

# **Central Nervous System State**

# **CENTRAL NERVOUS SYSTEM STATE**

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## **Definition**

The “state” of the central nervous system (CNS) is used here to refer to its level of arousal or excitation. A child’s CNS state results in a continuum of feelings and behaviors ranging from very relaxed, unresponsive, and slow moving (hypoactive) to hypersensitive, anxious, and hyperactive.

CNS state varies among individuals and within individuals at different times and under different conditions. We all know people who are comfortable with high levels of audible, visual, tactile (touch), and movement stimulation; while others find these stressful and become distractible, irritable, or anxious under these conditions. An individual might feel calm and lazy lying on a beach, yet become highly alert and excited when someone in the water yells “shark.” We are all familiar with the difficulty of studying or taking a test in a visually distracting or noisy location, but we vary in terms of our base level of excitability and how much noise or visual input we find overstimulating. If one is extremely anxious about an exam (high base level of arousal), it might take only the ticking of a clock to distract that person, increase anxiety, and interfere with performance. At the other extreme, the person with a very low arousal level may not be sufficiently alert to attend to the test material or be motivated to perform within the designated time limits.

## **Causes**

Difficulty with CNS state can be due to a wide variety of causes. Some children with learning disorders or central nervous system dysfunction have difficulty filtering out nonrelevant sensory information; they’re bombarded by sensory input from their environment. This can result in a distractible, excitable, or hyperactive state as they attend to one input after another.

Others have difficulty accurately interpreting sensory information so that some sensory inputs, such as touch or movement, might be felt as a threat and might result in a stress response. Some children who have high or low thresholds of arousal or sensory responsiveness require either a lower or higher level of stimulation than most of their peers for optimal attention, alertness, and ability to learn.

An unbalanced CNS state also might be due to psychological or emotional problems, fear of failure, or stressful situations in a child’s life.

A child’s CNS state has powerful effects on motor performance. A high level of excitement or anxiety can increase muscle tone or tension, resulting in fatigue or decreased muscle control. Many children have a slight tremor or shakiness of the hands which is normally unnoticeable but increases with stress or excitement. The hyperactive or distractible child may have difficulty

focusing on the relevant aspects of a motor activity, attending to the details of feedback from previous movement attempts for more accurate control during successive attempts, and inhibiting impulsive movement. The hypoactive child may have low muscle tone and may develop weakness and motor delays through inactivity and lack of sensorimotor experiences.

### **Preparation for Motor Activities**

Before working on motor activities, help the child to achieve a state of “equilibrium” (alert and focused, but not overstimulated) for optimal motor response. Use inhibitory techniques if a child is anxious, tense, hyperactive, or hypertonic (has high muscle tone); and use stimulating techniques if the child is hypoactive, unresponsive, or hypotonic (has low muscle tone).

In general, calming factors include slow, repetitive movement activity; soft, regular auditory rhythms; pleasant odors; warm liquids; and cool colors with minimal contrasts. Activities that involve fast, irregular movement rhythms; bright, warm colors; loud, irregular sound rhythms; or unpleasant odors have a stimulating effect.

Once the child is optimally calm, alert, and able to focus, present the desired motor activity.

### **Compensatory Strategies**

Set up a learning environment that helps the child to maintain an alert, yet relaxed, state and assists the child in focusing on relevant information. Again, a stimulating environment contains bright, warm colors and plenty of noise and movement; while an inhibitory environment has low levels of light, cool noncontrasting colors, minimal visual distractions, and slow, calming music or the voice of one person speaking in low tones.

### **Caution**

The same activities can calm or excite, depending on their rate and regularity. Be careful not to increase tone in a hypertonic child by encouraging movement that is too fast or irregular; or to decrease tone in a child with low tone by encouraging slow, repetitive activity. Stimulatory activities should not be used with hyperactive or hypertonic children, and inhibitory activities should not be used with hypotonic or inactive children.

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE**  
**Classroom and Individual Practice**  
**TOTAL BODY INHIBITION**

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**Purpose**

To achieve total body inhibition for calming, focusing, or decreasing muscle tone before fine motor activity

**Materials**

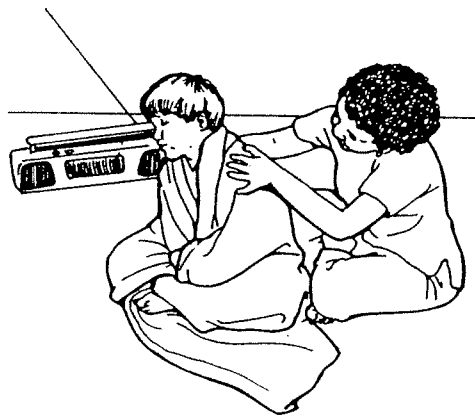
Cotton blanket, carpeted area or mat, relaxing music (slow, regular rhythm), and tape or record player

**Preparation**

Turn lights off or to low level of intensity. Child drapes blanket over shoulders and around body before instructions are given and stays "wrapped" during this activity. Some children can relax more easily with eyes closed. Use soft, slow, even speech to instruct the child.

**Position**

Child stands or sits comfortably on carpet or mat. Adult stands or sits behind child.



**Procedure**

1. Place your hands on child's shoulders and rock child gently, back and forth or from side to side, to the rhythm of the music.
2. When child can move with the rhythm independently, release your hold and allow child to continue swaying slowly and regularly with the music.
3. Child continues to sway gently for 5 to 10 minutes, or until desired relaxation is achieved. If tired of the movement, child can lie quietly and listen to the music.
4. When child is calm and relaxed, remove blanket, turn lights up, and present fine motor activity. Continue to speak in slow, even tones. Start with large, fluid movements that can be performed to the rhythm of the music.

**Desired Response**

Child becomes calmer and more relaxed.

**Undesired Response**

Child's behavior becomes more disorganized, or tone increases.

### **Variations and Adaptations**

Child sits in adult's lap (facing away from adult) while adult rocks slowly and regularly in sitting position on the floor, in rocking chair, or on swing.

Any use of neutral warmth and slow, repetitive, regular movement is calming. Examples of this kind of activity include:

- Child swings in a hammock or net swing.
- Child is passively rolled from back to side and back by an adult.
- Child rolls independently, back and forth slowly.
- Children dance slowly, with limp bodies and eyes closed.
- Child rocks slowly in rocking chair.
- Child lies on stomach over therapy ball while adult supports child at the hips and rocks child slowly back and forth, side to side, or in small circles.

This activity can be done in the classroom when the activity or excitement level gets too high.

### **Caution**

Do not use this technique with children who are hypotonic (have low muscle tone) or hypoactive (have a low activity level).

Observe child carefully during this activity to monitor its effects, and stop when the desired result is achieved. Monitor behavior afterward to ensure that stimulation is not causing a "rebound" effect of greater disorganization or increased tone when the inhibiting activity is discontinued.

If movement or music is too fast or irregular, these same activities can stimulate the child and increase tone. Be sure that you are encouraging slow, regular stimulation, and that you are promoting the result you want.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE**  
**Classroom and Individual Practice**  
**SENSORY STIMULATION**

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**Purpose**

To provide sensory stimulation to increase general activity level or muscle tone in preparation for fine motor activity

**Materials**

Carpeted area or mat, loud music with irregular rhythm, and tape or record player

**Preparation**

Turn lights to highest level of intensity. Provide instructions using loud, fast, enthusiastic tone of voice.

**Position**

Child stands or sits comfortably on carpet or mat. Adult stands or sits behind child.

**Procedure**

1. Child jumps, rolls, spins in circles, or swings to the rhythm of the music or to verbal instructions called out by the adult.
2. Child is encouraged to move at a fast pace with irregular stops, starts, and changes in direction.
3. Child continues for 5 to 10 minutes, or until desired results are achieved.
4. When child is alert or tone is improved, follow with a purposeful fine motor activity. Continue to speak in irregular, enthusiastic tones. Start with rapid irregular movement, such as scribbling on chalkboard or textured surface; and progress to regular drawing, writing, cutting, or other fine motor activity.

**Desired Response**

Child becomes more alert; muscle tone increases.

**Undesired Response**

Child reacts with fear or stress responses, or behavior becomes more disorganized. If this occurs, decrease the level of stimulation.

**Variations and Adaptations**

If child is unable to move independently, hold the child on your lap or in your arms while you bounce, swing, rock, or dance around.

Always start with a level of movement or stimulation that is comfortable for the child, and increase from there. If rapid movement is threatening, start slowly and increase speed as comfort increases. Start with simple back-and-forth movement; then side to side; then diagonal; and only when the child is comfortable with all of these, rotary (spinning) movement patterns.

If child is confused, fearful, or overstimulated by the combination of sensory stimulation in this activity, start with simple movements (such as rapid rocking in a rocking chair or on a swing) without music, and add music only when the child is comfortable with a wide range of rapid, irregular movement activities.

In the classroom, let the children get up and move their bodies or jump around quickly for a few minutes to increase attention and muscle tone between periods of inactivity or desk work.

“Stop and go” running games and fast swinging in swings, hammocks, or net swings are playground activities that will increase alertness and tone if done quickly and with many stops, starts, and changes in direction.

#### **Caution**

Do not use this technique with children who are hypertonic (have high muscle tone) or hyperactive (have a high activity level).

Observe child carefully during and following this activity to monitor its effects, and stop when the desired results are achieved. Make sure that it is not overstimulating or causing fear or discomfort.

Spinning can bring on seizures and should not be used or encouraged with seizure-prone individuals.

If movement or music is slow or regular, these same activities can be calming and may decrease tone. Be sure that you are encouraging rapid, irregular stimulation, and that you are promoting the results you want and not making the situation worse.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE**  
**Classroom and Individual Practice**  
**PROGRESSIVE\* AND DIFFERENTIAL**  
**RELAXATION TECHNIQUES**

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**Purpose**

To encourage physical and mental relaxation during fine motor activities

**Materials**

Comfortable chair, carpeted area or mat, or desk

**Preparation**

Turn lights to low level of intensity. If light level cannot be reduced, have child close eyes for this activity. Speak in slow, regular, gentle tone of voice.

**Position**

Child sits in comfortable chair, lies on carpet or mat, or rests arms and head comfortably on desk.

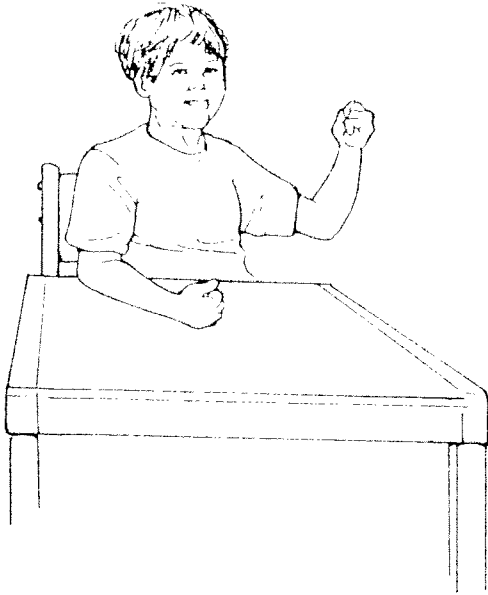
**Procedure**

1. Child vigorously contracts muscles in both feet for a few seconds, then slowly releases the tension. This is repeated. Child focuses on the heavy, tingly feeling that follows release of the tension.
2. Child repeats this for all muscle groups of the body, working from feet up to forehead. Muscle groups include:
  - Feet
  - Hands
  - Legs
  - Arms
  - Hips and buttocks
  - Shoulders
  - Abdominals (stomach muscles)
  - Neck
  - Chest
  - Face
  - Back
3. Child sits or lies quietly for a few minutes, experiencing a relaxed state.

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\*The progressive relaxation technique was originally developed by E. Jacobson. See: Jacobson, E. 1964. *Anxiety and tension control*. Philadelphia: J. B. Lippincott.





4. Follow with desired fine motor activity. Encourage child to recognize tension that develops in any group of muscles during the activity, and relax it by contracting and releasing that group before continuing the activity.

**Desired Response**

Child relaxes fully before fine motor activity; child recognizes and releases excess tension or tone in any muscle group during the activity.

**Variations and Adaptations**

If child has a short attention span or finds it difficult to lie or sit still for this activity, combine muscle groups and/or contract groups only once. For example, child contracts feet, legs, and hips as a group; trunk muscles (stomach, back, and chest) as a group; and hands, arms, and shoulders as a group. Start with short periods of relaxation, and increase length of time as the child's tolerance increases.

It may take several sessions before the child learns to relax muscle groups. Provide feedback when the child looks "nice and relaxed," and reward any attempts at relaxation.

Provide cues, such as "Does your arm (shoulder, hand) feel tense or relaxed right now?" Continue to give cues until the child consistently recognizes tension when it occurs.

Reinforce this technique in the classroom by teaching a physical cue to serve as a reminder that the child needs to relax. For example, if the child is getting overly stimulated during a classroom activity, gently place a hand on the child's shoulder to alert the child to the need to relax. The child might be permitted to lie in a beanbag chair in a quiet corner of the room, eyes closed, for a few minutes before resuming the activity.

Encourage the child to take short breaks to relax in this manner when feeling tense or overly stimulated during classroom or home fine motor activities.

This technique is often helpful with children who have very negative feelings about handwriting. After achieving a relaxed state, while an adult says letter names or sounds these children can keep their eyes closed and imagine how the letters look, how they are formed, and the correct sequence of movements needed to produce them.

*Use of these activities should be directed by a qualified therapist*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

CENTRAL NERVOUS SYSTEM STATE  
Classroom and Individual Practice

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## MENTAL IMAGERY RELAXATION TECHNIQUE

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### **Purpose**

To encourage relaxation before and during fine motor activities

### **Materials**

Desk, table, or carpeted area or mat

### **Preparation**

Turn lights to low level of intensity. Speak in slow, regular, gentle tone of voice. Ask child to think of a place that feels very calm and comfortable, and to briefly describe this place to you.

### **Position**

Child sits comfortably at desk or table, or lies on carpet or mat, with eyes closed.

### **Procedure**

1. Lead the child through a mental fantasy that lasts from 5 to 15 minutes.
  - Speak slowly, softly, and with regular rhythm.
  - Encourage the child to imagine a pleasant, calming experience.
  - Describe the place that the child identified for you. Describe the child's feelings, using sensory details that promote vivid images. ("You feel the warmth of the sun on your face"; "The grains of sand are warm under your feet, and they tickle between your toes"; "You hear waves gently hitting the beach, and you feel happy and calm.")
  - Use long silences so the child can imagine what you've described.
  - Encourage the child to take deep, regular breaths and to breathe in "calm and comfort" and to exhale "tension and worry."
  - End the imagery with a few minutes of relaxing silence.
2. Tell the child, "I will count to three. When I reach three, you will open your eyes and feel relaxed, yet energetic and ready to begin an activity."
3. Follow this activity with a fine motor activity. Begin by encouraging the child to maintain the relaxed feeling while drawing large shapes, letters, or lines on the chalkboard or large paper, using smooth, fluid movement. Then proceed to the desired motor activity.

**Desired Response**

Child relaxes fully before fine motor activity and maintains a relaxed state during the activity.

**Variations and Adaptations**

If child has a short attention span or finds it difficult to lie or sit still for this activity, start with short periods of imagery and increase the length of time as the child's tolerance increases.

It may take several sessions before the child learns to relax. Provide feedback when the child looks "nice and relaxed," and reward any attempts at relaxation.

Reinforce this technique in the classroom by teaching a physical cue to serve as a reminder that the child needs to relax. For example, if the child is getting overly stimulated during a classroom activity, gently place a hand on the child's shoulder to alert the child to the need to relax. The child might be permitted to lie in a beanbag chair in a quiet corner of the room, eyes closed, for a few minutes before resuming the activity. Teach the child to imagine the "quiet place" to calm self.

This technique is often helpful with children who have very negative feelings about handwriting. After achieving a relaxed state, while an adult says letter names or sounds these children can keep their eyes closed and imagine how the letters look, how they are formed, and the correct sequence of movements needed to produce them.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

CENTRAL NERVOUS SYSTEM STATE  
Classroom and Individual Practice  
**RECOGNIZING AND RELEASING TENSION  
IN THE ARM AND HAND**

**Purpose**

To encourage recognition of tension and relaxation of arm and hand muscles before and during fine motor activities

**Materials**

Any materials needed for a fine motor activity that usually results in increased tension in the arm and hand

**Preparation**

Turn lights to low level of intensity. Provide instructions using slow, regular, gentle tone of voice.

**Position**

Child sits comfortably at desk or table.

**Procedure**

1. Child "makes a fist," tenses muscles of the shoulder, arm, and hand, as hard as possible, and holds the contraction for at least three seconds.
2. Child relaxes all muscles suddenly; adult encourages child to focus on "all of the tension leaving your arm and hand."
3. Child repeats this tensing and release of arm and hand muscles.
4. Child rests arm and hand on desk or table top and focuses on "the heavy, numb, relaxed feeling" in the muscles.
5. Child maintains the relaxed feeling while drawing large shapes, letters, or lines on the chalkboard or large paper, using smooth, fluid movement.
6. Child proceeds to the fine motor activity that usually results in increased tension. Child repeats Steps 1-4 whenever tension is recognized.

**Desired Response**

Child recognizes tension or increased tone in arm and hand muscles, and relaxes them.



### **Variations and Adaptations**

Provide cues, such as “Does your arm (shoulder, hand) feel tense or relaxed right now?” Continue to give cues until the child consistently recognizes tension when it occurs.

Reinforce this technique in the classroom by teaching a physical cue to serve as a reminder when you notice increased tension in the child’s arm or hand. For example, during a classroom writing activity, gently touch any tense area to alert the child to the need to relax.

Record the amount of time during which a relaxed arm is maintained while doing a fine motor activity, to monitor and point out progress to the child.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

CENTRAL NERVOUS SYSTEM STATE  
Classroom and Individual Practice

**RELAXING THE ARM AND HAND—  
WEIGHT BEARING AND SHAKING**

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**Purpose**

To encourage relaxation of arm and hand muscles before and during fine motor activities

**Materials**

Any materials needed for a fine motor activity that usually results in increased tension in the arm or hand

**Preparation**

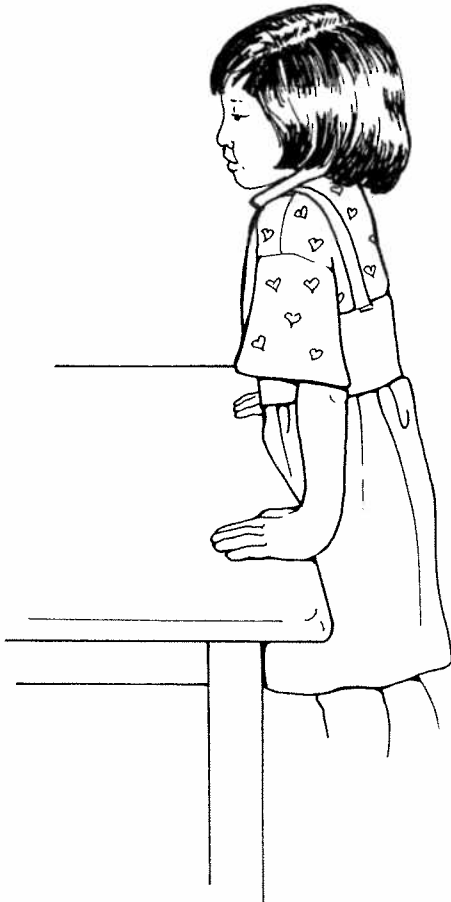
Turn lights to low level of intensity. Speak in slow, regular, gentle tone of voice.

**Position**

Child stands comfortably in front of desk or table.

**Procedure**

1. Child stands with palms on table or desk top and leans forward so that body weight rests on straight arms, with wrists perpendicular (at a 90-degree angle) to the hands.
2. Child sways slowly, several times from side to side, so that body weight is shifted from one hand to the other.
3. Child stands up and lets arms hang loose at sides. Focus child's attention on "the heavy feeling and weight of the arms."
4. Child vigorously shakes the "tension out of" the arm and hand as they hang limp at the child's side until "a warm, tingly feeling" occurs when the shaking stops.
5. When the arms and hands look and feel relaxed, child maintains the relaxed feeling while drawing large shapes, letters, or lines on the chalkboard or large paper, using smooth, fluid movement.
6. Child proceeds to the fine motor activity that usually results in increased tension. Child repeats Steps 1-4 whenever tension is recognized.



**Desired Response**

Child's body weight is distributed equally through the palmar surface of the hands and fingers as child bears and shifts body weight on desk top (Steps 1 and 2). Child recognizes tension or increased tone in arm or hand muscles and relaxes them during the fine motor activities (Steps 5 and 6).

**Undesired Response**

Child bears and shifts weight onto hands which are not perpendicular to the wrists, so that weight is supported primarily by the "heel" of the hand or the fingers.

**Variations and Adaptations**

If tone in the hands is high, if the child is unable to open hands fully, or if stretching hands open results in increased tone, provide a contoured surface for the hands to hold onto when bearing weight on hands (Steps 1 and 2). The child can grasp a roll, raised grab bar, or rolled towel.

Provide cues, such as "Does your arm (shoulder, hand) feel tense or relaxed right now?" Continue to give cues until the child consistently recognizes tension when it occurs.

Reinforce this technique in the classroom by teaching a physical cue to serve as a reminder when you notice increased tension in the child's arm or hand. For example, during a classroom writing activity, gently touch any tense area to alert the child to the need to relax.

Record the amount of time during which a relaxed arm is maintained while doing a fine motor activity, to monitor and point out progress to the child.

Encourage child to relax arms in this manner before beginning classroom or home fine motor activities, and to take breaks to relax arms if they develop tension during the activity.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE**  
**Classroom and Individual Practice**  
**INCREASING TACTILE CONTACT**

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**Purposes**

To encourage tactile (touch) contact with various textures  
To decrease tactile hypersensitivity or defensiveness

**Materials**

Firm surface such as desk or table top; towel or other rough textured material; materials for a motor activity that provides lots of touch input (See list in Step 3)

**Preparation**

Warm your hands before touching the child's skin. If the child is fearful or anxious, provide some general calming techniques before working on this activity.

**Position**

Child sits comfortably at desk or table.

**Procedure**

1. Provide maintained pressure to the skin surface to be desensitized (usually the palms and palmar surfaces of the fingers) by one of the following techniques. Usually these can be done in an unnoticeable manner for a few minutes while you are talking to the child about the fine motor activity that will be presented later.
  - Encourage the child to press both palms together firmly and to hold hands in this position for several minutes.
  - Firmly hold the child's hand in your own and press into the palmar surface with your palm and fingers.
  - Press the child's hands, palms down, firmly against a table or desk surface, or encourage the child to do so.
  - Child rests hands on desk top, palms up. Place your palms over the child's palms and press firmly.
2. Child rubs rough towel or other textured material on skin surface with heavy pressure until it feels comfortable or for as much time as can be tolerated (up to several minutes).





3. Follow with motor activity with a strong touch component.  
Activities include:

- Climbing on a climber or gym bars
- Rolling inside, or climbing on, a carpeted barrel
- Kneading, rolling, and manipulating clay or dough
- Painting with finger paint, shaving cream, or pudding
- Manipulating rice, sand, water, or other textured materials in a water table
- Applying skin lotion to body parts (also good for body awareness)
- Writing letters with fingers on carpet squares
- Crawling over carpet squares or other textured materials
- Wheelbarrow walk

#### **Desired Response**

Child applies heavy touch pressure to sensitive skin surfaces (or allows adult to do so). Child makes firm contact of the palmar surfaces of the fingers and palms with the manipulative media presented in Step 3.

#### **Undesired Responses**

Child's behavior becomes disorganized or fearful. Opening the hand for Step 1 stretches finger muscles and causes an increase in tone. Child manipulates objects with minimal contact (using the tips of the fingers only, with slight pressure).

#### **Variations and Adaptations**

Progress from self-initiated heavy touch pressure (child presses hands down or rubs self with towel) to pressure applied by a trusted adult as the child becomes more comfortable with touch. If child is unable to apply touch pressure, place your hand over the child's hand and provide assistance.

If child has difficulty with rough textures, begin with smooth textures (such as silky materials, skin lotion, and finger paint), and gradually introduce rougher textures as sensitivity decreases.

If child is unable to grasp towel, hold towel on table and encourage child to rub hands and fingers on it.

If child has high muscle tone in the hands, apply deep touch pressure without stretching open the hands by placing objects (such as your own hand or a small textured ball) into the child's hand and applying pressure evenly over the child's hand with your own.

Do Steps 1 and 2 in preparation for any fine motor activity that involves a lot of touch.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE**  
**Classroom and Individual Practice**

## **INCREASING TACTILE CONTACT WITH TOOLS AND UTENSILS**

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**Purpose**

To increase tactile (touch) contact for more secure grasp of tools such as writing implements and eating utensils

**Materials**

Firm surface such as desk or table top; towel or other rough textured material; writing or eating utensils; materials for an activity that requires secure grip of a utensil (See list in Step 4)

**Preparation**

Warm your hands before touching the child's skin. If the child is fearful or anxious, provide some general calming techniques before working on this activity.

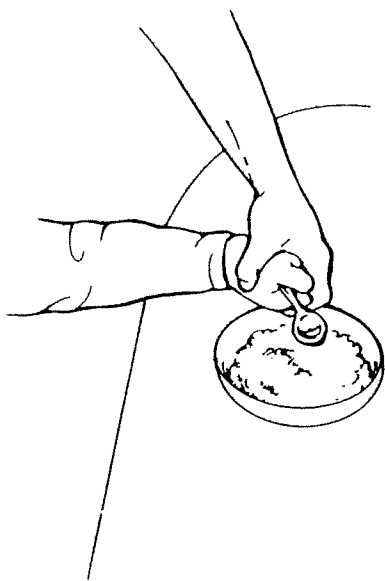
**Position**

Child sits comfortably at desk or table.

**Procedure**

1. Provide maintained pressure to the skin surface to be desensitized (usually the palms and palmar surfaces of the fingers) by one of the following techniques. Usually these can be done in an unnoticeable manner for a few minutes while you are talking to the child about the fine motor activity that will follow.
  - Encourage the child to press both palms together firmly and to hold hands in this position for several minutes.
  - Firmly hold the child's hand in your own and press into the palmar surface with your palm and fingers.
  - Press the child's hands, palms down, firmly against a table or desk surface, or encourage child to do so.
  - Child rests hands on desk top, palms up. Place your palms over the child's palms and press firmly.
2. Child rubs rough towel or other textured material on skin surface with heavy pressure until it feels comfortable or for as much time as can be tolerated (up to several minutes).





3. Child holds utensil in a position that provides lots of contact of the hand and fingers with the utensil. Adult holds hand over the child's hand, presses down on the hand and fingers with firm, even pressure, and maintains this position for a few minutes.
4. Follow with an activity that requires a firm grip of a writing, eating, or cutting utensil against resistance. If contact of the fingers and hand with the utensil decreases, repeat Step 3. Activities include:
  - Coloring with crayons over textured surfaces such as templates, book covers with raised designs, or scribble board (made from bumpy plastic that is used to cover fluorescent ceiling light fixtures).
  - Cutting modeling clay or bread with a plastic knife.
  - Stirring clay, dough, or batter.
  - Cutting cardboard or other thick material with scissors.
  - Writing or drawing with pencil with hard lead.

#### **Desired Response**

Child applies heavy touch pressure to sensitive skin surfaces (or allows adult to do so). Child makes firm contact of the appropriate surfaces of the fingers and palms with the utensil and maintains this grip for the activity presented in Step 4.

#### **Undesired Responses**

Child's behavior becomes disorganized or fearful. Opening the hand for Step 1 stretches finger muscles and causes an increase in tone. Child holds tools with minimal contact (using the tips of the fingers only, with slight pressure).

#### **Variations and Adaptations**

Progress from self-initiated heavy touch pressure (child presses hands down or rubs self with towel) to pressure applied by a trusted adult as the child becomes more comfortable with touch. If child is unable to apply touch pressure, place your hand over the child's hand and provide assistance.

If child is unable to grasp towel, hold towel on table and encourage child to rub hands and fingers on it.

If child has high muscle tone in the hands, apply deep touch pressure without stretching open the hands by placing objects (such as your own hand or a small textured ball) into the child's hand and applying pressure evenly over the child's hand with your own.

Building up handles on utensils often encourages increased touch contact. Built-up handles can be purchased commercially or made by putting foam hair curlers over handles. If purchasing them, hard smooth surfaces are preferable to foam. Primary pencils also may help.

Before using any utensil, do Steps 1, 2, and 3 until grip is secure.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

CENTRAL NERVOUS SYSTEM STATE  
Classroom and Individual Practice

**REFLECTIVE APPROACH TO FINE MOTOR ACTIVITY**

**Purpose**

To promote a more reflective (less impulsive) approach to fine motor activities.

A reflective approach involves:

- Pausing to plan a systematic approach.
- Thinking before each action within the activity.
- Monitoring motor performance as it occurs.
- Working slowly and accurately.

**Materials**

Materials for any simple fine motor activity such as drawing, coloring, cutting, or pasting; paper; colored pencils or markers

**Preparation**

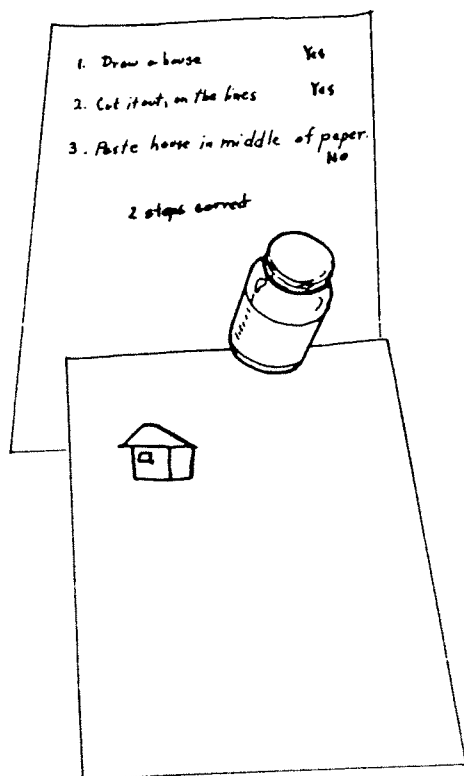
If child is distractible, minimize visual and sound distractions by working in a quiet room or corner. If child's behavior is very active and disorganized, first use some general calming techniques (deep breathing, closing eyes, listening to calming music).

**Position**

Child sits comfortably at desk or table.

**Procedure**

1. Before picking up pencil, crayon, or scissors, child verbally outlines a plan for completing the activity. ("I am going to draw a house, cut it out on the lines, and paste it in the middle of my paper.") If the activity is decided by an adult, adult provides general instructions and child repeats the plan in more detail.
2. Child or adult records the plan, with each step numbered and written in a different color.
3. Child repeats plan verbally before beginning.
4. Child pauses before each step and repeats that step verbally.
5. When the activity has been completed, child compares the results with the plan and identifies discrepancies. Record the number of steps that are accurately completed, to monitor progress.
6. On successive activities, child tries to increase the number of steps that are completed according to the plan.



**Desired Response**

Child plans a systematic approach to the activity, stops to think before each action, and compares performance during and after the activity with the plan.

**Undesired Response**

Child's behavior becomes more disorganized because of the focusing demands of the task. If this occurs, make the activity more attractive or simple, and allow a more simple verbal plan.

**Variations and Adaptations**

Start with an activity that is not motorically difficult so the child focuses on the plan and process and not on motor control.

Grade the number of steps in an activity. When the child successfully plans and completes an activity with two steps, progress to a slightly more complex activity. Build up complexity as ability improves.

Start with activities and materials that the child finds appealing. If the child likes bright colors, incorporate these into the activity by using bright markers, paints, or manipulatives. As the child's approach to these activities becomes more organized, start to encourage this approach with classroom activities that the child finds less appealing.

A detailed plan will encourage more attention to details during the activity. If the child presents only a vague plan verbally, that's how accurate the result will be. Start by allowing less detailed plans; then encourage more detail after the child has successfully completed several activities following simple plans. Encourage detail by asking questions. ("You said that you will cut out the square. Will you cut on or next to the line?")

To assist the child in working more slowly, use a timer or stopwatch. Provide encouragement. ("You copied that shape in one second. Let's see if you can take five seconds and make it look more like this one.")

As the child follows the plan more accurately, decrease the number of times that the steps of the plan are verbally repeated. As using a plan and focusing on details becomes more automatic, the child might need to state a plan only before beginning the activity.

Reinforce this technique in the classroom by encouraging the child to repeat instructions to you before beginning an activity, to repeat the plan during the activity, and to check that the plan is being followed. Reward the child for an organized approach or accurate results. If the child has difficulty remembering the plan, have an adult—or the child—take notes as reminders of the steps to be followed.

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE  
Classroom and Home Adaptations**

**CREATING A STIMULATING LEARNING ENVIRONMENT**

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**Purpose**

To create a learning environment that helps the underaroused child to remain alert and active

**Suggestions**

The underaroused child will benefit from a higher level of stimulation than is usually found in the classroom or home environment. Multisensory input and frequent changes in stimulation will help to increase the child's level of alertness.

**Visual Stimulation**

1. Provide bright, warm colors on the walls around the child's desk and play or work area. Cabinets can be painted in bright, contrasting colors, and colorful posters can be taped on the walls. Corners of the room can be painted in different colors for different activity levels. Use yellow, orange, and red in action-oriented areas.
2. Use bright, shiny, and colorful manipulative materials for fine motor activities. Manipulatives, games, and toys that light up or move in interesting patterns are often appealing and stimulating.
3. Bright-colored chalks are more stimulating than white for chalkboard work.

**Auditory (Sound) Stimulation**

1. Play loud, fast, and irregular music before or during activity. Music can increase muscle endurance and delay fatigue during physical activity. It also increases alertness.
2. Speak to the child enthusiastically, using a high or low voice and irregular tones. Avoid rhythmic, monotone speech.
3. Occasional intense prompts (such as a loud "bang" on the table) help some children to increase their alertness and return attention to the activity.

### **Movement Stimulation**

1. Encourage movement breaks before and between desk activities or at any time the child appears lethargic. Fast, irregular, and varied movement of all muscle groups will increase alertness. Examples include:
  - Rolling, jumping, running around, or doing jumping jacks
  - Using playground equipment
  - “Roughhousing” with a sibling or parent
  - Dancing or doing movement or body awareness activities
2. Devise errands that involve physical activity when stimulation is needed. Have the child clean or erase the chalkboards, bring the attendance sheets to the office, pass out materials for the next activity, or go to the cafeteria to get the milk for the class.

### **Temperature**

Children tend to become listless in a hot room. Keep room temperature between 68 and 76 degrees for optimal alertness. Learning ability and alertness are reduced substantially for every degree above this range. If it is impossible to maintain temperature within this range, seat the child in the coolest location (by the window, door, or fan) and make sure that cool clothing is worn. Provide breaks for the child to drink cool water or to splash cold water on the face.

### **Taste and Smell**

Different kinds of tastes and smells can be stimulating. Provide a variety of taste and olfactory experiences during snack and meal time, including tart and sour tastes such as oranges, grapefruit, and lemonade.

### **Caution**

Do not use these suggestions for children who are hypertonic (have high muscle tone), hyperactive (have a high activity level), or are overly aroused.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE  
Classroom and Home Adaptations**

**CREATING A CALMING LEARNING ENVIRONMENT**

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**Purpose**

To create a calming learning environment for the child who is easily overstimulated or has a high activity level

**Suggestions**

1. Reduce sensory stimulation.
2. Modify furniture.
3. Adapt the activity schedule.
4. Teach habits.

**Reduce Sensory Stimulation**

Reduce the amount, intensity, and variety of stimuli in the child's classroom and home work area.

1. Paint walls around the child's work area in cool colors (green, blue) with little contrast.
2. Remove posters, calendars, and other visual distractions from the walls around the work space.
3. Keep chalkboard clean. Erase all nonrelevant information completely.
4. Clear the work area of all materials except those that are in use. Keep other materials out of sight in closed shelves, cupboards, or closets.
5. Create a work area that is calm and quiet.
  - Close doors and windows during work periods to prevent extraneous sounds from entering the room.
  - Seat the child as far as possible from a window or door so that stimulation from outside noise, movement, and sights will be minimized.
  - Carpets on floors and walls can significantly reduce noise level.
6. Use a study carrel to block out visual stimulation from the classroom. Cardboard shields are available commercially and can be placed around the child's work area, or classroom furniture and room dividers can be arranged to create a visually calm space.



7. Encourage the child to use the same work area consistently so the child becomes accustomed to the area and associates it with quiet activity time.
8. At home, locate the child's work area in a den, study, or other quiet room. Do not locate the work area in the bedroom, which contains many distractions and is associated with sleep or play.
9. Speak to the child in slow, even tones. Avoid unnecessary words when providing instructions or helping to calm the child for activity.
10. Children tend to be restless in a cold room. Maintain the room temperature at 68 to 76 degrees for optimal learning ability.

### **Modify Furniture**

1. If the child moves constantly and rocks the chair, attach triangular pieces of wood to the back of the chair to prevent it from rocking backward or tipping over.
2. Attach a carpet square or piece of rubber matting to the chair seat to decrease excess movement that interferes with fine motor performance.
3. Create a desk fence by attaching a 1" to 2" wooden edge to the front and sides of the desk, so the child doesn't push materials onto the floor.

### **Adapt the Activity Schedule**

1. Devise errands that involve physical activity for times when the child's energy level is high, or to be used between desk activities. Cleaning up or passing out materials for classroom activity, bringing notices to the office, and cleaning the chalkboard are examples of constructive ways to divert excess energy.
2. Movement helps some children to divert excess energy. When unable to remain calm in the classroom, the child might go outside and run back and forth between two points as many times as possible in a five-minute period, or jump up and down for a few minutes before attempting to relax and begin a desk activity.
3. Notice whether the child has difficulty with overarousal at a regular time within the daily schedule. If so, schedule a "slow-down" period at that time, during which the child takes a "movement break" or practices self-calming for a few minutes before beginning the next activity.
4. Present activities in a consistent manner, without sudden changes. When a change in schedule or instructions for an activity must occur, prepare the child and provide extra support for dealing with the transition. Make the change in small steps, if possible.

### **Teach Habits**

1. Teach the child some self-calming strategies. Some children calm themselves by using progressive relaxation, mental imagery, deep breathing, closing eyes and sitting quietly, or listening to quiet, slow, rhythmic music.
2. Teach the child to anticipate difficulty with transition periods (for example, calming self for desk work after gym class or recess) and to use self-calming strategies. After coming in from recess, the child might be allowed a short period to sit in a beanbag chair in the reading corner with eyes closed, breathing deeply.
3. Encourage the child to keep the desk clear of materials that are not being used, and to keep the desk contents organized in boxes and piles.
4. Teach the child to seek out a quiet, nonstimulating place for concentrating. Encourage the child to recognize the need for decreased stimulation and to speak up when the classroom or home environment is uncomfortably loud or distracting.

*Use of these activities should be directed by a qualified therapist.*

Child's Name \_\_\_\_\_

Date \_\_\_\_\_

**CENTRAL NERVOUS SYSTEM STATE**  
**Classroom and Home Adaptations**  
**FOCUSING ATTENTION**

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**Purpose**

To create a learning environment that helps the distractible child to focus on relevant information

**Suggestions**

1. Decrease sensory distractions in the environment.
2. Adapt activities.
3. Block out nonrelevant sensory information.
4. Improve communication.

**Decrease Sensory Distractions in the Environment**

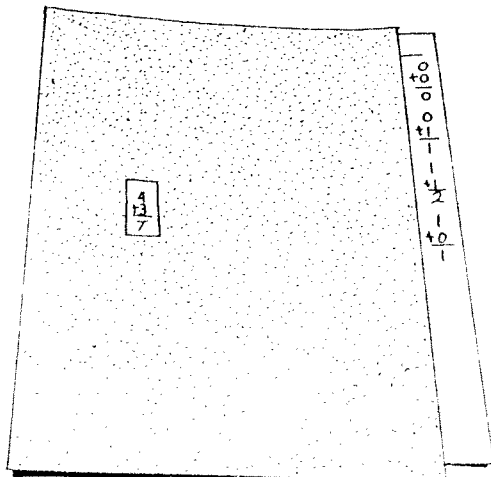
1. Remove posters, calendars, and other visual distractions from the walls around the work space.
2. Keep chalkboard clean. Erase all nonrelevant information completely.
3. Clear the work area of all materials except those which are in use. Keep other materials out of sight in closed shelves, cupboards, or closets.
4. Close doors and windows during work periods to prevent extraneous sounds from entering the room.
5. Seat the child as far as possible from a window or door so that stimulation from outside noise, movement, and sights will be minimized.
6. Carpets on floors and walls can significantly reduce noise levels.
7. Use a study carrel to block out visual stimulation from the classroom. Cardboard shields are available commercially and can be placed around the child's work area, or classroom furniture and room dividers can be arranged to create a visually calm space.
8. At home, locate the child's work area in a den, study, or other quiet room. Do not locate the work area in the bedroom, which contains many distractions and is associated with sleep or play.

**Adapt Activities**

1. Break up work periods or assignments into smaller segments so that the task of attending to the entire assignment does not appear impossible. For example, instruct the child to copy a letter five times (instead of completing an entire row of copies), then take a short break before copying it five more times. Increase the amount of work required between breaks as the child's ability to attend improves.
2. Increase intensity or attractiveness of the stimuli that you want the child to attend to.
  - Bright colors and interesting movement patterns can attract and maintain attention. For example, a child might find it easier to attend to a design-copying task when using brightly colored pipe cleaners or a Lite Brite® box with pegs that light up, rather than pencil and paper.
  - Bright-colored chalk can increase attention to the chalkboard, and bright clothing can attract attention to the teacher.
  - Outline pictures with a bright marker, to assist the child in focusing on and coloring within line boundaries.
  - Incorporate music into activities.
  - For some children, listening to a teacher reading a story or giving instructions through earphones is helpful. The voice can be magnified and other sounds blocked out.
3. Provide worksheets that are clear and visually uncluttered.

**Block Out Nonrelevant Sensory Information**

1. Encourage the child to close the eyes and focus on the feel of movement patterns or sound.
2. Block out competing sounds with earplugs, cotton, earphones, or sound masking when the child is attending to a visual or motor activity. Use recordings of the sea, wind, or white noise to mask distracting sounds in the environment. To make a white noise tape, record a TV channel that is not receiving programming.
3. Make cutout frames from cardboard or poster board. Use them to cover worksheets so that only the relevant problem, paragraph, or picture is visible. Move the frame to reveal the next item to be attended to.



**Improve Communication**

1. Seat child near the teacher. Use a cue for reminding the child to focus on the activity.
2. Avoid unnecessary words when giving directions. Use clear, specific language, and ask the child to repeat the instructions to be sure the child focused on what you said and knows what is expected.

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*Use of these activities should be directed by a qualified therapist.*