

# santa's parachute

# STEM



LOW PREP  
CHRISTMAS  
STEM CHALLENGE

K-5<sup>TH</sup> GRADE


CREATED BY BROOKE BROWN

- ✓ SIMPLE SUPPLIES
- ✓ INTERACTIVE ANCHOR CHARTS
- ✓ VISUAL VOCABULARY
- ✓ QR CODE RESEARCH
- ✓ REFLECTION QUESTIONS

## Santa's Parachute

Santa's sleigh broke down!

Construct a parachute with basket that will help him land safely on target and upright on the ground.



**MATERIALS:**

**CHOICES FOR PARACHUTE:**


- Coffee filter
- Plastic tablecloth (10" x 10")

**CHOICES FOR BASKET:**

- Mini cup
- 4 index cards
- string, yarn, or fishing line
- Scotch tape
- Paper Santas
- pennies to adjust weight


### Santa's Parachute


**REAL WORLD EXAMPLES**




What is similar? What is different?  
How Parachutes Work

**Main Parts of a Parachute**

CANOPY → 

SUSPENSION LINES → 



LOAD → 

How Parachutes are Useful





## EXPLORE PARACHUTES



**PLAYTIME WITH PARACHUTES**



**PARACHUTE ADVENTURE**





**FALLING OBJECTS**

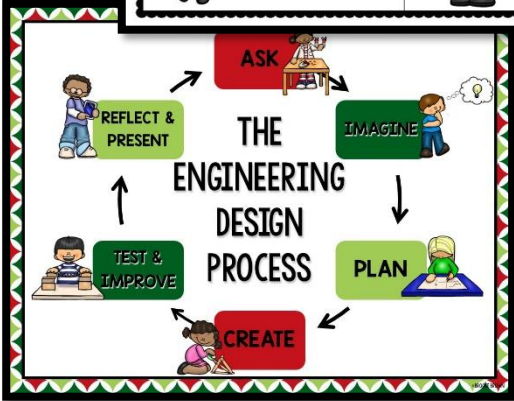



**HOW PARACHUTES ARE MADE**

## WORDS TO KNOW

<p><b>canopy</b></p>  <p>the main upper component of a parachute</p>	<p><b>gravity</b></p>  <p>the force of attraction of objects to the center of the Earth</p>
<p><b>drag</b></p>  <p>a type of force or air resistance that reduces forward motion</p>	<p><b>mass</b></p>  <p>the amount of matter in an object</p>



## LET'S REFLECT!

- What was most difficult about this challenge?
- How are parachutes useful?
- Which materials were most effective for your parachute and why do you think so?
- How did drag (air resistance) affect your parachute's drop?
- How did gravity affect your parachute's drop?
- How did mass and weight affect your parachute's drop?
- What are some features of real parachutes that are important for them to function effectively?
- If we completed this challenge again, what would you do differently next time?

# DIFFERENTIATED RECORDING SHEETS FOR K-5<sup>TH</sup> GRADE

## LOWER GRADES

## UPPER GRADES

### santa's parachute

Name: \_\_\_\_\_

#### MY BLUEPRINT

Draw a picture of your parachute and basket.

Label the CANOPY and LOAD.

→

→

Draw the materials you used.

Did Santa land UPRIGHT?

YES NO

Did Santa land on the TARGET?

YES NO

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### santa's parachute

Name: \_\_\_\_\_

#### BLUEPRINT

Label the CANOPY, SUSPENSION LINES, and LOAD.

TESTS	Did Santa land upright?	Did Santa land on the target?
TEST 1		
TEST 2		
TEST 3		

What improvements did you make to your parachute design?

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## DIGITAL GOOGLE SLIDES NOTEBOOK

### santa's parachute

Santa's sleigh broke down!

Construct a parachute with basket that will help him land safely on target and upright on the ground.

**MATERIALS:**

**CHOICES FOR PARACHUTE:**

- Coffee Filter
- Plastic tablecloth (60" x 10")

**CHOICES FOR BASKET:**

- Mini cup
- 4 index cards
- string, yarn, or fishing line
- Scotch tape
- Paper Santas
- pennies to adjust weight

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### STEM Challenge Assessment Rubric

Challenge: \_\_\_\_\_

Date: \_\_\_\_\_

Student Name: \_\_\_\_\_

3	2	1
Student followed all instructions for challenge.	Student followed some instructions for challenge.	Student did not follow instructions for challenge.
Student used best effort and perseverance on challenge.	Student used some effort and perseverance on challenge.	Student did not show effort or perseverance on challenge.
Student completed assigned blueprint and reflection sheet.	Student partially completed assigned blueprint and reflection sheet.	Student did not complete assigned blueprint and recording sheet.
Student showed accuracy in testing, calculating, and measuring.	Student showed some accuracy in testing, calculating, and measuring.	Student did not show accuracy in testing, calculating, or measuring.
Student fully cooperated with group members and contributed fairly.	Student partially cooperated with group members and contributed fairly.	Student struggled to cooperate with group members and/or failed to contribute.
Student fully participated in class discussions.	Student somewhat participated in class discussions.	Student did not participate in class discussions.

TOTAL POINTS: \_\_\_\_\_ /18

Comments: \_\_\_\_\_

### We Need STEM Supplies!

Dear Families: We are learning all about Science, Technology, Engineering, and Math through STEM lessons, and we need your help! If you are able to donate any of the following supplies for our STEM Challenges, please detach and return the form below and send back to school with your child. We greatly appreciate your support and generosity!

We are in need of the following items by \_\_\_\_\_:

Thank you so much for helping to make our STEM lessons possible! Please contact me at \_\_\_\_\_ with any questions.

Sincerely, \_\_\_\_\_

all you are able to donate, please detach and return the form below

Parent Name(s): \_\_\_\_\_

Child's Name: \_\_\_\_\_

I am able to donate: \_\_\_\_\_

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# SAY Hello TO STRESS-FREE STEM!

SUPPLIES CHECKLIST			
STEM CHALLENGE	ITEM	NUMBER PER GROUP	I HAVE IT
Santa's Parachute	coffee filters	1	
	thin plastic tablecloth cut into 10" x 10" squares	1	
	mini cup	1	
	index cards	4	
	Scotch tape	1 roll	
	scissors	1	
	string, yarn, or fishing line	2 yards	
	Santa cutouts	1	
	pennies	5	

STANDARDS ALIGNMENT			
CHALLENGE	ENGINEERING	SCIENCE	MATH
Santa's Parachute	K-2-ETS1 Engineering Design: K-2-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3  3-5-ETS1 Engineering Design: 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3	K-PS2 Motion and Stability: Forces and Interactions 3-PS2 Motion and Stability: Forces and Interactions 5-PS2 Motion and Stability: Forces and Interactions	1-EP.1 Make sense of problems and persevere in solving them. 1-EP.2 Reason abstractly and quantitatively. 1-EP.3 Model with mathematics. 1-EP.5 Use appropriate tools strategically.

## SUPPLIES CHECKLIST & STANDARDS ALIGNMENT

### CHALLENGE OVERVIEW

### STEM CHALLENGE: Santa's parachute

### KEY SKILLS



**OVERVIEW:** Choosing from a variety of materials, students will construct a parachute and basket for Santa that will drop on a target and land without the basket tipping over. By designing an effective parachute, they will attempt to increase drag, reduce the strength of gravitational pull, and reduce the speed at which objects fall.

**KEY SKILLS:** Engineering Parachutes, Drag/Air Resistance, Gravity, Balance

**SUGGESTED READ ALOUDS:** [Santa's New Jet by David Biedrzycki](#), [Parachute by David Parker](#), [How Do Parachutes Work? by Jennifer Boothroyd](#)

**MATERIALS PER GROUP:** Parachute options: 1 coffee filter, 1 10" x 10" plastic tablecloth square  
Basket options: mini cup, 4 index cards  
Other materials: scotch tape, 2 yards of string, yarn, or fishing line, 5 pennies, paper Santa

### MATERIALS

### SUGGESTED READ ALOUDS

### STEP BY STEP INSTRUCTIONS

### LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about parachutes and how they work. Discuss the different kinds of materials that parachutes are made out of in order to increase drag/air resistance and help people and objects land safely.
2. Share and discuss the videos on "Explore Parachutes."
3. Hold a class discussion, using the teacher chart and real world examples to guide student thinking. (You can project the chart on an interactive whiteboard or document camera.) Record their ideas on the teacher chart.
4. Introduce the STEM challenge and permitted materials.
5. Introduce and discuss key vocabulary cards related to the challenge.
6. Have students sketch blueprints of their designs on their recording sheets.
7. Distribute materials and allow students 45-60 minutes with partners or small groups to construct their parachutes and test them to see if they land on the target with Santa's basket upright.
8. Hold a whole class closing discussion and reflection, allowing students to share their parachute designs. Use the "Let's Reflect" poster to guide the discussion.

# ALTERNATIVE WINTER CHALLENGE

## Special Delivery

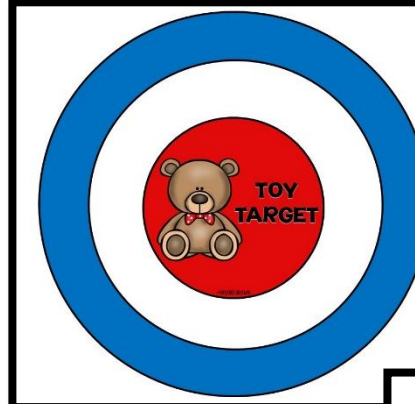
You need to delivery toys to children in need.

Construct a parachute with basket that will help the toys land safely on target and upright on the ground.



### MATERIALS:

- CHOICES FOR PARACHUTE:**
- Coffee Filter
  - Plastic tablecloth (10' x 10')
- CHOICES FOR BASKET:**
- Mini cup
  - 4 index cards
  - string, yarn, or fishing line
  - Scotch tape
  - paper toys
  - pennies to adjust weight



## Special Delivery Challenge



## EXPLORE PARACHUTES

### PLAYTIME WITH PARACHUTES



### PARACHUTE ADVENTURE



### FALLING OBJECTS



### HOW PARACHUTES ARE MADE



## WORDS TO KNOW

### canopy



the main upper component of a parachute

### gravity



the force of attraction of objects to the center of the Earth

### drag



a type of force or air resistance that reduces forward motion

### mass



the amount of matter in an object

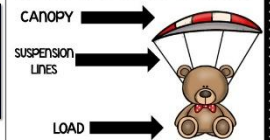
## Special Delivery

### REAL WORLD EXAMPLES



What is similar? What is different?  
How Parachutes Work

### Main Parts of a Parachute



How Parachutes are Useful

## Special Delivery

Name: \_\_\_\_\_

### BLUEPRINT

Label the CANOPY, SUSPENSION LINES, and LOAD.



TESTS	Did the toys land upright?	Did the toys land on the target?
TEST 1		
TEST 2		
TEST 3		

What improvements did you make to your parachute design?

## LET'S REFLECT!

- What was most difficult about this challenge?
- How are parachutes useful?
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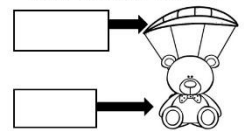
## Special Delivery

Name: \_\_\_\_\_

### MY BLUEPRINT

Draw a picture of your parachute and basket.

Label the CANOPY and LOAD.



Draw the materials you used.

Did the toys land UPRIGHT? YES NO

Did the toys land on the TARGET? YES NO