pre-registration form	
Monday Nov 30, 2009	Monday, March 8, 2010	Quick entry admissions form	
Monday Dec 14, 2009	Monday Dec 14, 2009	Literature Review	25%
Monday January 4, 2010	Monday, March 29, 2010	Online course registration	
Sunday January 10, 2010	Sunday April 4, 2010	Last day to add or drop course with 100% refund	
Due date for regional fair	Due date for regional fair	ISEF Research Plan	5%
Due date for regional fair	Due date for regional fair	Abstract	5%
One week before regional fair	One week before regional fair	Three figures with captions	10%
One week after regional fair	One week after regional fair	Photos of completed poster at ISEF-affiliated regional fair	15%
One week after regional fair	One week after regional fair	Post fair reflection	5%
Wed March 17, 2010	Monday May 3, 2010	Research Paper	35%
Wed March 17, 2010	Monday May 3, 2010	Final Reflection	5%
Wed March 24, 2010	Wed June 16, 2010	Grades posted and available online	

Assignments are in bold type; other important dates are noted. Note that spring term dates are not in chronological order.

Assignments:

- **Literature Review.** Use at least 5 major references and other supporting references to provide background information on your topic. A major reference is from a textbook, scientific journal, interview, book that explains scientific research, or scientific magazine (such as *Discover*, *Scientific American*, or *National Geographic*). Some websites are also very technical and would qualify as major sources. Use your judgment and check with the instructor if you are not sure. Wikipedia is not a major reference, but can be used as a supporting reference. Give a 3-5 page (double spaced, 12 point font) summary of what you have learned from your sources. What is already known about your topic? How will you use this information to create a research question and design an experiment? Be sure to include a bibliography and cite all your sources in text. If you are not sure how to do this, contact the instructor for more information. “A” quality work will use the information from the sources to build a coherent central argument about the topic. “B” quality work will provide a coherent and accurate summary of the sources without a clear central argument. “C” quality work will summarize the sources in an unclear or inaccurate way, lack enough major sources, or lack appropriate in-text citations and bibliography.
- **ISEF Research Plan.** Submit a copy of your ISEF Research Plan to the instructor when you submit it to the science fair.
- **Abstract.** Submit a copy of your AFOR Abstract to knorton@pdx.edu in addition to the normal fair submission.
- **Three figures with captions.** Submit three figures from your data analysis with captions. Figures can be electronic (Excel graphs and charts, photos, maps) or photocopied from your research journal/lab notebook. The caption should help the reader get a good understanding of what your project is about. Scientific captions fully explain the figure and can be as much as a

paragraph long. Ask the instructor if this is unclear. “A” quality work will present summarized data in a way that clearly shows the evidence for the conclusions that are drawn from the data. “B” quality work will present a mix of summarized and raw data. Most, but not all, of the graphs will clearly show evidence for the conclusions that are drawn from the data. “C” quality work will not present any summarized data, be unclear, have unlabelled axes, be missing captions, or will not show data that supports the conclusions being drawn.

- **Photos of poster at regional fair.** In the case that the instructor cannot attend your regional fair to view your poster you should submit photos of your poster. Photos should make it possible to read the poster. Posters will be graded based on ISEF judging guidelines.
- **Post-fair reflection.** Reflection is a process of taking time to think over your learning experience carefully and deliberately. The purpose of reflection is not to get to a right or wrong answer, but to help you grow as a learner. For the post-fair reflection, write a paragraph to answer each of the following two prompts:
 - What part of participating in the fair was most challenging for you? What part was the easiest?
 - Describe an experience at the fair or during your research that was unexpected. What did you learn from this experience?

Reflection assignments will not be graded for content. All students that submit answers to both prompts will get full credit for the assignment.

- **Research Paper.** The research paper should follow the Introduction-Methods-Results-Discussion format. Good guidelines for writing a scientific research paper can be found in the ISEF student handbook. Guidelines for the length of the paper are not strict, but it should be at least four pages long. Do not forget to use in-text citations and provide a bibliography with your sources. Grading guidelines for the final paper will be distributed at the beginning of winter term.
- **Final reflection assignment.** Attach the reflection assignment to the end of your final paper. All students that respond to all three prompts will receive full credit for the assignment. Write a paragraph to answer each of the three following prompts:
 - Was conducting scientific research easier or more challenging than you expected? Why?
 - Now that you have experience conducting scientific research do you have more or less respect for scientific information? Why?
 - What is one lesson you learned about how to conduct scientific research that you will take with you to your next science project?

SCI 201 *Natural Science Inquiry*
High School Student Pre-registration Form
Fall 2009

Name:

Address:

E-mail address:

Parent Name and Contact Information:

High School:

Grade Level:

Sponsoring Science Teacher:

Regional Science Fair (check <http://www.nwse.org/nwsesmap>):

3-sentence description of proposed project (We understand that this may change.):

Term you plan to register for NSI: Winter Spring

I have read the attached materials describing participation, registration, and payment requirements for this course. I understand that a **non-refundable** \$50 pre-registration fee is due with this form. Mail this form along with a check made out to Portland State University to:

Attn: Kate Norton
Center for Science Education
Portland State University
P.O. Box 751
Portland, OR 97207

Student signature: _____

Date: _____

Parent signature: _____

Date: _____