

Magnet Inquiry Investigation

*Based on the work from the Institute for Inquiry
at the Exploratorium in San Francisco*

Next Step Institute
Tucson, AZ
November 1-3, 2007



Workshop Strands

- Understanding by Design
- **Supporting Inquiry**
 - How can I facilitate and assess inquiry investigations in a K-8 classroom and achieve a standards-based curriculum?
 - How can I plan an inquiry to ensure that students demonstrate critical learning of content and process skills?
- Literature Inquiry
- Next Steps & Collaboration

Agenda

- Inquiry Investigation (integrate break) – approx 2.5 hours
 - Phase 1
 - Phase 2
 - Lunch @ 12:00 – 1:00
 - Phase 3
- Debrief and share strategies to support inquiry in the classroom @ 1:45
- Share Inquiry Template

Purpose

Provide a quick, intensive experience of **inquiry** to create a

feel for inquiry and

vision of the process.

Magnets Inquiry

- ❑ Based on the Exploratorium's work
 - ❑ Model structure of inquiry (see map)
- ❑ Focused on elementary school (Grades 3-5)

This experience
includes:

- Science content associated with magnets.
- Use of process skills to learn content.
- Process of doing inquiry.

Become the learner.



Mess around and explore.



Inquiry Structure for Learning Science Content

PHASE 1

Inquiry Starters

Learners explore materials, make observations, and raise questions related to content goals.

PHASE 2

Focused Investigation

Learners plan and carry out investigations based on their questions.

PHASE 3

Sharing Understanding

Learners share investigation results with each other to further their understanding of scientific concepts.

Inquiry Starters – Phase

1

- The inquiry experience is introduced.
- Explore engaging materials and phenomena.
- Raise and record questions.

PHASE I Inquiry Starter #1

(1 magnet)

- Every group has 1 magnet in a cup and a 'bag o' stuff'
- On paper, make predictions about whether an object is magnetic or not to an object found in the bag.
- Test the object and record whether or not it is magnetic.
- 5 minutes to do this

Charting Your Findings

<u>Object</u>	<u>Prediction</u>	<u>Observation</u>

Developing Questions

I NOTICED.....
(Observations)

I WONDER....
(Questions)

PHASE I

Inquiry Starter #2 (2 Magnets)

- Explore with 2 magnets and how they work together.
- Chart on paper "I notice..... I wonder..."
- 10 minutes
- Clean up

2 TYPES OF QUESTIONS

- INVESTIGABLE QUESTIONS
 - Questions that can be investigated in the here and now with the provided materials
- NON-INVESTIGABLE QUESTIONS
 - Questions that we can't investigate in the here and now
 - Safety concerns
 - Lack of materials
 - Time constraints, etc.
 - Research / Non-Fiction type questions

Fair Test / Controlled Experiment

- What is a fair test?
- What are controlled variables?
- How do you plan an investigation?

Gallery Walk

- Post questions on wall
- Read questions
- Form groups of approximately 3
- Revise question if necessary
(investigable)
- Use planning template

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■ Phase 2 – Focused Investigation

- Figure something out
- Receive help from facilitators
- Share information with other groups
- Raise new questions
- Revise your plan



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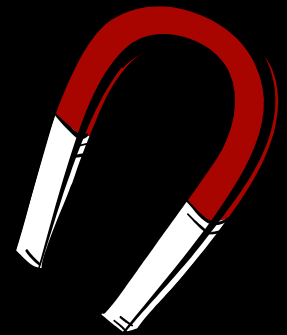
Phase 3 – Sharing Understanding

- Process for meaning
- Share results of investigations
- Facilitator synthesizes these results

- 2-3 minutes
- Template as a guide
- Chart paper & markers available

Magnets Synthesis

We learned...



Content Goals

- Magnets produce a force that some things respond to and some things do not
- Magnets exert a force at a distance ; they can push or pull without touching
- A Magnet's pull is greatest when measured close to the magnet
- A magnetic force can hold a limited amount of weight
- Magnets possess various degrees of strength
- Magnets can exert their force through materials

Process Skills Addressed

- Observation
- Raising Questions
- Planning
- Data collection, Organization, Display
- Presenting/Sharing

Inquiry Skills

- Investigable (testable) questions can be answered in the here and now. Non-investigable questions need to be answered using print resources.
- To help ensure reliable data, the experimental design should have only one independent variable, the rest of the variables should be held constant. (controlled experiment / fair test)
- Rich inquiry investigations lead to more questions.
- MORE..

Chart Talk

- Identify strategies that help support these critical elements of inquiry
- Debrief

Inquiry Template

- Common structure to communicate grade level inquiries to teachers
 - Structure to design new inquiries
 - 3 phases
 - Apply to unit of choice on Saturday.
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- Exploratorium's work is focused on professional development

Essential Questions

Supporting Inquiry

- How can I facilitate and assess inquiry investigations in a K-8 classroom and achieve a standards-based curriculum?
- How can I plan an inquiry to ensure that students demonstrate critical learning of content and process skills?

BACKGROUND

- Very successful and **engaging** with grades 3-5
- In the classroom might normally take about 3 hours (could be spread over 3 days)
- Simple and fairly inexpensive
- Would need to make modifications for classroom – need more time
- Aligns with new CT Science Framework

CT STATE FRAMEWORKS – GRADE

4

Continued...
