

## Activity: Ten Flashing Fireflies

### Mathematics Content Focus:

- Recognizing patterns through number relationships
- Developing number sense concepts
- Composing and Decomposing numbers

### Materials Needed:

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| <ul style="list-style-type: none"><li>● Fireflies cut for students to use as a manipulative</li><li>● Paper jars cut</li><li>● Mini hundreds chart</li><li>● Grid paper for students to use to represent thinking</li><li>● Ten Frames blank cut</li></ul> | <ul style="list-style-type: none"><li>● Two Color counters</li><li>● Unifix cubes</li><li>● Children's Literature book Ten Flashing Fireflies</li><li>● Tape or Glue</li></ul> |
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### Resources Used:

- **Ten Flashing Fireflies** by Philemon Sturges

### Preparing for the Activity:

- Cut paper materials for students
- Record questions you want to ask on post its and place inside the book.

### Conducting the Activity: (60 minutes)

#### Launching the Lesson:

1. Begin the lesson by reading the children's literature book *Ten Flashing Fireflies*. As you read the book, be sure to pause while you read and ask students guiding questions about number sense concepts (subitizing, more/less, compare)

#### Guiding Questions:

- **Page with 8 fireflies in the in the sky**
  - How many fireflies do you see for the girl to catch?
  - How do you see it? (Record student thinking on paper)
  - How many fireflies are in the jar? How many more fireflies does she need to catch 5? 7? 10?

- **Page with 4 fireflies in the jar**
  - How many fireflies are in the jar?
  - How did you see it?
  - How many more fireflies does she need to have caught 5? 9? 10?
  - How many fireflies could the boy catch? How did you see it?
  - What do you know about the number of fireflies on these pages?
  
- **Page with 5 fireflies in the jar**
  - How many fireflies do you think will be in the jar on the next page? Explain your thinking.
  - How many fireflies will be in the sky on the next page? Explain your thinking.
  - Will the jar on the next page have more or less fireflies? How do you know?
  
- **Page with 7 fireflies**
  - How many fireflies are in the jar? How do you see it?
  - How many fireflies would be in the jar if 3 flew out of the jar?
  - What do you notice about each jar of fireflies? (The quantity is more, there is one more each time)
  - If she catches 10 more fireflies how many will she catch? How do you know?
  
- **Page with 8 fireflies**
  - How many more fireflies are in this jar than the last jar? How do you know? Explain.
  - How do many fireflies are there? How do you see them?
  - If they children caught 10 more fireflies how many would they have caught?
  - How many will they have if they catch 3 more? Explain.

2. After reading the story, read the following problem to students.

**Task:** *Toby collected fireflies in his jar for a week. Each day he trapped 6 fireflies. But each day when he unfastened his jar 2 fireflies dashed out. How many fireflies did he accumulate at the end of the week?*

3. After reading the task have students complete the four block graphic organizer. You may also choose to do this whole group. The purpose of

the organizer is to allow students to unpack a problem. However, while unpacking it is important that not too much information is given, such as “what is a week” This will allow students an opportunity for a discussion at the end of the lesson, that will exemplify Mathematical Practice 3.

#### **Four Blocks:**

- What is the problem mostly about?
    - A boy that is catching fireflies in a jar
  
  - Vocabulary: *Discuss what each of these words mean. If possible, connect an action or act out the words. This will help students make a picture in their mind when solving the problem.*
    - Collected
    - Unfastened
    - Trapped
    - Accumulate
  
  - What facts can you list from the problem:
    - Toby collects fireflies for a week (allow students to think of a week as 5 or 7 days)
    - 2 fireflies fly out when he unfastens the jar
  
  - What is the problem asking you to do?
    - Determine how many fireflies did he accumulate at the end of the week
4. After using the four blocks graphic organizer, allow the students to begin exploring the problem.

#### **Exploring the Task:**

1. Allow students opportunity to explore the problem. As students are exploring, it is important that they build a model of their thinking first. Students can choose which representations or manipulatives they would like to use. Have a variety of tools available for students to choose from.
  
2. As students are exploring the task, you may see different quantities and days of the week represented. Allow students to keep their thinking, this understanding will be uncovered during the summarize part of the lesson.

3. As students complete their model, next have them represent their thinking on paper. Encourage students to represent their model and show how many fireflies Toby caught using numbers with their model.
4. After students represented their model on paper, have them determine and write a conjecture about the patterns you notice and describe *How would you convince others that your thinking makes sense?*

### **Summarize the Learning:**

1. Conduct a gallery walk, allowing students to visually see other student work. This opportunity, will provide students to see new strategies, tools used the same or different ways, and possibly different solutions. During the gallery walk, have students leave a post-it on student work using the following prompts:
  - This helped me understand \_\_\_\_\_.
  - I am confused about \_\_\_\_\_.
  - I have a question about \_\_\_\_\_.
2. After students complete the gallery walk, allow them to go back to their work and reflect on what was posted.
3. Next bring students, together for a discussion. Using student thinking and conjectures discuss the patterns they notice and how those are represented using the guiding questions below.

### **Guiding Questions:**

- How did these mathematicians thinking show a pattern?
- How did their representation help to convince others that a pattern occurred.
- How are these 2 conjectures similar? Different?
- *Comparing two mathematicians work using the same tool or different tool for the same conjecture discuss the following:*
  - How is this thinking alike? Different?
  - How did their counting strategies show a pattern?
  - What other patterns or relationships do you see in these two mathematicians thinking?

4. Depending on student solution pathways and strategies there are several discussion opportunities you may choose to conduct.

**Additional Suggested Discussion Topics:**

- Strategies for counting the fireflies
- Tools and models used to represent thinking
- The number of fireflies that were caught

**Extending the Learning:**

- Attached are additional problems that you could use with this children's literature book.
- Read the story again and focus on a different number sense concept.
  - Unitizing
  - 1 or 2 More/Less
  - 10 More/Less
  - Comparing quantities
  - Fluency to 5 and 10



