

Problem Solvers Activity 22: Animal Sets

CHILDREN ARE LEARNING TO...¹

- Sort and classify objects by one attribute into two or more groups, with increasing accuracy.
- Compare visually (with or without counting) two groups of objects that are obviously equal or nonequal and communicate "more" or "same."

MATERIALS NEEDED:

4 large paper plates or shallow boxes (You'll use these items as sorting trays, so there should be enough room to display up to 6 cards.)

6 envelopes

Handout 1: Spotted Animals

Handout 2: Striped Animals

Handout 3: Solid-Colored Animals

PREPARATION:

- Print 2 copies of **Handouts 1**. Cut the spotted animal cards apart and place one set into each of 2 envelopes.
- Print 2 copies of **Handouts 2**. Cut the striped animal cards apart and place one set into each of 2 envelopes.
- Print 2 copies of **Handouts 3**. Cut the solid-colored animal cards apart and place one set into each of 2 envelopes.
- NOTE: You may wish to laminate the animal cards for future use.
- Have one set of spotted animal cards and one set of solid-colored animal cards ready for the **ENGAGE** activity.
- Prepare copies of the parent handout for distribution.
- If you plan on implementing the optional book activity, refer to the preparation instructions in that section.

¹ California Department of Education (2008). Preschool Learning Foundations. Retrieved from <https://www.cde.ca.gov/sp/cd/re/documents/preschoollf.pdf>

Activity Instructions

ENGAGE

Gather a group of 4 children on the floor or at a table.

Remove the following animal cards from the “Spotted” and “Solid” envelopes: Giraffe, green frog, spotted bird, dog, elephant, brown fish, red bird. Display them in front of you, with pictures facing the children, in random order.

SAY: Problem Solvers, let’s take a look at the collection of cards in front of me. What do you see? [Children may describe or name specific animals or talk about the colors of the animals.] Does anyone know the names of any of these animals? [Name each animal for the children: giraffe, frog, owl, dog, elephant, fish, cardinal.]

ASK: Now Problem Solvers, let’s look again closely. How are the pictures on my cards the same? [They are all animals.] How are they different? [Children might point out differences in color, or the number of feet, or that some fly and some don’t.]

SAY: That’s right. Our animals have some attributes that are the same—like how many legs they have or where they live. The owl and the cardinal both have feathers and can fly. [Move these two cards next to one another.] Our animal collection also has some animals with features that are different. The dog and the giraffe both have fur, but they are very different sizes. The giraffe is very tall. The dog is much shorter.

THINKING ABOUT SET SKILLS²

The list below shows how children’ set-making skills emerge developmentally.

1. **Matching**, where children focus on the “sameness” of an attribute (or feature) of an object, like recognizing a pair of socks.
2. **Sorting by a single attribute**, for example, putting all circles together and all squares together.
3. **Sorting by one attribute and then by a second attribute**, for example, sorting the same set first by shape and then by color. This skill requires flexible thinking.
4. **Comparing**, where children determine which set has more/most. Children may begin to use “-er” words like *bigger* or *smaller*.
5. **Ordering sets**, where children can arrange sets based on their size. Over time, children will use “-est” terms like *biggest* or *smallest*.

EXPAND

Place two sorting trays in front of you.

SAY: Let’s play a game called “Guess My Rule.” I am going to separate these cards into two sets according to a secret rule. All the animals in this set [point to one sorting tray] will be different from the animals in the other set [point to the other sorting tray] based on my rule. See if you can figure out what my rule is for deciding which animal goes in each set.

Take the giraffe card name it, and place it in an empty tray. [This becomes the tray for the set of spotted animals.]

SAY: I will put the giraffe here.

Take the dog card, name it, and place it in the other tray. [This becomes the tray for the set of solid-colored animals.]

SAY: I will put the dog here.

Continue with the third, fourth, and fifth cards, mixing spotted and solid animal cards.

² Adapted from Erikson Institute’s Early Math Collaborative. *Big Ideas of Early Mathematics: What Teachers of Young Children Need to Know* (2014), Pearson Education.

When you pick up the sixth card, ask the children where they think it belongs. Do the same for the seventh card.

ASK: Does anyone think they know my rule? Tell me what my rule is. [Take several responses. Let children point out the animals in each set and explain. For example: *The animals in this set have spots—the giraffe, the frog, and the owl. The animals in the other set don't have spots.*]

ASK: Which set of cards has more? What can we do to find out? [Invite children to count the animals in each set and describe the relationship: *There are 4 animals without spots and 3 animals with spots. The set without spots has more.* Note: younger children who don't yet have a sense of the number line (that is, an understanding that 4 is greater than 3) may need to line the animals up, one set above the other, to compare.

SAY: Let's keep playing! Should we see if this rule helps us sort the rest of these animals?

Display remaining spotted and solid animal cards: the leopard, deer, ladybug, bear, and rat. Invite the children to take turns adding each card to the correct tray. When children have finished, collect the cards.

SAY: Let's try another sorting game.

EXPLORE

Display the six cards with spotted animals: Leopard, giraffe, deer, green frog, ladybug, and owl.

Ask children if they know the names of any of these animals. If not, label each animal.

SAY: Problem Solvers, I'm wondering if we could make different sets using just these animals? How are these animals alike? [They're spotted.] Yes, they're all spotted, so we can't sort them by spots or no spots. What other features do you see on some of these animals? What do you notice that is the same about some of these animals? What is different?

[If children have difficulty, suggest one or two possibilities like: Do some of these animals have four legs? Can some of them fly? Do they have fur or feathers? Do they have wings? Ears you can see?]

After discussing as a group, allow children to decide on the sorting rule for the cards. Sort the cards based on the rule, giving each child a turn to select a card and place it in a set. Help the children identify which set has more.

If you are working with children aged 30-42 months, continue the following activities as a group:

Use a set of solid-colored animals (dog, bear, rat, elephant, cardinal, fish) to create sets based on the following guidance:

- **Less Challenging:** Sort the cards based on whether the animal has fur or no fur.
- **More Challenging:** Look at the cards and discuss the animals pictured. Talk as a group to decide on a sorting rule. Sort the cards together as a group.

If working with children ages 42-48 months, continue with the following activity in pairs:

Provide each pair of children with a set of the solid-colored animals: dog, bear, rat, elephant, bird (cardinal), fish.

Ask partners to look at the animal cards together and create a rule for sorting them. Then, they can take turns sorting animal cards based on that rule. Last they can compare to see which set is largest.

Listen to children as they work to hear how they are noticing and describing the attributes of the animal cards.

Be prepared to step in if children appear unsure of a specific attribute on which to sort their cards. **If children are struggling**, you can observe aloud some of the attributes of the animals: "I see some of the animals can fly and some cannot..."

If children need more direct guidance about their sorting rule, you can offer two options from which to choose: "You can sort based on whether the animal has fur or not. Or you could sort based on whether the animal has 4 legs or not."

Conclude the activity by asking the partners show you their sets and explain their rule. If time permits, encourage children to try a second sort using a different rule.

REFLECT

Debrief the activity using questions such as the following:

- What was your favorite thing about making sets of animals?
- What set had the most cards? What set had the least cards?
- What was tricky about sorting the cards using a rule?
- What did you do when it was hard to decide which set an animal belonged in? Tell me/show me how you thought through that problem.

Individualizing the Activity

MAKE IT MORE CHALLENGING:

- Have children guess each other's rules.
- Have children sort the animals from **Handout 1** (spotted animals) and **Handout 2** (striped animals) by pattern.

MAKE IT LESS CHALLENGING:

- Skip the activity where children make their own sorting rules. Instead, suggest a sorting rule for children to use and demonstrate the first two or three animals.
- Describe your thinking as you sort the cards, for example: *I have a frog with spots. I will put it in the set with the giraffe and the ladybug because they also have spots.*

MAKING CONNECTIONS ACROSS THE DAY:

- During clean-up time, organize small toys by attributes. Place photos on bins to show what goes where: human figurines in one bin, animal figurines in another.
- During free play, suggest ways children can separate collections of items into smaller sets. From a bin of cars, children can form sets of blue cars and red cars. From a basket of blocks, children can organize sets of triangle blocks and rectangle blocks.
- Collect small items on a nature walk and have children create rules to display them in sets: green leaves and red leaves, oak leaves and maple leaves, pine cones and acorns.
- During mealtime or circle time, talk about different ways children might be sorted into groups: Children wearing long-sleeve shirts and children wearing short-sleeve shirts, or children wearing sneakers and children wearing snow boots, or children who love chocolate ice cream and children who love vanilla ice cream.

Song: *Sorting Our Class*

Materials Needed: Space in the room to move

Directions: Have children sort themselves into sets by using the rules in the song. Encourage children to do the movements suggested for their set.

In between verses, pause the audio and count the number of children in each set, noticing which set has more children in it. Then come together as a group again and sort the class in other ways!

Making some sets, making some sets
Let's sort our class into some sets.
Making some sets, making some sets
Let's sort by the **shoes** on our feet.

If you are wearing **sneakers** today
Stand right over here.
If you are wearing **other shoes** today
Stand right over there.

(Spoken): Let's count the number of our friends in each set!
Which set has more? Pause the audio, and count!
Making some sets, making some sets
Let's sort our class into some sets.
Making some sets, making some sets
Now, let's sort by the **length of our hair**.

If your hair is **longer** [Gesture from top of head to shoulders to show "longer" hair.]
Stand right over here.
If your hair is **shorter** [Gesture close to scalp to show "shorter" hair.]
Stand right over there.

(Spoken): Let's count the number of our friends in each set!
Which set has more? Pause the audio, and count!

Making some sets, making some sets
Let's sort our class into some sets.
Making some sets, making some sets
Now, let's sort by **pets at our house**.

If you have **a pet at your house**
Stand right over here.
If you have **no pets at your house**
Stand right over there

(Spoken): Let's count the number of our friends in each set!
Which set has more? Pause the audio, and count!

Making some sets, making some sets
We sorted ourselves into some sets.
Making some sets, making some sets
We sorted our class into sets.

Making Literacy Connections

Share the following book with children as an opportunity to deepen their understanding of matching and sorting. The literacy extension activity below suggests another play-based experience to invite children to explore sets.

Suggested Book: *A Pair of Socks* by Stuart J. Murphy

A Pair of Socks is the rhyming story of a sock looking for its mate. Many possible matches are found, (socks with one red stripe and one blue stripe), but further investigation shows an additional element that makes it “not a match.” The mate is finally located, a hole in its heel is repaired, and all is well.

AS YOU READ:

- Ask the children what we mean by a pair of socks. (Two that match and can be worn together.) Ask what else comes in pairs. (Shoes, mittens, boots.)
- Show the two-page spread at the beginning of the book. Ask: How many socks are there? How are the socks alike? (All have a red and blue stripe at the top.) Can you find any pairs?
- Ask children to point out each possible match as it's found. Is it a match? Turn the page and ask what's alike and what's different about the two socks. Remember to give children plenty of time to look at the illustrations and take in what they see before they answer. Young children need more processing (thinking) time before they respond.
- Help children identify and name the common household objects in the illustrations, like the laundry bag and the dryer.
- Ask children if they ever have helped to match socks at home. What was that like?
- Point out the heel of the sock. Have children point to the heels of their feet or shoes. Ask how they think the heel might have been torn? Can this sock be worn? What will happen next? (Children may never have seen a needle and thread before, or know that socks can be repaired, so this might be a new idea!)

BUILD ON THE BOOK

Materials: 4 pairs of shoes from the children in the group (alternatively, 4 pair of socks of different patterns brought from home)

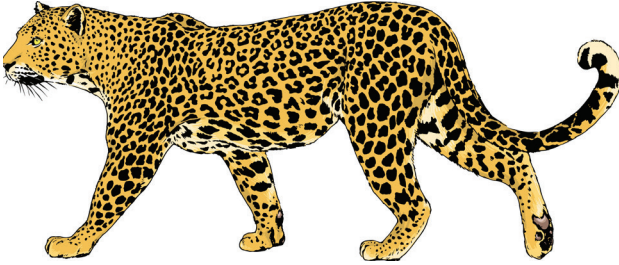
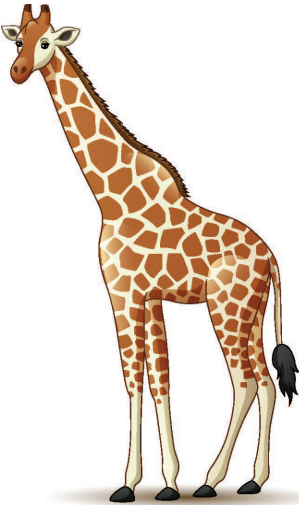




Have one child take off their shoes. Remind children of what two matching shoes are called. (A pair.) Ask the remaining children in the group to take off their shoes and count the total number of shoes. (Eight.)

Mix up the shoes, then let children take turns putting them back into pairs. How did they know which shoes matched?

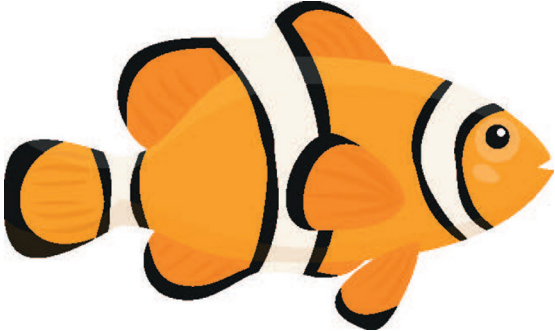
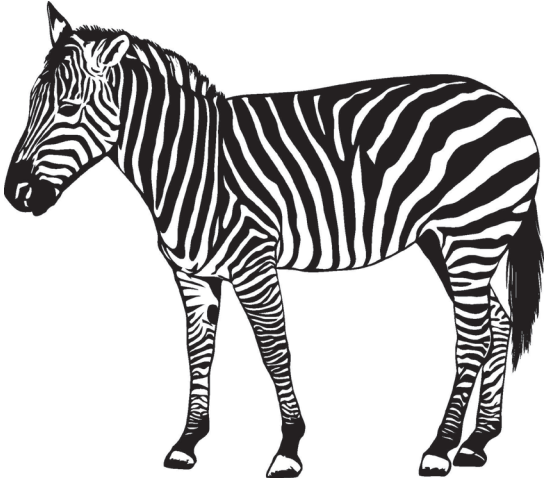


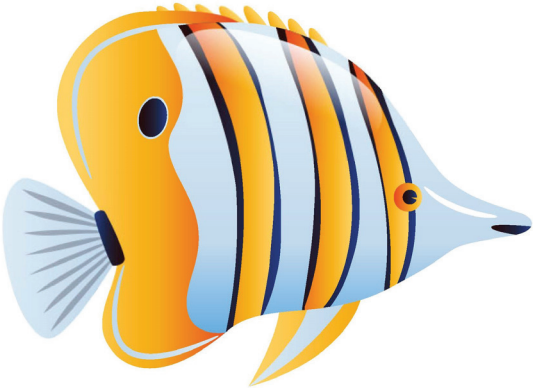

Mix them up again and have children create a rule for sorting the shoes. For example, the children might sort shoes based on whether they have Velcro™ or not.

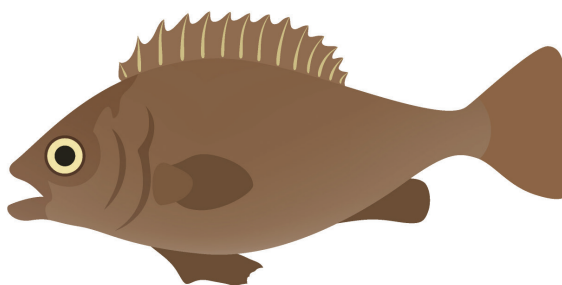
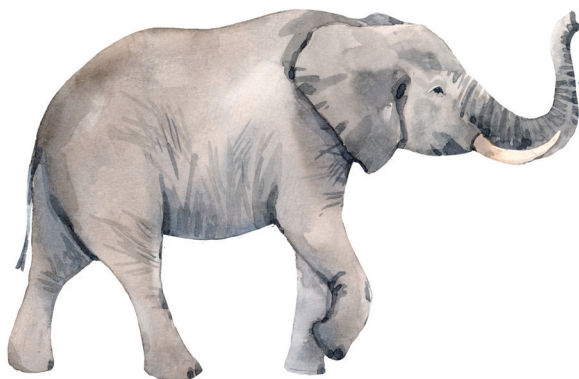
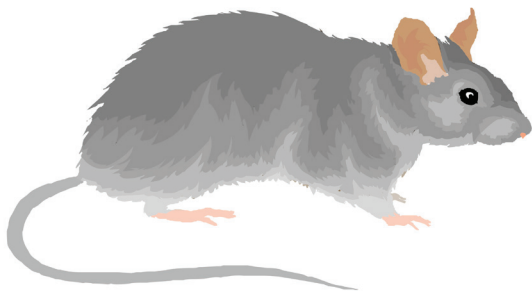
Play again and choose a different sorting rule, like whether the shoes are sneakers or not.

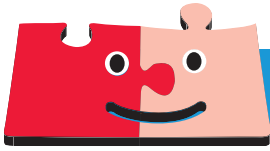
Handout 1: Spotted Animals

Handout 2: Striped Animals





Just for Families

Making Sets

A set is a collection of things with something in common. A set could be all the teaspoons in the silverware drawer. Or a small group of toy cars.

We can make different sets by grouping the same objects in different ways. For example, we can sort toy cars by color (red, yellow, blue) or by size (big or little).

Matching and sorting items are early math skills you and your child can practice almost anywhere.

Here's what you can try at home:

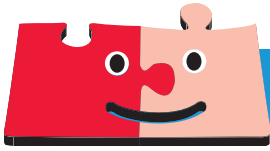
Have your child help sort laundry.

You can sort by color (place white socks and colored socks in two different piles). You can then re-sort by size (big T-shirts and little T-shirts). You can also sort by owner. "Let's put all of baby sister's clothes in the basket and all of Mama's clothes on the bed."

Help your child sort toys as they put them away. They might put cars in one container, blocks in another. Or put all the big cars together, or all the red cars together. You can help by labeling by bins or baskets with photos of what should be placed inside.

Let your child help you set the table. Each person gets one set of dishes at their place—a plate, a cup, a fork, a spoon. Older children can also help put clean dishes back in the cupboard—unbreakable cups together in one place, spoons together in another.





Solo para familias

Hacer conjuntos

Un conjunto es una colección significativa de cosas. Un conjunto podría ser todas las cucharitas en el cajón de los cubiertos. O un pequeño grupo de coches de juguete.

Podemos hacer diferentes conjuntos agrupando los mismos objetos de diferentes maneras. Por ejemplo, podemos clasificar los coches de juguete por color (rojo, amarillo, azul) o por tamaño (grande o pequeño).

Emparejar y clasificar elementos son habilidades matemáticas tempranas que usted y su hijo pueden practicar en casi cualquier lugar. Esto es lo que puede tratar en casa:

Haga que su hijo ayude a clasificar la ropa.

Puede clasificar por color (coloque calcetines blancos y calcetines de colores en dos montones diferentes). A continuación, puede volver a clasificar por tamaño (camisetas grandes y camisetas pequeñas). También puede clasificar por propietario. "Pongamos toda la ropa de Joel en la canasta y toda la ropa de mamá en la cama".

Ayude a su hijo a clasificar los juguetes a medida que los guarda.

Podrían poner autos en un contenedor, bloques en otro. O poner todos los autos grandes juntos, o todos los autos rojos juntos. Puedes ayudar etiquetando por contenedores o canastas con fotos de lo que se debe colocar dentro.

Deje que su hijo le ayude a poner la mesa.

Cada persona recibe un juego de platos en su lugar: un plato, una taza, un tenedor, una cuchara. Los niños mayores también pueden ayudar a poner los platos limpios en la alacena: tazas irrompibles juntas en un lugar, cucharas juntas en otro.

