ITQ ARTS AND SCIENCE INTEGRATION
GRADE 4
THEATRE AND PHYSICAL SCIENCE

Magnets in Action!
"Physical Science: Magnetism and Electricity," Investigation 1, Part 1
Lesson #1

CONTENT STANDARDS

Theatre Grade Four

1.2 Identify a character's objectives and motivations to explain that character's behavior.
2.1 Demonstrate the emotional traits of a character through gesture and action.
5.2 Use improvisation and dramatization to explore concepts in other content area.
5.3 Exhibit team identity and commitment to purpose when participating in theatrical experiences.

Physical Science Grade Four

PS1f Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.

ESSENTIAL QUESTIONS *(Questions that students might ask about the topic)*

- What does a magnet do?
- What do different objects do when they come into contact with a magnet?
- How do I use what I know and can do in theatre to demonstrate how magnets work?

OBJECTIVES & STUDENT OUTCOMES *(Students will be able to…..)*

- identify, describe, and explore how magnets work and their effect on different objects.
- demonstrate their understanding of magnets by applying theatre concepts and skills of force and relationship.

ASSESSMENT *(Various strategies to evaluate effectiveness of instruction and student learning)*

- **Feedback for Teacher**
  - Student response to inquiry
  - Worksheet from the Grade 4 *FOSS Teacher Guide*, pp 305 and 306
- **Feedback for Student**
  - Teacher feedback
  - Worksheet from the Grade 4 *FOSS Teacher Guide*, pp 305 and 306

WORDS TO KNOW

Theatre Grade Four

- **Actor:** a person, male or female, who performs a role in a play or an entertainment.
- **Audience:** people who watch, listen and respond to live theatre.
- **Character:** the personality or part an actor recreates
- **Characterization:** the development and portrayal of a personality through thought, action, dialogue, costuming, and makeup.
- **Dialogue:** the conversation between actors on stage.
- **Ensemble:** a group of theatrical artists working together to create a theatrical production.
- **Gesture:** an expressive movement of the body or limbs.
- **Improvisation (Improv):** a spontaneous style of theatre in which scenes are created without advance rehearsing or scripting.

- **Space:** The immediate spherical space surrounding a body. **Personal space** refers to movement done in place and **general space** refers to movement from point A to B.

Science Grade Four

- **Attract:** To pull toward one another, as opposite poles of two magnets pull toward one another.
- **Force**: A push or pull.
- **Iron:** A metallic element.
- **Magnet:** An object that sticks to iron.
- **Pole:** Either of two opposing forces or parts, such as the poles of a magnet.
- **Repel:** To push away, as similar poles of two magnets push away from one another.

MATERIALS

- Labels or 8X10 sheets of paper marked with names or pictures of things that magnets would stick to and things that will not stick to a magnet
- Yarn, 20 pieces two feet long
- Student Worksheet from the Grade 4 *FOSS Teacher Guide*, pp. 305 and 306

RESOURCES

- *The Playing is the Thing: Learning the Art of Acting Through Games and Exercises*, Anita Jesse, Wolf Creek Press, 1999
- Online improvisation lesson videos: http://www.ehow.com/video_4949233_improv-yes-lets.html
- The benefits of improv in addressing multiple intelligences web article. http://www.improvwarrior.com/benefits.html
- *Theatre Games for the Classroom*, Viola Spolin (available on Google Books at http://tinyurl.com/spolinbook)
- *Unscripted Learning, Using Improv Activites Across the K – 8 Curriculum,* Carrie Lobman and Matthew Lundquist
- *Structuring Drama Work, A Handbook of Available Forms in Theatre and Drama,* Jonothan Neelands and Tony Goode
- *An Usborne Introduction Acting and Theatre,* C. Evans and L. Smith
- VAPA "Core Learnings" Grade Four
- Ohio Department of Education: Grade One, *Magnets on the Move*
- *FOSS Kit Grade 4*, "Physical Science: Magnetism and Electricity," Investigation 1, Part 1

PREPARATION

- Prepare labels or 8X10 sheets of paper marked with names or pictures of things that magnets would stick to and things that will not stick to a magnet. Punch two holes on one side of the paper.
- Cut strips of yarn and thread through each label (to be worn around the student's neck).
- Make copies of student worksheets "Magnets and Objects" on pp. 305 and 306 in *FOSS.*
- Provide ample space to move.

WARM UP *(Engage students, access prior learning, review, hook or activity to focus the student for learning)*

(3 Minutes)

- Ask students to discuss (in pairs) what they know about **magnets**. Share and chart responses to these questions:
  - *What does a **magnet** do?* [sticks to things, picks up things]
  - *What do objects or other **magnets** do when they come into contact with a **magnet**?* [Objects move toward or away, or may not respond at all.]

MODELING *(Presentation of new material, demonstration of the process, direct instruction)*

(22 minutes)

- *Say:*
  - *Today we are going to participate in a large group **improvisation**, Does anybody know what **improvisation** or **improv** means?* [a spontaneous style of theatre in which scenes are created without advance rehearsing or scripting].
- Explain to students that an **improvisation**, like any piece of literature or theatre, is made up of different parts that form the beginning, middle and end. The beginning introduces the **characters** and the problem, the middle is where the **characters** try different things to solve the problem and the end is where the **characters** are successful or not and wrap up any loose ends.
- Reveal to students that an **improvisation** is very similar to a science experiment.
- *Say:*
  - *We are going to show, as **actors** in an **improv** playing the part of a **magnet**, how **magnets attract** metal things (that contain **iron** or steel), what magnets do when they don't **attract** an object or when magnets **repel** another object. As **actors**, we need to show with our gestures, and voice when the magnetic fields get closer to an object how it **attracts**, **repels**, or does nothing. When an **actor** shows a characters personality through thought, action and **dialogue** this is called **characterization.*** [Also define for the students the **dialogue**].
- The **Attraction improv** (set up)
  - Tell the students you are going to give them who the **characters** are, what the main **character** (**Magnet**) wants, and where the setting for the **improv**.
  - Give five or six students a label to wear that says **Magnet**. Explain to the students they are going to play the **character**, **Magnet**.
  - Give seven or eight students a label with objects that have **iron** in them (nail, paperclip, screw, fork, spoon, refrigerator). Explain to these students they are going to play the **character** of which ever label they where given.
  - Give seven or eight students a label with objects that do not have **iron** (match, paper, rubber band, plastic cup, plate, water bottle, book). Explain to these students they are going to play the **character** of which ever label they where given.
  - Remaining students are labeled detectors and will record observations. Explain that in theatre they would be called the **audience**.
  - Tell the students the setting for this **improv** is out on the playground and **Magnet** [the main **character**] who is new to school is looking to make friends.
  - When **Magnet** meets another character or object that will **attract**, the two students make up dialogue showing that they are friends, which shows **attraction**.
  - When **Magnet** meets a **character** or object that is not **attracted** or does not want to be friends with **Magnet**, **Magnet** will try to be friends [**attract**] with the other character or object however there is no attraction so **Magnet** moves on without any interaction.
  - Individual students that are not being **attracted** act in the **general space** interacting with other **characters**.
  - Explain to students as the improv is happening you will be giving the que to freeze. All actors should freeze in an interesting pose showing what they where doing. (If they where talking they need to freeze in mid sentence or If they where walking towards someone they should freeze in mid walk and so on).
  - Note: it will help students if the teacher gives prompts for dialogue and remind students where the **improv** takes place and what they might be doing if they where out in the playground.
- The **Attraction improv** (procedure)
  - Distribute "Magnets and Objects" handouts to the detectors.
  - Students find **personal space** in the room and freeze into an interesting pose showing they are outside in the playground.
  - Give the signal for the **improv** to begin by calling out "lights!" and explore **attraction** (or no **attraction**) for 60 seconds. Call out "Freeze!". Allow detectors or the audience to record observations.

- Resume **improv** by calling out "action!" and explore for another 60 seconds.
- Change roles. Have students exchange labels (**magnets** with detectors, **iron** with non-**iron** objects) and repeat exercise.
- Exchange roles once more so that detectors and **magnets** have a chance to be both metal and non-metal objects. Repeat exercise.

- The **Attraction improv** (debrief)
- Discuss and chart observations. Look for commonalities. Sort the students into categories (things that stick and things that do not). Draw conclusions based on observations (things that stick are made of metals with **iron** or steel in them).
- *Ask:*
  - *How can we show attraction through acting*?
  - *What happens when a **magnet** is placed next to an object with no **iron**/metal? How did we show this in our **improv**?* [no **attraction**]

GUIDED PRACTICE *(Application of knowledge, problem solving, corrective feedback)*
(18 Minutes)

North and **South Poles Ensemble Exercise**

- *Ask*: (questions from the *FOSS Teacher Guide*, p. 58)
  - *Why do you think **magnets** sometimes stick together and sometimes push away from each other?* [The two sides or two ends of the magnet are different.]
  - *How do you know when the two sides are different?* [The sides stick together (**attract**) when they are different.]
  - *Does it matter which **magnet** you turn around?* [no]
- Introduce or review **north** and **south poles*.***
- *Say:*
  - *The two different sides of a **magnet** are called **poles**. One side is called the **north pole**, the other side is called the **south pole***.
- Tell students they will be participating in an **ensemble** building exercise **actors** use to help create a sense of ensemble and at the same time demonstrate how opposite **poles attract** and same **poles repel**.
- Explain to the students they will all be **magnets**. Tell the students sometimes they will be a magnet with only either a **north pole**, **south pole** or both. (When the students have both poles the left side of there body will be their **south pole** and their right side will be their **north pole**.)
- Direct the students to spread out in the acting space and that you will be calling out to the group the following commands:
  - *North pole only magnets* (all the magnets have only a **north pole** so students should move about the acting space showing how they **repel** from each other for about 15 to 20 seconds.)
  - *South pole only magnets* (all the magnets have only a **south pole** so students should move about the acting space showing how they **repel** from each other for about 15 to 20 seconds.)
  - *North and south pole magnets* (Everyone has to quickly get into pairs making sure they **attract** to another **magnet** on the correct **pole**.)
- Call out to the students one of the commands and check for understanding. After about 10 or 15 seconds call out another command (*North pole magnets, South pole magnets, North and south pole magnets*.)
- Explain to the students when actors do these kind of exercises they always like to add a challenge to the exercise to keep there minds sharp and help them think quickly when on stage.
- *Say:*
  - *I am going to call out the same commands however when I call out north and south pole magnet I am also going to call out a number. Once I call out north and south pole magnet and a number you will need to connect with other magnets in groups of what ever number I call out. Don't forget, the left side of there body will be their **south pole** and*

*their right side will be their **north pole**. So when you connect with other **magnets** you need to make sure the correct **poles** are **attracting**.*

- Do the exercise again calling out different commands and when you call out the *North and south pole magnet* remember to call out a number. (To add another level of challenge you can call out math sentences students have to solve in order to figure out how many magnets need to attract to each other. For instance you can call: *2 times 3 minus 1* and students need to get into **magnet** groups of 5 **attracting** with the correct **poles**.)
- Ask the students to return to their seats for the debrief.

DEBRIEF AND EVALUATE *(Identify problems encountered, ask and answer questions, discuss solutions and learning that took place. Did students meet expected outcomes?)*
(7 minutes)
Debrief the **North** and **South Poles Ensemble Exercise**

- *Ask:*
  - *What are the forces exhibited by a **magnet**?* [push and pull]
  - *What do you know about **magnets**?* [**Magnets** have two **poles**, north and south. **Magnets attract** objects made of **iron** or steel.]
  - *What happens when two like **poles** come together?* [Like **poles repel**]
  - *What would happen if both **magnets** were turned around?* [The **magnets** would **repel.**]
  - *What did you like to perform the best, **attracting** or **repelling**? Why?*
- Have students respond to the following prompt in their science notebooks: How did the **improvisation** help you to understand how magnets **attract** and **repel**?

EXTENSION *(Expectations created by the teacher that encourages students to participate in further research, make connections and apply understanding and skills previously learned to personal experiences.)*

- Play "What would happen if?" to engage students in making predictions using **magnets**.
  - Select three students (one **magnet**, one paper, one refrigerator).
  - *Ask/Say: What would happen if the paper comes between the **magnet** and the refrigerator? Do an **improvisation** showing what this would look like.* (The three students should show the paper between the **magnet** and the refrigerator who continue to have **dialogue** together.)
  - *Ask: Why and how did this happen?* [Magnetic field is strong enough and the paper thin enough that the attraction can still happen.]
  - Ask: *What would happen if a book were placed between the **magnet** and the refrigerator?* [A small **magnet** would not have enough **force** to penetrate the book and therefore would not stick to the refrigerator. A very powerful **magnet** probably could.]
  - Ask students to show this in an improvisation.
- Research and generate a list of as many things that use **magnets** around the house.