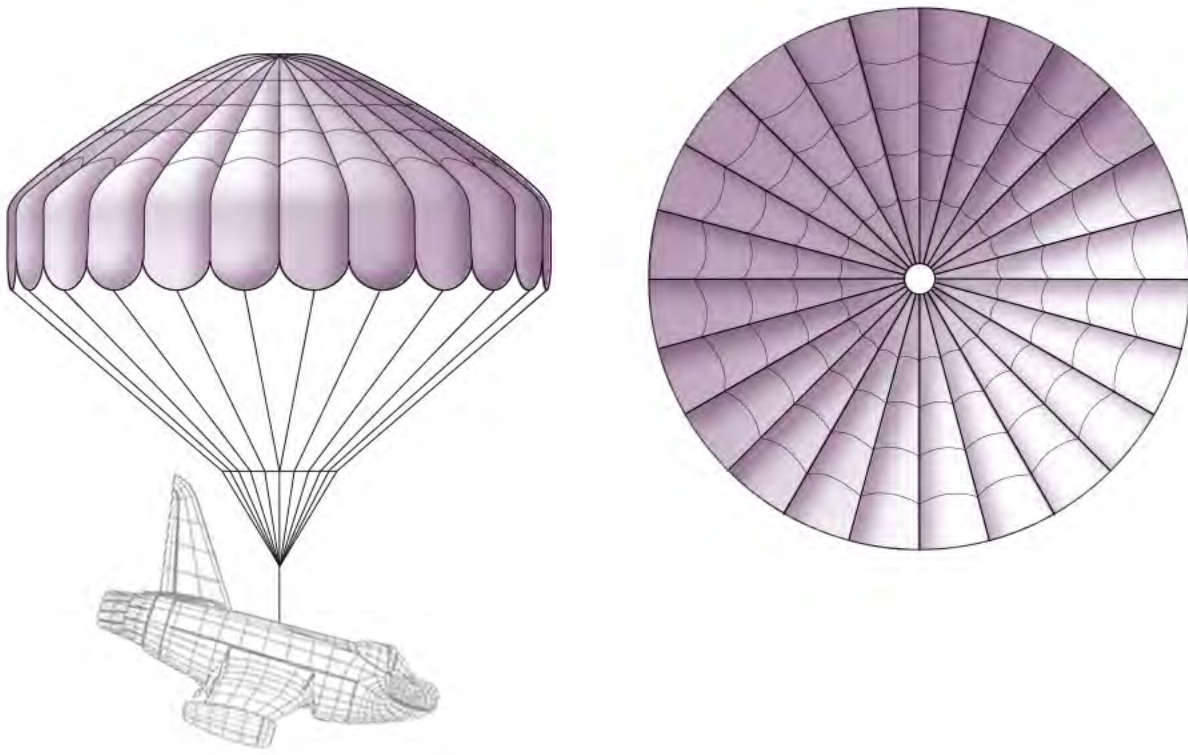




On Newton's Wings - Lesson Plan*

The Scientific Process



Parachute	
EPISODE 207: ORANGE OUTRAGE	M08D07-2016

*Developed in collaboration with Laurie Sullivan, PhD

On Newton's Wings - Lesson Plan

Overview: In this lesson, students work together to learn how to set up and conduct an experiment and draw conclusions. Students will be producing and experimenting with small parachutes (made from coffee filters, bags, handkerchiefs, etc.)

Grades: Preschool and K-2

Length of Lesson: 45-60 minutes

Related Video: Orange Outrage episode

Learning Goals:

After completing this lesson, students will be able to:

- Set up an experiment and describe the steps involved.
- Use a chart to record results.
- Discuss findings from an experiment.
- Revise the experiment and variables and redo the process.
- Acquire a basic understanding of the scientific process.

Related Goals from the Space Racers® Curriculum:

Scientific Inquiry: The process of studying the natural world, proposing explanations based on evidence and data from experiments, and deriving models and theories that can be shared with others.

Exploration and Investigation: We obtain information and learn about the world through exploring objects and investigating how things work. Conducting scientific investigations, engaging in hands-on experiences, and asking open-ended questions can foster greater conceptual understanding of our world.

- Explore new things as a way to broaden one's understanding of the world.
- Form theories/hypotheses/predictions to explain how and why things happen.
- Design and carry out simple cooperative investigations that apply learning from past experiences and support new discoveries.
- Discuss the findings of investigations.

Observation: Looking carefully is one way to learn about things around us.

- Take note of a variety of properties and describe as accurately as possible (e.g., number, shape, size, length, color, texture, weight, motion, temperature, other physical characteristics, etc.).
- Scan/analyze an object or event from multiple positions in order to capture different perspectives.
- Make comparisons to identify similarities and/or differences.
- Inspect/investigate in detail in order to sort, group, classify, or sequence according to size or other characteristics.
- Develop questions and predictions based on observations.
- Communicate findings verbally or by using pictures, graphs, charts, and/or representations.

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Related Goals from the Space Racers® Curriculum (continued):

Experimentation: Sometimes more can be learned by actually doing something to things and taking note of what happened. We use scientific testing and experimentation (design and perform a fair, repeatable experiment) to seek reasons and evidence in an attempt to prove or disprove our ideas and hypotheses, to discover new information, and to draw conclusions.

- Form hypotheses/make predictions using prior knowledge and past experiences.
- Perform tests and observe any new findings.
- Collect data: e.g., ask questions, make observations, perform simple measurements using standard and/or non-standard units of measure, make estimations, etc.
- Describe things as accurately as possible in terms of their number, shape, texture, size, weight, color, motion, etc.
- Draw conclusions/discover new information; compare conclusions to original hypotheses.
- Communicate findings using pictures, graphs, charts, representations, and/or words.
- Model safe behaviors while experimenting.

Materials:

- Standard size coffee filters in various sizes (e.g. sizes 2, 4, 6, if available) for parachutes or alternatively plastic bags cut to different sizes, handkerchiefs or similar objects that could function as parachutes
- Binder clips
- String
- Colored markers
- A weight to which a string can easily be attached to (Can be several Lego blocks stacked together)
- Stopwatch/watch

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Materials:

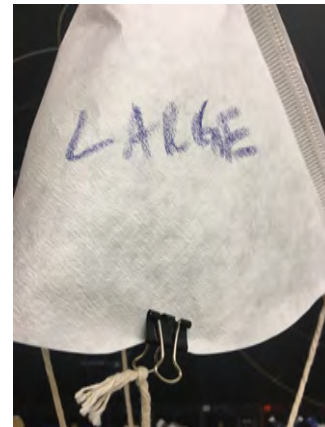


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Prep:

- Set up three different piles (small, medium, large-sized parachutes) of coffee filter parachutes; alternatively, you can use plastic bags of different sizes that might need to be cut with scissors in various sizes however.
- Provide a number of strings of the same length (minimum ___ inches). Four strings should be sufficient for each parachute, but three strings work as well.
- Weights for the bottom of the parachute (payload) can be Lego blocks stacked together, or even a small toy; use the same weight throughout the experiment.
- Ask the students to number their parachute (small, medium, large OR 1, 2, 3 OR different colors)
- Draw on a chalkboard the columns of the table to track your experiment or provide printouts of the attached table.
- Have a measurement for the drop height. This can be a mark on the chalkboard or a hook on the wall.

Setup Example:



Optional:

- Students can color their parachute with Crayon, pencil or water colors.

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Lesson Activities:

Activity 1: The Big Drop

1. Each student should have their three parachutes ready.
2. Let them hold up the parachute to the drop height.
 - Alternatively, you have prepared one set of parachutes for the whole class.
3. Drop the parachute – you can measure the time with a stop watch (Alternative: observe the drops and record whether the small, medium, or large-sized parachute hits the ground first).
4. Record the time in the table or the order in which the parachutes hit the ground (1 for first, 2 for second, 3 for third)
5. Repeat for each parachute
6. *Alternatively: you can drop all three parachutes at the same time and race them against each other*

Activity 2: Changing Weights

1. Change the weight for each parachute
2. Repeat steps 1-4 above.
3. What other variables can be changed?

Activity 3: Watch Orange Outrage

1. Watch the Space Racers® “Orange Outrage” episode.

Link: <https://www.spaceracers.com/kids/videos/orange-outrage>

2. SR207 - “ORANGE OUTRAGE” Synopsis

When the high-flying Rooster Rockets endorse a new energy-boosting fuel drink called Orange Outrage, Eagle can't wait to get his wings on it. But Coach Pigeon bans it from the cafeteria: that junk is bad for growing rockets! To Eagle's delight and Coach's chagrin, they soon find the drink everywhere after Vulture strikes an exclusive deal to offer it at the academy. Orange Outrage's effects begin to show; the racers have engine problems, and trouble sitting still or sleeping. Sneaking backstage before a show, the kids discover their heroes drinking the old fuel instead. The embarrassed Roosters come clean that it was just an endorsement, and after the show they announce that they'll no longer shill for the drink. They thank the cadets for helping them do the right thing, while Vulture is furious – and would do more... if only he didn't feel so sluggish.

Curricular focus: Exploration & Investigation – forming theories and hypotheses to explain how and why things happen. Secondary focus: Observation – making comparisons and monitoring them to detect changes over time.

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3. After watching the episode, discuss how Robyn used observations, asking questions, forming a hypothesis (What could be the cause for the negative effects at Stardust space Academy?) and concluded that Orange Outrage causes the lack of concentration, restless wheel symptom and upset stomachs.
4. In one scene, Eagle uses his emergency parachute to land safely on the ground.
 - What would have happened if the parachute were bigger? Smaller? Ask the students to use their observations from the experiment to state their opinion.
 - Ask students in what way parachutes are used and why.
 - What is needed for a parachute to work? (A dense atmosphere; a minimum height for the parachute to open).
 - Could we use parachutes on other planets for spacecraft to land them safely?

Wrap-up:

1. Lead a discussion about today's lesson. Ask students to talk about what they learned.
2. Ask them to discuss how they had to work together to complete the activities in this lesson.
3. Ask them to describe the process in their own words. Compare with the attached diagram.
4. Ask them if they know of situations on the real world where the scientific process is used.
5. Ask if anybody has heard of "Isaac Newton." Who is he? What is he known for?
6. What changes for each experiment? What stays the same? (Optional for higher grades: Discuss dependent and independent variables)
7. What happens if your hypothesis is not confirmed?
8. Others?

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Notes:

Student Name: _____

Parachute	Weight	Drop Height	Observation on fall time

My conclusion:

THE SCIENTIFIC PROCESS

