**Locomotion**

**Designer Tips:**
- Does the design encourage maintaining balance during simple movements?
- Can the design evaluate the quality of movements such as running in place or jumping?
- Can the design help children practise balance and agility through simple activities?

**Reading**

**Designer Tips:**
- Does text in the design use the simplest language possible?
- Does the design include audio to help children sound words out?
- Can the design recognize and reward successfully reading simple words and sentences?
Passing a ball while playing basketball requires maintaining balance to make an accurate pass and passing the ball with enough force to reach the other player.

Children can practice this by swimming laps, playing basketball, and rollerblading.

Hopping requires simple leg movements while maintaining balance.

Children can practice this by hopping, running, and rolling.

Sounding out new words with a caregiver’s guidance requires recognizing letters and their sounds and combining these sounds together.

Children can practice this by looking at picture books, sounding out new words, and reading simple sentences with a caregiver.

A balance beam routine in gymnastics may involve performing a sequence of flips, cartwheels, and jumps.
**Reading**

**Designer Tips:**
- Does text in the design make use of multi-syllable words or compound sentences?
- Can the design help children practise figuring out the meanings of uncommon words?
- Can the design recognize and reward making sense of new words and sentences?

**Instructions**

**Designer Tips:**
- Are instructions broken up into simple steps?
- Does the design provide repeatable access to the instructions?
- Does the design confirm successful completion of each step?
- Does the design provide additional support when a child does not follow an instruction correctly?
Reading
Children in this age group are practising reading complex words, sentences, and paragraphs.

Children can practise this by reading novels, blogs, play scripts, and textbooks.
Reading a script requires understanding complex words and sentences while making sense of a variety of paragraph forms.

Instructions
Children in this age group are practising following a sequence of instructions to complete a task on their own.

Children can practise this by getting ready for school, following a simple recipe, and building simple models.
Baking cookies involves following a simple set of instructions such as measuring ingredients, putting them in a bowl, and mixing them.

Children in this age group are practising reading multi-syllable words and compound sentences.

Children can practise this by reading comic books, short novels, and poems.
Reading a short novel may require making sense of new words and compound sentences in order to understand simple paragraphs.

Children in this age group are practicing following simple step-by-step instructions with the help of a caregiver.

Children can practise this by playing simple board games, tying their shoes, and playing connect-the-dots.
Tying shoes with adult supervision involves a child following simple instructions that must be completed in order, one step at a time.
### Problem Solving

**Designer Tips:**
- Does the design provide multiple ways for a child to solve a problem?
- Can the design provide different levels of detail to help a child solve a problem?
- Can the design help a child evaluate different problem-solving approaches?

### Problem Solving

**Designer Tips:**
- Does the design help a child develop independent learning skills?
- Can the design encourage a child to try many different approaches to solve a problem?
- Can the design help a child pick the best solution from potential solutions they've generated?

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### Instructions

**Designer Tips:**
- Can instructions be carried out in different orders?
- Does the design require a child to decide the order in which instructions are completed?
- Can the design help a child understand the outcomes of prioritizing certain instructions over others?

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### Problem Solving

**Designer Tips:**
- Does the design demonstrate a problem-solving process for the child to follow?
- Can the design encourage a child to try different approaches to solving a problem?
- Can the design recognize when a child is struggling to solve a problem?
A child can use their counting skills to solve addition and subtraction problems with the help of blocks.

Children can practise this by completing simple puzzles, solving math problems with physical objects, and answering simple riddles.

A child can use their counting skills to solve addition and subtraction problems with the help of blocks.

**Problem Solving**

Children in this age group are independently practising understanding, evaluating, and solving problems.

Children can practise this by planning a sleepover party, completing a science fair project, and fixing a bicycle.

Completing a science fair project requires a child to choose a topic they are interested in, find information about that topic, and build a demonstration that illustrates the topic.

**Problem Solving**

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ATTENTION

**Designer Tips:**
- Does the design support easy switching between related tasks?
- Does the design encourage a child to practise individual tasks separately before practising them together?
- Can the design recognize when a child is having difficulty managing two tasks?

**Designer Tips:**
- Does the design present a child with only one task to focus on at a time?
- Can the design help a child recognize when they are close to completing a task?
- Can the design help a child practise improving their ability to pay attention?

**Designer Tips:**
- Does the design encourage prioritization between different tasks?
- Can the design help a child recognize when a task requires more or less attention?
- Can the design help a child understand how to successfully manage their attention to meet their own goals?

**Designer Tips:**
- Does the design encourage children to express their emotions?
- Does the design communicate basic rather than complex emotions?
- Can the design convey emotion in obvious (e.g. through characters) or subtle ways (e.g. through instructions)?
**Attention**

Children in this age group are practising focusing on a few closely-related tasks at the same time.

Children can practise this by performing a dance routine, riding a bike, and playing dodgeball.

Playing dodgeball requires a child to pay attention to incoming balls while throwing balls at other players.

**Physical Expression**

Children in this age group are practising expressing how they feel.

Children can practise this by storytelling, drawing pictures, and spontaneous dancing.

Drawing pictures allows a child to express their feelings through the colours, shapes, and characters that they draw.

**Attention**

Children in this age group are practising focusing on doing one task at a time.

Children can practise this by listening to a teacher, memorizing their phone number, and getting ready for bed.

Getting ready for bed requires a child to focus on several tasks one by one, such as brushing their teeth, washing their face, and brushing their hair.

**Physical Expression**

Children in this age group are practising expressing how they feel.

Children can practise this by watching over younger siblings, walking the dog with a friend, and chatting online while doing math homework.

Watching over young children may require giving more attention to a younger child while also monitoring the actions of an older child.
**Emotional Expression**

*Designer Tips:*
- Does the design encourage sharing emotions with friends and family?
- Does the design communicate emotions following accepted social conventions?
- Does the design recognize and respond when a child breaks social convention (e.g. detecting swearing in chat rooms)?

**Understanding & Empathy**

*Designer Tips:*
- Do characters, stories, or instructions in the design express age-appropriate emotions?
- Does the design encourage a child to recognize and express their feelings?
- Does the design help a child to recognize other people’s feelings?

*Designer Tips:*
- Does the design encourage a child to use different skills to express their emotions?
- Does the design encourage a child to reflect on their emotions?
- Does the design support sharing expressed emotions with others appropriately?

*Designer Tips:*
- Does the design help a child interpret subtle emotional cues?
- Does the design help a child make sense of conflicting cues?
- Can the design suggest different ways of making sense of conflicting emotional cues?
Writing in a diary encourages a child to reflect on their thoughts and feelings and express them using an intimate and reflective voice.

Children can practice this by playing instruments, creating and exhibiting art, and writing in diaries.

Writing in a diary encourages a child to reflect on their thoughts and feelings and express them using an intimate and reflective voice.

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Children in this age group are practicing using skills from other parts of their lives to help express their emotions.

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- Writing in a diary encourages a child to reflect on their thoughts and feelings and express them using an intimate and reflective voice.

---

**Emotional Expression**

Children in this age group are practicing expressing emotions according to social convention.

Children can practice this by acting in a play, sharing feelings with friends, and having emotional discussions in class.

Acting in a play encourages a child to understand the emotions of their character and act out these emotions so that others can understand them.

- Children can practice this by acting in a play, sharing feelings with friends, and having emotional discussions in class.
- Acting in a play encourages a child to understand the emotions of their character and act out these emotions so that others can understand them.

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**Understanding & Empathy**

Children in this age group are practicing interpreting other's feelings and are starting to make sense of non-verbal or conflicting emotional cues.

Children can practice this by demonstrating sportsmanship, comforting a friend who looks lonely, and avoiding an upset caregiver.

Comforting a friend who looks lonely requires a child to recognize subtle signs of loneliness in their friend's behavior, facial expression, and body language.

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---

**Understanding & Empathy**

Children in this age group are interpreting their own feelings and are becoming aware of other people's feelings.

Children can practice this by playing house, sharing toys with friends, and talking about characters in a story.

Playing house with other children encourages a child to practise expressing their own feelings and recognize other children's feelings.

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- Playing house with other children encourages a child to practise expressing their own feelings and recognize other children's feelings.
### Designer Tips:
- Does using the design involve a single whole body movement?
- Can the design react to movements such as skipping, dance steps or throwing?
- Does using the design encourage perfecting a complex, single movement through practice?
Passing a ball while playing soccer requires maintaining balance to make an accurate pass and avoid falling over.

Children can practise this by swimming laps, playing baseball, and playing soccer. Passing a ball while playing soccer requires maintaining balance to make an accurate pass and avoid falling over.

**LOCOMOTION**

Children in this age group are practising complex movements requiring balance and agility.

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Children can practise this by swimming laps, playing baseball, and playing soccer. Passing a ball while playing soccer requires maintaining balance to make an accurate pass and avoid falling over.
**Emotional Regulation**

- Does the design help a child identify strong emotions that they are feeling?
- Can the design help a child learn to express strong emotions appropriately?
- Can the design help a child practise strategies for coping with strong emotions?

**Designer Tips:**

- Does the design encourage a child to empathize with another person's feelings?
- Does the design help a child learn to negotiate and compromise?
- Can the design highlight the benefits of empathizing and compromising with others?

**Emotional Regulation**

- Does the design help a child recognize that different social situations may require different types of emotional expression?
- Can the design show different ways of managing emotions in a variety of social situations?
- Can the design help a child understand why different types of emotional expression are useful in different social situations?

**Designer Tips:**

- Does the design help a child recognize situations where others are not managing their emotions appropriately?
- Can the design suggest strategies for responding to inappropriate emotional expressions?
- Can the design help a child recognize their authentic feelings in an emotionally charged situation?
Naming a strong emotion requires a child to identify what they are feeling and encourages them to think about why they are feeling that emotion.

Children can practise this by naming a strong emotion they are feeling, taking deep breaths when they are upset, and waiting to play with a favourite toy.

Naming a strong emotion requires a child to identify what they are feeling and encourages them to think about why they are feeling that emotion.

Children in this age group are practising coping with strong emotions.

Children can practise this by deciding which movie to watch at a party, teaching a board game to younger siblings, and sharing a favourite present with a group of friends.

Deciding which movie to watch at a party requires each child to negotiate with their friends and compromise from a list of their favourite movies.

Children in this age group are practising making decisions based on their emotions while accounting for the emotions of others.

Children are practising this by talking to a close friend about things that make them upset at home, keeping calm during a debate exercise at school, and practising good sportsmanship during competitions.

Practising good sportsmanship during a competition requires a child to appropriately handle their emotional response to upsetting comments and behaviours from coaches, parents, team mates, and opponents.

Children in this age group are practising managing strong emotions during group activities.

Children are practicing this by learning appropriate classroom manners, controlling an outburst at a birthday party, and waiting patiently for food at a restaurant.

When a child is not given the attention they want in class, they are expected to manage their frustration differently than they may at home.
**GROSS MANIPULATION**

Does the design encourage practising simple actions that involve a major muscle group?

Does the design clearly demonstrate simple actions for a child to follow?

Can the design recognize mistakes in simple actions and encourage correct form?

**Designer Tips:**

- Does the design emphasize achieving the same goal through a variety of coordinated movements?
- Can the design help a child increase their accuracy when carrying out coordinated movements?
- Can the design help a child understand how practising basic movements can improve their performance in coordinated movements?

**GROSS MANIPULATION**

Does the design help a child coordinate multiple movements to complete an action?

Does the design help a child practise coordinated movements without injuring themselves?

Can the design demonstrate how different movements combine to carry out a coordinated action?

**Designer Tips:**

- Does the design afford easy grasping, holding, and moving by smaller hands?
- Does the design encourage using fine motor skills instead of large muscle groups?
- Can the design encourage a child to explore a range of precise movements?

**FINE MANIPULATION**

Does the design help a child increase their accuracy when carrying out coordinated movements?

Does the design help a child understand how practising basic movements can improve their performance in coordinated movements?

**Designer Tips:**

- Does the design help a child coordinate multiple movements to complete an action?
- Does the design help a child practise coordinated movements without injuring themselves?
- Can the design demonstrate how different movements combine to carry out a coordinated action?
**Gross Manipulation**

Children in this age group are practising activities that involve coordinated movement of large muscle groups.

Children can practise this by jumping on a pogo stick, horseback riding, and rollerblading.

Rollerblading requires a child to coordinate multiple muscle groups in their arms, legs, and torso.

---

**Fine Manipulation**

Children in this age group are practising manipulating objects that require basic coordination of small muscles.

Children can practise this by stacking wooden blocks, shaping modeling clay, and drawing patterns using a pencil.

Stacking wooden blocks requires a child to coordinate their fingers and thumbs in order to pick up and place blocks.

---

**Gross Manipulation**

Children in this age group are practising activities that involve moving large muscle groups.

Children can practise this by kicking a ball, throwing and catching, and playing hopscotch.

Kicking a soccer ball requires a child to use their leg muscles to aim at the ball and hit it with force.

---

**Gross Manipulation**

Children in this age group are practising activities that require accurate repeated coordination of large muscle groups.

Children can practise this by hitting a pitched ball, taking shots on goal with a hockey stick, and shooting a target with a dart gun.

Shooting the puck at the goal during hockey practise requires a child to coordinate their upper and lower body while skating.
**FINE MANIPULATION**

*Designer Tips:*
- Does the design encourage a child to develop several fine movements in coordinated way?
- Can the design show a child the steps involved in completing a complex fine-motor movement?
- Can the design help a child understand subtle differences in complex fine-motor movements?

**SELF-ESTEEM**

*Designer Tips:*
- Does the design have a series of single activities that a child can complete successfully?
- Can the design help a child recognize that they have done a good job?
- Can the design help a child recognize when they have improved a skill?
## Fine Manipulation

**Children in this age group are practicing manipulating small and intricate objects that require a variety of complex small-muscle movements.**

Children can practise this by doing embroidery, building detailed models, and putting on make-up.

Building a model requires a child to precisely manipulate model parts and construction tools to paint, sand, and glue small kit pieces.

Children can use this skill by:
- Sewing buttons
- Shooting marbles
- Stringing beads

### Fine Manipulation for Different Ages

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## Self-Esteem

**Children in this age group build up confidence by practising favourite activities that require several skills to complete.**

Children can practise this by developing the sets of skills involved in activities such as playing the piano, drawing, or playing baseball.

Becoming a better baseball player requires a child to develop skills such as throwing a ball, batting, and running.

### Self-Esteem for Different Ages

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**SELF-ESTEEM**

Does the design encourage a child to use skills they have already developed to complete a new task?

Can the design help a child recognize how certain skills can transfer to a variety of different activities?

Can the design help a child recognize new activities they could participate in with existing skills?

**Perspective Taking**

Does the design provide opportunities for a child to be introduced to new points of view?

Can the design help a child imagine an event from another point of view?

Can the design recognize when a child changes their actions in consideration of another's point of view?

**Designer Tips:**
- Does the design present new points of view in simple terms?
- Does the design make sense without requiring a child to understand a new point of view?
- Can the design help a child to imagine an event from another person's point of view?
Playing charades requires a child to act out clues for words that will make sense from another person's point of view. Children can develop this by telling stories with puppets, playing hide and seek, and playing charades.

Planning a family camping trip involves balancing the different needs and preferences of parents, siblings, and friends. Children can practise this by solving arguments between friends, listening to coaches and parents at a baseball game, and planning a family camping trip.

Children in this age group are starting to be aware that other people have their own point of view. Children can develop this by telling stories with puppets, playing hide and seek, and playing charades.

Choosing a present for a friend involves considering the friend's interests rather than the buyer's preferences. Children can practising this by negotiating game rules, choosing a present for a friend, and practising magic tricks.

Facilitating group projects, leading a sports team, and participating in public speaking all help a child develop communication and problem-solving skills. Children can practise this by facilitating group projects, leading a sports team, and participating in public speaking.

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FRIENDSHIPS

Does the design provide a shared focus that encourages children to collaborate?
Does the design reward or require cooperative interaction rather than individual interaction?
Can the design provide opportunities for trust-building between children?

Designer Tips:
- Does the design allow multiple children to interact with it in turns?
- Does the design provide strategies to help the child to understand how long a turn is?
- Can the design help a child understand the benefits of cooperation and sharing?

FRIENDSHIPS

Does the design support long-term collaboration between children?
Does the design require children to take on different roles to achieve a common goal?
Can the design encourage constructive criticism among children who are working together?

Designer Tips:
- Does the design provide a shared focus that encourages children to collaborate?
- Does the design reward or require cooperative interaction rather than individual interaction?
- Can the design provide opportunities for trust-building between children?
Playing cooperative video games successfully requires children to share strategies with each other, encourage each other, and help each other in risky situations.

Children can practise this with a friend by playing cooperative video games, building models together, and sharing secrets.

Playing cooperative video games successfully requires children to share strategies with each other, encourage each other, and help each other in risky situations.

**FRIENDSHIPS**

Children in this age group are practising two-way cooperation and building trust during activities.

Children can practise this with a friend by playing cooperative video games, building models together, and sharing secrets.

**FRIENDSHIPS**

Children in this age group are practising two-way cooperation and building trust during activities.

Children can practise this with a friend by playing cooperative video games, building models together, and sharing secrets.

**FRIENDSHIPS**

Children in this age group are practising cooperative play that involves sharing.

Children can practise this with friends by playing simple card games, skipping rope, and playing catch.

Playing card games requires a child to wait until everyone else has their turn before taking their own turn.

**FRIENDSHIPS**

Children in this age group are practising cooperative play that involves sharing.

Children can practise this with friends by playing simple card games, skipping rope, and playing catch.

Playing card games requires a child to wait until everyone else has their turn before taking their own turn.

**FRIENDSHIPS**

Children in this age group are practising loyalty, intimacy, and taking other’s needs into account.

Children can practise this by helping each other with school work, working together during team sports, and performing with a band.

Playing in a band requires a child to work closely with other band members during practise so that they can rely on each other during a performance.
INSTRUCTIONS

Audience
The card-tool is intended for designers and design students to be used in projects involving the design of products for children.

Purpose
The cards provide age specific information about children’s developing cognitive, physical, social, and emotional abilities.

Specifications
The DSD card set consists of 42 cards, describing 14 developmental areas for 3 age groups (5 to 6, 7 to 9, and 10 to 12).

The cards are colour coded for the different abilities: see the Reference Card, e.g. cognitive in blue.

AUTHORS

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Graphic Design: Allen Bevans, Ying Deng, Saba Nowroozi, Luuk Rombouts
**P**
**PHYSICAL**
1. Fine Manipulation
2. Gross Manipulation
3. Locomotion

**E**
**EMOTIONAL**
1. Emotional Expression
2. Emotional Regulation
3. Understanding Empathy

**S**
**SOCIAL**
1. Friendship
2. Perspective Taking
3. Self-Esteem

**C**
**COGNITIVE**
1. Attention
2. Information Processing & Working Memory
3. Problem Solving
4. Reading
5. Reasoning Logic Instructions

**ATTRIBUTIONS**

DSD Cards use the Creative Commons licensed photos by the following Flickr authors. (The card identifier righter after each author indicates the card that uses the author’s work.)

Lighttruth (P1a), Bruce A Stockwell (P1b), Wouter Marra (P1c), edenpictures (P2a), Chris A (P3a), courosa (P3a), Xiaozhuli (P3c), Ana Fukase (E1a), climbnh2003 (E1a), jeffreychen (E2a), woodley-wonderworks (E2c), hubertk (E3a), McBeth (E3a), Sheryl’s Boys (E3c), nlnet (S1a), USAG-Humphreys (S1c), KimmerKC (S2a), bluekdesign (S3B), lindsay.dee.bunny (S3c), hdes.copeland (S3B), familymwr (S3c), Vaughan (C1a), heraldpost (C1B), woodleywonderworks (C1C), used-carspecialist (C5A), Old Shoe Woman (C4B), chefbranden (C5A)

In addition, the authors of the photos on the following cards are unknown: P2b, P2c, S1b, C3c, C5a, C5c

---

**REFERENCE CARD**

**GROSS MANIPULATION**

Children in this age group are practising activities that involve coordinated movement of large muscle groups.

Children can practise this by jumping on a pogo stick, horseback riding, and rollerblading.

Rollerblading requires a child to coordinate multiple muscle groups in their arms, legs, and torso.

**Age:** A = 5-6, B = 7-9, C = 10-12
e.g. S1 = stands for ‘Social - Friendship - Age 7-9’