



Autism Focused Intervention  
Resources & Modules

This overview  
brief will  
support your  
use of the  
evidence-  
based practice:  
Exercise.

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## Exercise (ECE) ---EBP Brief Packet---

### Components of the EBP Brief Packet...

This evidence-based practice overview on Exercise (ECE) includes the following components:

1. **Overview:** A quick summary of salient features of the practice, including what it is, who it can be used with, what skills it has been used with, and settings for instruction.
2. **Evidence-base:** The *ECE Evidence-base* details the NPDC criteria for inclusion as an evidence-based practice and the specific studies that meet the criteria for this practice.
3. **Step-by-Step Guide:** Use the *ECE Step-by-Step Practice Guide* as an outline for how to plan for, use, and monitor ECE. Each step includes a brief description as a helpful reminder while learning the process.
4. **Implementation Checklist:** Use the *ECE Implementation Checklist* to determine if the practice is being implemented as intended.
5. **Data Collection Sheets:** Use the data collection sheets as a method to collect and analyze data to determine if progress is being made for a learner with ASD.
6. **Tip Sheet for Professionals:** Use the *ECE Tip Sheet for Professionals* as a supplemental resource to help provide basic information about the practice to professionals working with the learner with ASD.
7. **Parent Guide:** Use the *ECE Parent Guide* to help parents or family members understand basic information about the practice being used with their child.
8. **Additional Resources:** Use the *Additional Resources* to learn more about the practice.
9. **CEC Standards:** A list of *CEC Standards* that apply specifically to ECE.
10. **Module References:** A list of numerical *References* utilized for the ECE module.

### Suggested citation:

Griffin, W., & AFIRM Team. (2015). *Exercise*. Chapel Hill, NC: National Professional Development Center on Autism Spectrum Disorder, FPG Child Development Center, University of North Carolina. Retrieved from <http://afirm.fpg.unc.edu/exercise>

## What is Exercise?

Exercise usually refers to the physical activity in which we engage in order to achieve a healthier level of physical fitness. The integration of daily opportunities for physical activity for learners with ASD is important for improving their basic physical fitness.<sup>3-4</sup>

In addition to physical fitness, exercise also can be used as an intervention for learners with ASD to increase desired behaviors, such as academic engagement, time on task, correct responding, and task completion. Exercise can decrease inappropriate behaviors, such as aggression, self-injury, self-stimulatory/stereotypic behaviors, and time off task.<sup>5-8</sup>

## Evidence-base

Based upon the recent review, exercise is a new focused intervention that meets the evidence-based practice criteria with 3 single case design and 3 group design studies. The practice has been effective for preschoolers (3-5 years) to middle school learners (12-14 years) with ASD. Evidence-based practices (EBP) and studies included in the 2014 EBP report detailed how exercise can be used effectively to address: motor, behavior, school readiness, and academic outcomes.

## How is ECE Being Used?

Exercise can be used by a variety of professionals, including teachers, special educators, therapists, and paraprofessionals in educational and community-based environments. Parents and family members also can use exercise in the home.

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## ---Evidence-base for Exercise---

The National Professional Development Center on ASD has adopted the following criteria to determine if a practice is evidence-based. The EBP Report provides more information about the review process (Wong et al., 2014).

Efficacy must be established through high quality, peer-reviewed research in scientific journals using:

- randomized or quasi-experimental design studies (two high quality experimental or quasi-experimental group design studies),
- single-subject design studies (three different investigators or research groups must have conducted five high quality single subject design studies), or
- combination of evidence [one high quality randomized or quasi-experimental group design study and three high quality single subject design studies conducted by at least three different investigators or research groups (across the group and single subject design studies)].

### --OVERVIEW--

Based upon the recent review, exercise is a new focused intervention that meets the evidence-based practice criteria with 3 single case design and 3 group design studies. The practice has been effective with learners in preschool (3-5 years) to middle school learners (12-14 years). Studies included in the 2014 EBP report detailed how exercise can be used effectively to address: behavior, school readiness, academic, and motor outcomes.

In the table below, the outcomes identified by the evidence base are shown by age of participants.

Early Intervention (0-2)	Preschool (3-5)	Elementary (6-11)	Middle (12-14)	High (15-22)
No studies	Behavior	Behavior		No studies
	School-Readiness			
		Motor	Motor	
	Academic			

## Early intervention (0-2 years)

No studies

## Preschool (3-5 years)

Celiberti, D. A., Bobo, H. E., Kelly, K. S., Harris, S. L., & Handleman, J. S. (1997). The differential and temporal effects of antecedent exercise on the self-stimulatory behavior of a child with autism. *Research in Developmental Disabilities, 18*(2), 139-150. doi: 10.1016/S0891-4222(96)00032-7

Oriel, K. N., George, C. L., Peckus, R., & Semon, A. (2011). The effects of aerobic exercise on academic engagement in young children with autism spectrum disorder. *Pediatric Physical Therapy, 23*(2), 187. doi: 10.1097/PEP.0b013e318218f149

## Elementary (6-11 years)

Cannella-Malone, H. I., Tullis, C. A., & Kazee, A. R. (2011). Using antecedent exercise to decrease challenging behavior in boys with developmental disabilities and an emotional disorder. *Journal of Positive Behavior Interventions, 13*(4), 230-239. doi: 10.1177/109830071140612

\*Fragala-Pinkham, M. A., Haley, S. M., & O'Neil, M. E. (2011). Group swimming and aquatic exercise programme for children with autism spectrum disorders: A pilot study. *Developmental Neurorehabilitation, 14*(4), 230-241. doi: 10.3109/17518423.2011.575438

Nicholson, H., Kehle, T.J., Bray, M.A., & Van Heest, J. (2011). The effects of antecedent physical activity on the academic engagement of children with autism spectrum disorder. *Psychology in the Schools, 48*, 198-213. doi:10.1002/pits

\*Pan, C. Y. (2011). The efficacy of an aquatic program on physical fitness and aquatic skills in children with and without autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*(1), 657-665. doi: 10.1016/j.rasd.2010.08.001

## Middle (12-14 years)

\*Fragala-Pinkham, M. A., Haley, S. M., & O'Neil, M. E. (2011). Group swimming and aquatic exercise programme for children with autism spectrum disorders: A pilot study. *Developmental Neurorehabilitation, 14*(4), 230-241. doi: 10.3109/17518423.2011.575438

\*Pan, C. Y. (2011). The efficacy of an aquatic program on physical fitness and aquatic skills in children with and without autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*(1), 657-665. doi: 10.1016/j.rasd.2010.08.001

## High (15-22 years)

No studies

\* Research which included participants in multiple age ranges.



## Exercise (ECE) ---Step-by-Step Guide---

### BEFORE YOU START...

Each of the following points is important to address so that you can be sure the selected EBP is likely to address the learning needs of your student.

Have you found out more information about...?

- Identified the behavior...
- Collected baseline data through direct observation...
- Established a goal or outcome that clearly states when the behavior will occur, what the target skill is, and how the team will know when the skill is mastered...

If the answer to any of these is “no,” review the process of how to select an EBP.

This practice guide outlines how to plan for, use, and monitor the practice of exercise.

Keep in mind that exercise can be used to increase physical fitness or as an antecedent intervention to increase desired/appropriate behaviors and/or to decrease inappropriate behaviors.

# Now you are ready to start...

## Step 1: ECE Planning

The planning step explains initial steps and considerations involved to prepare for and develop an exercise plan for a learner.

### 1.1 Identify potential exercise activities.


To develop an exercise plan, you should first consider the potential location or locations that will be used for exercise. Next, brainstorm a list of potential exercise activities that would be appropriate to the location(s).

 *The **Sample Exercise Inventory** can assist you in thinking of possible activities*

### 1.2 Conduct individualized exercise assessment.

An individualized exercise assessment often begins with informal observation and a review of current data. Additional data should be collected as needed to determine learner skills and preferences regarding the various movement activities.

\*\*\* Please remember to consult a physical education expert, physical therapist, or even a physician when designing a plan for learners with any physical or medical health issues. \*\*\*

 *The **Sample Informal Exercise Assessment Tool** can be used to collect data about a learner's ability and level of interest in performing a skill*

### 1.3 Develop an exercise plan

Make a plan for the length and frequency of the intervention – at least one routine per day of at least 10-20 minutes, resulting in moderate to vigorous physical exertion, is recommended. Use the information obtained from the individualized assessment to inform the structure of the routine – consider learner skills, any physical limitations, stamina, and preferences. Finally, determine when the exercise routine will be implemented. Ideally, schedule the routine prior to activities/tasks in which the target behavior will more likely occur.

### 1.4 Plan for any needed supports

Determine visual supports that may be needed, such as picture cards, written descriptions, a schedule, or a timer. Consider additional structure that may be needed to make the end of the activity or activities clear. Determine whether peer or adult support is necessary and any modifications that may be needed to make the activity more appealing. Finally, make a plan for reinforcement of engagement in the exercise routine.

### 1.5 Obtain and organize all needed materials and equipment

Before beginning the routine, make sure you have all the materials and equipment you need.

## Step 2: Using ECE

This section describes the process of implementing the exercise plan that was developed – teaching, reinforcing, and fading prompts.

### 2.1 Teach the learner the exercise routine

The teaching process should be individualized for each learner based on his or her strengths and skills. In general:

- use visual cues as needed; reference the visual schedule for the routine as transitioning to each movement activity
- model each movement activity
- prompt as needed (visual, verbal, physical)

### 2.2 Reinforce learner engagement and completion of the exercise routine

Part of the teaching process involves the reinforcement of newly learned skills. Some learners are easily reinforced by simple verbal praise, while others may require different forms of rewards or a more sophisticated reinforcement system. Both learner engagement and completion of exercise activities should be reinforced.

### 2.3 Fade prompts and any tangible reinforcement as quickly as possible when criterion is met


It is important to fade any additional reinforcement as soon as the learner has learned the routine and can successfully complete the activities. Extra prompting and cuing used while teaching should also be faded as much as possible, although some visual cues might continue to be helpful to learners throughout the intervention.

## Step 3: Monitoring ECE

The following process describes how the use of exercise can be monitored and how the plan might need to be adjusted based on the data.

### 3.1 Collect data on engagement in exercise routine and target behaviors

Collect data on both the learner's participation in the exercise routine and the target behaviors of the learner. Learners may also complete a self-assessment regarding their perceived effort or level of difficulty of the routine.

 *Sample Datasheets* may be used as is or modified for use.

### 3.2 Determine next steps based on learner progress

The team will need to make a determination about effectiveness of the exercise intervention based on the data collected. If the learner is making progress, the team will need to decide whether or not to fade use of the exercise routine altogether, reduce the frequency, make further modifications, or continue with the intervention as planned.

If the team determines that the learner is not making appropriate progress, consider the following:

- Is the target skill or behavior well defined?
- Is the skill or behavior measurable and observable?
- Is the skill too difficult? Does it need to be broken down into smaller steps?
- Have we devoted enough time to using this strategy (frequency, intensity, and/or duration)?
- Was the exercise intervention implemented with fidelity?
- Are the supports developed appropriate for the learner?
  - Is the form of supports appropriate (e.g., picture, photograph, words, a combination, etc.)?
  - Is additional support/structure needed (this may include tangible support materials or even adult assistance)?
  - Does the reinforcement plan need to be adjusted (e.g., identify a novel set of rewarding items/activities, increase the frequency of reinforcement, etc.)?
- Are there changes to the exercise routine itself that might make it more appropriate/accessible for the learner? For example:
  - More/less/different activities on the schedule
  - More opportunities for learner choice

If these issues have been addressed and the learner with ASD continues to not show progress, consider selecting a different evidence-based practice to use with the learner with ASD



# Exercise (ECE) ---Implementation Checklist---

*Before you start:*

*Have you...*

- Identified the behavior?
- Collected baseline data through direct observation?
- Established a goal or outcome that clearly states **when** the behavior will occur, **what** the target skill is, and **how** the team will know when the skill is mastered.

*If the answer to any of these is "no", refer to the "Selecting EBPs" section on the website.*

	Observation	1	2	3	4
	Date				
	Observer's Initials				
<b>Step 1: Planning</b>					
1.1 Identify potential exercise activities.					
1.2 Conduct individualized exercise assessment.					
1.3 Develop an exercise plan					
1.4 Plan for any needed supports					
1.5 Obtain and organize all needed materials and equipment					
<b>Step 2: Using</b>					
2.1 Teach the learner the exercise routine					
<input type="checkbox"/> Use visual cues as needed; reference the visual schedule for the routine when transitioning to each movement activity					
<input type="checkbox"/> Model each movement activity					
<input type="checkbox"/> Prompt as needed (visual, verbal, physical)					
2.2 Reinforce learner engagement and completion of the exercise routine					
2.3 Fade prompts and any tangible reinforcement as quickly as possible when criterion is met					
<b>Step 3: Monitoring</b>					
3.1 Collect data on engagement in exercise routine and target behaviors					
3.2 Determine next steps based on learner progress					



Autism Focused Intervention Resources & Modules

## ---ECE Data Collection--- Single Movement Activity

Learner's Name: \_\_\_\_\_ Week of: \_\_\_\_\_

Observer(s): \_\_\_\_\_

Classroom/Setting: \_\_\_\_\_

Activity: \_\_\_\_\_

### Single Movement Activity:

This sheet could be completed by highlighting, circling, or shading each lap or repetition as it is completed or circling the highest number completed. The sheet is designed to provide a graphic representation of the number of laps/reps completed over time (the resulting data, if blocks are circled or highlighted, will appear similar to a bar graph).

	Monday	Tuesday	Wednesday	Thursday	Friday
Laps or Reps completed	15	15	15	15	15
	14	14	14	14	14
	13	13	13	13	13
	12	12	12	12	12
	11	11	11	11	11
	10	10	10	10	10
	9	9	9	9	9
	8	8	8	8	8
	7	7	7	7	7
	6	6	6	6	6
	5	5	5	5	5
	4	4	4	4	4
	3	3	3	3	3
	2	2	2	2	2
	1	1	1	1	1
	0	0	0	0	0

Key: VP = with Verbal Prompt; VC = with Visual Cue; PP = with Physical Prompt; I = Independently

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## ---ECE Data Collection--- Routine

Learner's Name: \_\_\_\_\_ Week of: \_\_\_\_\_

Observer(s): \_\_\_\_\_

Classroom/Setting: \_\_\_\_\_

### Exercise Routine:

This sheet could be completed with simple checks, or a coding system could be used to indicate other data of interest (e.g.: independent, physical prompt, verbal prompt, visual cue; number of repetitions completed or time duration completed, etc...).

Reps / Time Duration - Activity	Monday	Tuesday	Wednesday	Thursday	Friday

Key: VP = with Verbal Prompt; VC = with Visual Cue; PP = with Physical Prompt; I = Independently

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## ---ECE Data Collection--- Behavior Monitoring

Learner's Name: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Observer(s): \_\_\_\_\_

### Behavior Monitoring:

Consider including some notation regarding participation in the exercise routine on the datasheet. This might be simply checking a yes/no box regarding whether or not the learner engaged in the exercise routine, or something slightly more detailed, such as a likert-type scale indicating the learner's participation in the exercise routine that day or a note with the time of day the routine was completed.

	Behavior (define in measurable terms)	Antecedent (what happened just before)	Consequence/ Response (what happened afterwards)	Exercise Participation?
Date: Time: Setting:				<input type="checkbox"/> Yes <input type="checkbox"/> No Approx. time:
Date: Time: Setting:				<input type="checkbox"/> Yes <input type="checkbox"/> No Approx. time:
Date: Time: Setting:				<input type="checkbox"/> Yes <input type="checkbox"/> No Approx. time:
Date: Time: Setting:				<input type="checkbox"/> Yes <input type="checkbox"/> No Approx. time:
Date: Time: Setting:				<input type="checkbox"/> Yes <input type="checkbox"/> No Approx. time:

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## ---ECE Activity Inventory Checklist---

Learner's Name: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Observer(s): \_\_\_\_\_

Target Behavior: \_\_\_\_\_

\_\_\_\_\_

### Exercise Location:

Answer the following questions to guide selection of exercise activities.

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| Will the student be inside, outside, or both?                                  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| If outside, are there alternative options when there is poor weather?          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Will the student be going to a gym?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Will the student go to a nearby location, such as the hallway or another room? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Will the student stay in the classroom?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

### Exercise Activity Inventory Checklist:

Review the list of potential activities and options for how those activities might be implemented. Indicate whether or not you may be able to use each activity by checking "Yes" or "No." Notes about specific options/considerations/etc. can also be included here.

Exercise Activity	Options Description/	Yes	No	Notes
Running	Run a specified distance, for a specified time, or a specific number of laps; run a relay-style race; sprints, shuttle-run (sprints while collecting and depositing an item/items from one end to the other)	<input type="checkbox"/>	<input type="checkbox"/>	
Jogging	Same as running but less strenuous	<input type="checkbox"/>	<input type="checkbox"/>	
Wall pushups	Standing "pushups" – pressing on wall and pushing off	<input type="checkbox"/>	<input type="checkbox"/>	
Riding a scooter	Riding a specified distance, for a specified time, or a specific number of laps	<input type="checkbox"/>	<input type="checkbox"/>	

Exercise Activity	Description/Options	Yes	No	Notes
Jumping Rope	Jump turning own rope or jumping a rope others are turning; Basic jumping or jumping with tricks/kicks/etc.; jump ropes can also be used to create structure for other movement activities, such as laying rope on the ground and jumping back and forth over the rope(s)	<input type="checkbox"/>	<input type="checkbox"/>	
Riding a bike	Riding a specified distance, for a specified time, or a specific number of laps	<input type="checkbox"/>	<input type="checkbox"/>	
Jumping Jacks	Jumping a specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Trampoline	Jumping a specific number of times or for a specific duration of time; simple jumping or jumping with tricks/kicks/etc.	<input type="checkbox"/>	<input type="checkbox"/>	
Pushups	A specific number of times or for a specific duration of time; full pushups or pushups on knees	<input type="checkbox"/>	<input type="checkbox"/>	
Sit-ups	A specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Crab Walking	Moving a specified distance, for a specified time, or a specific number of laps	<input type="checkbox"/>	<input type="checkbox"/>	
Lunges	A specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Stairs	Moving up and down a step or set of stairs	<input type="checkbox"/>	<input type="checkbox"/>	
Chair raises	Raise self by the arms while seated in a chair	<input type="checkbox"/>	<input type="checkbox"/>	
Swimming	Swimming laps, other swimming activities (swimming aerobics)	<input type="checkbox"/>	<input type="checkbox"/>	

Exercise Activity	Description/Options	Yes	No	Notes
Toe Raises	A specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Leg Scissors	A specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Leg kicks	A specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Arm Curls w/weights or resistance bands	A specific number of times or for a specific duration of time	<input type="checkbox"/>	<input type="checkbox"/>	
Yoga poses	Hold static poses or complete a series of poses moving fluidly throughout; may be part of warm-up or cool-down aspect of routine	<input type="checkbox"/>	<input type="checkbox"/>	
Hula Hoop	Can hula-hoop for a specific number of times or for a specific duration of time; can also use hula hoops on the ground to create structure for other movement, such as jumping in and out of a hoop(s)	<input type="checkbox"/>	<input type="checkbox"/>	
Sports-related activities: tennis, ping pong, volleyball, kickball, basketball, etc.	Consider the level of exertion involved – keeping a fairly high level of exertion is best, so a sport where the learner sits/waits/is static for a while would not be ideal for an exercise routine. Instead, modified versions/aspects of a sport activity could be considered, such as shooting baskets alone, passing or kicking a ball back and forth, running while dribbling a ball with hands or feet, volleying/hitting a ball back and forth outside of the context of a game, etc.	<input type="checkbox"/>	<input type="checkbox"/>	

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## ---ECE Activity & Movement Checklist---

Learner's Name: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Observer(s): \_\_\_\_\_

Target Behavior: \_\_\_\_\_

\_\_\_\_\_

### Exercise Activity and Movement Checklist (Basic):

Indicate the learner's ability to perform skills with a ✓, followed by the code for the level of support needed (see the key below the checklist). Also, place a ✓ to indicate the learner's level of interest.

Basic Motor Skills	Ability to Perform Skill			Observed Interest in Performing Skill		
	Never	Sometimes	Always	No Interest	Some Interest	High Interest
Imitates basic motor movements/ activities						
Throws						
Catches						
Runs						
Jumps						
Crawls						
Other: _____.						
Other: _____.						
Other: _____.						

Key: VP = with Verbal Prompt; VC = with Visual Cue; PP = with Physical Prompt; I = Independently



**Exercise Activity and Movement Checklist (Specific):**

Indicate the learner’s ability to perform skills with a ✓, followed by the code for the level of support needed (see the key below the checklist). Also, place a ✓ to indicate the learner’s level of interest.

Specific Activities	Ability to Perform Skill			Observed Interest in Performing Skill		
	Never	Sometimes	Always	No Interest	Some Interest	High Interest
<b>Running</b> Duration: _____.						
<b>Jumping jacks</b> Total: _____.						
<b>Jumping rope</b> Duration: _____.						
<b>Jumping on trampoline</b> Duration: _____.						
<b>Other:</b> _____. Duration: _____.						
<b>Other:</b> _____. Total: _____.						

Key: VP = with Verbal Prompt; VC = with Visual Cue; PP = with Physical Prompt; I = Independently

**Additional Considerations:**

Are there safety concerns for learner? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

List potential distractions for the learner: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Does the learner have access to appropriate clothing/shoes? \_\_\_\_\_  
 Does the learner hydrate effectively? \_\_\_\_\_

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# Exercise (ECE) ---Tip Sheet for Professionals---

## Exercise ECE

### Exercise is ...

- the physical activity in which we engage in order to achieve a healthier level of physical fitness
- a potential antecedent intervention for learners with ASD to increase desired behaviors and decrease inappropriate behaviors

### Why Use?

- Learners with ASD often have lower levels of physical activity than their typically developing peers; exercise can improve physical fitness and may also create opportunities for interactions with peers
- Exercise has been used successfully as an antecedent intervention to increase desired behaviors such as academic engagement, time on task, correct responding, and task completion
- Exercise has also been used as an antecedent intervention to decrease inappropriate behaviors such as aggression, self-injury, self-stimulatory/stereotypic behaviors, and time off task

### Outcomes

- The evidence-base for ECE supports the use of this practice to address the outcomes below:

Early Intervention (0-2)	Preschool (3-5)	Elementary (6-11)	Middle (12-14)	High (15-22)
No studies	Behavior	Behavior		No studies
	School-Readiness			
		Motor	Motor	
	Academic			



## TIPS:

- Create an exercise plan that is based on assessment data and incorporates learner interests.
- When used as an antecedent intervention, try to design an exercise plan that is at least 10-20 minutes in duration, results in moderate to vigorous physical exertion, and is implemented shortly before the target behavior is most likely to occur.
- Remember to consult a physical education expert or even a physician when designing a plan for learners with any physical or medical health issues.



# Exercise (ECE) ---Tip Sheet for Professionals---

## STEPS FOR IMPLEMENTING

### 1. Plan

- Identify potential exercise activities.
- Conduct individualized exercise assessment.
- Develop an exercise plan
- Plan for any needed supports
- Obtain and organize all needed materials and equipment

### 2. Use

- Teach the learner the exercise routine
  - use visual cues as needed; reference the visual schedule for the routine as transitioning to each movement activity
  - model each movement activity
  - prompt as needed (visual, verbal, physical)
- Reinforce learner engagement and completion of the exercise routine
- Fade prompts and any tangible reinforcement as quickly as possible when criterion is met

### 3. Monitor

- Collect data on engagement in exercise routine and target behaviors
- Determine next steps based on learner progress

## Exercise ECE

This tip sheet was designed as a supplemental resource to help provide basic information about the practice.

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[www.afirm.fpg.unc.edu](http://www.afirm.fpg.unc.edu)



## Exercise (ECE) ---Parent's Guide---



This parent introduction to ECE was designed as a supplemental resource to help answer basic questions about this practice.

To find out more about how ECE is used with your child, speak with:

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**For more information visit:**  
[www.afirm.fpg.unc.edu](http://www.afirm.fpg.unc.edu)

This introduction provides basic information about exercise.

### What is ECE?

- Exercise is the physical activity in which we engage in order to achieve a healthier level of physical fitness.
- Exercise can be used as an intervention for learners with ASD to increase desired behaviors and decrease inappropriate behaviors.

### Why use ECE with my child?

- Learners with ASD often have lower levels of physical activity than their peers; exercise can improve physical fitness and may also create opportunities for interactions with peers.
- Exercise has been used successfully as an intervention to increase desired behaviors such as being engaged in academic work, staying on task, responding correctly, and completing tasks.
- Exercise has also been used as an intervention to decrease inappropriate behaviors such as aggression, self-injury, self-stimulatory/stereotypic behaviors, and being off task.

### What activities can I do at home?

- Notice what kinds of exercise or movement activities your child seems interested in and try to schedule time for practicing that activity or skill.
- Find opportunities to teach, practice, and encourage engagement in new exercise or movement activities when possible; this might include riding a bike, jumping rope, doing stretches, throwing a ball, participating in a sport, or doing yoga.
  - These may be individual or group activities – with a peer group or just with your family.
  - This may include opportunities in the community for your child to engage in exercise activities with structure and support.
- Consider planning exercise activities in your schedule at home prior to times that are sometimes challenging for your child; for example, have your child engage in an exercise activity before completing homework or household chores.



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Check out  
these  
resources to  
support your  
use of  
exercise.

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information visit:**  
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## ---Additional Resources---

### Articles:

Verstrat, A. & Hedges, S. (2015). *Exercise for Adolescents with ASD* (Autism at-a-Glance Brief). Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, CSESA Development Team.  
Retrieved from:  
<http://csesa.fpg.unc.edu/sites/csesa.fpg.unc.edu/files/Exercise%20for%20Adolescents%20with%20ASD.pdf>

### Apps:



*Cardio - Heart Rate Monitor + 7 Minute Workout Exercise Routine for Cardio Health and Fitness* by Cardio, Inc. (Free)



*Daily Workouts FREE – Personal Trainer for a Quick Home Workout and Exercise Fitness Routines* by Daily Workout Apps, LLC  
(Free/\$3.99)



*Fitocracy - Workout Exercise Log and personal fitness coach for weight loss* by Fitocracy, Inc. (Free)



*Full Fitness: Exercise Workout Trainer* by Mehrdad Mehrain (\$2.99)



*Gorilla Workout: Fitness Aerobic Strength and Exercise Trainer Program on a Budget* by Heckr LLC (\$13.99)

## Apps:



*JEFIT Workout – Free personal exercise trainer and Gym log* by Jefit Inc. (Free)



*Sworakit Kids* by Nexercise (Free)

## Books:

Geslak, D. S. (2014). *The autism fitness handbook: An exercise program to boost body image, motor skills, posture and confidence in children and teens with autism spectrum disorder*. Philadelphia, PA: Jessica Kingsley Publishing.

Gray, S. M. (2011). *101 Games and activities for youth with autism*. Monterey, CA: Healthy Learning.

Hardy, S. T. (2015). *Asanas for autism and special needs: Yoga to help children with their emotions, self-regulation, and body awareness*. Philadelphia, PA: Jessica Kingsley Publishing.

Jacobs, D. S. (2012). *Everyday activities to help your child with autism live life to the full: Simple exercises to boost functional skills, sensory processing, coordination, and self-care*. Philadelphia, PA: Jessica Kingsley Publishing.

## Websites:

IDEA Health & Fitness. (2015). *Fitness programs for kids and teens*. Retrieved on December 17, 2015 from: <http://www.ideafit.com/kids-fitness/fitness-programs-for-kids-and-teens>

NCHPAD. (2015). *Autism and exercise*. Retrieved on December 17, 2015 from: <http://www.nchpad.org/1399/6254/Autism~and~Exercise>

Walters, J. (n.d.). *Over 110 cardio workout ideas: Limitless options for aerobic exercise* Retrieved on December 17, 2015 from: [http://www.sparkpeople.com/resource/fitness\\_articles.asp?id=1596](http://www.sparkpeople.com/resource/fitness_articles.asp?id=1596)





Autism Focused Intervention  
Resources & Modules

## Exercise CEC Standards

The CEC Standards that apply to all 27 evidence-based practices can be found on our website at: <http://afirm.fpg.unc.edu/learn-afirm>

Below are CEC Standards that apply specifically to Exercise (ECE) module.

Standard	Description
<b>Initial Preparation Standard 1: Learner Development and Individual Learning Differences</b>	
ISCI 1 K1	Typical and atypical human growth and development
ISCI 1 K10	Effects an exceptional condition(s) can have on an individual's life
DDA1 K3	Co-existing conditions and ranges that exist at a higher rate than in the general population
<b>Initial Preparation Standard 2: Learning Environments</b>	
ISCI 2 S10	Use effective and varied behavior management strategies
<b>Initial Preparation Standard 4: Assessment</b>	
DDA4 S1	Select, adapt and use assessment tools and methods to accommodate the abilities and needs of individuals with developmental disabilities/autism spectrum disorders
DDA4 S2	Develop strategies for monitoring and analyzing challenging behavior and its communicative intent
<b>Initial Preparation Standard 5: Instructional Planning &amp; Strategies</b>	
ISCI 5 S17	Use procedures to increase the individual's self-awareness, self-management, self-control, self-reliance, and self-esteem
DDA5 S13	Plan instruction for independent functional life skills and adaptive behavior

Standard	Description
<b>Advanced Preparation Standard 3: Programs, Services, and Outcomes</b>	
SEDAS3.K3	Modify the verbal and non-verbal communication and instructional behavior in accord with the needs of individuals with developmental disabilities/autism spectrum disorder
SEDAS3.S8	Provide varied instruction and opportunity to learn play and leisure skills
SEDAS3.S11	Identify evidence based strategies to increase self-awareness, and ability to self-regulate

**For more  
information visit:  
[www.afirm.fpg.unc.edu](http://www.afirm.fpg.unc.edu)**

## ---Module References---

1. Council on Sports Medicine and Fitness, & Council on School Health (2006). Active healthy living: Prevention of childhood obesity through increased physical activity. *American Academy of Pediatrics*, 117, 1834-1842. doi:10.1542/peds.2006-0472
2. Pan, C., & Frey, G. C. (2006). Physical activity patterns in youth with autism spectrum disorders. *Journal of Developmental Disorders*, 36(5), 597-606. doi: 10.1007/s10803-006-0101-6
3. Fragela-Pinkham, M. A., Haley, S. M. & O'Neil, M. E. (2011). Group swimming and aquatic exercise programme for children with autism spectrum disorders: A pilot study. *Developmental Neurorehabilitation*, 14(4), 230-241. doi: 10.3109/17518423.2011.575438
4. Pan, C. (2011). The efficacy of an aquatic program on physical fitness and aquatic skills in children with and without autism spectrum disorders. *Research in Autism Spectrum Disorders*, 5(1), 657-665. doi: 10.1016/j.rasd.2010.08.001
5. Canella-Malone, H. I., Tullis, C. A., & Kazee, A. R. (2011). Using antecedent exercise to decrease challenging behavior in boys with developmental disabilities and an emotional disorder. *Journal of Positive Behavior Interventions*, 13(4), 230-239. doi: 10.1177/1098300711406122
6. Celiberti, D. A., Bobo, H. E., Kelly, K. S., Harris, S. L., & Handleman, J. S. (1997). The differential and temporal effects of antecedent exercise on the self-stimulatory behavior of a child with autism. *Research in Developmental Disabilities*, 18(2), 139-150.
7. Nicholson, H., Kehle, T. J., Bray, M. A., & Heest, J. V. (2010). The effects of antecedent physical activity on the academic engagement of children with autism spectrum disorder. *Psychology in the Schools*, 48(2), 198-213. doi: 10.1002/pits.20537
8. Oriel, K. N., George, C. L., Peckus, R., & Semon, A. (2011). The effect of aerobic exercise on academic engagement in young children with autism spectrum disorder. *Pediatric Physical Therapy*, 23(2), 187-193. doi: 10.1097/PEP.0b013e318218f149
9. Elliot, R. O., Dobbin, A. R., Rose, G. D., & Soper, H. V. (1994). Vigorous, aerobic exercise versus general motor training activities: Effects on maladaptive and stereotypic behaviors of adults with both autism and mental retardation. *Journal of Autism and Developmental Disabilities*, 24, 565-576.
10. Kern, L., Koegel, R. L., & Dunlap, G. (1984). The influence of vigorous versus mild exertion on autistic stereotyped behaviors. *Journal of Autism and Developmental Disorders*, 14(1), 57-67.



11. Levinson, L.J. & Reid, G. (1993). The effects of exercise intensity on the stereotypic behaviors of individuals with autism. *Adapted Physical Activity Quarterly*, 10, 255-268.
12. Barrow, W. J., Jaworski, M., & Accardo, P. J. (2011). Persistent toe walking in autism. *Journal of Child Neurology*, 26(5), 619-621. doi: 10.1177/0883073810385344
13. Esposito, G., & Venuti, P. (2008). Analysis of toddlers' gait after six months of independent walking to identify autism: A preliminary study. *Perceptual and Motor Skills*, 106(1), 259-269. doi: 10.2466/pms.106.1.259-269
14. Jansiewicz, E. M., Goldberg, M. C., Newschaffer, C. J., Denckla, M. B., Landa, R., & Mostofsky, S.H. (2006). Motor signs distinguish children with high functioning autism and Asperger's syndrome from controls. *Journal of Autism and Developmental Disorders*, 36, 613-621. doi: 10.1007/s10803-006-0109-y
15. Longuet, S., Ferrel-Chapus, C., Oreve, M. J., Chamot, J. M., & Vernazza-Martin, S. (2012). Emotion, intent and voluntary movement in children with autism. An example: The goal directed locomotion. *Journal of Autism and Developmental Disorders*, 42(7), 1446-1458. doi:10.1007/s10803-011-1383-x
16. Ming, X., Brimacombe, M., & Wagner, G. (2007). Prevalence of motor impairment in autism spectrum disorders. *Brain and Development*, 29, 564-570. doi: 10.1016/j.braindev.2007.03.002
17. Minshew, N. J., Sung, K., Jones, B. L., & Furman, J. M. (2004). Underdevelopment of the postural control system in autism. *Neurology*, 63, 2056-2061. doi: 10.1212/01.WNL.0000145771.98657.62
18. U. S. Department of Health and Human Services. (2008). Physical activity guidelines for Americans. Washington, DC: U.S. Department of Health and Human Services
19. Fox, L. C. (2014). Physical activity and adolescent girls with ASD: Effects of an individualized exercise program on cognitive, social, and physical-health indicators. (Doctoral dissertation). University of North Carolina at Chapel Hill, Chapel Hill, NC. Retrieved from: <https://cdr.lib.unc.edu/indexablecontent/uuid:38f63ab4-b106-43f6-8639-2c...>
20. Phillips, K.L., Schieve, L.A., Visser, S., Boulet, S., Sharma, A.J., Kogan, M., ... Yeargin-Allsop, M. (2014). Prevalence and impact of unhealthy weight in a national sample of US adolescents with autism and other learning and behavioral disabilities. *Maternal and Child Health Journal*, 18(8). 1964-1975. doi: 10.1007/s10995-014-1442-y
21. Wong, C., Odom, S. L., Hume, K. Cox, A. W., Fettig, A., Kucharczyk, S., Schultz, T. R. (2014). Evidence-based practices for children, youth, and young adults with autism spectrum disorder. Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence-Based Practice Review Group. <http://autismpdc.fpg.unc.edu/sites/autismpdc.fpg.unc.edu/files/imce/documents/2014-EBP-Report.pdf>