Curiosity

A Science Inquiry-Based Learning Educational Program

Curiosity is a crab. Curiosity's message to students is that to begin to understand the natural world (and furthermore, the key to understanding the natural world – and being successful at school and in life) is asking questions. 'Curiosity' can be run by any educator for any school group, whether in class or in the field. 'Curiosity' serves as an introduction to science inquiry based learning using the scientific method. This program was developed at Olympic Park Institute in 2006.

Goals:

- Provide students with a foundation in inquiry-based science.
- Give students experience working in groups to formulate questions, progressing through the steps of the Scientific Method, and presenting their findings to their peers.
- Provide Olympic Park Institute (OPI) with an age-appropriate and development-level-appropriate introduction to inquiry-based science that will prepare students to carry out investigations with any OPI educator.

Objectives:

- Students will become familiar with scientific inquiry and the Scientific Method phrased according to the students' grade level and local education standards (see attached WASL vocabulary list).
- Students will practice asking investigate-able questions (GLE 2.1.1), working through the steps of the Scientific Method in their journals (GLE 2.1.2 and 2.1.3), and presenting to their peers (GLE 2.1.5).
- Students will be prepared to carry out scientific investigations in their ensuing days at OPI.

Program Flow:

The basic time breakdown of this program is the following;

- 0 to 15 minutes: Curiosity's story, Introduction to questioning strategies and the Scientific Method
- 15 to 40 minutes: Students work in groups of 3 – 6 to formulate investigate-able questions, work through the Scientific Method, and prepare to present to the rest of the group.
- 40 to 55 minutes: Small groups present their investigations to the entire group.
- 55 to 60 minutes: Program wrap-up (Curiosity Song or something else).

Curiosity is a crab whose story follows a little later in this write-up. Curiosity and/or her story can be used as a way to draw in students' attention and to provide an icon for students to associate with the scientific inquiry process. Aside from drawing students in and sparking their interest, the introduction to this evening program should provide a clear vision of what the students will be doing for the hour, introduce the parts of the Scientific Method, and lay out questioning strategies to help students come up with their own questions. Students should already have OPI journals, and if they do not, distribute the journals as students arrive at the program. Page 6 and 7 of the journal can be used to introduce the Scientific Method and what students will be doing during the program. Some conversation about each step the students will go through is important including the presentation. The educator should somehow introduce questioning strategies (this could be by referring back to Curiosity) and provide students with examples of investigate-able questions. This could be done in conjunction with introducing the materials that will be used for investigation. In this program, a

variety of materials could be used for investigation depending on the curriculum track a school has chosen or depending on the age of the students (examples include: lichens, mosses, fungi, cones, needles, or soil for a forest ecology curriculum track, aquatic insects, water samples, or wet moss for a watershed science curriculum track, rocks, sand, or soil for an earth sciences curriculum track, or M&M's for any curriculum track). The tools that students can use will likely be their own hands and senses, though magnifying glasses, thermometers, measuring devices, or other things could be incorporated.

If Curiosity Crab is used and her story told at the very beginning of the program, a logical progression would be the following; from Curiosity's story, lead into questions and questioning strategies. The educator could ask students to brainstorm questions they might have about a crab on the beach (i.e. What does a crab eat? Where is a crab's home?). The educator could then focus these questions toward answer-able, investigate-able questions (i.e. How many crabs can you see in 10 minutes in the same spot? What are the measurements of the crab? Are there more crabs on fine sand or big rocks?).

After working on questioning strategies, the educator should introduce the subsequent steps of the Scientific Method. The journals could be used as a visual to help students grasp this. Additionally, a large white board could be utilized to highlight the steps of the method. Aside from educating students about how scientists (i.e. the students) answer questions and learn about the natural world, the introduction to the inquiry process will also serve to demonstrate to students what they will be doing during the next part of the program.

After the introduction, the students should be split into groups of 3 – 6 (the educator or teachers can decide how best to do this). The groups should be able to work at a table where ideally the materials will already be laid out. For example, if the program introduction is in the cedar room, the materials can already be laid out on tables in the dining hall. The educator(s) working this program should solicit help from teachers and chaperones to be able to roam from table to table helping the students through their inquiry projects. Supporting students in coming up with a question and designing an investigation is essential to success of this program. The educator should keep an eye on time and announce how much time is remaining periodically. Accompanying these announcements can be suggestions about what step students ought to be on to be able finish their investigation and be ready to present on time.

After the investigation, students should all come to a place where presentations can happen (ideally the same place where the introduction happened). Presentations should be kept short (1 or 3 minutes depending on number of groups) but should include the entire circle of scientific inquiry (page 6, OPI journal). Students may be encouraged to conclude their presentations with the quote, "Are there any questions?" Educators may want to limit the number of questions allowed if time is running short.

This evening program could be wrapped up in a variety of ways, though it is important that students leave with a sense of accomplishment as scientists and that students recognize that they will follow the same procedures for investigating the natural world throughout their time at OPI and in their home communities. A suggestion for a fun closing to the activity is to sing Curiosity's song (see attached).

Curiosity's Story:

This story was told to me by a young girl (insert age here) who lives not far from the Puget Sound (or other relevant location). She was a student at OPI recently.

This story takes place in the early-fall, soon after the beginning of school, and a couple of weeks before her school was going to come to OPI for a program.. School had been going pretty well, though she was feeling like school was starting to get difficult. They had just started studying science and the environment and her teacher had said to the class,

"Science is studying the natural world. For our unit on science, and when you go to OPI, you will all need to learn about the natural world." 'But how do I learn about the natural world? I don't even know how to start learning about the natural world,' the girl thought to herself.

She felt frustrated, so that very day, she went for a walk in her favorite spot by the water of the Puget Sound. She was walking down the beach by herself, nobody else was in sight. She was thinking about what her teacher had said in school that day. She had the question in her mind 'how do I start to learn about the natural world?' She walked for a while, occasionally stepping over rocks and kelp, sometimes dragging her feet through the black sand, all the while thinking of that question, 'How do I start to learn about the natural world?' But no answer came. She listened closely for a while to the breeze in the red cedar trees next to the shoreline. "Whoosh" – then she listened to the small waves lapping against the beach "Swish-Swash." All of a sudden, she heard another sound mixed in with the wind and waves. It was a light clicking sound coming from behind her. She stopped suddenly and turned around. The sound stopped also. She scanned the horizon, and there was nothing in sight. She was still the only person on the beach. She shrugged and continued walking along. Before long, she heard the clicking sound again behind her. Again she stopped and looked around. Nothing.

'I wonder what that sound is?' She thought to herself as she turned to continue walking. As she took her first step, she started to hear the sound again – Click, Click – She immediately turned around and this time she looked down at the sand below her. And there – crouched on the sand – was a crab. The girl squatted down to get a closer look. The crab edged away at first, but then crept back toward the girl in a curious manner until the crab was only a couple of feet away.

'What a curious crab,' the girl thought to herself. She looked down into the crab's shiny black eyes. "Hello young friend," the crab said. The girl's eyes opened wide with surprise. She looked up and down the beach. Nobody was in sight. She wasn't one who normally talked to animals, at least not since she was a bit younger, but she thought to herself, 'why not?' She leaned in close and said, "Hello Crab." The crab said to the young girl, "you look frustrated, what's the matter?"

The girl, who was a little surprised at herself and at the situation continued to talk to the crab. "Well, today in school my teacher said I need to learn about the natural world for our science unit and then for when we go to OPI, but I don't even know how to start learning about the natural world. . . . Can you help me out, crab?" Even before she had spoken the last part the crab scurried off and disappeared. – Click, Click --

'What a curious creature indeed,' the girl thought to herself. Just as she was about to stand up and continue her walk down the beach she heard that same clicking sound coming closer. The crab reappeared, only this time it was dragging something behind it, struggling slightly with the weight. The crab stopped close to the girl and offered what it had been dragging. The girl held it up and stared at it for a while (it is dried kelp in the shape of a question mark). She was at first very confused, but after a short while, she started to understand.

"It's all about asking questions, my friend." The girl heard from the sand. She stared at the gift the crab had given her for a little longer and started to hear a clicking sound. When she looked down, the crab was already 10 or more feet away. "Hey, wait crab," the girl said. The crab stopped. "Thank you. By the way, what's your name?" The girl said. "What do you think?" The crab replied.

The girl looked down at the gift the crab had given her and smiled. "I think your name is Curiosity Crab." When the girl turned to look back down to the sand the crab was gone.

Curiosity's Song:

Chorus:

G C D
Curiousity . . . She is a crab who talks to
G C D

You and me . . .You'll hear her too if only
G Am7 G
You believe . . .
C Bm
If something you see has you feeling some doubt
C D
And you can't understand what it's all about
G C D
Curiosity . . . She will tell you her
G Am7 G
Philosophy . . .
C D
And don't be surprised when you hear her reply

Em D
It's all about Asking Questions, my friend.
Em D
Questions are a cycle with no end.
C Bm
If you want to be wise, when you hear a reply,
Am G/B C D
Ask another question and you'll start again.

Em D
The more we ask questions, the more we learn,
C B7
And this will often lead us to care.
Am G/B C C#dim
And if we respect something's freedom to be,
G/D D7
We may choose to act so that it remains there.

CHORUS

It's all about Asking Questions, you know.
Questions are your friend and not your foe.
And if one gets answered, don't take it for granted,
Ask another question and away you'll go.

The more we ask questions, the more we learn,
And this will often lead us to care.
And if we respect something's freedom to be,
We may choose to act so that it remains there.

CHORUS

It's all about asking questions, I say.

And investigating answers every day.
If you're feeling perplexed just relax, don't get stressed.
Ask another question and you'll find your way.

The more we ask questions, the more we learn,
And this will often lead us to care.
And if we respect something's freedom to be,
We may choose to act so that it remains there.

CHORUS