Learning Trajectory for Subitizing
FACILITATOR GUIDE

Marsico Institute
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Subitizing: What Is It? Why Teach It? How to Teach It?

Three pictures hang in front of a six-month-old child. The first shows two dots, the others one dot and three dots. The infant hears three drumbeats. Her eyes move to the picture with three dots.

Before you read further, what do you make of this startling research finding? How in the world could such a young child do this? At some intuitive level, this infant has recognized number, and a change in number. When developed, and connected to verbal number names, this ability is called subitizing—recognizing the numerosity of a group quickly, from the Latin “to arrive suddenly.” In other words, people can see a small collection and almost instantly tell how many objects are in it. Research shows that this is one of the main abilities very young children should develop. Children from low-resource communities and those with special needs often lag in subitizing ability, harming their mathematical development. This is why the first learning trajectory we discuss involves children’s recognition of number and subitizing.

Types of Subitizing

Subitizing differs from the ANS in that the goal is to determine the exact number of items in a set. When you “just see” how many objects in a very small collection, you are using perceptual subitizing (Clements, 1999b). For example, you might see three dots on a die and quickly say “three.” You perceive the three dots intuitively and simultaneously. How is it you can see an eight-dot domino and “just know” the total number, when evidence indicates that this lies above the limits of perceptual subitizing? You are using conceptual subitizing—seeing the parts and putting together the whole. That is, you might see each side of the domino as composed of four individual dots and as “one four.” You see the domino as composed of two groups of four and as “one eight.” All of this can happen quickly—it is still subitizing—and often is not conscious. Another categorization involves the different types of things people can subitize. Spatial patterns such as those on dominoes are just one type. Other patterns are temporal and kinesthetic, including finger patterns, rhythmic patterns, and spatial-auditory patterns. Creating and using these patterns through conceptual subitizing helps children develop abstract number and arithmetic strategies. For example, children use temporal patterns when counting on. “I knew there were three more so I just said, nine . . . ten, eleven, twelve” (rhythmically gesturing three times, one “beat” with each count). They use finger patterns to figure out addition problems. For example, for 3 + 2, a child might put up a finger pattern they know as three, then put up two more (rhythmically—up, up) and then recognize the resulting finger pattern as “five.” Children who cannot subitize conceptually are handicapped in learning such arithmetic processes. Children who can may be limited to subitize small numbers at first, but such actions are useful “stepping stones” to the construction of more sophisticated procedures with larger numbers.

Subitizing and Mathematics

The ideas and skills of subitizing start developing very early, but they, as every other area of mathematics, are not just “simple, basic skills.” Subitizing introduces basic ideas of cardinality—“how many,” ideas of “more” and “less,” ideas of parts and wholes and their relationships, beginning arithmetic, and, in general, ideas of quantity. Developed well, these are
related, forming webs of connected ideas that are the building blocks of mathematics through elementary, middle, and high school and beyond. As we discuss the details of children’s initial learning of subitizing, let’s not lose the whole—the big picture—of children’s mathematical future. Let’s not lose the wonderment that children so young can think, profoundly, about mathematics.

### Starting Out: Where Are My Children on the LT for Subitizing?

<table>
<thead>
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<th>Where Are My Children on the LT for Subitizing?</th>
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<tr>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td>• Be able to identify where children are on the subitizing LT.</td>
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<tr>
<td>• Be able to plan subitizing activities aligned with children’s developmental levels.</td>
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<tr>
<td><strong>Levels Addressed</strong></td>
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<tr>
<td>• Small Collection Namer</td>
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<td>• Perceptual Subitizer to 4 (and above)</td>
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<td><strong>Big Ideas</strong></td>
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<td>• Subitizing tells how many in groups without counting</td>
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<tr>
<td>• Groups can be named with numbers</td>
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<tr>
<th>Facilitation Materials</th>
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<tbody>
<tr>
<td>• Manipulatives of various type for subitizing</td>
</tr>
<tr>
<td>• Exploring Materials Activity Materials and Instruction PDF</td>
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</tbody>
</table>

### Directions

1. **Sign on to [LT]²** — [www.learningtrajectories.org](http://www.learningtrajectories.org)
2. **Click “Learning Trajectories”** and then click the age/grade level that represents most of the participants.
3. **Show video:** Introduction to Subitizing by clicking “Subitizing” or the video icon to the right of it.
4. **Ask** participants to go to the Learning Trajectories page on [LT]² and explore several of the levels, *starting with the first highlighted level*, reading the descriptions and examples and watching videos. Remind them that this is just a gentle introduction—we will study them carefully throughout our time together.
   - **a. What did you notice as you explored the levels of thinking for the subitizing LT? Where do you find them?**
   - **b. What is subitizing? Why is it important? Where do you think most of your children fall on the subitizing LT?**
5. **Ask** participants to find a level and then an activity (click on the “Activities” button or just s roll down) that you would like to try out in your classroom to build that level. Give participants time to explore the instructional activities and then share out.
**Maker of Small Collections**

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

**Ask** participants to explore and discuss the information on this page.

**Ask:** What are children’s behaviors and ways of thinking that characterize this level?

**Ask:** What else might one see as children operate at that level?

**Discuss** where this level appears in GOLD.

**Definition:** The child is able to make a small collection (usually 1-3) either visually matching another collection (not necessarily matching one-to-one) or recognizing the number name.

This level sets the foundation for children to be able to perceptually subitize at later levels.

**Example:** When shown a collection of 3, makes another collection of 3.

**Video:** Watch a child performing at this level.

**GOLD:** Note: GOLD, and to a large extent the Common Core State Standards, are based on, or borrowed from, our learning trajectories. They are basic benchmarks, so of course they do not include all the levels of our learning trajectories. That is what makes our learning trajectories more useful for teaching. Seeing the connections between GOLD and our learning trajectories, however, is valuable.

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**Objective 20:** Uses number concepts and operations

<table>
<thead>
<tr>
<th>No.</th>
<th>Yr.</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Recognizes and names the number of items in a small set up to 10 and relates them by combining, separating, or counting into and from sets of up to 10.</td>
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</tbody>
</table>
| 2   | 3   | Solves simple equal shares problems: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 20 objects and then describes their parts: relates sets of 10 - 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Where’s That Number?

Facilitation Options:
Ask: participants to read the activity directions.
- What is the main objective of Where’s That Number?

Watch: Have participants watch the video.
- What mathematical behaviors did the children demonstrate? What do you think the teacher may have learned about each child?
- How can the teacher adapt the activity for children at different levels of learning?
- What might you have done differently?

Do: Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”
- What did you notice the “children” doing in this activity? What mathematical behaviors did they demonstrate?
- How do the teachers apply variations to this activity?
- What teaching ideas and strategies did you come up with?

Reflect:
- How and why do you think this activity would help children achieve the goal of Maker of Small Collections?
- What mathematical language might be used? What questions encourage subitizing? Remember, subitizing questions should not encourage counting.
- How will you implement this activity in your classroom? When and where could you ask children to make small groups?
Small Collection Namer

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page.
Ask: What are children’s behaviors and ways of thinking that characterize this level?
Ask: What else might one see as children operate at that level?
Discuss where this level appears in GOLD.

Definition: Names groups of 1 to 2, sometimes 3.

For a Maker of Small Collections (the previous level), the child may rely on matching strategies to make their small collection. In Small Collection Namer, the child is actually able to recognize groups of 1-3 without relying on a model or matching strategy.

Example: Shown a pair of shoes, says, “Two shoes.”

Video: Watch a child performing at this level.

GOLD: The location of the Small Collection Namer level is below.

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<table>
<thead>
<tr>
<th>No.</th>
<th>Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>1. Removes, names, and describes the number of items in a small set up to two, including three groups of two or three. (Take two creations, take two creations. Take two creations.)</td>
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<td></td>
<td>2. Recognizes and names the number of items in a small set up to two, including three groups of two or three.</td>
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<td>3. Makes sets of 1-3 objects and then describes the parts; identifies which part has more, less, or the same (equal) number of objects, or an equal relationship of parts and describes their relationship to the whole.</td>
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<td></td>
<td>4. Skips simple equal share problems; makes sets of 11-20 objects and then describes the parts.</td>
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<td></td>
<td>5. Asks how many questions about whole partitioned into equal shares of two and three, identifies which part has more, less, or the same (equal) number of objects, or an equal relationship of parts and describes their relationship to the whole.</td>
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<td></td>
<td>6. Knows how to identify which part has more, less, or the same (equal) number of objects, or an equal relationship of parts and describes their relationship to the whole.</td>
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<td></td>
<td>7. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<tr>
<td></td>
<td>8. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<tr>
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<td>9. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>10. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>11. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>12. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>13. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>14. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>15. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>16. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>17. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>18. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<td>19. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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<tr>
<td></td>
<td>20. Watches a rectangle into four equal parts and describes the parts and their relationship to the whole.</td>
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</table>

Objective 20: Uses number concepts and operations
**Have participants explore the activity to understand what instruction looks like to help children achieve a Small Collection Namer level.**

### Number Me

**Facilitation Options**

Ask participants to read the [activity directions](#).
- What is the main objective of Number Me?

Watch: Have participants watch the [video](#).
- What mathematical behaviors did the children demonstrate? What do you think the teacher may have learned about each child?
- What different questions does the teacher ask the children and how do the questions relate to Small Collection Namer?
- How does the teacher actively engage the children in the activity?
- What might you have done differently?

Do: Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”
- What did you notice the “children” doing in this activity? What mathematical behaviors did they demonstrate?
- What teaching ideas and strategies did you come up with?
- What other questions could you ask the children and how would you actively engage them?

Reflect:
- How and why do you think this activity would help children achieve the goal of Small Collection Namer?
- What mathematical language might be used? What types of questions?
- In whole group subitizing activities, what strategies can you use to formatively assess each child? Can children respond in a non-verbal way?
- How will you implement this activity in your classroom? Would it work during transition times?
Definition: A child is able to instantly and effortlessly recognize collections up to 4 (without counting).

What separates this level from the previous levels (characterized by number recognition competences) is that a child will verbally name the number of a set that they have seen for ≤2 seconds. Thus, there is a time limit that is not present at previous levels, making this the first level where children are truly subitizing.

Example: When shown 4 objects briefly, says “four”.

Video: Watch a child performing at this level.

GOLD: Note that this trajectory level captures some of the skills necessary between phase 2 and 3.
Have participants explore the activities to understand what instruction looks like to help children achieve a Perceptual Subitizer to 4 level.

Snapshots and Subitize! Planets

Facilitation Options

Ask participants to read the activity directions.
- What is the main objectives of Snapshots and Subitize! Planets?

Watch: Have participants watch the video.
- What mathematical behaviors did the children demonstrate? What do you think the teacher may have learned about each child?
- How does the teacher have the children respond to her questions?
- What follow up question does the teacher ask and why are they important?
- How are the children physically engaged with the activity?
- What might you have done differently?

Do: Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”
- What did you notice the “children” doing in this activity? What mathematical behaviors did they demonstrate?
- What teaching ideas and strategies did you come up with?
- What helped the “teacher” formatively assess children’s ability to subitize?

Reflect:
- How and why do you think this activity would help children achieve the goal of Perceptual Subitizer to 4?
- What times in your schedule could you incorporate Snapshots and Subitize?
- Why do the instructions ask you to place dots in a straight line?
- How can the computer activity be incorporated during a typical day?
- What mathematical language might be used while a child is participating in the activity and the computer game? What types of questions? Would you have children work alone or in pairs at the computer? Why or why not?
Perceptual Subitizer to 5

Definition: A child is able to instantly and effortlessly recognize collections up to 5 (without counting). What separates this level from the previous level (perceptual subitzer to 4) is that a child recognizes and uses spatial and numeric structures from past experiences to subitize.

Example: Shown 5 objects briefly, says “five”.

Video: Watch a child performing at this level.

GOLD: Note this phase focuses on recognizing groups of items up to 5.

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<th>Objective</th>
<th>Uses number concepts and operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Demonstration understanding the concept of one, two, and three.</td>
</tr>
<tr>
<td>21</td>
<td>&quot;Say, &quot;John apple,&quot; to indicate he eats 0-01-02, and so on.</td>
</tr>
<tr>
<td>22</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
</tr>
<tr>
<td>23</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<tr>
<td>24</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<tr>
<td>25</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<tr>
<td>26</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<tr>
<td>27</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>28</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>29</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>30</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>31</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>32</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>33</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>34</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>35</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>36</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>37</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>38</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>39</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>40</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>41</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<td>42</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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<tr>
<td>43</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
</tr>
<tr>
<td>44</td>
<td>Notes: &quot;How many?&quot; to indicate he eats 0-01-02, and so on.</td>
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When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page.

Ask: What are children’s behaviors and ways of thinking that characterize this level?
Ask: What else might one see as children operate at that level?
Discuss where this level appears in GOLD.
Have participants explore the activities to understand what instruction looks like to help children achieve a Perceptual Subitizer to 5 level.

**Fantastic Five (Tricky Two) and Subitize! Planets**

**Directions**

Ask participants to read the activity directions.

- What is the main objectives of Fantastic Five (Tricky Two) and Subitize! Planets?

**Watch:** Have participants watch the video.

- What prompts did the teacher use to facilitate subitizing? What do you think the teacher may have learned about each child?
- What follow up questions does the teacher ask and how they relate to perceptual subitizing?
- What might you have done differently?

**Do:** Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”

- What did you notice the “children” doing in this activity? What mathematical behaviors did they demonstrate?
- How could you modify this activity to keep it engaging for the children?
- What teaching ideas and strategies did you come up with?

**Reflect:**

- How and why do you think this activity would help children achieve the goal level of Perceptual Subitizer to 5?
- What mathematical language might be used? What types of questions?
- If children count, what is an appropriate reaction? How do you ask questions that do not encourage counting?
- How will you implement this activity in your classroom? Would this be appropriate for the math canter during free choice time?
**Conceptual Subitizer to 5**

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page.

*Ask:* What are children’s behaviors and ways of thinking that characterize this level?

*Ask:* What else might one see as children operate at that level?

**Discuss** where this level appears in **GOLD**.

**Definition:** Conceptual subitizing refers to the ability of children to identify a whole quantity as a result of composing smaller quantities (recognized through perceptual subitizing) that make up the whole. For example, a child might roll a die and know it’s 5 because they see a 2 and a 3.

**Example:** “Five! I saw 3 and 2 and I said five.”

(Child’s response when shown briefly five objects)

**Video:** Watch a child performing at this level.

**GOLD:** Note this phase focuses on recognizing groups of items up to 5.

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**Table:**

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<thead>
<tr>
<th>Numbers</th>
<th>Subitize 3</th>
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**Objective 20:** Uses number concepts and operations

**LT² Facilitator Guide – Subitizing**

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13
Have participants explore the activities to understand what instruction looks like to help children achieve a Conceptual Subitizer to 5 level.

**Snapshots** and **Subitize! Planets**

**Facilitation Options:**

Ask participants to read the activity directions.

- **What is the main objective of Snapshots?**

Watch: Have participants watch the video.

- **What mathematical behaviors did the children demonstrate? How does the teacher instruct the children in regards to conceptual subitizing? How does conceptual subitizing differ from perceptual subitizing?**

- **What might you have done differently?**

Do: Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”

- **What did you notice the “children” doing during this activity? What mathematical behaviors did they demonstrate?**

- **What teaching ideas and strategies did you come up with?**

Reflect:

- **How and why do you think this activity would help children achieve the goal level of Conceptual Subitizer to 5?**

- **What types of dot arrangements could be used with this activity? Would the differing arrangements allow for both perceptual and conceptual subitizing concurrently?**

- **How will you implement this activity in your classroom? Would subitizing work in a free choice center? How? What materials are needed?**
Conceptual Subitizer to 10

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page.

Ask: What are children’s behaviors and ways of thinking that characterize this level?
Ask: What else might one see as children operate at that level?
Discuss where this level appears in GOLD.

Definition: A child verbally labels arrangements up to 6, then up to 10, using groups.

The ten-frame is a powerful arrangement, presented as two (horizontal or vertical) rows of five. This organization is referred to as the base-10 system. These frames provide a simple visual image children can associate with each number. These images, which can be mentally represented with practice and experience, are also useful for children as they learn to partition numbers into smaller quantities (e.g., you can make 10 with 5 and 5 as well as 6 and 4).

It should be noted that the tens-frame may play a special role in supporting children’s abilities to conceptually subitize numerals 6 through 9. For example, we can compose 9 with one five-frame and 4 out of 5 grids filled in. Alternatively, 9 can also be represented as a ten-frame with one grid empty.

Example: “In my mind, I made two groups of 3 and 1 more, so seven”

Video: Watch a child performing at this level.

GOLD:

Objective 20: uses number concepts and operations.

- Solves simple equal share problems: makes sets of 11-13 objects and then describes their parts, how they related to the whole, and how the concept of base-10 is relevant in solving the problem.
- Makes sets of 10-15 objects and then describes the parts, their quantities, and numbers related to the whole.
- Represents and names the number of objects in a set by first mentally composing and regrouping the objects, and then describes the parts.
- Counts all sets of objects and counts using any counting sequence that makes sense.
- Identifies the value of 10, 10+1, 10+2, and so on, and describes the parts.
- Solves problems: makes sets of 11-13 objects and then describes their parts, how they relate to the whole, and how the concept of base-10 is relevant in solving the problem.
- Makes sets of 10-15 objects and then describes their parts, how they relate to the whole, and how the concept of base-10 is relevant in solving the problem.
- Represents and names the number of objects in a set by first mentally composing and regrouping the objects, and then describes the parts.
- Counts all sets of objects and counts using any counting sequence that makes sense.
- Solves problems: makes sets of 11-13 objects and then describes their parts, how they relate to the whole, and how the concept of base-10 is relevant in solving the problem.
- Makes sets of 10-15 objects and then describes their parts, how they relate to the whole, and how the concept of base-10 is relevant in solving the problem.
- Represents and names the number of objects in a set by first mentally composing and regrouping the objects, and then describes the parts.
- Counts all sets of objects and counts using any counting sequence that makes sense.
- Solves problems: makes sets of 11-13 objects and then describes their parts, how they relate to the whole, and how the concept of base-10 is relevant in solving the problem.
- Makes sets of 10-15 objects and then describes their parts, how they relate to the whole, and how the concept of base-10 is relevant in solving the problem.
- Represents and names the number of objects in a set by first mentally composing and regrouping the objects, and then describes the parts.
- Counts all sets of objects and counts using any counting sequence that makes sense.
Have participants explore the activities to understand what instruction looks like to help children achieve a Conceptual Subitizer to 10 level.

**Subitizing Song and Subitize! Planets**

**Facilitation Options:**
Ask participants to read the activity directions.
- What is the main objective of Subitizing Song?

**Watch:** Have participants watch the video.
- When would this activity be good to use in your classroom? What activity could be used with this song activity?
- What did you learn about presenting subitizing to your children?
- What important mathematical does the activity include?

**Reflect:**
- How and why do you think this activity would help children achieve the goal level of Conceptual Subitizer to 10?
- What mathematical language might be used? What types of questions?
- How did this activity change your thinking about 5 Frame cards or the use of fingers when subitizing?
- How will you implement this activity in your classroom? What materials could you add to your math center when it is organized as a subitizing center?
**Conceptual Subitizer to 20**

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page.

**Ask:** What are children’s behaviors and ways of thinking that characterize this level?

**Ask:** What else might one see as children operate at that level?

**Discuss** where this level appears in GOLD (see below).

**Definition:** A child verbally labels arrangements up to 10, then up to 20, using groups. At this point, a child is building proficiency with the base-10 system using a tens-frame and may even recognize that two tens-frames is 20. However, at this level children find it easier to subitize numbers up to 20 when at least one tens-frame is filled. For example, a 10 and a 2. They are still working to conceptually subitize more difficult arrangements; for example, two sets of unfilled tens-frame, such as an 8 and a 2.

**Example:** "In my mind, I made two groups of 3 and 1 more, so seven"

**Video:** Watch a child performing at this level.

**GOLD:** Note this level aligns with standard 8 and starts to develop standard 10.
Have participants explore the activities to understand what instruction looks like to help children achieve a Conceptual Subitizer to 20 level.

Subitize Dots to 20 and Concentrate: Match Sums

Facilitation Options:

Ask participants to read the activity directions.

- What is the main objective of Subitize Dots to 20?

Watch: Have participants watch the video.

- What mathematical behaviors did the children demonstrate? What did notice about the difference each child’s responses?

- What might you have done differently?

Do: Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”

- What did you notice the “children” doing in this activity? What mathematical behaviors did they demonstrate?

- What teaching ideas and strategies did you come up with?

Reflect:

- How and why do you think this activity would help children achieve the goal level of Conceptual Subitizing to 20?

Conceptual Subitizer with Place Value

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page.

Ask: What are children’s behaviors and ways of thinking that characterize this level?

Ask: What else might one see as children operate at that level?

Discuss where this level appears in GOLD (see below).

Definition: Verbally labels structured arrangements, shown only briefly, using base-10 and place value.

To understand place value children need to understand part-whole concepts. In other words, can a child compose and decompose numbers up to 10? Thus, children who have not yet acquired an understanding of place value do not equate ten ones and ten. Children who have can decompose ten into ones.

Example: “I saw groups of tens and twos, so 10, 20, 30, 40, 41, 44, 46...46!”

Video: Watch a child performing at this level.

GOLD:

Objective 20: Uses number concepts and operations

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- Demonstrates understanding of the concepts of ten, one, and zero.
- Shows ten as a single entity.
- Identifies part—whole relationships.
- Identifies parts of a whole.
- Identifies parts of a whole.
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- Identifies parts of a whole.

Ask participants to explore and discuss the information on this page.

Ask: What are children’s behaviors and ways of thinking that characterize this level?

Ask: What else might one see as children operate at that level?

Discuss where this level appears in GOLD (see below).
Have participants explore the activities to understand what instruction looks like to help children achieve a Conceptual Subitizer with Place Value level.

**Subitize Dots to 20 and Concentrate: Match Sums**

**Facilitation Options:**

Ask participants to read the activity directions.
- What is the main objective of Subitize Dots to 20?

*Watch:* Have participants watch the video.
- What mathematical behaviors did the children demonstrate? What did notice about the difference each child’s responses?
- What might you have done differently?

*Do:* Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”
- What did you notice the children doing in this activity? What mathematical behaviors did they demonstrate?
- What teaching ideas and strategies did you come up with?

*Reflect:*
- How and why do you think this activity would help children achieve the goal of Conceptual Subitizing with Place Value and Skip Counting?
- How do you know when children are ready for this activity? Does readiness vary with the skip counting groups of 2, 3, 4, or 5?

How will you implement this activity in your classroom? How can this activity be differentiated so each child can be challenged just beyond their own level?
Conceptual Subitizer with Place Value and Multiplicative Thinking

When exploring this level, think about the purpose of the professional development session you are running and the aims that you want participants to walk away with at the end of the session. Below are different prompts to help you launch this activity. Choose and modify the prompts to best meet your session aims.

Ask participants to explore and discuss the information on this page. 
Ask: What are children’s behaviors and ways of thinking that characterize this level? 
Ask: What else might one see as children operate at that level? 
Discuss where this level appears in GOLD (see below).

Definition: Verbally labels structured arrangements shown only briefly, using groups, multiplicative thinking, and place value.

This level builds on the previous level, such that children are able to use the base-10 system to conceptually subitize larger numbers. Children are able to verbalize the quantity of 10’s they see.

Example: “I saw groups of tens and threes, so I thought, 5 tens is 50 and 4 threes is 12, so 62 in all.”

Video: Watch a child performing at this level.

GOLD:

Objective 20. Uses number concepts and operations

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<tr>
<td><strong>Recognize and name the number of tens, or a small set of tens, including any tens and ones.</strong></td>
<td><strong>Name ten plus any tens and ones.</strong></td>
<td><strong>Name two tens, or any tens, and any ones.</strong></td>
<td><strong>Name three tens in the box with any ten or one.</strong></td>
<td><strong>Count and name any tens and any ones.</strong></td>
<td><strong>Name the tens and ones in the box.</strong></td>
<td><strong>Count on from ten.</strong></td>
<td><strong>Name the tens and ones in the box.</strong></td>
<td><strong>Count on from ten.</strong></td>
<td><strong>Name the tens and ones in the box.</strong></td>
<td><strong>Count on from ten.</strong></td>
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Assess how much children understand the relationship between parts and the whole and what is the relationship between the number of tens in the box and the number of ones in the box. 

Discuss where this level appears in GOLD (see below).
Have participants explore the activities to understand what instruction looks like to help children achieve a Conceptual Subitizer with Place Value and Multiplicative Thinking level.

**Subitize Dots and Subitize! Planets**

**Facilitation Options:**

Ask participants to read the activity directions.
- What is the main objective of this version of Subitize Dots?

Watch: Have participants watch the video.
- What mathematical behaviors did the children demonstrate? What questions did the teacher use to determine the children’s understanding? What do you think the teacher may have learned about each child?
- What might you have done differently?

Do: Have participants practice the activity in groups of three. Allow time for all participants to rotate as the “teacher.”
- What did you notice the “children” doing in this activity? What mathematical behaviors did they demonstrate?
- How did the “teacher” arrange the dots to encourage multiplication?
- What teaching ideas and strategies did you come up with?

Reflect:
- How and why do you think this activity would help children achieve the goal of Conceptual Subitizing with Place Value and Multiplication?
- How is this activity different from the previous version, Place Value and Skip Counting?
- What types of arrangements would be best to encourage multiplicative thinking?
- How will you implement this activity in your classroom? Would the arrangements for this activity be appropriate for children mastering the skip counting level?
Summary and Classroom Applications.

Directions

Ask participants to summarize what they have learned about subitizing.

Work together to select a level and then an assessment to have all participants try (possibly with just a couple of children) in their own classes/at home.

Work together to select a level and then an activity to have all participants try in their own classes/at home with their own children.