

# APPLE TEN APPLES UP ON TOP!

## OVERALL EXPECTATIONS

- Analyze social and environmental impacts of forces acting on structures and mechanisms.
- Investigate forces that act on structures and mechanisms.
- Identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.

## LEARNING GOALS

- Understand the different external forces that can affect a structure's stability (gravity, natural phenomena, etc.).
- Learn to form a hypothesis before conducting an experiment.
- Work in a group to increase collaboration and teamwork skills.

## RESOURCES

- Apples
- Computer/ Tablet
- Projector

## INTRODUCTORY ACTIVITY

- Show students the YouTube video "Ten Apples Up On Top" by Theo. LeSieg! A Storytime Read-Aloud!  
[www.youtube.com/watch?v=eTISlzL0jN4](http://www.youtube.com/watch?v=eTISlzL0jN4)

## MAIN ACTIVITY

- Following the video, have students seated in groups of 4-5 and divide apples evenly among the groups.
- Form a prediction with the students - Ask: "How many apples will your group be able to stack before the structure falls?"
- Write each group's prediction on the board.
- Give the students time to experiment with the apples. On a piece of paper, have the students draw a picture of the maximum height of their structure, or allow students to use technology to take photos.

## CONSOLIDATION

- Have each group share their picture with the class and how many apples they were able to stack before the structure falls next to their predictions.
- Ask the following guiding questions to guide class discussion: Why does the apple structure eventually fall? (Gravity). What types of natural phenomena could cause a structure to fall? (e.g., tornadoes, hurricanes, earthquakes, tsunamis). What types of materials could be used to help the apple structure withstand different forces?



# APPLE SCIENTIFIC METHOD – WHY DO APPLES BROWN?

## OVERALL EXPECTATIONS

- Use scientific inquiry/experimentation skills to investigate changes of state and changes in matter.

## LEARNING GOALS

- Understand how different liquids affect changes in apples.
- Understand the process of chemical reaction and chemical change.
- Apply knowledge to scientific inquiry.
- Know how to keep apples fresh.

## RESOURCES

- Apples
- Honey
- Lemon juice
- Mini bowls/trays
- Apple cutter/knife
- Appendix A

## INTRODUCTORY ACTIVITY

- Distribute Apples2 Worksheet (attached). Ask students to follow along throughout the discussion.

### SCIENTIFIC METHOD STEP 1

- ASK: What is the best way to keep an apple from turning brown?

### SCIENTIFIC METHOD STEP 2

- EXPLAIN apples brown due to process of oxidation

### SCIENTIFIC METHOD STEP 3

- TELL: Advise students of different solutions they will be provided
- FORM a hypothesis with the students
  - Which solution will slow down the process?
  - Which will taste the best?

## MAIN ACTIVITY

### SCIENTIFIC METHOD STEP 4

- Set out three bowls big enough to cover each apple slice with the solution.
- Put each solution in each bowl (one empty, one honey, one lemon juice)
- Cut an apple into eight-ten slices of approximately the same size
- Place an apple slice in each bowl.

### SCIENTIFIC METHOD STEP 5

- Wait approximately ten minutes before pulling the apples out of the solution. This is an estimated time frame. It is up to the teacher's discretion depending on how quickly the apples are browning.
- Pour the solution out and inspect each apple for brown color.
- Students should record levels on their handout.

## CONSOLIDATION

### SCIENTIFIC METHOD STEP 6

- Assist students with drawing a conclusion by asking;
  - Which one was more delicious?
  - Which solution kept the apple the whitest?

### EXTENDED LEARNING

- How does this apply to the real world?



**NAMES:** \_\_\_\_\_



## PROBLEM



## EXPERIMENT



## HYPOTHESIS



## RESULTS

[illegible]

# APPLE TOWER CHALLENGE

## OVERALL EXPECTATIONS

- Analyze social and environmental impacts of forces acting on structures and mechanisms.
- Identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.
- Understand the different external forces that can affect a structure's stability (gravity, natural phenomena, etc.).
- Evaluate the impact of society and the environment on structures and mechanisms, taking different perspectives into account.
- Measure and compare, quantitatively and/or qualitatively, the force required to move a load
- Use technological problem-solving skills to design, build, and test a frame structure
- Identify internal forces acting on a structure

## LEARNING GOALS

- Learn to form a hypothesis before conducting an experiment
- Work in a group to increase collaboration and teamwork skills
- Use various skills & items around the class to build a structure

## RESOURCES

- Projector
- Internet access (for YouTube)
- Apples (3 or 4 per group)
- Plastic rain gutters (optional)

*\*\*If you decide to have the students build their own ramp, they are to use resources around the classroom.\*\**



## INTRODUCTORY ACTIVITY

- Show students the YouTube video on Sir Isaac Newton's Discovery on Gravity from an apple falling from a tree [www.youtube.com/watch?v=jwPc0kK9VHU](http://www.youtube.com/watch?v=jwPc0kK9VHU)
- Have a class discussion on what internal/external forces made the apple fall from the tree.
- Show students "Crash Course" video on gravity [www.youtube.com/watch?v=ljRIB6TuMOU](http://www.youtube.com/watch?v=ljRIB6TuMOU)

## MAIN ACTIVITY

- Have students seated in groups of 4-5 and divide apples evenly among the groups.
- Have students predict on a rough lab report: Which size apple will roll the fastest? Will the angle of the ramp make the apples go faster or slower? Explain answer.
- Have students create/build different ramps around their tables and chairs (or anything else around the classroom).  
*Teacher Note: You can buy rain gutters as a ramp, but this is optional.*
- Have students record their results after each apple roll on each ramp.
- Students should repeat this process a few times on different ramps with different size apples.

## CONSOLIDATION

- Have students discuss their results of their group activity with the whole class.
- Ask Questions: Why do you think the bigger/smaller apples roll faster? Does the incline of the ramp make a difference on how fast the apple rolls? What did you try to make your ramps out of? Did any specific item work better for your ramp?
- Lab Report: Students will answer their questions from their predictions and use their results to create a concluding statement. Ensure they discuss what kind of ramp they made and how it held up in their experiment.
- Each student should hand in their own lab report.



# BROCCOLI CLASS PLANT

## OVERALL EXPECTATIONS

- Identify a variety of forms of energy and give examples from everyday life of how that energy is used
- Identify renewable and non-renewable sources of energy

## LEARNING GOALS

- Learn to form a hypothesis before conducting an experiment
- Work in a group to increase collaboration and teamwork skills

## RESOURCES

- Computer/tablet with internet access
- Broccoli seeds
- Planting pots (of various sizes)
- Potting soil
- Window with access to sunlight

## INTRODUCTORY ACTIVITY

- As a class, research when broccoli is typically grown, when it's harvested, and when it's prepared, etc

## MAIN ACTIVITY

- As a class you will plant broccoli seed(s) and observe and document the resources necessary for them to grow
  - How broccoli uses energy (water, sunlight, fertilizer)
  - Broccoli grows widespread - perhaps you may plant one seed in a wide pot or give each pot a different amount of water and watch/measure as a class throughout the science unit

## CONSOLIDATION

- The students can discuss how they felt throughout the planting process. This can launch a discussion about farming across the world and communities who grow food to survive. Additionally, students will understand differences and similarities to their own lifestyles and gain an appreciation of complications around the gathering of essential resources.



# CARROTS SCIENCE

## OVERALL EXPECTATIONS

- Evaluate the social and environmental impacts of processes used to make everyday products.
- Conduct investigations and demonstrate an understanding that explores the properties of matter and changes in matter.
- Evaluate the environmental impacts of processes that change one product into another product through physical or chemical changes.
- Assess the social and environmental impact of using processes that rely on chemical changes to produce consumer products, taking different perspectives into account (e.g., the perspectives of food manufacturers, consumers, landfill operators, people concerned about the environment) and make a case for maintaining the current level of use of the product or for reducing it.

## LEARNING GOALS

- Learn valuable information regarding the impact pollution has on the growth process of carrots. Plants, like humans, need certain elements for their survival. Plants need food, sunlight, air, and water to grow.
- Turn an old carrot into a science activity that will teach children how plants grow.

## RESOURCES

- Carrot seeds
- Two 2 Litre plastic bottles
- Water
- Rocks/pebbles
- Soil
- Sunlight
- Garbage (plastic, cans, etc.)

## INTRODUCTORY ACTIVITY

- Explain to students the itinerary of the lesson. Discuss with the students that they will be growing two carrots in two different environments. One grown in a 2 Litre bottle that is free of pollution and the other will contain remnants of pollution (i.e., garbage).
- Prior to performing the main activity, discuss with students what they think will happen in both environment (hypothesis)
- Show youtube video:  
[www.youtube.com/watch?v=V0IQ3lj140](http://www.youtube.com/watch?v=V0IQ3lj140)

## MAIN ACTIVITY

- As the teacher is assembling the two growth environments (see attached resource), students can discuss why they are constructing each environment with the resources in a certain order.
- Terrariums are a self-contained environment. Once they are established, they need nothing from the outside except a little indirect sunlight. If it is placed in the right amount of sunlight, they thrive without water for several days to a few weeks. Moisture in the Terrarium evaporates from the soil and plant leaves. It condenses on the Terrarium walls (sides of the plastic bottle). You can point out the water droplets to show how the plants are being watered. The condensed water then falls down and re-moistens the soil. As long as the top is sealed, this process will continue for months.
- [www.teaching-tiny-tots.com/toddler-science-terrarium.html](http://www.teaching-tiny-tots.com/toddler-science-terrarium.html)

## CONSOLIDATION

- Bring whole class together and have students raise their hands and discuss what they have learned from today's lesson about pollution and its effects on the growth of vegetables.
- Students will then complete an "Exit Ticket". Each student will be handed a piece of paper with 4 questions regarding pollution and its effects on growth. They must answer the questions before leaving class. Explain what the follow up lesson will be for the next class.
- Formative assessment - EXIT TICKET
- Students will be given a sheet of paper at the end of class with 4 questions regarding carrots on them. They must answer the questions before leaving class.



Carrots Experiment Steps:

- Cut bottom half of plastic bottle four-six inches from the bottom. You may need to poke a hole with tip of scissors to start the cut. (Adult only)
- First, put one inch of coarse sand, gravel, or pebbles. This is the drainage layer that captures excess moisture.
- Add a thin layer of charcoal granules. This keeps odors from developing. You can buy this at a well stocked pet store or at a garden center. (optional)
- Add a layer of Sphagnum Moss. This serves to keep soil from seeping into the drainage layer. (optional)
- Add 3-4 inches of potting soil.
- With plastic spoon dig a small hole where a few seeds are to be placed.
- Plant your seeds carefully. Making sure there is space to grow between the seeds.
- Fill soil on and around the seeds, and tamp down lightly. Add a spoonful of soil if necessary.
- Add garbage (i.e., garbage left over from lunch or things the students picked up from the school yard) to one of the bottles (around the seeds).
- Seal up bottles with tape to ensure a tight fit.

# PLUMS THE DIGESTIVE SYSTEM

## OVERALL EXPECTATIONS

- Demonstrate an understanding of the structure and function of human body systems and interactions within and between systems.
- Demonstrate the ability to apply health knowledge and living skills to make reasoned decisions and take appropriate actions relating to their personal health and well-being.
- Identify major systems in the human body and describe their roles and interrelationships.
- Describe the basic structure and function of major organs in the respiratory, circulatory, and digestive systems.
- Explain how to use nutrition facts tables and ingredient lists on food labels to make healthier personal food choices.

## LEARNING GOALS

- Understand the difference between soluble and insoluble & soluble fibre and insoluble fibre.
- Understand that there are different types of fibre and how it can affect the digestive system.

## RESOURCES

- 60 plastic cups
- 30 salt packets
- 30 pepper packets
- 30 stir sticks
- 1 worksheet/student (see attached)

## INTRODUCTORY ACTIVITY

*\*Remind students that this is a science AND health class and although the topic might seem silly and inappropriate, it is important to talk about these subjects.*

- In order for students to understand that regular bowel movements are important for health, we can demonstrate the difference between soluble and insoluble fibre (which helps people have bowel movements)
- Introduce prunes (dried plums) to students. Explain to students:
  - Often when people are constipated, they drink prune juice to help them go, therefore, they are good for the digestive system.
  - The reason that happens is because there is a lot of fibre in prunes.
  - Fibre is a part of plant or a complex carbohydrate that cannot be digested and it helps with digestion .
  - There are 2 types of fibre that can be found in prunes, soluble and insoluble.

## MAIN ACTIVITY

- Each student will receive 1 salt, 1 pepper, 2 plastic cups filled with equal amounts of water, 1 stir stick, and the worksheet (attached) for the experiment.
- The teacher will ask students what they think will happen when they put the pack of salt into the water.
- Students will put the pack of salt into the water and stir it. It will dissolve.
- Students will check "dissolve" on their worksheet.
- Students will put the pack of pepper into the water and stir it. It will not dissolve.
- Students will check "I can still see it" on their worksheet.
- As a class, students will write the definition of soluble and insoluble. The teacher will write their definition of each on the board so students can copy onto worksheet. Definitions could look like the following:
  - Soluble: able to dissolve or mix into liquid.
  - Insoluble: not able to dissolve or mix into liquid.
- Fibre in the Digestive System:
  - Explain to students that the two types of fibres in prunes are soluble fibre and insoluble fibre. Explain that they are really helpful when your body is trying to break down your food to create stool so people do not feel get constipated.
- Video: show students this video
  - [www.youtube.com/watch?v=zFoD3F-nlec](http://www.youtube.com/watch?v=zFoD3F-nlec)

## CONSOLIDATION

- Have students break into groups of 5/6. Give each group the word soluble or insoluble. Each group must demonstrate the word with their bodies.
- Example: The group soluble could have some students doing one movement to begin. The other students come from the side doing a different movement. Once they are all together in the group the students will all begin to do the same movement that the first group was doing.





## Teacher Cheat Sheet:

### Fibre

- Fibre is a part of plant, it is a complex carbohydrate that cannot be digested, and it helps with digestion <sup>1</sup>.
- 2 types of fibre are *soluble fibre*, which becomes gel when put in water <sup>2</sup> and *insoluble fibre*, which does not dissolve in water <sup>2</sup>.

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<sup>1</sup> <http://kidshealth.org/en/teens/fiber.html>

<sup>2</sup> <https://www.youtube.com/watch?v=nENjgHcBOb0>

### Soluble vs. Insoluble

What happened when the items were stirred into the water? Did it DISSOLVE or CAN YOU SEE IT? (put a X under the correct one)

Item	Dissolved	I can still see it.
Pepper		
Salt		

Salt is:

- a. soluble
- b. insoluble

Pepper is:

- a. soluble
- b. insoluble

Soluble is \_\_\_\_\_

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Insoluble is \_\_\_\_\_

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