



## **Approaches to Inquiry** shifting classrooms toward inquiry learning **Course Syllabus**

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**Course Title:** Approaches to Inquiry: shifting classrooms toward inquiry learning

**Dates:** August 14-18, 2011

**Prerequisites:** Applicant must be a teacher in a school or in an informal educational organization. Previous experience in science teaching and a strong interest in inquiry teaching are highly recommended.

**Registration and Fees:** Cost is \$200 for course tuition, room and board. Additional costs will be met by workshop sponsors. Participants are responsible for the cost of credits and clock hours. Those who participate in an optional follow-up session in October 2011 will receive a \$50 rebate.

For application materials, please contact the Port Townsend Marine Science Center at 360-385-5582 or 1-800-566-3932 or [info@ptmsc.org](mailto:info@ptmsc.org).

**Credits/Clock Hours:** 3 graduate credits or 30 Clock Hours, through Seattle Pacific University.

**Course Description:**

At the heart of both environmental education and science literacy, scientific inquiry draws upon and reinforces the natural inquisitiveness and inventiveness of children and adults. **Approaches to Inquiry: shifting classrooms toward inquiry learning** explores the nature of inquiry using methods and materials developed at the Exploratorium's Institute for Inquiry, along with activities developed at the Port Townsend Marine Science Center which feature investigations of marine and aquatic environments.

This course is designed for professional development purposes. Although training sessions will introduce many interesting hands-on activities, these activities were not designed for teachers to take back to the classroom for use with students. Rather, teachers are asked to take part as learners themselves, in order to experience what the learner experiences. This will help them understand how subtle changes in the way a lesson is set up can dramatically affect how students engage with the lesson content. While some activities presented can be modified for use in classrooms, teachers should understand this workshop does not provide a "take-home" curriculum.

An underlying objective of **Approaches to Inquiry: shifting classrooms toward inquiry learning** is for teachers to look beyond the immediate goal of student success on tests such as the WASL, to achieve the wider goal of helping children develop a lifelong curiosity, the ability to use scientific logic, and a practice of critical thinking throughout their lives.

**Approaches to Inquiry: shifting classrooms toward inquiry learning** will be held at the Port Townsend Marine Science Center (PTMSC) in Fort Worden State Park, with meals and lodging at the Fort Worden State Park Conference Center. Workshop sessions will be held in the Schoolhouse Building at Fort Worden State park, as well as PTMSC classrooms, labs, exhibits and nearby beaches and wetlands.

### **Course Objectives:**

- Teachers will understand distinctions between scientific inquiry and other forms of hands-on science and will be better prepared to choose approaches that best match their learning goals.
- They will have a clearer understanding of the process skills of science, which students need in order to practice inquiry (observing, questioning, hypothesizing, predicting etc.), and have strategies for strengthening these skills in their students.
- They will be able to support students in asking questions based on their own observations and curiosity, and help them modify their original questions into questions that they or other students can investigate.
- Teachers will carry out a full inquiry investigation, deepening their understanding of inquiry science and giving them ideas for using inquiry in their own teaching.
- Teachers will recognize the benefits to student learning from teaching science content using an inquiry approach.
- Teachers will recognize the opportunities and challenges involved in applying inquiry teaching to topics in the natural environment.
- Teachers will learn ways they can make small, incremental changes to curriculum they currently teach in order to strengthen students' inquiry process skills and give them a larger role in directing their own investigations.

### **Student Expectations**

Students are expected to attend and participate fully in all sessions, which includes an orientation session Sunday evening, August 14<sup>th</sup> and an evening session on Tuesday, August 16<sup>th</sup>. Students registering for graduate credits will complete additional assignments outlined below.

### **Instructors:**

Judy D'Amore, MS, is Education Specialist at the Port Townsend Marine Science Center with many years experience in curriculum development and teacher training. She recently attended the Institute for Inquiry Training at the Exploratorium.

Lois Sherwood, MS., received her National Board Certification in 2007. Lois teaches science at Port Townsend High School and served as teacher on special assignment for WSU in 2005, supporting other Olympic Peninsula science teachers in inquiry strategies.

### **Methods of instruction:**

All sessions are interactive and hands-on, combined with guided discussion and occasional presentations by facilitators or by participants.

### **Course Outline**

**Sunday, August 14th**

**5:00–6:00 pm Check in at the dorm**

**7:30–8:30 pm, Orientation to Course**

## **Monday, August 15th**

### **8:30 am–noon. Session #1: Comparing Approaches to Hands-On Science.**

(Based on curriculum from the Institute for Inquiry)

In this session, participants explore three different forms of hands-on science, clarify the differences between them, and discuss the place each method plays in effective science teaching.

8:00-8:10	Introducing the session
8:00-9:00	Activity Stations, rotation #1
9:00-10:00	Activity Stations, rotation #2
10:00-10:15	Break
10:15-11:30	Small group discussions
11:30-12:00	Summary

### **1:00–4:30 pm. Session #2: Identifying Process Skills.**

(Based on curriculum from the Institute for Inquiry)

In this session participants rotate through hands-on stations and identify the main process skill in each activity. This is followed by small group and whole group discussions to clarify understanding of process skills learners need and to identify activities that help them master these skills.

1:00-1:15	Introducing the session
1:15-1:45	Activity Stations
1:45-2:05	Small Group Discussions
2:05-2:30	Whole Group Discussion
2:30-2:40	Break
2:40-3:20	Guided Discussion: How Students use Process Skills
3:20-4:15	Helping Students Develop Process Skills
4:15-4:30	Summary

## **Tuesday, August 16<sup>th</sup>**

### **8:00 am.–noon. Session #3: Beach Investigation.**

(Based on programs developed at the PT Marine Science Center)

Participants take part in a study of sandy and cobble beaches at low tide and discuss ways of using the natural environment to strengthen students' process skills.

### **1:00 – 4:30 pm. Session #4: Raising Questions.**

(Based on curriculum from the Institute for Inquiry)

As part of an investigation of an unfamiliar substance, participants generate questions that arise as they explore the material. They then focus their attention on the questions themselves. This leads to an understanding of the kinds of questions that can lead to investigation and strategies for helping students turn their own questions into experimental questions.

1:00 – 1:10	Introducing the Session
1:10 – 1:40	Raising Questions
1:40 – 2:10	Investigating Questions
2:10 – 2:25	Break
2:25 – 3:20	Examining characteristics of Investigable Questions
3:20 – 3:55	Turning Non-Investigable Questions into Investigable Questions
3:55 – 4:20	Working with Questions in the Classroom
4:20 – 4:30	Summary

### **7:15–8:45 pm. Session 5: Inquiry in a Marine Science Lab**

(Based on programs developed at the PT Marine Science Center)

Participants will become familiar with some of the common marine fish and invertebrates of Puget Sound. They will observe a common but little known marine organism from Puget Sound and develop questions that can be investigated using simple materials.

**Wednesday, August 17<sup>th</sup>,**

### **8:00am–5:00pm. Session 6: Full Inquiry Investigation**

(Adapted from curriculum from the Institute for Inquiry and programs at the PT Marine Science Center)

In this session participants apply knowledge from previous sessions in developing and carrying out a full inquiry on aquatic ecosystems.

9:00 – 9:30	Introducing the session
10:00 – 12:00	Inquiry Starters, Raising Questions and “Gallery Walk”
12:15 – 12:45	Lunch break
1:00 – 5:00	Focused Field Inquiry Investigations

**Thursday, August 18<sup>th</sup>**

### **9:00 – 12:15. Session 7: Concluding Full Inquiry Investigation**

(Adapted from curriculum from the Institute for Inquiry and programs at the PT Marine Science Center)

This session concludes the Full Inquiry Investigation.

9:00 – 9:30	Concluding Investigations: prepare findings for sharing with full group
9:30 – 10:30	Sharing Investigation Findings
10:30 – 10:45	Break
10:45-11:00	Synthesis of Findings
11:00-12:00	Making Meaning Discussion

### **1:30-3:200 pm. Session 8: Subtle Shifts.**

(Based on curriculum from the Institute for Inquiry)

This session explores ways of shifting existing classroom curriculum to give learners more responsibility for the learning process, increasing ownership and building process skills.

1:30-1:35	Introducing the session
1:35-2:15	A “Shifted” activity
2:15-2:45	Comparing “Shifted” and “Un-shifted” activities
2:45-2:55	Break
2:55-3:20	Shifting lessons in your own classroom
3:20-3:30	Summary

### **3:00 – 3:30 pm, Closure and Evaluation**

#### **Grading Criteria System and Evaluation Activities**

Attendance at all sessions of **Approaches to Inquiry: shifting classrooms toward inquiry learning** is required of teachers registering for clock hour or graduate credits.

Teachers enrolled for graduate credit must participate fully in all training sessions and complete two additional assignments.

- 1) A journal with an entry for each session. Journal entries should be made the day in which the lesson was taught and include the following components:
  - a. An overview of the session with summary of important points brought up in the session

- b. A brief, thoughtful discussion of how the writer views the session content in relation to his/her professional work.
- 2) A paper detailing how the teacher plans to apply new understandings and strategies gained in this workshop to their teaching and/or their work with colleagues. This paper should include discussion of the goals and anticipated outcomes of this plan.

**Grading Scale**

Points will be awarded in for participation and assignments for a total of 100 points. Grades will be assigned on a standard 100 point grading scale.

Full participation in all 8 training sessions (4 points each)	32 points
Journal Entries for each of 8 sessions, to include:	48 points
A. Overview of the session, including <u>your own</u> take home messages (3 pts)	
B. Discuss how you see this session influencing your teaching (3 pt)	
Implementation Plan	20 points
A. Teaching Goals (6 points)	
B. Implementation Plan (10 points)	
C. Expected Outcomes (4 points)	
Total	100 points

Assignments must be received by August 31<sup>st</sup> for credit to be awarded.