

Using Paper Red Rods

The purpose of the red rods is to:

- Directly aid in the child in the visual discrimination of length
- Indirectly develop the child's muscles and muscular memory of length
- Indirectly prepare the child for mathematics

Presentation: Align the rods

1. Invite the child to do the work with you. Say, "These are the red rods. Let's bring them to a table."
2. Place the rod basket in front of the child. Carefully take out each rod and place them randomly on the table. Each rod must have its own space (none should be touching) and appear visually isolated (leave space around each rod in their random order). All should be parallel to the table's long edge (horizontal). Move the basket to the center top of the table (but within the child's reach).
3. Say, "I'll have a turn and then you can have a turn. I'm looking for the first one." Scan the rods until you find the longest rod. Place it just in front of the basket, aligned to the left corner.
4. Stabilize the left end of the rod with your left hand and trace the length with your right first finger from left to right.
5. Say, "I'm looking for the next rod." Scan the rods until you find the longest one left. Place it in front of and in contact with the first rod so that the left edges line up. Stabilize and trace as above.
6. Continue for all rods (you don't need to repeat the verbalization once the child gets the procedure), aligning and then tracing the length for each, until the stair is built.
7. Say, "Now it's going to be your turn. Let me get it ready for you."
8. Deconstruct the stair one rod at a time and randomize the rods.
9. Give the child a turn. Fade and observe. Encourage repetition.
10. When they are finished say, "Let's put this back in the basket so it is ready for next time. We'll put the longest rod in first." Help the child carefully place each rod in the basket, aligned on the left.
11. Complete the lesson. Go to the shelf together to return the basket to its assigned location. Free the child to do the work again anytime they like or tell them you'll do it together again next time.

Activity #1: Measure with the smallest rod

1. Same as Presentation but when the rods are aligned, take the smallest rod and move it up to the right side of the next smallest rod. It's the same size as the rod above it!
2. Trace your fingers at the end of the rods to feel that they are the same length.
3. Stabilize and trace the length.

4. Continue to measure the remaining rods, inviting the child to step in and take over as soon as they are able. Fade and observe. Encourage repetition.
5. If this is easy and the child is curious, ask what would happen if you aligned the second rod.
6. Complete the lesson (as in the Presentation).

Control of Error:

- Visual disharmony
- Stroking each rod

Accommodations:

- When you randomize the rods on the table, align them all so they are perpendicular to the table's left edge (to isolate the property of length). As always, leave space between each rod.
- Try taking only the first four rods to isolate the difficulty; slowly add in more rods as the child is able or do the next 3-4 rods separately.

Using Paper Number Rods

The purpose of the number rods is to:

- Teach the names of the numbers and that each number is a separate object in itself
- Help the child memorize the sequence of the numbers from 1 to 10
- Link quantity (the concrete) with name (abstract) with reference to the numbers from 1 to 10

Prerequisites: Ability to align the red rods

Presentation: Align the Rods

1. Go together to get the number rod basket and bring it to your work area.
2. Take the paper rods out carefully and place them randomly (but all horizontally aligned) on the table. Each rod must have its own space (none should be touching) and appear visually isolated (leave space around each rod in their random order). Move the basket to the center top of the table (but within the child's reach).
3. Say, "I'm looking for the biggest one." Visually scan the rods and then choose the ten rod.
4. Place it just in front of the basket, aligned to the left corner.
5. Say, "I'm looking for the next biggest one." Use your left hand to feel the left edge of the rods after each one is placed to verify their alignment. Guide the child to align the rest, verifying that the red is on the left. Fade and observe.
6. If the child is able to align the rods with ease, proceed directly to Activity #1. If the child has difficulty aligning the rods, encourage repetition. For example, have them close their eyes as you carefully randomize the rods (one at a time). Fade and observe.
7. Encourage repetition then complete the lesson. Let the child know if they are free to work with the materials whenever they like or if you will do it together again another time.

Activity #1: Names

1. You may continue directly from the alignment presentation (unless the child is having trouble with alignment). The rods must be aligned to begin.
2. Slide the first rod down in front of the child. Touch it with your right finger and say 'one.' Guide the child to say it and touch it, too. Move it to the bottom front of the table.
3. Slide the second rod down in front of the child. Touch the red segment with your right finger and say 'one.' Touch the blue segment with your right finger and say 'two.' Guide the child to count each segment and say, 'one, two,' just like you did.
4. Move it to the front of the table, slightly above the one rod.
5. Repeat for the third rod.

6. Conduct a 3-period lesson:
 - The first period occurred when you named each rod's number. Rename each number now and point to each one as you say its number.
 - Next, in the second period, say a number and ask the child to find that number. For example, you might say, "Show me the three." Keep it lively by varying the action in the second period (e.g., point to the, count the, move the, pick up the...). The second period is where most learning takes place. When they are accurate most of the time, add distance to increase the challenge. Leave the rods on the table and move to a different place in the room. Ask the child to bring you a number rod. Match your challenge to the child's ability; better too easy than too hard. If they make an error, do not correct them. Instead, move back to the first period. For example, if they bring you the two and you asked for the three just say, "You brought me the two." Then, walk together back to the table and repeat the first period.
 - When you are 100% sure they know the number, move on to the third period. Point to a rod and say, "What is this?" This is the final test of their knowledge. It may take a day or weeks before they succeed at the third period. Don't go here too soon.
 - This entire three-period lesson should only take a few minutes. Do not belabor it. Continue for as long as the child is interested; leave them wanting more!
7. Before you clean up, align the rods back on the top of the table. Guide the child to put the longest rod in the basket/container first and stack the others (longest to shortest, aligned on the left) on top. Return them to their designated space on the shelf.
8. Complete the lesson. Note: Over the next few days add in the rest of the numbers, doing two or three rods at a time and always reviewing the ones they've already mastered (via second-period questions) before introducing the new ones. Isolate the three you are presenting on the bottom of the table.

Activity #2: Find the number

1. Begin the lesson. Place the number rods randomly on the table (not in order) as above.
2. Identify a second work area (maybe a coffee table) at a distance from the first table that is appropriate for that child (adjacent or far across the room).
3. Go to the empty table and say, "Let's see if we can find the three rod. What rod are we going to find?" Guide them to say "three."
4. Walk together to the rod table. Visually scan the rods for the three. When you find it, count it (on the table) to verify and then bring it to the other table.
5. At the other table, say, "What did we bring?" Guide the child to count it and tell you the rod's name.
6. Say, "Now bring me the one rod. What rod will you bring?" Guide them to repeat one. Go with them if needed to make sure they count the rod at the distant table before bringing it to the second table.
7. Continue in this fashion but you may remain at the second table while they search for the requested rod. Proceed at the children's pace. If they are able, aim to get all of the rods on the second table. If they need more time, remain on the lower numbers and go back to the first table to allow them to repeat the procedure with just the smaller rods.
8. Complete the lesson. *Note:* Once they have the counting procedure internalized (so they are counting the rod on each table), encourage them to play together, without an adult (this may be the same day or another day). Each child will tell the other child which rod to bring.

Activity #3: One more/less

1. Begin the lesson. Guide one or two children to align the rods on your table.
2. Ask one child to find a second clear work area/table at a distance from the first table that is appropriate for that child (adjacent or far across the room).
3. Take the five rod to the second table. (Count it at the first table.)
4. Say, "What's this rod called?" Have the child say it, touch it, and count it.
5. Say "See if you can find me the rod that is one more than this one." Have the child walk to the other table, find the six rod, count it there, and bring it to you.

6. Say, "Which one did you bring me?" Have the child touch each segment and count it out loud to you.
7. Say "Now see if you can get me one more than this one!" Have the child walk to the other table, find the seven rod, count it there, and bring it to you.
8. Say, "Which one did you bring me?" Have the child touch each segment and count it out loud to you.
9. Once they get "one more than" do "one less than," either that day or another day, whenever they are ready.
10. When they are finished, say, "Next time you can do this work together, without me if you like! Let's put this work away so nicely."

Control of error:

- Visual; The number of segments guides the child's memory

Accommodations:

- You may begin with only the first three or five rods. Work with those many times before adding in more.
- If the children cannot align the number rods (but can align the red rods), encourage them to align the number rods as much as they need to before you begin counting in Activity #1. There is no rush. It is a challenge for some children who are distracted by the checkered color pattern (if they don't always have the red segment on the left). Some may even prefer it! As a scaffold, when you randomize the rods on the table, align them on the left side (by the red ends) to help isolate the visual attribute of length.
- If the child cannot remember the rod they are seeking, move the work spaces closer together. You can also model repeating the name of the rod (under your breath) as you go together to seek it. This will give them a memory trick that they can use. It also models meta-cognition and demonstrates that they can help themselves to succeed.
- If the child is rough with the materials, they are showing you that they need more foundational work with practical life, possibly heavy work. Encourage them to do table scrubbing, shelf scrubbing, floor scrubbing, slide scrubbing (on the playground); whatever you need to do to get them carrying heavy things (like pails of water) and learning how to practice lightness of touch while coordinating their mind with their hands. Be patient but don't allow them to damage the materials. Simply say, "Oh, we have to be so careful with these materials. They are precious, just like you!" If they can't control their actions, simply say, "Let's put this away and try it again together another day." Then, redirect them, ideally towards practical life.

Notes:

- Go at the child's pace, as quickly or slowly as they need. Be sure they have truly internalized the quantity before moving past this work and introducing the cards. Do not rush this concrete phase! Once they have learned the names at the second period, you can separately introduce the sandpaper numbers (this is a simultaneous acquisition).
- If after much experience, the child cannot align the rods, this is a diagnostic indicator that there is something else going on. Make sure the child has had adequate practical life and sensorial preparation. Can they cross mid-line with the bow tying frame? Have they had many opportunities to develop their foundational executive functions (e.g., waiting for a turn, following a sequence, holding something in working memory)? If you have authentically presented the pedagogy, they have had adequate experience with the materials, and there are no gaps in their preparation, seek additional support.

Using Paper Number Rods with Number Cards

Purpose:

- To associate the written symbol with the quantity
- Indirect preparation for addition (building of tens)
- Indirect preparation for subtraction (removal of rods)
- Indirect preparation for multiplication & division (five-rod activities)

Prerequisites: Number rods Activity #2; Sandpaper numbers

Presentation: Match symbols to rods

1. Begin the lesson. Say, "Today I want to show you a new thing to do with the number rods...the number cards!" Touch the container of number cards as you say this.
3. Guide the children to bring the materials to your table and align the number rods in front of the basket.
4. Put the number cards basket in front of the child.
5. Take out the top card and say, "This is ten, ten." Have the child repeat it and hold the card and place it randomly on the table.
6. Take the next card and say, "What is this?" Have the child name it and place it randomly on the table.
7. Continue by having the child lay out all of the cards randomly on the table.
8. Play a quick "What is it?" game to review the names of the numbers.
9. Touch the one rod and say, "One."
10. Find the one card, pick it up and place it just on the top right of the one rod and say, "This is one."
11. Count the segments on the two rod and say, "One, two. This is two. Let's find the two card." Find the two card and place it on the farthest right section of the two rod.
12. Continue for all cards, having the child step in as soon as they are able.
13. When all cards are laid out, touch each card (or the end of the rod) and say the number. Have the child step in and do it after you give a few examples. First, go from one to ten and then go from ten to one. Say it again, up and down!
14. Encourage repetition. Fade and observe.
15. When the child is finished, show them how to clean up the number cards. Carefully pick up a card and put it in the box. Continue picking up the other cards one at a time, in any order, inviting the child to step in as soon as they are able.
16. Complete the lesson.

Activity #1: Get the card

1. Begin the lesson. Say, "I want to show you how to play a game with the number rods and cards. We'll need two work areas for this work. Let's choose two that are far away from each other!"
2. Once the tables are selected, guide the children to randomly place the number rods on one table (aligned but with space between each rod).
3. Guide the children to randomly layout the number cards (but from the same perspective) on the second table.
4. Go to the rod table and pick up a rod. Isolate it at the bottom of the table.
5. Ask, "What is this?" Have the child say the name, counting if needed (e.g., Say, "Count it to make sure.")
6. Say, "Can you get the card that says that? Which one will you get?" Guide them to repeat the name of the number and then go to fetch the card.
7. Say, "Which card did you bring? Count the rod and make sure it's the right one." When it's right, have the child place the symbol with the rod (no special order is necessary).
8. Guide the child to choose a rod to do next. Isolate it just above the first rod on the bottom left of the table.
9. Continue for all rods/cards.
10. Complete the lesson.

Activity #2: Get the rod

1. Same as Activity #1 but start at the card table. Randomize the cards in the lower right of the table. Guide the child to choose a number card, isolate it on the lower left of the table, and ask him to find the rod that matches the card. Then bring the rod to the card table and count it to verify (first count it at the rod table, then count it at the card table).

Activity #3: Add the rods to ten

1. Begin the lesson. Invite one or two children to do the work with you. Guide them to set up the number rods and cards as in the Presentation. Say, "Let's align the rods and put the cards with them. Then I'll show you something special that we can do!"
2. Place your hand in the empty segment at the right end of the nine rod. Ask, "What can we get to fill in this space so it is the same as the ten?"
3. Pause and if they don't see it, you go ahead and move the one rod there.
4. Use your fingers to align the left and right ends of the nine and ten rods to verify that they are the same length.
5. Place the one card on the one rod. Say, "nine plus one is the same as ten!"
6. Continue with the 8 (+2), 7 (+3), and 6 (+3) moving rods and placing cards. Allow the child to take over as soon as they are able.
7. Point to the space after the five rod and ask, "What can we get to fill in this space?" Pause as if you don't know and wait for them to figure it out. (They always guess that it's the middle red rod.)
8. Ask, "What about a card?" Again, pause and let them discover that they know we have a five sandpaper number that they can use.
9. Review the sums with the child in a quick three-period lesson game. Touch the 8+2 rods and say, "8 plus what makes 10?" Touch another rod combination and say, "What does this say?" Have fun and keep this lively. Don't do too many, just enough to keep it interesting and give them experience saying equations.
10. Encourage repetition. Fade and observe. Complete the lesson.

Activity #4: Add other rods

1. Same as Activity #3 but do combinations that add up to other numbers (e.g., $7 + 2 = 9$, $6 + 3 = 9$, etc.)

Activity #5: Subtract the rods

1. Do Activity #3 in its entirety.
2. Before cleaning up, say you have something new to show them.
3. Review the difference when you take the added number away. For example, "We had ten and if we take away five, we have five left over."
4. Move the red five rod onto a second table.
5. Continue for the remaining rods, moving both the card and the rod to the second table. Guide the child to step in as they are able.
6. Encourage repetition. Fade and observe. Complete the lesson.

Activity #6: Write equations

1. Offer this lesson after the child has progressed through the Recording Process (Language) and is writing on chalkboards and/or paper.
2. Begin as in Activity 3, 4, or 5 but once the child is finished, model writing the equations. Say, "Let's write down what you've done."
3. Bring your writing tray or chalkboard to the table. Write, so the child can see you, the equation on the top of the table (e.g., $10+0=10$). Read the equation as you touch the rods that create it. Write a second one (e.g., $9+1=10$). Invite the child to write the rest. If they write on paper, encourage them to staple the equations into a little book that they can decorate.

Control of error:

- The segments on the rods; The child's developing number sense

Accommodations:

- Isolate three rods on a separate table. Match cards to them on the separate table (to minimize visual distractions and further isolate the stimuli).
- If they have difficulty remembering what they seek, move the tables closer together so they can "peek" back at the table to remind them what they seek. Be sure the stimulus is fully isolated on the first table.
- Invite them to be the requester for another child who is succeeding with the work. They can ask the other child to bring the rod or card.