Grade 3

Problem Solving Unit

CCSS Aligned
Lesson Plans
and
Math Exploration

Math Workshop

Teacher's Page

Years ago I was introduced to the reading workshop model created by Fountas and Pinnell and immediately fell in love with its structure. As I became skilled in teaching through that model, I found myself wondering if it would lend itself well to math too. Over the years, I have researched guided math and math workshop so that I could implement it successfully in my classroom. This product is a result of that.

In this product you will find vocabulary cards that can be used for word walls, anchor charts, and detailed mini-lessons along with the resources necessary to carry them out. For each lesson I have provided activities for remediation and enrichment so that you can differentiate your lessons and meet the needs of all your students.

It is at your discretion as to how you work through this unit. You can pick and choose lessons as needed or parts of lessons. You can also decide to teach the remediation or enrichment piece to the whole class as a regular lesson. These are merely a suggestion of how I would pace it in my classroom. Further, it is not necessary to follow the "scripted" portion of my lesson plans; rather, it is there as a guide to give you an idea of the workshop language used. You are welcome to modify it to your classroom needs. You will need to partner students up in advance as partner 1 and partner 2. Lastly, you may wish to modify the timing of the workshop or implement centers during independence time. You know your students best and should focus on their needs.

I would strongly recommend reading the lesson plans a few days before actually implementing them to be sure that they meet your children's needs and that you are prepared. It is also recommended to print some materials in color, on cardstock, and then laminate for future use. Some activities in this unit plan will offer teacher choices as how to handle the particular lesson. I would also frequently have students practice their multiplication facts and provide additional supplementary worksheets for further practice.

If you are not following my store, or my blog, you may want to, as I will continue to produce more units in the math workshop model. All of my products are 50% off for the first 48 hours after posting. The best way to know about this deal is by following, as you'll then receive a notification! Please also consider leaving feedback so I know how I can improve on these units and so that others will have the opportunity to learn about them. Thank you for your feedback and purchase!

I hope that you enjoy it!

Tammy (The Owl Teacher)

Unit Overview

Lesson 1 What do we do in math workshop? pg. 10	**Lesson 2** How do I collaborate well with others? pg. 14	**Lesson 3** What is the language of math workshop and how do I use it? pg. 19	**Lesson 4** What tools do we use in math and what are their purposes? pg. 28	**Lesson 5** What is guided math and how does it work? pg. 40
Lesson 6 What strategies can I use to solve problems? (Guess & Check) pg. 41	**Lesson 7** What strategies can I use to solve problems? (Visuals) pg. 49	**Lesson 8** What strategies can I use to solve problems? (Work Backwards) pg. 57	**Lesson 9** What strategies can I use to solve problems? (Organization) pg. 66	**Lesson 10** What strategies can I use to solve problems? (Strategy Review) pg. 77
Lesson 11 How do I understand word problems? (Analyzing) pg. 88	**Lesson 12** How do I solve word problems? pg. 96	**Lesson 13** What do I do if I get stuck? (Thinking Strategies) pg. 105	**Lesson 14** How do I justify my solution? pg. 109	**Lesson 15** Problem Solving Review (Lap Book) pg. 115

Standards Addressed

All Standards of Mathematical Practices (SMP) - 1, 2, 3, 4, 5, 6, 7, 8

3.OA.D.8

Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.[3]

Vocabulary Covered

Guess & Check
Visuals
Models
Draw a Picture
Act It Out
Work Backwards
Analyze
Justify
Inverse Operation
Charts, Tables, Lists
Organization
Problem Solving
Multiple Representations
Operation
Reasonableness

Math Workshop Routine

Warm Up	5 minutes During this time you work with students on fact fluency through a variety of methods.
Mini-lesson	15 minutes This is where you make a connection to the previous lesson and briefly introduce your teaching point for the lesson. It must be kept short; therefore, it should be explicit.
Active Engagement	10 minutes This is where you have the students briefly try out what you just taught during the mini-lesson. This is your opportunity to verify who may or may not need additional assistance.
Link and Independent Practice	25 minutes This is where you link what we did during the mini-lesson to what students will do independently. Then students begin working independently while you circulate and assist or pull small groups.
Closing	5 minutes During the last five minutes of workshop, it is crucial to wrap things up with a closing. This is typically sharing something learned or completed related to the mini-lesson.

Case Files Prep
Teacher's Notes

Advance Prep:

*Print, cut out, and laminate cards #1–4, along with the directions and answer key (if desired), per group.
*Make copies of "A Photo Line Up…" for each student
*Make copies of all "Let's Solve the Case" sheets for the tabbed booklet. Each sheet per student.
*To save time, have a teacher's assistant or parent volunteer cut and assemble tabbed booklets ahead of time. (Optional)
*Prepare a file folder for each student with the "Photo Line Up…" sheet in it and the tabbed booklet sheets in it. (Folder is optional, but fun for the 'detective' theme.)

**The Strategy Review Grid is optional and extra.

I traditionally do not follow the workshop model during this lesson. While it is not necessary to break students up into groups, I do. If you would rather to save copies, you can create stations that students rotate through. I break my student up into groups and provide each group with a set of the cards and directions. I do not provide the answer card, but you can if you desire students to check themselves. Then I provide each student with a file folder because they have a "case" to solve and they are the detectives. Inside the folder are all their materials needed.

First, they need to find the suspects and create a line up. (The suspects are going to be the strategies.) I do this by reviewing each of the strategies. As I'm reviewing the strategies, they are recording information on the lines of their "photo line up" page. They will later (on their own time) create an image in the box that will represent that strategy.

After I have reviewed, they will then work with other "detectives" to look at the case files. The case files are the cards for each group. These cards are problems that need to be solved. Students will decide which strategy (or suspect) is involved based on the clues in the problem. Each strategy (suspect) is only used once. They will write their suspect's name in the picture in the tabbed booklet under the case number tab, then solve the problem, and explain it.

They should work independently and just share the case file cards, but that is up to you and your students' needs.

case File #1

Let's Solve the Case!

*Guess & Check * Visuals *Work Backwards * Organization

Dawn reads three pages every five minutes.

How many pages did she read after one hour?

case File #2

Let's Solve the Case!

*Guess & Check * Visuals *Work Backwards * Organization

Mr. Johnson picks up his son's friends for marching band every Monday night. He begins his route by the football field and heads south 18 miles, then travels east 24 miles, and 18 miles north. Then they travel 9 miles west. How far and in what direction does Mr. Johnson need to travel to return to the football field?

A Photo Line Up of Strategies

Give a brief description about each strategy and then draw a picture in the photo box to help recognize it in a line up.

_____

_____

_____

_____

Guess & Check

Visuals

_____

_____

_____

_____

Work Backwards

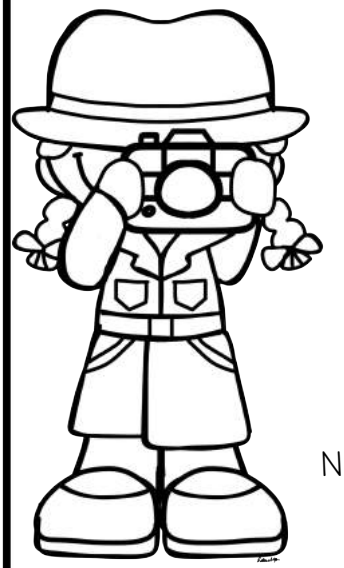
_____

_____

_____

_____

organization



Let's Solve the Case!

Identifying the Problem Solving Strategy

Name _____

Cover

Directions

Directions

Identifying the Problem Solving Strategy

You have 4 case files in front of you that you will need to look over and read. Each case has its own clues and problem that needs to be solved. You will need to decide which strategy from the line up is involved and solve the problem for each case.

Make sure that you have shared how you solved the case so that your lead detective (teacher) can understand and verify it. The best way to do this is to show all your work on the next few pages of the case files.

Glue Here

Directions: Cut out each flap carefully on the solid black line. Then put together in order with the cover on top, directions, then case file 1, 2, and 3. Case file 4 will be the bottom flap. Apply glue along the "Glue Here" strip or staple. Finally, complete the case files according to your teacher's directions.

Case File Booklet

Glue Here

_____

_____

_____

_____

Explain It

Solve It

Case File #1

Case File #2

Solve It

Explain It

_____

_____

_____

_____

Glue Here

Directions: Cut out each flap carefully on the solid black line. Then put together in order with the cover on top, directions, then case file 1, 2, and 3. Case file 4 will be the bottom flap. Apply glue along the "Glue Here" strip or staple. Finally, complete the case files according to your teacher's directions.

Lesson 14: How do I justify my solution?
(Checking Word Problems)

I Can Statement
I can explain my answer using clear mathematical language and prove why it's logical.

CCSS
SMP 2, 3, 6
3.OA.8

Vocabulary
justify, reasonableness, analyze

Mini-lesson
Materials: Anchor Chart (Optional)

Alright, super star students, we are almost done with this unit. Last time we talked about what to do when we feel like we are stuck when solving word problems. Today, we are going to talk about what to do once we have finished solving the problems. Once we have finished working out the problem and find the answer, we are not done. We still have a few very important things to do. First you will need need to compare your answer to the estimate you came up with in the beginning - if you have an estimate. Then you need to check your answer for reasonableness. This means that you want to make sure your answer makes sense. You want to double check your work once more and add on any labels. Then boys and girls, when you write your answer, you will want to restate the question in the answer and explain how you solved it. I'm going to show you an example. I have here a problem that I'm going is solved. I'm going to show you how to wrap it up and justify it. In this problem, it says, "there are 5 seats in each row of a small airplane. There are 10 rows of seats. How many total seats are on the plane?" The person who solved this said there are 50 seats. That is a reasonable answer because it doesn't seem like the plane would have a lot of seats, so it makes sense. If the answer was 1,500 that would not be reasonable because the two small numbers of 5 and 10 would not likely create a large number like 1500. The student wrote, "There are 50 seats on the small plane." That is restating the question and including the answer. The question was how many seats are on the plane and the answer was, there are 50 seats on the plane. Next it explains how it solved the problem. It says "I know this because I first drew one row of five seats. Then I created 9 more rows with fives seats in each row. When I was done I counted up five seats per row or 5+5+5+5+5+5+5+5+5+5 and that equaled 50." The person mentioned what strategy they used and exactly each step they used. There was nothing to label.

Active Engagement
Materials: Folded Cards, Glue, Scissors

Boys and girls, now it is your turn to check and explain. I have here a small, foldable card for you. You are going to cut it out and fold it on the dotted line. Then you are going to glue the back of it into your notebook. Read the problem on the front and solve it. Once you have solved it, you will go through these things on the check it list. You will check for reasonableness. You will check your work and then restate the question in the answer. Finally you will explain how you solved the problem. (Give students a few minutes to work on it. While they are working on it, take note of who needs additional assistance. Finally after a few minutes, call on students to read their explanations. These should be written under the flap.)

Link and Independent Practice
Materials: Student Cards, You're the Teacher Sheet

Fantastic! Boys and girls, today we are going to continue practicing the checking and explaining step of the problem solving process. You are going to each get a student card. They each have a letter on it, such as student A or B or Student C. Each of these cards have a problem and then that student's explanation of the solution. Your job will be to read their explanation and work through the checklist to decide if they did a great job explaining their solution accurately. If they didn't, you will need to rewrite it on this page, called "You're the Teacher." Do you have any questions? Let's get started. (Pass out the cards to students, along with the paper. You can have students complete multiple cards or just one.)

Intervention
Assist students in what to look for and break it down into smaller steps. Have them tell it verbally if needed.

Extension
Have students look back through their notebooks and create the check and explain for problems in it.

Closing
Materials: Sticky Notes

Have students write on a sticky note why it's important to check their work before they turn it in, then pair up and share with a partner. Call on volunteers to share if desired. (Write, Pair, Share)

Problem Solving Steps

The Keys to Success

Check It

*Compare Your Answer to Your Estimate
*Check for Reasonableness
*Check Your Calculations
*Add the Units
*Restate the Question in the Answer
*Explain How You Solved the Problem

Example

There are 5 seats in each row of a small airplane. There are 10 rows of seats. How many total seats are on the plane?

XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5
XXXXX 5

=50

Checked and Explained

There are 50 seats on the small plane. I know this because I first drew one row of five seats. Then I created 9 more rows with five seats in each row. When I was done, I counted up five seats per row or 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 and that equaled 50.

Student E

Problem

On Monday, James put $5 aside. On Tuesday, he put $8 aside. On Wednesday, he put $11 aside. If James continues this pattern, how much money will he have next Tuesday?

Solution

On Tuesday James will have $29 if you continue with the same pattern as described. I know this because I added $3 each time.

Student F

Problem

There are 20 stickers on each page. Nelson has 9 pages in his sticker book. How many stickers does he have total?

Solution

Nelson has 180 stickers. I know this because I am smart.

Student G

Problem

Monica had 27 M&M's. She had 15 more peanut M&M's than regular M&M's. How many regular M&M's did she have?

Solution

Monica had 15 peanut M&M's and 12 Regular M&M's. I know this because I subtracted the 15 Peanut M&M's that it tells me about from the 27 total she has and I get 12.

Student H

Problem

April has 42 cupcakes that she wants to share with her 6 friends. How many does each friend get if she shares them equally?

Solution

Each get 7 because I drew a picture of the friends and a picture of the cupcakes.

Name_____ Student _____

Checklist

- ☐ Does their answer make sense?
- ☐ Did they calculate correctly and add units?
- ☐ Is their answer reasonable?
- ☐ Did they explain their thinking and justify their work?
- ☐ Did they restate the question in the answer?

you're the Teacher!

Now that you have looked over your student's paper, what would you say needs to be changed? How would you suggest changing it? Write that below as specific as possible.

_____

_____

_____

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_____

_____

_____

Name_____ Student _____

Checklist

- ☐ Does their answer make sense?
- ☐ Did they calculate correctly and add units?
- ☐ Is their answer reasonable?
- ☐ Did they explain their thinking and justify their work?
- ☐ Did they restate the question in the answer?

you're the Teacher!

Now that you have looked over your student's paper, what would you say needs to be changed? How would you suggest changing it? Write that below as specific as possible.

_____

_____

_____

_____

_____

_____

_____

Anchor Chart

Be A problem Solving

Stop - Don't RUSH with any solution. Take time to look everything over.

Think - Take time to think about the problem and solution.

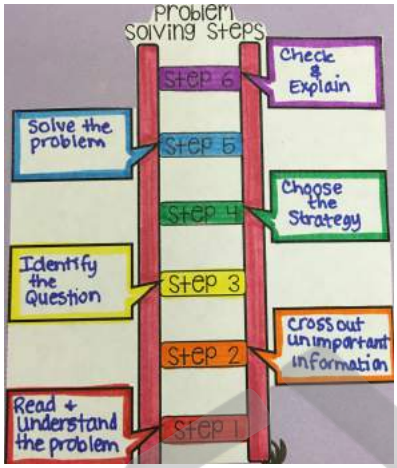
Act - on a strategy and try it out.

Review - look it over and see if you got all the parts.

The Lap Book Directions

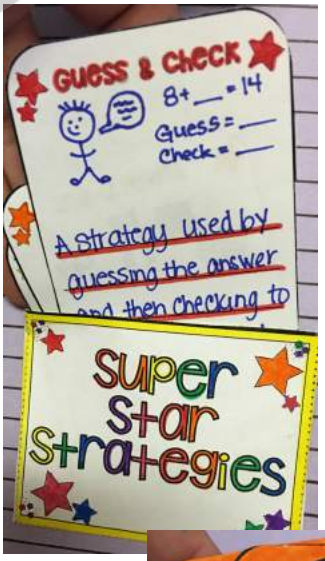
Materials:

*File Folder (per Student)
*Scissors
*Glue
*Colored Markers, Pencils, or Crayons
*Copies of Lap Book Pages (per Student)



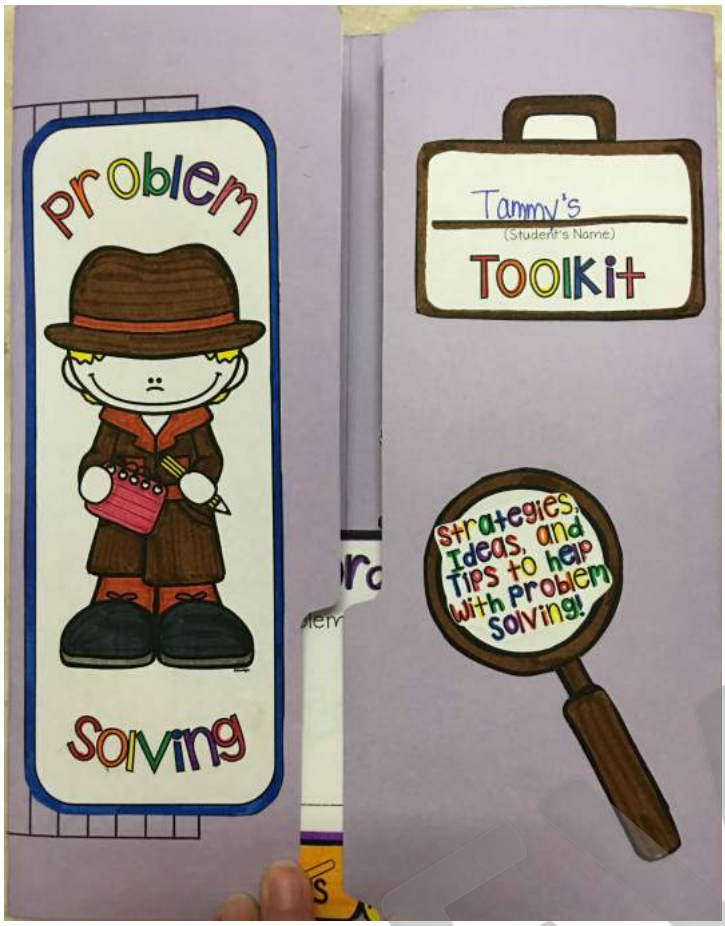
Folding the Folder:

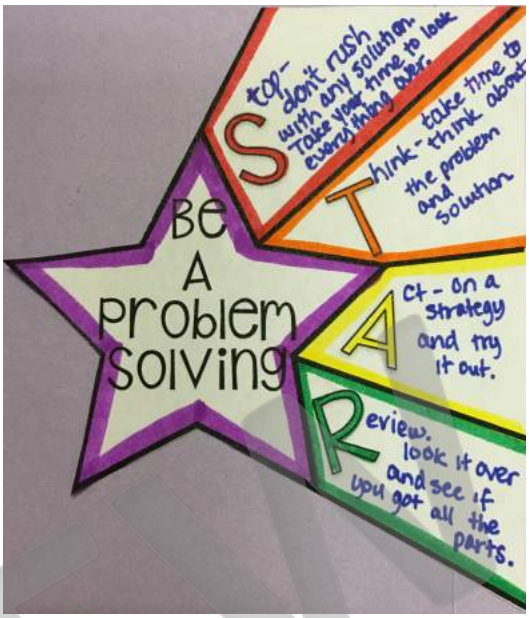
*Open the File Folder
*Fold each side toward the inside center crease
*Press firmly on the new creases to create new "doors" to your lap book.



Creating the Lap book: A Few Tips

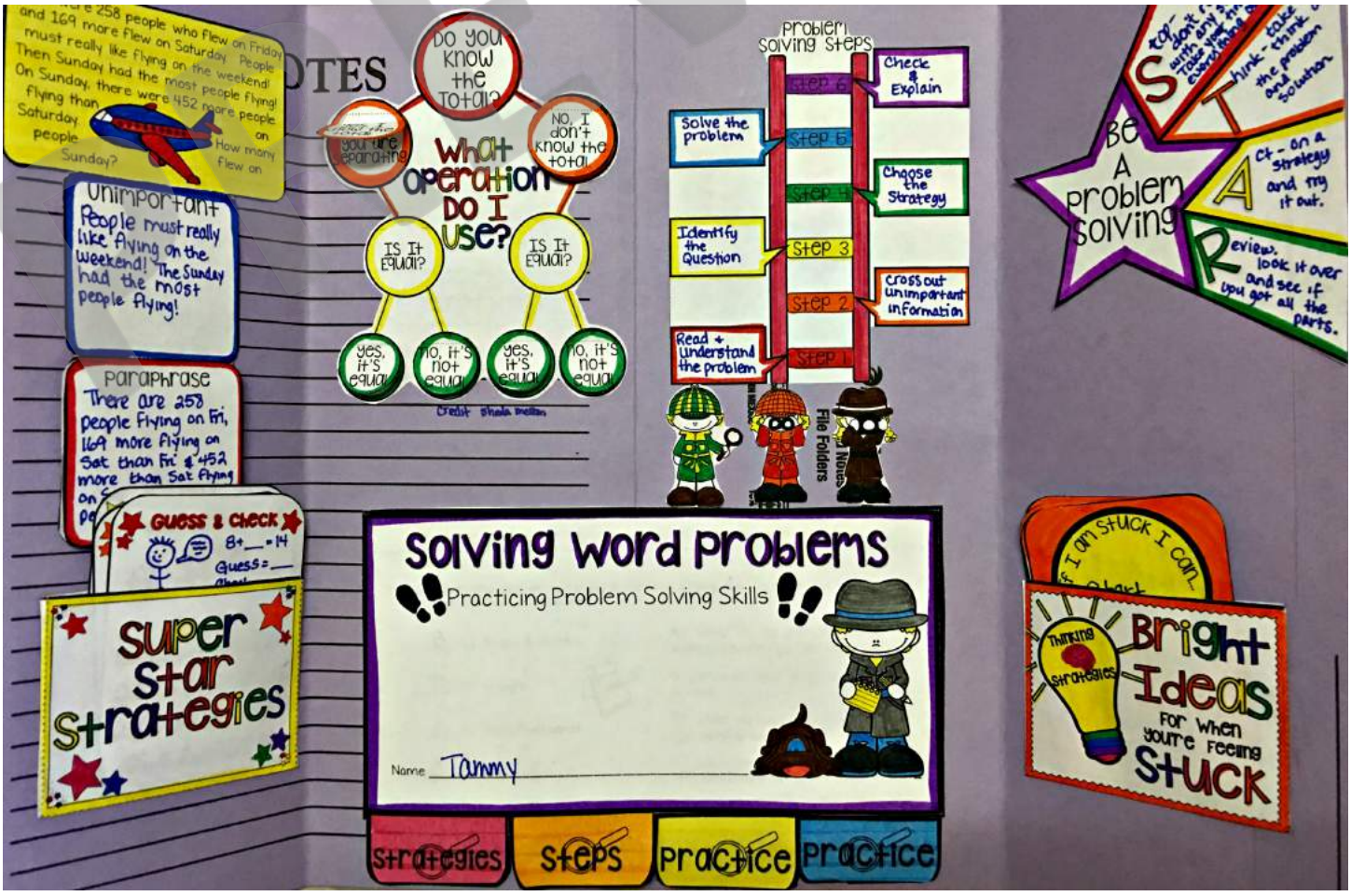
*Have students decorate and complete their lap book materials BEFORE cutting and gluing.
*Have students glue and attach on the inside of the lap book first.
*Students should reference their notes and the class anchor charts to help construct their lap books.
*When creating the envelope pockets, have students glue on the pocket flaps only so that they can place the cards inside without any problems. Remind them to wait for the glue to dry before inserting the cards.
*After students complete the inside of their lap book, they then decorate the front flaps. Students can add decorative border so it doesn't look so "empty."
*Some cards can be filled out during their corresponding lessons.





Outside Cover. Add doodles or borders if desired. I don't recommend using a file folder that has lines in it like I did. ☺

Inside. You can change up the location of each piece if desired. There are extra parts and choices.



A Special Thank You!

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Happy Teaching!

Tammy

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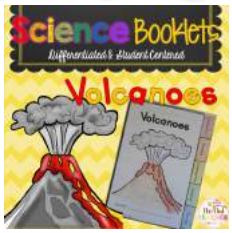
Science Picture of the Day



Tabbed Booklets

State Research Project

Credits

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