

# Jolly Rancher Division 3 Act Task

Based on the Japanese Concept of one overarching problem

## Rationale

I constructed this lesson after reading about the Japanese method of structuring math lessons around a specific problem that emphasizes a skill as well as building critical thinking and communication skills which connect to the core competencies. I have also built on the work of Dan Mayer in using three act tasks which builds students curiosity and engagement. Three act math tasks are a problem often involving a video or image with minimal numerical information to provoke curiosity (Mayer, 2017). “, Japanese teachers use problem solving not only for lessons that focus on developing problem-solving skills and strategies but also throughout the curriculum in order to develop mathematical concepts, skills, and procedures,” (Takahashi, 2006). The three act task blends with the Japanese approach of using a problem to teach key mathematical skills by allowing students the opportunity to work through the problem and build their understanding in pairs and small groups before joining a class discussion. The three act tasks also meet the Japanese criteria of being carefully selected to build a desired skill, as well as to promote creativity and curiosity. This is also a collaborative process as students work with their elbow pairs, small groups and finally the whole class allowing students to have a chance to discuss their thinking and build their confidence when sharing their thinking.

## Big Idea:

- Development of computational [fluency](#) and multiplicative thinking requires analysis of patterns and relations in multiplication and division. (British Columbia Ministry of Education, 2002)

## Curricular competencies:

- **Reasoning and analyzing**
  - [Estimate reasonably](#)
  - Develop [mental math strategies](#) and abilities to make sense of quantities
  - [Model](#) mathematics in contextualized experiences
- **Understanding and solving**
  - Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
  - Develop and use [multiple strategies](#) to engage in problem solving

- **Communicating and representing**
  - [Communicate](#) mathematical thinking in many ways
  - Use mathematical vocabulary and language to contribute to mathematical discussions
  - [Explain and justify](#) mathematical ideas and decisions
  - Represent mathematical ideas in [concrete, pictorial, and symbolic forms](#)
- **Connecting and reflecting**
  - [Reflect](#) on mathematical thinking

Curricular content:

- [multiplication and division](#) of two- or three-digit numbers by one-digit numbers

SWBAT:

- Divide two digit numbers by one digit numbers using long division

Success criteria:

- Fairly share the jolly ranchers between the 3 grade 4 classes
- Know the steps to the long division algorithm
- Use the long division algorithm to solve problems

## Lesson

Prompt:

This container of Jolly ranchers must be shared between 3 classes.



Lesson Part	Activity	Materials	Adaptations
Introduction	<ul style="list-style-type: none"> <li>• Number of the day – 99 (McCoy, Barentt, &amp; Combs, 2013)</li> <li>• Students model and describe the number of the day in as many ways as possible</li> <li>• Share answers on smart board</li> </ul>	<ul style="list-style-type: none"> <li>• Student math tool boxes</li> <li>• Smart board</li> <li>• Computer</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage use of manipulatives</li> <li>• Have students show their understandings visually</li> </ul>
Warm up	<ul style="list-style-type: none"> <li>• Give each student 1 jolly rancher</li> <li>• Students make observations about the jolly rancher (encourage math observations and measurements)</li> <li>• Don't eat the Jolly Rancher</li> </ul>	<ul style="list-style-type: none"> <li>• Jolly ranchers</li> <li>• Smart board</li> </ul>	<ul style="list-style-type: none"> <li>• Sentence frames</li> <li>• Questions to answer</li> <li>• Graphic organizer</li> </ul>
Setting the stage for a task.	<ul style="list-style-type: none"> <li>• This container of Jolly ranchers must be shared between 3 classes.</li> <li>• There are 30 students in each class how many do we need?</li> </ul>	<ul style="list-style-type: none"> <li>• Container of Jolly ranchers</li> <li>• Student white boards</li> </ul>	<ul style="list-style-type: none"> <li>• Sentence frames</li> <li>• Question stems</li> <li>• Multiplication charts</li> <li>• Calculators if needed</li> </ul>

Lesson Part	Activity	Materials	Adaptations
act 1	<ul style="list-style-type: none"> <li>• Students write down observations on white boards</li> <li>• Think – pair -share with elbow buddy each pair shares one observation with class</li> <li>• Students write down questions on white board</li> <li>• Think – pair – share with elbow buddy each pair to share one question</li> <li>• Hand out sticky notes</li> <li>• On your sticky write down in pen your best estimate / guess for how many, put it in the corner of your desk and don't touch it. We'll get back to it later.</li> <li>• Share estimates – chart on board / chart paper</li> <li>• Which do we think is closest? Why?</li> <li>• Which do we think is furthest? Why?</li> </ul>	<ul style="list-style-type: none"> <li>• Image 1</li> <li>• Smart board</li> <li>• Student white boards</li> <li>• Sticky notes</li> <li>• Pens</li> <li>• Chart paper</li> <li>• Chart pens</li> </ul>	<ul style="list-style-type: none"> <li>• Sentence frames</li> <li>• Question stems</li> <li>• Multiplication charts</li> <li>• Teacher guidance to do estimates</li> </ul>
Act 2	<ul style="list-style-type: none"> <li>• What information do we have?</li> <li>• What information do we need?</li> <li>• Miss Younger counted the Jolly ranchers in the container we have 99</li> <li>• What new information do we have?</li> <li>• What new questions do we have?</li> <li>• How could that help us?</li> <li>• You have all on the information you need</li> </ul>	<ul style="list-style-type: none"> <li>• Student white boards</li> <li>• Smart board</li> <li>• Chart paper</li> <li>• Chart pens</li> <li>• Student white boards</li> </ul>	<ul style="list-style-type: none"> <li>• Sentence frames</li> <li>• Question stems</li> </ul>

Lesson Part	Activity	Materials	Adaptations
Act 3	<ul style="list-style-type: none"> <li>• Work on your own to create a problem</li> <li>• May use any tool in classroom</li> <li>• Students work to solve problems in groups of 3 following the ideas in building thinking classrooms (Liljedahl, Building Thinking Classrooms, 2020) <ul style="list-style-type: none"> <li>○ Visibly random groups</li> <li>○ Vertical whiteboards – 1 pen per group</li> <li>○ Adults only answer keep thinking questions</li> </ul> </li> <li>• Should have 33 as the final answer</li> <li>• How many does each class get? How do you know?</li> </ul>	<ul style="list-style-type: none"> <li>• Smart board</li> <li>• Chart paper</li> <li>• Student white boards</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage drawing pictures or diagrams</li> <li>• Use manipulatives</li> <li>• Purposeful groupings</li> <li>•</li> </ul>
Discussion	<ul style="list-style-type: none"> <li>• What questions did we answer?</li> <li>• What new questions do you have?</li> <li>• How did our questions help us solve the problem?</li> <li>• What made you curious about this problem?</li> <li>• What went well?</li> <li>• What was challenging?</li> </ul>	<ul style="list-style-type: none"> <li>• Smart board</li> <li>• Chart paper</li> </ul>	<ul style="list-style-type: none"> <li>• Sentence frames</li> <li>•</li> </ul>

Lesson Part	Activity	Materials	Adaptations
3 act response	<ul style="list-style-type: none"> <li>• In student math note books               <ul style="list-style-type: none"> <li>○ Describe what we did</li> <li>○ Write a problem to describe the image</li> <li>○ Write three clues to help someone solve the problem</li> <li>○ What was your initial guess?</li> <li>○ How close was your guess to the correct answer?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Math note books</li> </ul>	<ul style="list-style-type: none"> <li>• Sentence frames</li> <li>• Math vocabulary on word wall</li> <li>• Photos of the container</li> <li>• Journal template if needed</li> </ul>
Teacher lead	<ul style="list-style-type: none"> <li>• We used division to share the candies. We can do this with a set of steps known as long division</li> <li>• Go through steps together and teach actions</li> </ul>	<ul style="list-style-type: none"> <li>• Smart board</li> </ul>	<ul style="list-style-type: none"> <li>• Graph paper</li> <li>• Grid / boxes on practice page</li> </ul>
Pair work	<ul style="list-style-type: none"> <li>• Give pairs a question to solve using long division together</li> </ul>	<ul style="list-style-type: none"> <li>• White boards</li> <li>• Smart board</li> </ul>	<ul style="list-style-type: none"> <li>• Purposeful pairing</li> <li>• Long division template for dry erase sleeves</li> </ul>
Independent work	<ul style="list-style-type: none"> <li>• Students complete work sheet</li> </ul>	<ul style="list-style-type: none"> <li>• Work sheets</li> </ul>	<ul style="list-style-type: none"> <li>• Selected questions</li> <li>• 1 by 1 digit for specific student</li> <li>• Use manipulatives</li> <li>• Teacher to copy onto graph paper</li> </ul>

Lesson Part	Activity	Materials	Adaptations
Extensions	<ul style="list-style-type: none"> <li>• Create your own sharing long division problem on your desk using any object / manipulative in the room.</li> <li>• Take a picture with an iPad</li> <li>• Upload to Teams for other students to solve</li> <li>• Create a video or clip describing how to solve your problem you created</li> </ul>	<ul style="list-style-type: none"> <li>• Ipads</li> <li>• Student choice of manipulatives</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
Closing	<ul style="list-style-type: none"> <li>• Self assessment <ul style="list-style-type: none"> <li>○ Students complete recipe exit ticket ( see attached) (The Owl Teacher, 2014)</li> <li>○ Must complete before recess</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Exit slips</li> </ul>	<ul style="list-style-type: none"> <li>• Word wall</li> <li>• Scribe as needed</li> <li>• Use technology to assist where possible</li> </ul>

### Assessment

- Check in with pairs about their progress as they solve the problem, have them explain their thinking and understanding
- Formative assessment to see who is understanding and beginning to get the steps of long division.

### ELL Considerations

- Post important vocabulary to the word wall and review before the start of the lesson
  - Use illustrated word wall cards
- Have math question stems and sentence frames posted or taped to student desks
- Use consistent language to describe thinking across all subject areas
- Pre teach asking and answering questions as well as sharing opinions



### Question and response stems

- How many \_\_\_\_\_?
- I observed \_\_\_\_\_
- I noticed \_\_\_\_\_
- I agree with \_\_\_\_\_ because \_\_\_\_\_
- I disagree with \_\_\_\_\_ because \_\_\_\_\_
- This is how I did it \_\_\_\_\_
- Why did you \_\_\_\_\_?
- How did you get that answer?
- Do you agree?
- How did you know?
- I know because \_\_\_\_\_
- I wonder if \_\_\_\_\_
- What strategy did you use?
- My strategy is \_\_\_\_\_
- What would happen if?
- Have you thought about?
- Do you see a pattern?
- The pattern I notice is \_\_\_\_\_
- I started by \_\_\_\_\_

### Aboriginal Considerations

- Make connections to traditional foods
- Sharing of resources was common in all cultures
- Follow up with division bead lesson from <http://aboriginalperspectives.uregina.ca/workshops/workshop2010/division1.shtml>

### Dyscalculia or Learning Disabilities

- Provide multiplication tables and charts
- Use calculators if needed

- Conference with students
- Scribe answers
- Use talk to text for journal responses
  - o Print and glue into notebook
- Use snap type pro on the iPad to complete written worksheet
- One to one conferencing and conversations

### Extensions for gifted students


- See ideas in the extensions section
- Students to figure out how many Jolly ranchers would be needed for the whole school
- Represent each colour as a fraction or percent of the total
- Graph the number of each colour

### Assessment strategies

The assessment for this activity is formative as it is my introduction to long division and dividing larger numbers. Much of my assessment in this activity would be based on my conversations with my students as they are working and as I circulate between groups as they solve the problem. Using my conversation and the idea of “leveling to the bottom” (Liljedahl, Building Thinking Classrooms, 2020) allowing all groups to reach a minimum point in their exploration of a topic while challenging groups that have gone further. By allowing all groups to discover a common minimum point it gives every student a point from which to enter the conversation about the problem. At the end of the lesson, I would collect student’s exit tickets and then towards the end of the week I would collect student notebooks and look at their journals. I do not collect and read every math journal as it is a place for my students to record their thinking and refer to. I select which ones I will assess and let students know ahead of time that that journal entry or set of questions will be handed in. while students are working on journals and the worksheet I would be conferencing with individuals about their understanding or working with small groups to provide more scaffolding or build skills. My small groups use a lot of in the moment formative assessment as I work with my groups and adapt the activity and my questions to their understanding.

## Assessing for participation in mathematical conversations and rich tasks

Adapted from (Liljedahl, Building Thinking Classrooms, 2020)



<ul style="list-style-type: none"> <li>- Closed to others ideas</li> <li>- Disrespectful of others</li> <li>- Actively excluding</li> <li>- Hogging the marker</li> <li>- Discouraging</li> <li>- Leaving the group / wandering the room</li> <li>- Does not use mathematical language</li> <li>- Does not contribute to the conversation</li> </ul>	Collaboration	<ul style="list-style-type: none"> <li>- Open to other's ideas</li> <li>- Respectful of others</li> <li>- Actively including</li> <li>- Sharing the marker</li> <li>- Encouraging</li> <li>- Staying with the group for the whole problem / task</li> <li>- Uses mathematical language</li> <li>- Contributes positively to the conversation</li> </ul>
<ul style="list-style-type: none"> <li>- Gave up when things got tricky</li> <li>- Asked stop thinking questions</li> <li>- Did not look for hints</li> </ul>	Perseverance	<ul style="list-style-type: none"> <li>- Stuck with the problem</li> <li>- Asked keep thinking questions</li> <li>- Looked for a hint</li> </ul>
<ul style="list-style-type: none"> <li>- Uses a single previously known strategy</li> <li>- Waits to be given a clue to get started</li> </ul>	Risk taking	<ul style="list-style-type: none"> <li>- Tries multiple solutions or approaches</li> <li>- Gets started right away</li> <li>- Creates own strategies</li> </ul>

When reading about assessment in Building Thinking Classrooms Liljedahl recommends minimizing text on a rubric, as well as using an arrow instead of a performance scale. I like using an arrow because it indicates the direction, we want students to go with out using words that may add value judgment it simply shows a direction that we hope students will move. I added the middle box to allow room to make comments and observations in. some behaviours on this rubric would need to be explicitly discussed with my class and have T charts made for each. I would want to have a looks like / sounds like chart for being open to other's ideas, respectful behaviour and actively including others. I would expect that actively including extends beyond the classroom and to what happens on the playground.

## Assessing exit slips

I would collect the exit tickets and look for patterns in student responses. Were the students able to write the steps of long division as the directions? Who used an example of how they solved the problem? Did students list ingredients that made sense for what they were doing. My hope is that students would solve a sample problem in their exit ticket.

As an alternative to the listed exit ticket, I may post a single question on the board and have student solve them on index cards and turn in the one question. I would then follow up the next day with a My Favourite No routine where I copy a student solution on to the board and as a class, we look first at what they did well then look at where the mistake was made and have the students correct the mistake. I have found this routine helpful and a quick and easy way to review a concept or skill as part of our warmup for math. We always start with what worked because usually students do more well, and we build confidence for all students by looking at how much we know first then making corrections.

## Bibliography

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