

2-PS1-1	Gr. Level: <u>2nd</u>	Creation Date: <u>7/22/2013</u>	Edit Date/Time: <u>1/24/2017 8:08 AM</u>	Writer(s): 1
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Title: Classification Using Physical Properties

Objective

Students will plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Predicted Misconceptions

Introduction (5 minutes)

High School Explainers/Teacher(s) will be in the process of sorting a set of objects based on some (unknown to the students) property.

Demo: Sorting kits will include

- 1) Various different solid shapes (spheres, cubes, rectangular prisms, triangular prisms, cylinders, pyramids)
- 2) Laundry (hot/cold weather or shirts/pants/socks or outerwear/underwear or color...lots of different opportunities)

After completing the first sort, ask the kids to brainstorm what the sorting criteria was.

One/Two HSE's speaking whole group

Hello everyone, can anyone tell me how I've been sorting the shapes? shape (or something else)

The second HSE will do a second quick sort and repeat the brainstorming as to what the sort property was/is.

Now what property did I sort the shapes by now? Color (or something else)

BE SURE TO LET THE KIDS BRAINSTORM THE CRITERIA

Develop the Problem (5 minutes)

Now display the laundry sorted by clothing type.

What property was this laundry sorted by? Type of clothing

Why would it be important to sort this way? Keep clothing organized

"Can you think of some different properties we can use to sort through this box of laundry?"

Allow kids to brainstorm different criteria for sorting. Write on board. Then select color – dark and light

Sort some clothing by color – light or dark ***Where should this shirt go?...these pants...?***

"Every time that objects are sorted, there must be some sort of property or feature that the sort is based upon. This allows us to sort the objects using that property in this case color. But WHY should we sort laundry into dark and light colors?"

"There is always a reason for sorting or classifying objects. Why do we use the property of color to sort laundry? Wait for responses.

We then make a plan based on the shared property to sort the objects." "Today you guys are going to come up with a sorting plan for a group of objects that share a property, or features."

Your group will rotate through 3 different sorts; animals, rocks, and buttons. As you do, you will plan what property to use to sort and do the sort. For each table you will try to find 3 different properties to use.

Make a Prediction (2 minutes)

Break into 6 groups of 5 students (preassigned).

Each group will go to one table with a different set of objects than the others.

One HSE at each table

(6 tables (2 tables-rocks, 2 tables-animals, 2 tables-buttons))

Rocks Table

Instruct students to **"Look at the rocks on your table and spend a few minutes PLANNING on what property you will use to sort."** Don't let students start sorting until a plan is made!

Ideas: hardness, texture, color, size, luster, etc.

Okay, do you have a plan? Great! Recorder write down the property you chose and the range for the property. Why is it important that we sort this way?

Once they have decided on a sort property, remind the recorder to write the property down in their notes and define the range of the property (hard/soft, rough/smooth). They will be reporting their sort property for each table to the group later.

Okay, Investigator and Reporter follow our plan and start sorting. The rest of you will be next!

Circulate within your table and ask the LEADER/REPORTER what property they are using to do their sort as they work and help RECORDER with spelling.

Also ask...

"Why did you choose that property?"

"Why would it be important to sort on that property?"

After recording the data and conducting the sort, repeat for at least two more property sorts per table.

Great job! Let's reset the objects and make a different plan for sorting. (this time change the students doing the sort)

After group has sorted at least 3 different plans, they are prepared to move on. If waiting for other tables, have them continue with additional sort plans.

After 5 minutes at the first table, ring a bell and have Materials Manager MIX their objects so they are NO LONGER SORTED. Then have the groups rotate to the next table and repeat.

When tables are ready to rotate...**Okay group let's rotate to the next table!**

Animals Table

Instruct students to ***"Look at the animals on your table and spend a few minutes PLANNING on what property you will use to sort."*** Don't let students start sorting until a plan is made!

Ideas: wild/tame, farm/pet, plant eater/meat eater, fierce/gentle, four legs/two legs, fly/walk/swim, so on

Okay, do you have a plan? Great! Recorder write down the property you chose and the range for the property.

Why is it important that we sort this way?

Once they have decided on a sort property, remind the recorder to write the property down in their notes and define the range of the property (wild/tame, farm/pet). They will be reporting their sort property for each table to the group later.

Okay, Investigator and Reporter follow our plan and start sorting. The rest of you will be next!

Circulate within your table and ask the LEADER/REPORTER what property they are using to do their sort as they work and help RECORDER with spelling.

Also ask...

"Why did you choose that property?"

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After recording the data and conducting the sort, repeat for at least two more property sorts per table.

Great job! Let's reset the objects and make a different plan for sorting. (this time change the students doing the sort)

After group has sorted at least 3 different plans, they are prepared to move on. If waiting for other tables, have them continue with additional sort plans.

After 5 minutes at the first table, ring a bell and have Materials Manager MIX their objects so they are NO LONGER SORTED. Then have the groups rotate to the next table and repeat.

When tables are ready to rotate...***Okay group let's rotate to the next table!***

After the last rotation (groups have sorted all three stations) have groups re-mix their objects in preparation for the next class who comes in.

Button Table

Instruct students to ***"Look at the buttons on your table and spend a few minutes PLANNING on what property you will use to sort."*** Don't let students start sorting until a plan is made!

Ideas: color, number of holes, size, shape, texture

Okay, do you have a plan? Great! Recorder write down the property you chose and the range for the property.

Why is it important that we sort this way?

Once they have decided on a sort property, remind the recorder to write the property down in their notes and define the range of the property (wild/tame, farm/pet). They will be reporting their sort property for each table to the group later.

Okay, Investigator and Reporter follow our plan and start sorting. The rest of you will be next!

Circulate within your table and ask the INVESTIGATOR/REPORTER what property they are using to do their sort as they work and help RECORDER with spelling.

Also ask...

"Why did you choose that property?"

"Why would it be important to sort on that property?"

After recording the data and conducting the sort, repeat for at least two more property sorts per table.

Great job! Let's reset the objects and make a different plan for sorting. (this time change the students doing the sort)

After group has sorted at least 3 different plans, they are prepared to move on. If waiting for other tables, have them continue with additional sort plans.

After 5 minutes at the first table, ring a bell and have Materials Manager MIX their objects so they are NO LONGER SORTED. Then have the groups rotate to the next table and repeat.

When tables are ready to rotate...***Okay group let's rotate to the next table!***

After the last rotation (groups have sorted all three stations) have groups re-mix their objects in preparation for the next class who comes in.

Have students face the whiteboard and ask the recorders to come to the whiteboard and write down the property they used to sort at each table.

Whiteboard should be prelabeled with:

	Animal Table	Button Table	Rock Table
Group A			
Group B			
Group C			
Group D			
Group E			
Group F			

After recorders have written all the data on the dry erase board, review the various properties that were used to sort each table.

Choose a response on the table...ask Reporter for the group:

1. ***"Why did your group choose to sort or classify the objects this way?"***
2. ***"Would there be a reason to sort this way."*** (rough sandpaper does one job, smooth sandpaper another - we wash dark clothing differently than white clothing)

Note that some tables had more than one property which the objects could be sorted by.

Reach a Conclusion (1-2 minutes) **WHOLE GROUP**

"So what have we learned about the way that we sort things? What allows us to sort different objects into groups?"

a common property

Which common property of an object would you use to sort them if there were many to choose from?

the one that matters, that is important

(For example: If you wanted to win a car race, what property of three different cars would be most important in sorting the cars?)

(I could sort laundry into shirts, pants, socks, underwear and so on, but what really matters is separating the white clothes from the dark)

Extension: Using cans, prepacked with crayons of various colors (green, light green, lime green, magenta, light red, etc.), have each student take a crayon.

Ask students, ***"What is the only property that could be used to sort this group of crayons?"***

"Why is this the only property we can use?"

Display chart including visible spectrum (all colors we can see).

Ask students, ***"What color do you see on the left?"***

"What color do you see on the right?"

Point to another point in the chart.

"What color would you say this is?"

Tell the students to observe their own crayon.

"Think about where on the chart your color might fit."

Reference the visible color spectrum poster

"This chart is called a visible color spectrum chart. There is an easy way to remember the colors we can see: R O Y G B I V Red, Orange, Yellow, Green, Blue, Indigo, Violet"

(Point to colors on the spectrum as you read them off)

We want you to finish off today by sorting your crayons the way that the color spectrum sorts colors of light. That means the reddest crayon will be on the left, and the most violet crayon on the right, the other colors will be in between according to ROYGBIV.

For instance look at these three crayons (blue-green, green, spring green) which one would go more towards blue? Which one would go more towards yellow? This means that the yellowish-green crayon would be closer to yellow than the other two, and the blue-green closer to blue. USE VISUALS!

Wrap-up and Assessment (5 minutes)

Now go sort your crayons on the counter over there... After you sort your crayon, come back so we can do our Plicker's quiz.

Now get your QR codes ready.

Okay everyone, have a great day at Discovery Zone. See you next time!

Recorder's Sheet

While at the Animal Table


1. Sorted by the property _____
because some were _____ and some were _____
2. Sorted by the property _____
because some were _____ and some were _____
3. Sorted by the property _____
because some were _____ and some were _____

While at the Rock Table

1. Sorted by the property _____
because some were _____ and some were _____
2. Sorted by the property _____
because some were _____ and some were _____
3. Sorted by the property _____
because some were _____ and some were _____

While at the Button Table

1. Sorted by the property _____
because some were _____ and some were _____
2. Sorted by the property _____
because some were _____ and some were _____
3. Sorted by the property _____
because some were _____ and some were _____

2-PS1-1		Materials List	Date _____
		Description	Number needed
Introduction – 2 separate sorts by 2 different HSEs			
1.		Blocks – various shapes/colors 4 different colors, several different shapes	20 or 30 pieces
2.		Laundry – hot/cold, weather, shirts/pants/socks, outer/underwear so on	20 or 30 pieces
Experiment – small groups (2 animals, 2 buttons, 2 rocks)			
4.		Animal Table – 2 tables/5 students each series of plastic animals – wide variety of different animals wild, flying, walking swimming, mammals, reptiles, insects, etc.	20-30/table
5.		Button Table – 2 tables/5 students each series of buttons – variety of different buttons. (color, holes, metal, plastic, wood, size, texture, shape, flat)	About 30-40 buttons/table
6.		Rock Table – 2 tables/5 students each series of rocks – variety of different rocks. (Size, shape, texture, color, weight, luster, smooth, roll easily, etc.)	20 – 30 rocks/table
Extension – whole group, sorting crayons on color spectrum			
7.		Visible Light Spectrum banner	1 each
8.		Crayons, large variety of colors	1 or 2 boxes

Assessment:

1. Which is NOT a property of your desk?
 - A. Color
 - B. Texture (smooth/rough)
 - C. Hardness (hard/soft)
 - D. Taste

2. When you classify a group of objects you are _____
 - A. Sorting by a property
 - B. Giving a name to all the objects
 - C. Giving your partner some objects and keeping others
 - D. Building something useful with them

3. What is one property you could sort the following objects by that makes sense?
Marble dice can box globe baseball
 - A. Taste
 - B. Sound it makes
 - C. Shape
 - D. Sport you can play with it