New Mexico Agriculture in the Classroom

The Great Pumpkin Smash by Lori Haskins Houran

Ag Literacy Project with FFA, 4-H or Volunteers

Lesson Plan

Introductory Concepts to NGSS: Motion & Stability

K-2nd K-PS2-2 (Pull of an object increases distance travel) and
K-2nd ETS1-2 (Engineering Design)
3-5th 3-PS2-1 (Unbalanced Forces)
*Expand on and explore full standard after presentation www.nextgenscience.org

Common Core Standards – English

K.RI.1	**2.RI.1**	**4.RI.1**
1.RI.1	**3.RI.1**	**5.RI.1**

Lesson inspired by Illinois Ag in the Classroom

Book

The Great Pumpkin Smash is a book about agriculture (composting) and engineering. "For Luke, autumn in Florida feels weird. There are no changing leaves, no cider, and worst of all, no pumpkin chucking! But maybe Luke can engineer a way to bring some pumpkin spice to the south." The *Makers Make It Work* series offers fun and easy-to-read stories that focus on problem-solving and hands-on action.

How the Project Works

Groups, organizations, and/or individual volunteers will read to students in K-5 classrooms and completes a simple hands-on activity with the students. The classroom will get to keep the book, lesson plan, "Ag Mag", and additional and/or follow-up opportunities can be provided.
Suggested time; approximately 1 hour (longer if students have questions or comments).

Checklist

- ☐ Make sure you have ALL your supplies you need to present: PPT, complete Materials Kit, handouts (k-2 or 3-5), & evaluation form for the teacher to fill out.
- ☐ Give Teacher Evaluation Form to the teacher, BEFORE you start.
- ☐ Ask the teacher to take photos (back of students only), and email those in to agclass1@nmflb.org. These can be used on our social media pages, or for presentations to showcase the impact of this project.
- ☐ Collect the Evaluation Form and take it with you OR they can email it after your visit agclass1@nmflb.org
- ☐ Clean up presentation area – leave things better than how you found it.
- ☐ Have a great time & remember to smile! These students are so fortunate to have you visit their classroom.
- ☐ Scan/Email (agclass1@nmflb.org) the Participation Form once you have completed all presentations.

Supplied Materials in Kit:

- 1 Paperback Book – *The Great Pumpkin Smash*
- 1 Pumpkins Ag Mag (By *Illinois Ag in the Classroom*)
- 100 Popsicle Sticks (50 reg. & 50 super)
- 50 Rubber Bands (various sizes)
- 20 Spoons (10 reg. & 10 long handled)
- 20 Pumpkin Candies
- 10 Cotton Balls
- Stack of Post It Notes
- 2 Safety Glasses for students testing catapults
- All additional handouts and resources are available online to print.

Not supplied, but recommended as additional visuals to help students in the learning process:

- TAPE – to mark target lines on the floor (to launch items to/past)
- Real pumpkin as a prop (or plastic pumpkin decorations – found at the "dollar" or crafting stores)
- *Examples of everyday products that come from agriculture or show pictures on PowerPoint.*

Part 1: Intro/Recruit for Future Agriculturists & Community Leaders *(Time: 5 minutes)*

1. Briefly introduce yourself and talk about your program (FFA/4-H/volunteer group/organization volunteer).
   Suggestion: *Visuals help! If you live on a farm or ranch, bring props! Ex: crop samples or photos of the farm, hand-held equipment, buckles, ribbons, or plaques from FFA/4-H/volunteer activities*
2. Discuss your connection to agriculture. If you weren't involved in agriculture prior to FFA/4-H, explain what FFA/4-H has done for you and/or what you look forward to doing through related volunteer activities.
3. Encourage students to consider joining FFA/4-H/volunteer group!
   *Remind them that they don't have to live on a farm or ranch to be in FFA/4-H!
   Enthusiastically high five your presentation partners for joining such a great organization.

Part 2: What Is Agriculture? What is Engineering? *(Time: 5 minutes)*

Suggestion: *Bring examples of everyday products that come from agriculture and/or show pictures on PowerPoint.*

What is Agriculture?

1. Ask students to raise their hand if they….
   - Beg your parents at the grocery store to get your favorite foods (like spinach, & broccoli)
   - Have ever bought flowers
   - If you have ever worn jeans, t-shirts, socks, or underwear
   - Have ever taken medicine
   - Have you ever ridden in a vehicle that uses fuel (gasoline)
   - (Next Slide) Have you ever seen or heard of the word 'agriculture'?
     - Do you know what it means?
2. Say, "*Agriculture is SO important that we cannot live without it, and it has to do with the things we just mentioned and so much more!"* Tell students the following:
   Agriculture is very easy to remember because it mainly consists of two groups of living things:
   - Plants/Crops (plants that a farmer will grow on his/her land – corn, chile, cotton, i.e.)
   - Animals/Livestock (animals you would see on a farm that we can utilize for food, clothing, i.e.)
3. Say, "*Why are **animals/livestock** important?*" (They provide us with food like milk, meat, eggs, and clothing too!)
   "*Who raises these animals?*" (Farmers and Ranchers)
4. Say, "*Why are **plants/crops** important*?" (Provide healthy food for us to eat, food for animals, give us clothes to wear like cotton, give us medicine, ex. Ginger root-great for upset stomach).
   "*Who grows these plants*?" (Farmers)
5. Tell students that today we are going to focus on the plant/crop part of agriculture by reading a story about pumpkins. Then say, "*How many of you like to eat food dishes made with pumpkin, or decorate with them?"*
   Examples include pumpkin pie, pumpkin sweet rolls, or decorating with Jack-o'-lanterns, etc.

What is Engineering? *(Top part of "I'm an Engineer" handout can be used here)*

1. **Engineering** is the process of creating and building structures, products, and systems by using math and science!
2. **Engineers** design and build things, such as toys, phones, cars, bridges, TRACTORS, and your backpack. All these things and more were created by engineers.
3. **Engineers** ALSO solve problems with their inventions.
   - Can you think of other items you use every day that were made by engineers?
4. Say the following (including steps 1-6), "Look at this diagram with me."
   1. *(Pink)* First, as an **Engineer,** we need to **ASK** questions ("What needs to be created/modified/fixed?).
   2. *(Purple)* Next, we **IMAGINE** how this item can be created or improved.
   3. *(Blue)* Then, we lay out a **PLAN** for how this item will be built or changed.
   4. *(Teal)* Now, we get to **CREATE** the item (whether it's fixing it or building the first version).
   5. *(Green)* After creating, we take a step back to **REFLECT**, to test, and see how our invention looks & functions. Does it work the way we intended it to?
   6. *(Orange)* Finally, we **IMPROVE** on our creation, where it is needed & REPEAT the ENGINEERING PROCESS again.

Part 3: Book Reading *(Time: 10 minutes)*

PRACTICE reading the book before your class visit. Make it exciting and remember time yourself to keep a good pace!

1. Introduce story. "For Luke, autumn in Florida feels weird. There are no changing leaves, no ciders, and worst of all... No pumpkin chucking! But maybe Luke can engineer a way to bring some pumpkin spice to the south. Do you think he can do it??
   *Be sure and listen for important words such as:
   Pumpkin, Farm, Engineer, Miniature Catapult, Composting, and Problem-Solving
   (Have the slide up that shows these words & pictures – for recall after the book is read)
2. *Show off the great images in the book!*
3. *Timekeeper – Keep track of time.*
4. After the book is read and *if there is time, ask these questions:*
   a. *What are some things you noticed that Luke and his friend Ben did to **ENGINEER** their catapult?*
   b. Do you remember hearing any of the "important words"?

BRAIN BREAK (Stand, Stretch & Dance) *(Time: 5 minutes)*

1. Peterson Farm Brothers parody song (embedded in PPT): A Fresh Breath of Farm Air
2. *Optional* **CONTEST:** See which student can do the best Peterson Bro rendition of the "Running Man". Encourage them to use their arms and legs to help get the wiggles out. ☺ Remember, elementary students learn well by example! GET MOVING!!!
3. Give a round of high fives for a job-well danced!
4. Get students seated and ready for more learning by saying, "Great job, boys & girls, now we're going to learn about pumpkins and our natural resources."

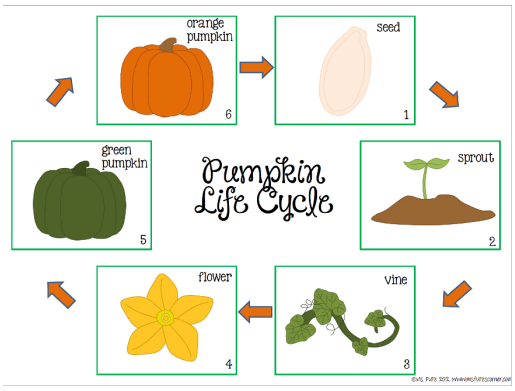
Part 4: Pumpkins & Natural Resources *(Time: 10 minutes)*

Natural Resources

1. Say, "Crops, like pumpkins, and livestock animals grow best when they get just the right amount of FOUR things that we get naturally on our Earth. What four natural resources do plants and animals need to grow?" *Give the hint:* Start from the ground up. (Pictures of all four will pop up on PPT with each new click: **WATER, AIR, SUN, AND SOIL**.)

Pumpkins (*Top & middle parts of "I Know Pumpkins" handout can be used here). Words that are BOLDED are to be filled in or traced over on the handout.*

1. Pumpkin Vocabulary:
   1. **Seed –** The life holder, with plenty of water, sunlight, air, and rich soil, the pumpkin seed grows into a pumpkin vine.
   2. **Vine –** Long flexible stem that grows along the ground where the blossom and leaves grow (and eventually, the pumpkin will grow on it, too).
   3. **Blossom –** A female flower that gets pollinated by insects will begin the start of the growing pumpkin.
   4. **Pollination –** The transfer of pollen from the male anther to the female stigma.
   5. **Mature Pumpkin –** Pumpkins that are finished growing and have a hard rind.
2. Pumpkin Facts
   1. Pumpkins are considered a type of **squash** or a **gourd**.
   2. They can be **big**, or they can be **small**.
   3. They can be oblong, **round**, or squished around the sides.
   4. The **seeds** are on the inside of the pumpkin.
   5. Pumpkins can be **orange**, **white**, or hues of **blue** or **brown.** If pumpkins are **green,** they're not ripe yet.
   6. The heaviest pumpkin ever grown weighed **2,624 lb**.
3. Types of Pumpkins
   1. **Pie** – *Pumpkin Pies*
   2. **Jack-O'-Lantern** – *for carving*
   3. Processing – *canned pumpkin puree (for pies, too)*
   4. Specialty – *like Cinderella and Fairytale*



5. **Giant** – *popular for growing competitions*
6. Miniature

How do we use pumpkins?

1. Decorating: For seasonal and holiday use, like Halloween or Thanksgiving!
2. Eating: Do you like pumpkin pie?
   - Pets and livestock animals enjoy eating pumpkins. Make sure they aren't rotting, covered in candle wax, or painted.
3. Composting
   1. Instead of throwing your pumpkin in the trash, compost it!
   2. It will take about 8-12 weeks for the pumpkin pieces to completely break down.
      a. This is about the same length of time as summer break.
   3. After a pumpkin is composted, it returns to the soil as fertilizer for new plants (crops).

Part 5: Become and ENGINEER with AGRICULTURE! *(Time: 20 minutes)*

Design a catapult model that will launch pumpkins and other items.

What will we use to build our catapults?

Time Allotment

- 3 minutes to explain the instructions & pass out materials
- 10 minutes to construct their catapult
- 7 minutes for testing and documenting data

List of Materials

- Popsicle Sticks (regular or super)
- Rubber Bands (various sizes)
- Plastic Spoons (regular & long handled)
- Tape on the floor "target lines" to launch object to/past

Launching Items

- Small pumpkin-shaped candy
- Cotton ball
- Crumpled paper

Say, "Students will work in pairs or groups to create a working catapult to launch various items to/past the marked locations on the floor, OR to the "Catapult Launch Target" sheet (*supplied in printable materials).* *The catapult can be built to their creativity but let them know that a max of 2 people may present their catapult during the CATAPULT TEST TIME: one person will hold it still on the ground behind the initial "Launch Line" while the other loads and launches the item.

For K-2nd graders (and should 3rd-5th graders need assistance in creating a catapult after a few minutes of CRITICAL THINKING and EXPLORING in their groups), here is an easy-to-follow instructions on the construction of a basic catapult.

Design Steps

- Step 1 – Make a stack of 7 popsicle sticks and use rubber bands to tie them together on both ends.
- Step 2 – Make a stack of 2 popsicle sticks and use a rubber band to tie them together on one end only.
- Step 3 – Pull the 2 popsicle sticks apart and wedge the stack of 7 popsicle sticks between them.
- Step 4 – Use 2 rubber bands, secure the plastic spoon to the upper popsicle stick.
  *To modify the design, use the extended handled spoon.
- Step 5 – Place the launching object onto the spoon. Hold the catapult with on hand, use the other hand to push down on the spoon. *Those testing should wear safety goggles.
- Step 6 – Release the spoon and watch.

Words to Know & Use – When Launching Catapult

- **Potential Energy** - Energy that is stored up and ready for use.
  - AKA - Energy that's "Waiting to Go".

    - When we pull the spoon back and hold it in place, that has "Potential Energy" because we are adding pressure to the spoon that is ready to force it back to return to its' original spot (speed and intensity are based on how far back you pull your spoon).
- **Kinetic Energy** - Energy that is in motion and being used.
    - When we release the spoon from holding it back with the item we're going to launch, it will use "Potential Energy" that's stored up to propel the item through the air, which showcases the amount of kinetic energy it held.

Say, "When we get ready to test our catapults, we will say outload what form of energy we're working with."

- When we're moving the spoon back and holding it in place, we will say, "Potential Energy – Engaged!"
- When we're ready to release the spoon from its holding place, we will say, "Kinetic Energy – Action!"

CATAPULT TEST TIME

Allow 2 representatives from each group to line up to test their catapult from behind the initial "launch line". Students will launch all 3 items (pumpkin candy, cotton ball, and crumpled paper), and will mark the distance down using their handout, at the bottom, called "Catapult Bar Graph – Test and Record".

**If there is enough room to spread out, more than one group may go at a time, but we encourage only one group at a time, so items launched don't get mixed up and safety goggles are used.*

IF THERE IS TIME: Here are 2 options to continue the learning process

1. Have the class decide which catapult out of the group performed the best. There are long-handled spoons in the kit. Switch out spoons and relaunch one item (from that ONE CATAPULT) and the class will mark the distance that item traveled on their form where it's labeled "longer spoon".

&/or

2. After everyone has launched their items, have them sit down and ask them, "Thinking like an engineer, how can we improve our catapults and make it better/stronger to help launch our items further next time?"
    - Example of an issue or restriction: Let's imagine that we have a student that has his arm in a sling or a cast, preventing him from using one hand. What modifications would need to be made so he could still launch a pumpkin?

Part 6: Wrap-Up & Recall (Time: 5 minutes)

- What is agriculture? _____ & _____
- What is engineering?
- Recall facts about pumpkins.
- Restate the four natural resources pumpkins need to grow.
- How can we use pumpkins? 1, 2, 3...
- Who are we? What program is visiting you today?
- Is agriculture something you use every day?
    - If yes, how?

******Please******

If you're able to take photos during the presentation, make sure no student faces are visible (back of heads are okay, as long as faces are not identifiable). We'd like to share your successes on social media, but we need to respect the privacy of the students and their families. THANK YOU!!!

Ask if students have questions.

1. Tell the class that you will be leaving the "The Great Pumpkin Smash" book in the classroom so anyone can re-read it later.
2. Thank the teacher and students for allowing you to visit, you hope to see them again soon, and if they took any pictures (having only the backs of the students heads) they can email those in to agclass1@nmflb.org.

FOLLOW-UP activities & resources that pair well with "The Great Pumpkin Smash"

LESSONS

- Pumpkins...Not Just for Halloween (k-2)https://newmexico.agclassroom.org/matrix/lesson/545/
- A Case of the Missing Pumpkin (k-2) https://newmexico.agclassroom.org/matrix/lesson/623/
- Storing Winter Squash (k-2) https://newmexico.agclassroom.org/matrix/lesson/824/
- Pumpkins...Not Just for Halloween (3-5)https://newmexico.agclassroom.org/matrix/lesson/131/
- 3 Sisters (3-5) https://newmexico.agclassroom.org/matrix/lesson/297/

ACTIVITIES

- The Great Pumpkin – Life Cycle https://newmexico.agclassroom.org/matrix/resource/441/

BOOKS

- The Life Cycle of a Pumpkin https://newmexico.agclassroom.org/matrix/resource/623/
- How Many Seeds in a Pumpkin? https://newmexico.agclassroom.org/matrix/resource/153/
    - AUDIO BOOK version – https://www.youtube.com/watch?v=tdViPybeP3c
- The Prized Pumpkin https://www.feedingmindspress.com/files/ThePrizedPumpkin_Book_SinglePage.pdf
    - AUDIO BOOK version – https://www.youtube.com/watch?v=ChrnO-8xY_g&list=PLsP1ZmsTobSekMFxElz-xYWqFs-QXIz3N&index=7
- ONLINE LEARNING (Read Along, Quizzes, English/Spanish options) https://www.agfoundation.org/files/the-prized-pumpkin/scormcontent/#/lessons/6VwLsTfTl7iYA6ExT0vGpiafpI47FRyA

VIDEOS

- The Physics of "Punkin Chunckin" https://www.youtube.com/watch?v=sXuQvAPwcOE
- Decomposing Pumpkin – Timelapse https://www.youtube.com/watch?v=LWF828lfARQ
- Pumpkin Facts http://www.history.com/topics/halloween/pumpkin-facts
- "No Water, No Food" (2021 Interview - News KOB4) Pumpkin & Chile Farmers in Corrales, NM https://www.kob.com/archive/farmers-concerned-about-drought-conditions/?utm_source=New+Mexico+Farm+%26+Livestock+Bureau&utm_medium=Email&utm_campaign=website
- Pumpkin Capitol of the World – Libby's *100% Pure Pumpkin From Farm to Can.* https://www.youtube.com/watch?v=Hft-zbqxeLM

RECIPES

- Pumpkin Pie in a Bag https://cdn.agclassroom.org/nm/teacher/lessons/pumpkin.pdf
- Skillet Toasted Squash Seeds https://newmexico.agclassroom.org/matrix/resource/1195/
- Pumpkin Cinnamon Rolls https://sallysbakingaddiction.com/pumpkin-cinnamon-rolls/

ADDITIONAL RESOURCES

- What Animals Can Eat Pumpkins https://www.vetpoultry.com/blogs/barn-talk-livestock-health-and-nutrition/can-pets-and-livestock-eat-leftover-halloween-pumpkins
- NM Farmers Markets "Harvest Calendar" - https://farmersmarketsnm.org/wp-content/uploads/NM-Harvest-Calendar_Color-English.pdf

Helpful Hints Before Your Classroom Visit

- Wear official dress! It looks sharp and promotes FFA/4-H. If you don't have official dress, wear a chapter or school-spirit shirt, etc.
- Practice! Prepare by reading the book and practicing the activity. You NEED to fit your presentation and activity within the time scheduled. Teachers have very busy schedules so please try to stick to your allotted time.
- Check in with the teacher. If possible, before your presentation, briefly visit with the teacher. Share a copy of the activity and ask if there are students that need special accommodations.
- Can everyone see and hear? Before you start reading, make sure all the students can see and hear the book so they will be good listeners.
- Walk around the room if students are at their desks.
- Pay close attention to the students' mood. Move along fast enough to maintain student's interest, but slow enough for all students to thoroughly enjoy the story.
- Most importantly, have fun! Enjoy this wonderful experience of reading aloud and teaching children about the importance of agriculture.

QUESTIONS:

Contact New Mexico Ag In the Classroom with any questions you may have on the Ag Literacy Project or to request a training session.

Britney Lardner, Program Coordinator agclass1@nmflb.org

Visit www.nmaitc.org for free lessons and resources

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