Questioning Strategies: AEES Central

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Participant Materials

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Tips for a Good Conversation

- Acknowledge one another as equals
- Stay curious
- Recognize that we need one another's help to become better listeners
- Slow down so we have time to think and reflect
- Remember that conversation is a natural way humans think together
- Expect it to be messy at times
- Take responsibility for our impact on others
- WAIT (why am I talking or why am I (not) talking?)

Adapted from the National Equity Project and The Art of Conversation

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Session Agenda

- 1. Introducing Questioning
- 2. Describe the Object
- 3. Discussing Broad and Narrow Questions
- 4. Broad Questions in Action
- 5. Wrapping Up

Breakout Room Discussion 1 Questions

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Read the Broad Questions and Narrow **Questions Handouts, then discuss:**

- What are some situations or goals for which narrow questions might be appropriate?
- What are some situations or goals for which broad questions might be appropriate?
- o Any questions that come up for you while reading the handouts.

Broad & Narrow Questions-Handouts

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Broad Questions

- wnat affects the water quality where you live?
- How might inter-tidal organisms survive living in and out of water?
- · Should we use pesticides?
- How are these young insects similar to and different from their adult stage?
- What do you think has caused the shapes of the landscape we're seeing?

Broad questions can be about specific topics and about science:

- . Broad questions can focus on a specific topic. The name "broad" might make it seem like broad questions can only be about broad topics. But what makes them broad is that they have multiple acceptable answer while narrow questions have only one acceptable answer. Broad questions can be about either general or specific topics.
- Broad questions can be about science content. Many instructors use broad questions about feelings, values, and opinions, but broad questions are also an important part of instruction about science content. Teaching science is not just delivery and recall of information. Asking students broad guestions gives them the opportunity to engage in higher level thinking and productive struggle with science content, leading to deep learning and understanding.

Broad questions encourage exploration and curiosity:

Broad questions encourage exploration and curiosity. Asking a broad question about something found in the field, such as, "What do you notice about this plant" tends to encourage deeper and longer exploration than a narrow question, such as, "what is this plant called?" Our curiosity tends to decline once we hear the name of something. Names and facts are useful, but it's better to share them after encouraging observation and exploration using broad questions.



e The Regents of the University of California.

All materials created by BEETLES[®] at The Lawrence Hall of Science
Find the Intest materials and information at http://beetlesproject.org.

Broad_Questions.pdf

PDF document

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Narrow Questions

NARROW QUESTIONS

Narrow questions (also known as "closed-ended questions"):

- have a specific answer
- help instructor know if students know a specific piece of information.
- require recall of information
- encourage group response and convergent thinking
- · tend to be overused by instructors

Narrow Question Examples:

- Is this an insect or a spider?
- · What is the definition for decomposition?
- · What is a marine mammal that has ear flaps, flippers, and barks like a dog?
- What is this called?
- What kind of animal is that?
- · What gas do plants take in that we breathe out?
- Do animals photosynthesize?
- What time is high tide?
- What is a consumer?
- How many legs does it have?
- . Is an oil spill bad for a river?
- What causes U-shaped valleys?

Narrow_Questions.pdf

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Skit Transcripts

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Skit 1 Transcript

instructor. Maybe coyote. Maybe domestic dog.

Student 1: Dog doesn't start with the letter "C."

Student 2: It could be a mountain lion.

Instructor: That's not a mountain lion scat. At least I don't think it is.

Student 3: Cat starts with a "C."

Instructor: It's not a cat scat. It's too big for a cat. Think about how big cats are. This scat is too big for a cat. So the reason you're seeing hair in the scat is because the animal can't digest the hair, so it comes out in its scat. Pointing at scat. Hey look, there are bones in there too. And of course, the dog or coyote couldn't digest the animals' bones either, so there they are. The bones in there look pretty small. Guess what kind of animal that might have been.

Student 1: A mouse

Instructor: Yeah, I think those are mouse bones, and they're from an unlucky mouse that got eaten by a dog of some

Student 4: A squirrel?

Instructor: No, I don't think it's from a squirrel. So, mountain lion scat is segmented, like it's got different parts to it, though they are still connected. The ends of mountain lion scat are usually blunt, not pointy. The ends on this scat are pointy.

Student 2: I don't get what you mean by segmented.

Instructor: Kind of like on that part there – that looks kind of segmented.

Student 2: But I thought you said it wasn't mountain lion scat cause mountain lion scat is segmented.

Instructor: I know, well dog scat can be segmented kind of too sometimes, but cat scat is even more segmented It's confusing and they can be hard to tell apart sometimes. I think this is coyote or dog scat, but I may be wrong.

Student 2 : Where would a dog live around here?

Instructor: If it was a domestic dog, it could live in a house nearby, like farther up this hill. But if it was a coyote, coyotes live in burrows dug out of the ground. Coyotes are nocturnal animals, but they used to be more diurnal. But because people hunt them sometimes, they have become more nocturnal. So this coyote probably ate the mouse last night and then pooped it out here in the darkness.

Instructor: Now you know how to look at scat like a naturalist. OK, let's move on. Everybody who couldn't see very well

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Skit #2

QUESTIONING STRATEGIES: HANDOUT



SKIT #2

Scene: A group is hiking with their instructor, with student #1 at the front, when they come across a large scat in the trail

Cast: 1 instructor and 4 students

Note: Stage directions are in parenthesis and italics **Student 1**: (points at scat in the trail) Oh, my God!

Instructor: Check it out! Look at the scat [Student 1] just found.

Student 2: It's humongous!

Instructor: What do you notice about it?

Student 2 : Why is the scat hairy?

Instructor: What do you mean by it being hairy?
Student 2: I mean it looks like it has hairs in it.

Instructor: Those of you who are up close, can you tell us more about whether those look like hairs?

Student 1: They look like hairs to me. Student 2: It's like made of hair.

Instructor: Can you describe the hairs for us? Color? Length?

Student 1: They look sort of gray.

Student 2: And twisted. It's almost like rope. Scat rope! **Student 1**: It looks like a little bone in there too.

Student 1. It looks

Student 2: Yeah!

Student 3: Yeah, it does look like gray hairs and it does look rope-y.

Student 3: Year, it does look if

Instructor: Anyone have an explanation for why there are hairs in the scat? What do you all think?

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Skit #3

QUESTIONING STRATEGIES: HANDOUT



SKIT #3

Scene: A group is hiking with their instructor, with student #1 at the front, when they come across a large scat in the trail. Cast: 1 instructor and 4 students

Note: Stage directions are in parenthesis and italics

Student 1: (points at scat in the trail) Oh, my God!

Instructor: Hey everybody!

Instructor: (singing/chonting) "It starts with an "S" and ends with a "T." / It comes out of you and it comes out of me./ I know what you're thinking, and you can call it that, but let's be scientific and call it SCAT!!!

Check it out you guys! We've got a humongous awesome scat here to explore. Now let me give you the scoop on poop, because I'm a bit of a scatologist. And the first question I have for you is—is it scat of the

cat, or doo-doo of the dog? **Student 2**: That's too big to be from a cat. My cat's poop is a lot smaller.

Instructor: I actually meant whether it's from the dog family or the cat family. Your cat is a distant cousin of bigger cats that might live around here: the beautiful bobcat and the magnificent mountain lion.

Student 1: Is it mountain lion scat?

Instructor: No, it's not. Scat from the cat family is segmented and has blunt ends like a tootsie roll. Dog scat has pointier ends. I remember it because dogs have pointier heads, and their scat has pointy ends. Cats have more blunt heads, and their scat has blunt ends.

Student 4: My pug has a blunt head.

Instructor: Well, most dogs anyway. So what kind of dog do you think might live around here?

Student 1: A wolf?

Instructor: (makes game show buzzer sound-bzzzzt) Not a wolf. There used to be wolves around here a long time ago.

But not anymore. Sorry, try again.

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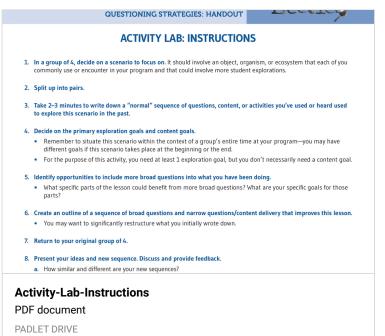
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Activity Lab Materials

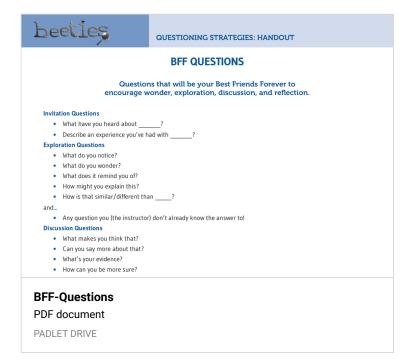
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Activity Lab Instructions



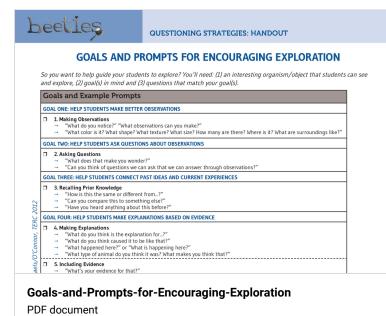
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BFF Questions



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Goals & Prompts for Encouraging Exploration



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Questions and the Learning Cycle

 What did you notice? What questions do you have? What are some possible explanations for that? · What did you find out about ...? . How is this the same or different from..? Can you compare this to something else? . What do you think is the explanation for ...? . Can you explain what makes you think that? What is your evidence? · What might another explanation be? Application phase: Use broad questions to encourage reasoning and analysis—involve students in authentic problemving situations and critical thinking—help students to generalize their knowledge and test their hypothes · What do you now know about the characteristics of ...? · What other factors do you think might be involved? • Can you find a way to...? · What does it remind you of? . How can we use what we found out to solve a problem? · How could you be more sure about ...? Reflection phase: Use questions to encourage students to think back on what they have done and how they have made · What surprised you? . How did you arrive at your solution or conclusion? · Did you change any of your initial thinking? • What caused you to see things differently? · How did you figure out ...? 36 Professional Learning Materials Questions-and-the-Learning-Cycle PDF document

Session Handouts & Follow Up Resources

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Session Materials

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Link to access session script, slides, handouts, and materials.

Questioning Strategies - Beetles Project

Science and Teaching for Field Instructors How Questions Impact Teaching and Learning This session focuses on how to use questions to encourage student exploration and discourse. Part of the session delves into how an instructor's different prompts and behaviors may encourage or discourage student exploration and learning.

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Thought Swap

Thought Swap - Beetles Project



Science and Teaching for Field Instructors Many field instructors have found this simple routine to be transformative for

their field experiences with students because it is so effective at sparking discourse. Thought Swap is easy to lead and supports student participation by focusing on one-on-one discussion.

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