# Understanding Multiplication

Total Number of Lessons: 3
Total Estimated Time for Module: 240 minutes

## Section 1: Module Overview and Curricular Connections – Required

- **Module goal**: At the end of this module, students will be able to model, solve, and explain multiplication problems using equal groups, arrays, scratch, and real-world contexts.

- **Connection to standards**:

  **Indiana Academic Standards – Math (Grade 3)**

  - **3.C.1**: Interpret products of whole numbers (e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7).
  - **3.CA.3** Model the concept of multiplication of whole numbers using equal-sized groups, arrays, area models, and equal intervals on a number line. Model the properties of 0 and 1 in multiplication using objects or drawings.
  - **3.C.4**: Solve real-world problems involving multiplication and division within 100.

- **Common Core State Standards (CCSS) Math** (aligned):

  - **CCSS.MATH.CONTENT.3.OA.A.1**: Interpret products of whole numbers.

  - **CCSS.MATH.CONTENT.3.OA.A.3**: Use multiplication to solve word problems involving equal groups and arrays.

- **RET materials/ideas to be leveraged**:

During the summer experience, we explored the Scratch programming language. It is a free, block-based, visual programming language and online community developed by the Massachusetts Institute of Technology (MIT). It's designed to introduce individuals of all ages to coding in an accessible and engaging way, particularly popular among children. I will incorporate a Multiplication Game: Create a game where a sprite asks multiplication problems and checks the player's answers.

## Section 2: Overview of Module Framework – Required

- **Real-world context**:

- **Possible Lesson Ideas**:

Multiplication is all around us, whether we're setting up chairs in rows for a school event, organizing teams for a game, or figuring out how many snacks are needed for a party. This module helps students discover the purpose of multiplication by solving problems they might face in everyday life.

Students will apply multiplication to contexts like classroom seating, planning supplies for a bake sale, or organizing sports teams. Using visuals, manipulatives, and discussions, they'll explore how and why multiplication works.

- **Background STEM content**:

  - **Possible Lesson Ideas**:

In early math, multiplication helps students see structure and patterns. Students will explore equal groups, arrays, and skip counting as foundational concepts that lead to understanding multiplication.

This approach builds computational thinking—breaking big problems into smaller steps and finding efficient solutions. Students will also explore basic problem-solving skills similar to those used in real-world STEM tasks.

**Possible Lesson Ideas:**

- Use counters and graph paper to build multiplication arrays (e.g., 3 rows of 5 = 15).
- Introduce multiplication as repeated addition using real-world items, such as crayons, snacks, or classroom supplies.

- **Description of Main Activity/Project**:

Students will work in small groups to plan and present a solution to a real-world multiplication challenge. For example, they might be tasked with organizing a classroom event and determining how many total items are needed for different groups of students.

Each group will receive a scenario card (e.g., "You need to set up 6 rows of 4 chairs each. How many total chairs do you need?"). They'll solve the problem using drawings, manipulatives, and equations. Groups will present their solutions, explaining their thinking and how multiplication helped them.

Steps to incorporate multiplication in a Scratch project

1. Create a Variable: Create a variable to store the result of the multiplication.
2. Generate or Input Numbers: Generate random numbers using the "pick random" block or allow the user to input numbers using the "ask and wait" block.
3. Use the Multiplication Operator: Drag the multiplication operator block into the scripting area and place the numbers or variables you want to multiply inside the empty slots.
4. Display the Result: Use a "say" block to make a sprite announce the result of the multiplication, or store the result in a variable and display it on the stage.

- **Possible Activity/Project Ideas**:

- **Goal**: Apply multiplication to solve a real-world group scenario.
- **Timeline**:
  - **Day 1**: Introduce multiplication through equal groups and repeated addition.
  - **Day 2**: Explore arrays and visual models, and Scratch.
  - **Day 3**: Group project – solve and present a real-world multiplication problem.
- **Collaboration**: Students will work in small groups to complete tasks.

## Section 3: Module Sequencing and Assessment – Required

- **Brief description of sequenced learning objectives**:

**Lesson 1**: Understand multiplication as equal groups and repeated addition.

**Lesson 2**: Use arrays and visual models to solve multiplication problems.

**Lesson 3**: Apply multiplication to solve and explain real-world scenarios in groups.

- **Brief description of formative and summative assessment approaches**:

**Formative Assessments**:

- Observation during group work and manipulatives use.
- Quick checks (e.g., “show me 3 × 4 with cubes”).
- Exit slips with short multiplication problems.

**Summative Assessment**:

- Group presentation with a clear problem setup, solution, and explanation.
- Individual worksheet with word problems and array drawings.
- Quiz

- **Recommendations for implementation**:
- Set clear behavior expectations for group work.
- Give extra time for groups that need support or struggle with drawing models.
- Use visuals and anchor charts to reinforce vocabulary (e.g., array, equal groups, product).
- Consider pairing high- and lower-level students for peer support.

## Section 4: Module Files – Optional

- **List of attached files**: [should include any lesson plans and handouts relevant to the Module, if you have them ready]
  - Quiz1.pdf
  - Quiz2.pdf
  - Quiz3.pdf

- Pre/PostTest.pdf
- Robertson_RET2025