Effective Scientific Questioning

Maria Soto
What techniques do you use to start a science lesson?
Course of Study

Asking Questions

Using the Question Formulation Technique to improve students ability to ask questions that drive scientific inquiry.
WHAT IS QFT?
Question Formulation Technique (QFT)

A step by step process designed to facilitate the asking of many questions.
The Rules of QFT

1. Ask as many questions as you can.
2. Do not stop to discuss, judge, or answer any of the questions.
3. Write down every question exactly as it was stated.
4. Change any statements into questions.
Open and Closed Questions

• Closed-ended Questions: answered with a one word response such as yes or no or another single word
  • Example: Is this going to be on the test?

• Open-ended Questions: requires more explanation.
  • Example: What will be on the test?
## Close Ended Questions

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• They’re quick</td>
<td>• They don’t give you much information</td>
</tr>
<tr>
<td>• They get you clear information right away.</td>
<td>• They close off discussion</td>
</tr>
<tr>
<td>• You get a very specific answer.</td>
<td>• You don’t learn what you really want to know.</td>
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</table>
# Open Ended Questions

<table>
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<th>Advantages</th>
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<tbody>
<tr>
<td>• You get more information.</td>
<td>• You may get too much information.</td>
</tr>
<tr>
<td>• You get to hear what the other person is thinking.</td>
<td>• You can be more confused.</td>
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<tr>
<td>• You might get an explanation that helps you understand more.</td>
<td>• It can be too long.</td>
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Prioritizing Questions

- Assigns importance
- Builds skills such as:
  - Comparison
  - Categorizations
  - Assessments
  - Synthesis
Our Lessons
Animal Adaptations: TEKS

3.2A: Process Skills, plan and implement descriptive investigations, including asking and answering questions, making inferences, and selecting and using equipment or technology needed, to solve a specific problem in the natural world.

3.9B: Food Chains, Identify and describe the flow of energy in a food chain and predict how changes in a food chain affect the ecosystem such as removal of frogs from a pond or bees from a field.

2.10A, 3.10A: Adaptations, Explore how structures and functions of plants and animals allow them to survive in a particular environment.
Plants and animals have structures that function to help them survive.
Student Work

3/20/18
- Coloring, patterns
- Animal feet
- Sticky
- Strange
- Different
- Useful
- Belongs to
different species of
same animal
- Human like
- Alien

Plants 9/11/18
- Why is it green at
  the bottom and blue
  at the top?
- Why at the top it
  rivals but at the
  bottom it's straight?
- What are the spikes
  for?
- Is it poisonous, if
  so what kind of poison
does it have?
- What type of plant
- What kind of medicine
does this plant produce?
- What are the colors
  black, orange, green and
  blue for?

3-20-18
1. What keeps a
   plant survive?
2. Why animals need
   wants to survive?
3. Why are functions
   important?
4. What kind or functions
   are these

Where does the
bread come from?
Where did the
chese come from?
What kind of
food chain does
the hamburger have?
Where did the onion
come from?
Where does the tomato
come from? What
kind of seeds
are in the bread?
How do people
cook the hamburger?
RESULTS
Growth of Open Ended Questions: 15%
Surprises & Challenges

Surprises

- Easy to integrate and continue within classroom routine.
- Curriculum alignment

Challenges

- Time
- District Lesson Pacing
Findings & Learnings

- Versatility
- Cross Curricular
- Positive Student Response
- Questioning prompted Student led Research
Next Steps

- Age appropriate rules (QFT)
- More time
- Use questions to guide research and design experiments
Thank you for your feedback!