Gifted Standards Based Lesson Plan: GPS Extensions

**Name of Lesson:** The Elephant’s Child – Lesson 4

**Topic:** Relationship & Connections - Scientific Inquiry/Questioning

**Lesson Summary:**
Using question starters students will think like their assigned scientist (meteorologist, botanist, ornithologist, and zoologist) to develop a list of questions/wonderings they think their particular scientist would have before beginning an investigation. In addition, they will be introduced to the process of scientific inquiry. When the lesson concludes, students should be able to create thought provoking questions to explore relationships and have introductory knowledge of the scientific process that will be applied in later GPS extension lessons.

**Gifted Standard and element(s):**
G1CG4: Relationships and Connections: Students will make relationships and connections among various topics and disciplines.
   - c. Formulate thought-provoking questions to explore relationships.
   - d. Research topics or real-world problems to develop a body of knowledge and depth of understanding beyond the Georgia Performance Standards.
   - e. Reflect upon and communicate an understanding of relationships.

**Georgia Performance Standard(s) and element(s):**
S1CS1 - Ask Questions
Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

S1CS1a - Raise Questions About the World Around Them
Raise questions about the world around them and be willing to seek answers to some of the questions by making careful observations and measurements and trying to figure things out.

S1CS7 - Scientific Inquiry
Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:

**Unit Essential Question(s):**
How do I identify relationships within the information/topic of study?

**Lesson Essential Questions:**
How do scientists choose questions to investigate?
How do scientists seek answers to their questions?

**Assessment Description/Performance Task:**
- [ ] Constructed response
- [x] Informal assessment
- [x] Performance task
- [ ] Selected response

**Brief Description of Assessment:**
- Students’ will work with a small group to sort the two types of questions and teacher will make informal assessments of their understanding based on correct sorting of the questions.
- Students will work with a partner to complete the Scientific Process – Internet Investigation – Card Sort. Teacher will assess student learning on students’ correct sequencing of the scientific process steps.
- ALP Thinking Log: Students will reflect on the different types of thinking they used in sorting questions, generating and ranking questions, and researching & sequencing the scientific process.
Instructional Methods:

Prior to the lesson:
- Reserve laptops – 1 per 2 students
- Access copy of Rudyard Kipling’s Elephant’s Child poem or book (see materials for sources)
- Prepare Question Sorting Cards (found in this document)
- Prepare Question Sorting Chart (see teacher example) or use the included SMARTboard Questions Category Sort notebook page
- Prepare Scientist Hats or Badges using included badges – hats can be made by 2 x18 inch strips of colored construction paper, cutting out the Scientist Badges, gluing one badge in the center of the strip, then and stapling to fit.

Hook/Activator:
Teacher will read aloud Rudyard Kipling’s The Elephant’s Child. The teacher need only read the beginning portion of the story, stopping at the end of page five. The poem by the same title, also by Rudyard Kipling, may be used in place of the story. After reading the chosen selection, the teacher should guide students in a discussion intended to explore the understanding that all investigations begin with questions or specific wonderings that can lead to specific actions on the part of the investigator. Just like the Elephant’s child, scientists have many questions and wonderings that can lead them to deeper understandings.

Teaching Strategy:

1. Teachers will introduce the Scientific Inquiry Process, explaining that scientists have an organized method they use when they begin an investigation. Teachers will prompt students to review what they have learned thus far about the four scientists: meteorologist, ornithologist, botanist, and zoologist. The teacher will divide students into four groups and assign each group one of the four scientists. The teacher will give students in each group a scientist badge or hat that includes the name of the scientist and a representative symbol, appointing each group honorary: botanists, meteorologists, ornithologists, or zoologists for the day.

2. Teachers will conduct a mini-lesson about types of questions. Using the Sorting Questions (found in this document or on the accompanying SMARTboard page), the teacher will lead a discussion about different types of questions; guiding them to the understanding that some questions will produce ready (one or two word) answers while others will lead them to explore relationships that develop deeper understandings and knowledge. The teacher will lead the students in sorting the Sorting Questions (see SMARTboard page) into two categories: Fact-Based Questions versus Exploratory Questions (this can be done on a SMARTboard/Promethean or on a large chart). The teacher will conclude the lesson by summarizing that exploratory questions are the type of questions that scientists use to develop deeper understandings and knowledge.

3. After concluding the above mini-lesson, the teacher will ask students to brainstorm a list of questions they think their particular scientist might need to investigate about his/her topic. Teachers will give each group a list of question starters (included in this document) to help guide student thinking. The teacher will also provide each group a Scientist Information Card (found in this document) that gives limited background information about their scientist.

4. After each group has generated a list of questions, the teacher will explain that scientists must evaluate their questions to decide which ones they believe are most important to pursue/study. The teacher will direct each group to rank their questions, as scientists do, from (#1) most interesting or need-to-know questions, to those that they determine to be less interesting or easily answered (rankings will vary depending on number of questions generated). After students have evaluated their questions, each group should share their top 1-3 questions,
depending on pacing of lesson. Teacher may decide on mode of presentation/sharing.

5. After students have shared their most intriguing questions, the teacher will remind them that scientists have a process that they use for investigating their questions. The teacher will explain that part of each Target student’s job is to find answers to their questions, and so they must learn about a process that scientists use to find answers and understand relationships.

6. Teachers will pair students with a partner to work on laptops. Teachers will show students how to access the Internet website:
   http://library.thinkquest.org/J001402F/question.htm
7. Teachers will explain that students will investigate/research the scientific process using the above website, and correctly sort the pre-cut cards from the Scientific Process – Internet Investigation – Card Sort page contained in this document. Students will sort the cards while researching, correctly matching the Step #s with each Step Name and Step Description.

Summary by the Learner:
Students will formulate questions to explore relationships and perform introductory research on the scientific process. Students should be able to create thought provoking questions to explore relationships and have introductory knowledge of the scientific process that will be applied in later GPS extension lessons. Students will conclude the lesson by correctly answering the two essential questions contained on the Official Target Scientist Certificate (or teacher can create a ticket out the door).

Differentiation:
• More Capable:
  1. More capable students who finish early may use resources to explore answers to the questions they generated earlier for their particular scientist.

• Less Capable:
  1. Teacher may opt to work with a particular group who may need additional assistance, circulating periodically to monitor progress of other groups.

Materials for this Lesson:
• Laptops – 1 per 1-2 students

• Prepare for access to scientific process website: http://library.thinkquest.org/J001402F/question.htm

• Copy of Rudyard Kipling’s Elephant’s Child:
  Storybook or Poem – Poem is included in this document:
  Free Recordings: http://www.archive.org/details/just_so_stories_1004_librivox
  Amazon: http://www.amazon.com/Elephants-Child-Rudyard-Kipling/dp/1845074920/ref=sr_1_1?ie=UTF8&qid=1323449323&sr=1-1

• Student handouts – Questions My Scientist Might Ask

• Pencils

• Scientist Badges or Hats – 1 per student

• Copy, laminate, and Cut the Sorting Questions Cards and place one set in one envelope per group.

• Copy, Laminate, and Cut the Scientific Process – Internet Investigation Cards and place one set in one envelope per group.

• Copy, cut and laminate one set of scientist information card for each group – Each group gets a set of 4 cards for their particular scientist.
- Teacher Background Website: [http://scene.asu.edu/habitat/inquiry.html](http://scene.asu.edu/habitat/inquiry.html)

**Vocabulary for this Lesson:**
- Question, hypothesis, insatiable, curiosity, wonderings, meteorologist, botanist, ornithologist, zoologist, rank, scientific process, hypothesis, experiment, observe, record, data, design, conclusion
The Elephant’s Child
by Rudyard Kipling

I keep six honest serving-men
(they taught me all I knew);
Their names are What and Why and When
and How and Where and Who.
I send them over land and sea,
I send them east and west;
but after they have worked for me,
I give them all a rest.
I let them rest from nine to five,
for I am busy then,
as well as breakfast, lunch, and tea,
for they are hungry men.
But different folk have different views;
I know a person small---
she keeps ten million serving-men,
who get no rest at all!
She sends ‘em abroad on her own affairs,
from the second she opens her eyes---
one million Hows, two million Wheres,
And seven million Whys!
Name __________________

**Questions My Scientist Might Ask**

<table>
<thead>
<tr>
<th>What would happen if...</th>
<th>I wonder what...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why would...</td>
<td>I wonder why...</td>
</tr>
<tr>
<td>Why does...</td>
<td>I wonder if...</td>
</tr>
<tr>
<td>How would...</td>
<td>I wonder how...</td>
</tr>
<tr>
<td>How do...</td>
<td>How can...</td>
</tr>
</tbody>
</table>

**Directions:** Choose several question starters from the box to help you write questions your scientist might ask. Write one question in each box.
Questions/Investigation Starters & Question Examples

Teacher Examples

<table>
<thead>
<tr>
<th>What would happen if...</th>
<th>I wonder what...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why would...</td>
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</tr>
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</tr>
<tr>
<td>How do...</td>
<td>How can...</td>
</tr>
</tbody>
</table>

How do birds fly?
How does weather change?
What would happen if there was no sun?
Why does weather change?
What would happen if all birds became extinct?
How are birds different?
How are animals different?
Why are animals different?
I wonder why the sky is blue.

Are all birds alike?
Do birds fly?
Is the weather always the same?
What is the weather like in the winter?
Are all animals alike?
Do animals have young?
Are all animal young born the same way?
How are turtle young like human babies?
Do all animals eat the same thing?
Why do animals eat different things?
What color is the sky?
Why does the weather change?

How many days are there in a year?

How do we know the length of a year?

Does weather change?

Are all animals alike?

How are animals alike or different?
### Question Sorting Chart

<table>
<thead>
<tr>
<th>Explanation to Answer</th>
<th>One Word to Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teacher Example:
### Scientific Process – Internet Investigation – Card Sort

(Copy on Colored Paper or Cardstock, Laminate, Cut apart all 15 cards, and Put in One Envelope – One Set per Group)

<table>
<thead>
<tr>
<th>Step #1</th>
<th>Questioning</th>
<th>This is where your investigation begins. People want to find answers to solve problems and cure diseases, or just to know more about things that they wonder about.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step #2</td>
<td>Hypothesis</td>
<td>This is where you make an educated guess about the answer to your question. First you need to do some research so you have background knowledge.</td>
</tr>
</tbody>
</table>

CCSD Version Date: May 2011
<table>
<thead>
<tr>
<th>Step #3</th>
<th>Experiment Design</th>
<th>This is where you try to produce an answer to your question. You think about all the variables and then you design, set-up, and conduct your experiment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step #4</td>
<td>Observe &amp; Record</td>
<td>This is where you use your senses to carefully examine and collect data. You organize your observations into notes, charts, graphs, tables, or lists.</td>
</tr>
<tr>
<td>Step #5</td>
<td>Conclusion</td>
<td>This is where you tell what happened in your experiment. You explain what you expected to happen, what actually happened, what the results of your experiment mean. You also tell what went right and what went wrong.</td>
</tr>
<tr>
<td>Zoologists</td>
<td>Botanists</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Zoologists love the animal kingdom and there’s no animal they can’t identify. They love to read about animals of all shapes and sizes around the world. They often live in the wild with the animals they study so they can learn more about them.</td>
<td>Botanists love working outside with the plants they study. They examine trees, flowers, bushes, and even plants that produce some of the foods we eat. Their favorite thing to do is to find new and rare plant species and give them names.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meteorologists</th>
<th>Ornithologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meteorologists love a good storm and are often called storm trackers. They study the many different types of weather and they wouldn’t want to miss a hurricane brewing on the coast. Their radar and maps can show how a storm grows in size. They often track storms and severe weather to keep people safe.</td>
<td>Ornithologists love to hear the call of different birds and listen to their songs. They often record new bird species songs to play back and study in their labs. They travel the world searching for new species of birds in different habitats. They use recording equipment to record rare bird songs.</td>
</tr>
</tbody>
</table>
Official Target Scientist Certificate

1. How do scientists choose questions to investigate?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

2. How do scientists seek answers to their questions?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

______________________________ has fulfilled
the requirements to be a certified Target Scientist.

Signed: ________________________________

______________________________
Target Teacher

on this day _____________ in the year ______
Student Hats - Copy, Cut-out, Glue to Center of 2 x 18 Construction Paper Strips – Staple to Size

Zoologist

Botanist
Meteorologist

Ornithologist