

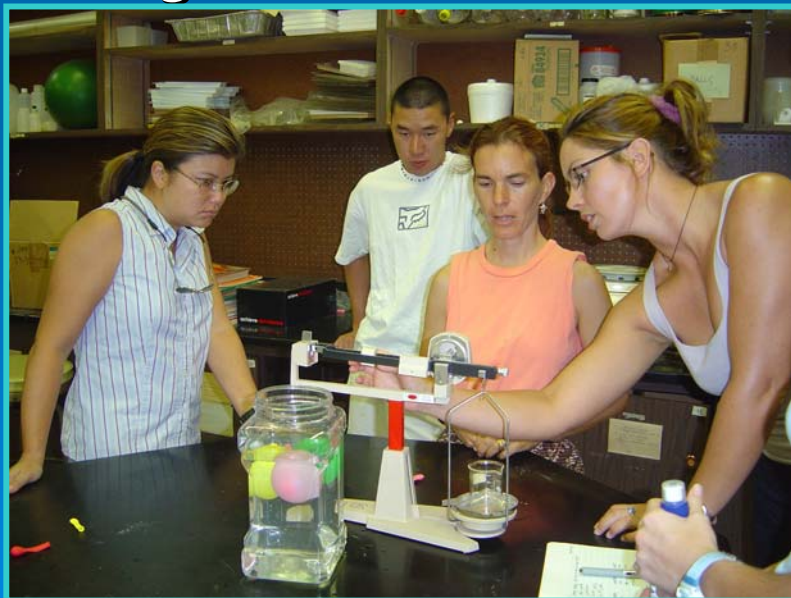
# Training Scientists to Effectively Communicate with K-12 Students and Teachers

Lessons from the  
Ecology Evolution & Conservation Biology  
GK-12 Program

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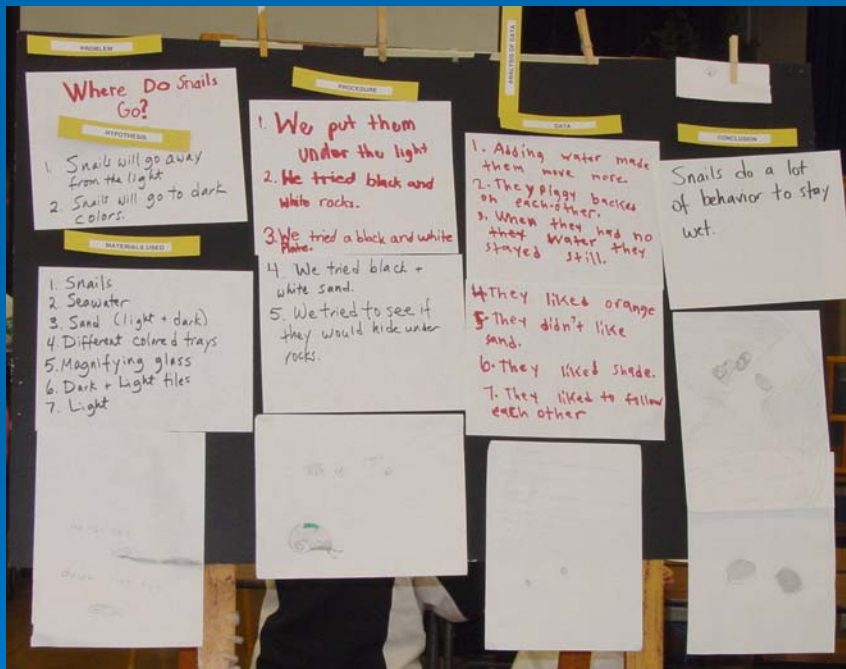
# The Hawaii GK-12 Fellows

- Fellows must be admitted to Ecology, Evolution, & Conservation Biology Program



- Application Essays:  
How does pre-college education strengthen research science, and how can research science benefit pre-college education?  
How might you involve K-12 teachers and students in your research (future or ongoing)?

# Why a training seminar?



- Familiarize fellows with expectations
- Common grounding for all in current educational research & practice
- Set day/time to manage logistics or other issues as they arise
- Build teamwork among fellows

# Training Seminar

- 3-credit course
  - Recognition beyond program for training
  - Provides accountability
- Conducted during regular semester
  - Summer schedules are busy with field work

# Seminar schedule

- 3-day intensive workshop
  - Topics considered to be most valuable by previous cohorts
- Weekly 3-hour meetings
  - Completion of background training
- Bi-weekly meetings
  - Project reports & group feedback
  - Additional topics requested by fellow
- Fellows are invited to return for optional seminars during their second year

# Expectations of Project Participants

## FELLOWS

- Work 15 hours per week in K–12 education
- Participate in seminars
- Demonstrate knowledge of the science education standards
- Develop & demonstrate an understanding of inquiry-based science education
- Cooperate with project evaluators
- Keep a web-based log of activities

## TEACHERS

- Fellows are scientist peers.
- Plan with the fellows the work to be done
- Always present when fellows are working with students
- Cooperate with project evaluators
- Provide feedback to fellow on their interactions with teachers and students

# Education Component

- National and State Science Standards
  - Teaching science as inquiry
  - Dealing with misconceptions in an inquiry classroom
  - Learning styles research; reaching diverse learners
  - Classroom organization and management
  - Grouping students for instruction
  - Developing safe and effective field studies
  - Multidimensional assessment
  - Cognitive coaching techniques
- We also address topics suggested by fellows as requested.

# Hawaii Content and Performance Standards



HCPS describe what students should “know, be able to do, and care about”

Standards are geared toward developing a scientifically literate society

Fellows’ K-12 projects include standards-based activities/ investigations



# Hawaii Content and Performance Standards

## Domain I

What are the habits of  
mind used by  
scientists?

What is the process of  
science?

## Domain II

What is the  
knowledge that we  
have gained through  
scientific inquiry?



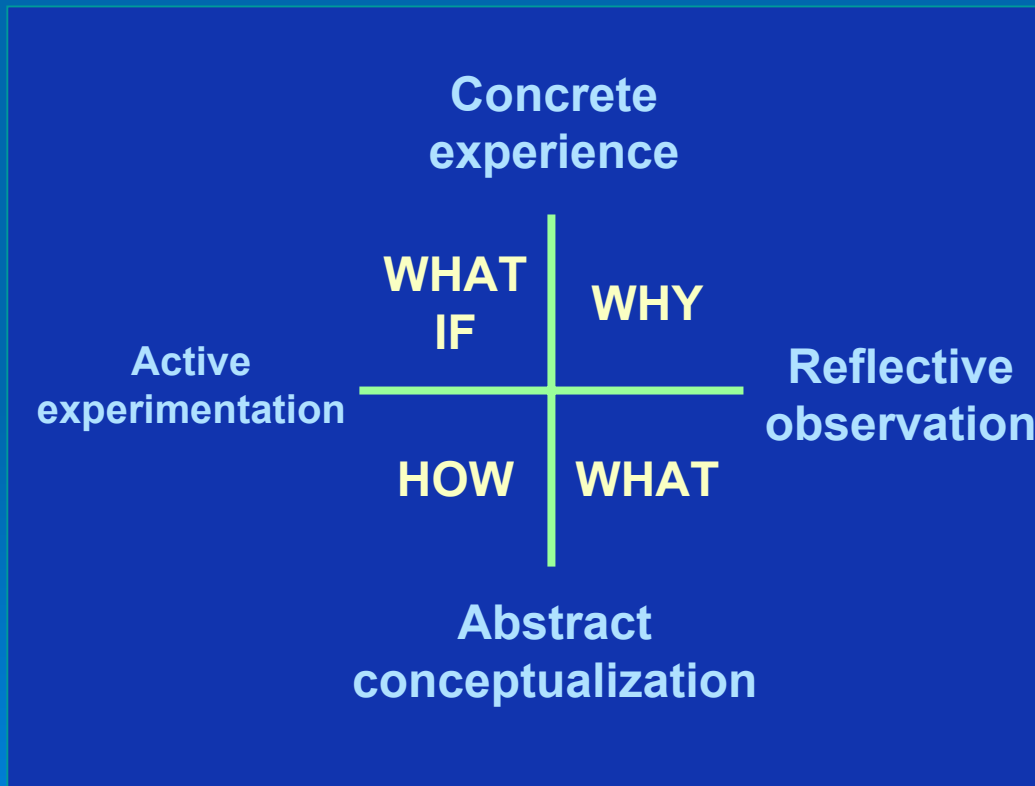
# Inquiry-Based Teaching



- Inquiry teaching involves learning science through doing science
- Inquiry activities teach the process of science, and scientific habits of mind
- Inquiry teaching is student centered and open-ended

# Diversity of Learning Styles

People learn in different ways:

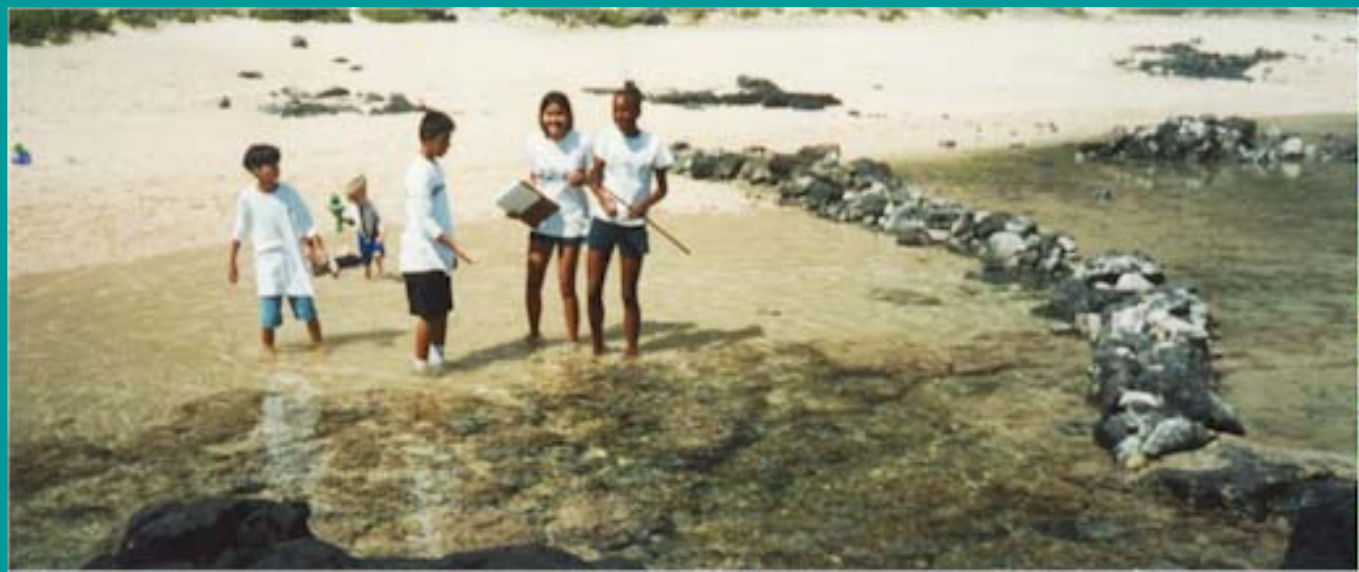


Incorporating all learning styles:

- Gives all students a chance to use their strengths
- Challenges students to think in new ways

# Field Activities and Safety

- Field activities give students a chance to see and do new things
- Safety is a key consideration when planning lab or field activities
- HIDOE specialists train fellows in required field safety procedures



# GK-12 Fellow Teamwork

- Participation in seminars allows for team building:
  - Science days
  - Workshops
  - Large-scale field trips
  - Research presentations
- Group problem solving
- Mentoring and networking
- Former fellows remain active



# What are some of the activities of the GK-12 program?

- School-based projects
- Field-based projects
- Teacher professional development
- Website
- Professional meetings and conferences



# Developing a Teacher Workshop

- Fellow cohorts conduct a final project: planning and executing a workshop for teachers
- Focus is on teaching science as inquiry
- Fellows practice and model techniques they learned in seminar to teachers at the workshop



# Successes

- Initial intensive workshop helps with fast-tracking fellows into projects
- Testing and trying ideas in safe setting is especially valuable for those with little or no teaching experience
- Team building allows for opportunities that one or few fellows could not do alone
- Professional development and networking of fellows is enhanced through participation in seminar



# Challenges

- Inclusion of students new to their graduate programs
  - Busy course schedule
  - Not as well-progressed in research
- Time commitment
- Scheduling
- 'Over-flexibility'
  - Requirements are not as formal as for most Teaching Assistantships
  - Can be more challenging for fellows who are not as self-motivated or used to flexible schedule

# What have we learned?

- Training components are considered a critical element for success by both administrators and fellows
- Two-year fellowships are needed
  - It takes a year to build knowledge and skills background and begin to test ideas
  - The second year is when the background built during the first is more effectively put into practice

# What have we learned?

- Time for follow-up is important
  - Fellows need opportunity to discuss methodologies which they have attempted in the classroom
- Certain ideas are considered very important by fellows:
  - Learning styles
  - Inquiry
  - Questioning & Instructional Strategies
  - Assessment (not evaluation) of impact on students, teachers, and fellows

# What have we learned?

- Team-building is a primary benefit  
Fellows mentor one another, provide valuable feedback, and work together effectively on large-scale projects



# Aloha from the GK-12 Team!



# Contact Information

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