Exhibit Design and Redesign

Connections to Africa

Grade Levels

Grades 4-6

Engage

This activity is designed to start your students in recognizing themselves as scientists and thinking critically about problem-solving. The goal is to teach concepts through discovery and to encourage using scientific thought processes. As with all lessons provided, please feel free to adapt them according to your students' abilities. You may find it more successful to lead activities and discussions as a whole group rather than using individual Research Plan sheets. Certain scientific vocabulary may or may not be appropriate for your students' level of understanding. Take these ideas, make them your own and your students will have a greater chance at success.

How does the elephant data collected at African Elephant Crossing show the successes of certain exhibit elements? Could you redesign the space so that the elephants would use all exhibit elements?

1. Begin this lesson by telling students that they will be investigating how the elephants use the space at African Elephant Crossing and how frequently or infrequently they interact with the various elements in their exhibit.
2. If your students are familiar with brainstorming and recording their ideas, break them into small groups. If your students need more guidance, work with them as a large group. Provide exhibit maps to the students and engage them in a discussion of what they predict will be the elephants favorite parts of the exhibit. More importantly, <u>why</u> do they think this?

Explore

3. Provide students with elephant data collected at African Elephant Crossing, which is available for download from the Zoo's website. As they examine the data, do they notice any trends? Does this help them answer that first question? Does it match their predictions?
4. Continue with the above discussion and encourage the group to examine the exhibit map in light of the data. Are there elements in the exhibit that are underutilized by the elephants? Are there any conditions that are affecting the level of use of each element?

Could the individual elephants have different preferences? Allow a wide variety of ideas and encourage conversation amongst the students to refine the details of their ideas.

5. Ideas should be recorded on the Research Plan sheets. Small groups can record their own answers or you can record ideas as a group.

Explain

6. Tell the students that zoo exhibits are costly endeavors. (African Elephant Crossing cost $25 million.) Lots of time and expertise goes into determining what is needed to provide the best care for the animals and how to provide the best experience for the public. Exhibit architects work with animal care staff, horticulturists, water quality specialists, facility maintenance

7. workers, educators and guest services staff to design the best exhibit possible. Each exhibit element is given tremendous consideration. Considerations continue once the animals are
placed in the exhibit, as there are always lessons to be learned about how the exhibit functions, given that individual animals all have their own unique personalities.

Expand

8. Have the students think about what they would do differently if they could design African Elephant Crossing. Would all the same exhibit elements be included? Would the design look the same? Are there new elements to the exhibit that they would want to include? Would other animal species be included? Allow a wide variety of ideas and encourage conversation amongst the students to refine the details of their ideas.
9. Have students work in their small groups to develop a graphic representation of their redesigned African Elephant Crossing exhibit. Remind them that, like all exhibit designers, they need to be able to give reasons for why exhibit elements were removed from or added to the original design. Incorporate spatial math concepts into this lesson by having them pay attention to scale when creating their drawings or models.

Assess

10. Monitor your students as they continue to research and develop their drawings and models. Make sure to help them continue their discussion on what they learned from the data, what they already know about elephants and exhibit design and what they may have discovered on their own.
11. When students have completed their designs, have them share their work with the rest of the class. Allow time for student critique and comments.
12. Conclude the lesson by looking back at the original research question. What did the data tell the students about how to approach their design? Do they think that the data would be the same if it were a different herd of elephants in the exhibit? How does this affect the decisions made by exhibit designers?

Standards

Next Generation Science Standards
Engineering Design 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem

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Supplemental Materials

My Research Plan

1. Questioning
State the problem.
Make a hypothesis.

How does the elephant data collected at African Elephant Crossing show the successes of certain exhibit elements? Could you redesign the space so that the elephants would use all exhibit elements?

2. Planning
Make a plan by asking these questions (think, talk, write)

3. Implementing
Gather the materials.
Follow the procedures.
Observe and record the results.

4. Concluding
Draw a conclusion.

5. Reporting
Share my results (informal)
Produce a report (formal)