



Active Learning Community Partnership

I Spy Science

STEM Focus Area: Properties of Materials

Learning Goal: Youth will investigate how objects are the same and how they are different by observing and describing properties of materials (size, shape, color, texture, etc.)

LEARNING ENVIRONMENT

Activity Duration: 45 minutes

Class Size: Large or Small

Type of Space: Indoor

Age of Youth: K-2 (ages 5-9)

Guiding Question: *What is the question to explore OR the problem or challenge to solve?*

Challenge #1: Can you sort the objects Mouse found by their properties?

Challenge #2: Let's play I Spy! Use just three words to describe an object's properties and challenge your classmates to guess what you're spying.

Through this activity, youth will:

- Observe and describe the properties of different materials using at least three descriptive terms;
- Sort objects by different properties;
- Compare and communicate the similarities and differences between materials.

Facilitator Checklist in the Learning Environment:

- Predict and hypothesize
- Develop and use models
- Measure materials
- ✓ Observe
- ✓ Investigate
- Record observations
- Analyze and infer
- ✓ Share and communicate data
- ✓ Interpret data
- Test and revise
- Draw conclusions and relationships
- ✓ Have voice and agency, make decisions and guide their own learning

PREPARATION

Facilitator prep:

Youth need to have a diverse array of experiences exploring different materials in order to make sense of their world. Understanding how materials behave in their natural state and under certain conditions will help them to understand why objects are made of specific materials. In this activity, you will guide youth to describe different properties of various objects including color, size, texture, weight, and shape. Properties of Materials are described using the five senses – touch, hearing, smell, sight, and taste.

Literacy Connection: Read The Subway Mouse by Barbara Reid to provide an engaging context for thinking about properties of materials for this activity. (*book is available on Amazon*).

You can also watch a delightful reading of the story on YouTube at <https://www.youtube.com/watch?v=hMZ6dUGz-Q>

Materials

Youth Materials: Facilitator will need to prepare the following materials before the science activity.

- Copy of The Subway Mouse by Barbara Reid
- Objects featured in the story: piece of ribbon, plastic straw, buttons, piece of yarn, small box of raisins, crumpled paper, feathers, popsicle stick, pencil stub, piece of fabric, candy wrapper, and a jelly bean.

Room: This activity is best facilitated in a circle time space where all youth can see the facilitator during the story time, followed by ample open floor space for playing the I Spy game.

Content: Materials are divided into two broad categories: natural materials (wood, cotton, silk, wool, sand, and slate) and human-made materials (plastics, metal, glass, and ceramics). All materials have unique properties. Properties are things that can be observed about an object such as color, shape, weight, size, texture, etc. Properties are attributes that can be observed with the senses.

Possible Misconceptions: Students at this age will likely resort to using simple words with little descriptive value when describing an object, such as nice and colorful. Explain that in this lesson, they will be focusing on learning richer descriptive words that more fully describe objects (e.g., heavy, smooth, dull, square, wide, narrow, bumpy, or stinky).



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Inquiry: Some questions you can ask youth while examining the objects that Nib found in the story of Subway Mouse (hold up each object so that everyone can see it; as well as pass the object around the circle of youth allowing each person to touch and feel the object).

- What is it?
- What does it look like?
- What does it feel like?
- What is it made of?
- Is it made of one or more materials?
- Does it have a single purpose or more than one purpose?
- What is the difference between this object and this object? (*holding up two objects*)
- How could we sort these objects?
- What properties describe how the object looks? (e.g., shape, size, color, luster)
- What properties describe how the object feels? (e.g., soft, rough, smooth, bumpy)
- How else can we describe the objects? (e.g., what they're used for, what materials they're made from, if they're made of one or more materials)

Facilitator Checklist for Preparation:

- ✓ Organization: I practiced the activity/technology, prepared materials/extras/place to record youth ideas, completed an activity (including timings).
- ✓ Materials: Materials are appropriate for teaching the learning goals; youth will be able to use them and will think they are appealing.
- ✓ Space Utilization: The space is set up appropriately for the activity and there will be no safety issues or distractions.
- ✓ Relevance: I have researched why the content matters to youth's everyday lives.
- ✓ Content Learning: I have become familiar with the content.
- ✓ Inquiry: I have become familiar with how authentic, age-appropriate inquiry practices look in this activity.

INTRODUCTION TO ACTIVITY (5 MINUTES)

Ask youth to sit in a circle just like they do for literacy circle time I preparation of you reading them a story about Subway Mouse.

Begin by introducing the following vocabulary words.

1. Properties

Definition: Things that can be observed about an object (such as color, shape, weight, size, texture, etc.)

Example: Pillows are soft and light.



Ask: What's a property of your desk? Of the floor?

2. Observing

Definition: Using our senses to gather information.

Example: I observed that the lights were off in the room.

Ask: Look around you and tell me what you observe about this space?

Talk about today's Learning Targets with the class so that youth are aware of your expectations.

- ✓ "I can observe the characteristics/properties of an object."
- ✓ "I can describe the properties of an object using words that tell a story."
- ✓ "I can use words to describe objects so that others know what object I'm talking about without saying its name."

Ask youth if they have ever thought about what kinds of characteristics or properties objects have before. For example, ask youth what they observe about you.

- Am I tall or short?
- Is my hair brown or red?
- Are my shoes heavy or light?
- Are my clothes smooth or rough?
- Do I smell like soap or perfume/cologne?

Ask youth to practice describing properties by describing one thing about the person they're sitting next to. (Her hair is wavy. His watch is plastic. Her eyes are brown. His sweater is soft)

Facilitator Checklist for Introduction to Activity:

- ✓ Space Utilization: I will use the space informally avoiding the lecture hall format.
- ✓ Purposeful Activities: This intro section gets youth on track for the learning goal.
- ✓ Content Learning: If age appropriate, I will accurately present content.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Relationships: I will make each youth feel welcome.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

ACTIVITY ENGAGEMENT (25 MINUTES)

Begin by reading the story of Subway Mouse or watching the YouTube video of the book (*about 8 minutes*) making sure that each child can see the pictures in the book as you read. Be sure to point out the objects that Mouse finds in the subway as you read the story.

After the story is finished, bring out the collection of objects from the story and one by one hold them up asking youth to describe their properties/characteristics. Be sure you give every child a chance to use descriptive words to talk about the objects.

Next, give small groups of youth a few objects and ask them to sort them in whatever way they think makes sense. They may sort by size, color, texture, etc. There's no wrong way to do this part of the activity. It's a first step to get youth thinking about how the objects are similar and how they're different. Once the groups have sorted their objects, ask them to share with the class how the objects are sorted. Be sure to ask the youth groups to use descriptive words to tell about each group of objects.

Facilitator Checklist for Activity Engagement:

- ✓ Space Utilization: I will use the space informally avoiding the lecture hall format.
- ✓ Participation: All youth will have access to the activity.
- ✓ Purposeful Activities: This core section helps youth to move toward the learning goal.
- ✓ Engagement: This activity has youth physically engaged with their hands while engaged with their minds.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Reflection: If appropriate, I will ask youth questions during the core activity that will help them make sense of what they are learning.
- ✓ Relationships: I will take steps to share my enthusiasm and create a nurturing, safe learning environment.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

FINAL REFLECTION AND RELEVANCE (15 MINUTES)

Play I Spy!

#1) Ask youth to sit quietly and look around the room to “spy” an object for the game.

#2) Next ask each youth to use 3 words to describe the object as follows.

“I Spy something that is *tiny, red, and soft*”.

#3) Give all students an opportunity to guess what the object is until someone gets the right answer.

#4) Be sure to allow time for every single youth to take on the role of the I Spy “describer”.

During the last few minutes of the class, ask youth why they think it might be important to be able to describe the properties of materials. If youth need prompting, ask some of these questions:

- When you ride your bike, what type of street or sidewalk surface is the easiest for you to ride on? Would it be safe to ride on a street that was really bumpy?
- When you take a shower is the water hot or cold? Could you burn yourself if it's too hot?

Facilitator Checklist for Activity Reflection & Relevance:

- ✓ Space Utilization: Again, I will use the space informally.
- ✓ Participation: I will prompt youth who do not have access to the activity to participate.
- ✓ Purposeful Activities: The closing section helps youth to reach the learning goal.
- ✓ Content Learning: I will help youth make connections between different ideas. I will create opportunities for youth to ask questions/provide ideas that show a deeper level of understanding.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Reflection. I will provide youth with a sustained opportunity to make sense of their learning.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

NGSS STANDARDS RELEVANT TO THIS ACTIVITY

PS1A: Structure and Properties of Matter

- Different properties are suited to different purposes.