# WINTER GAMES

# STEM

## Bobsledding

carly and Adam

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STEM Teachers Club

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# Bobsledding

## NGSS Standards

## Grades K-2

**K-2-ETS1-2 Engineering Design**

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

**K-2-ETS1-1 Engineering Design**

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

## Grades 3-5

**3-5-ETS1-2 Engineering Design**

Generate and compare multiple solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

# Bobsledding

## Teacher Instructions

**Materials**:

- 1 toilet paper roll
- washers, nuts, and/or pennies (approximately 4-6). Students should decide the best weight for their bobsled.
- 3 straws
- 1 foot of tape
- scissors
- a wood plank or playground slide for testing
- tape

**Instructions:**

- Watch some of the included YouTube videos with your students to help develop background knowledge about bobsledding.
- Students can also read the included article and complete the comprehension questions.
- After learning about the bobsled event students will construct a bobsled using only the materials listed above.
- Have students read the task instructions or read them aloud.
- Give students 10 minutes to plan individually and then 10 minutes to plan as a team. Use the included planning pages.
- Give students the materials listed above. Students will have 20 minutes to construct their bobsled.
- The washers, nuts, and/or pennines should be used as weights.
- At the end of the 20 minute time limit students will test their bobsleds.
- Set up a ramp in the classroom or use the playground slide. Have two groups race against each other to see which one will reach the bottom first.
- Have the winners of each round compete against each other until a winner has been decided.

# Bobsledding

## Teacher Instructions (CONTINUED)

**Resources:**

Olympic Coaching Tips: Bobsled Basics( 3:15 min)
https://www.youtube.com/watch?v=UmKyHjLShp8

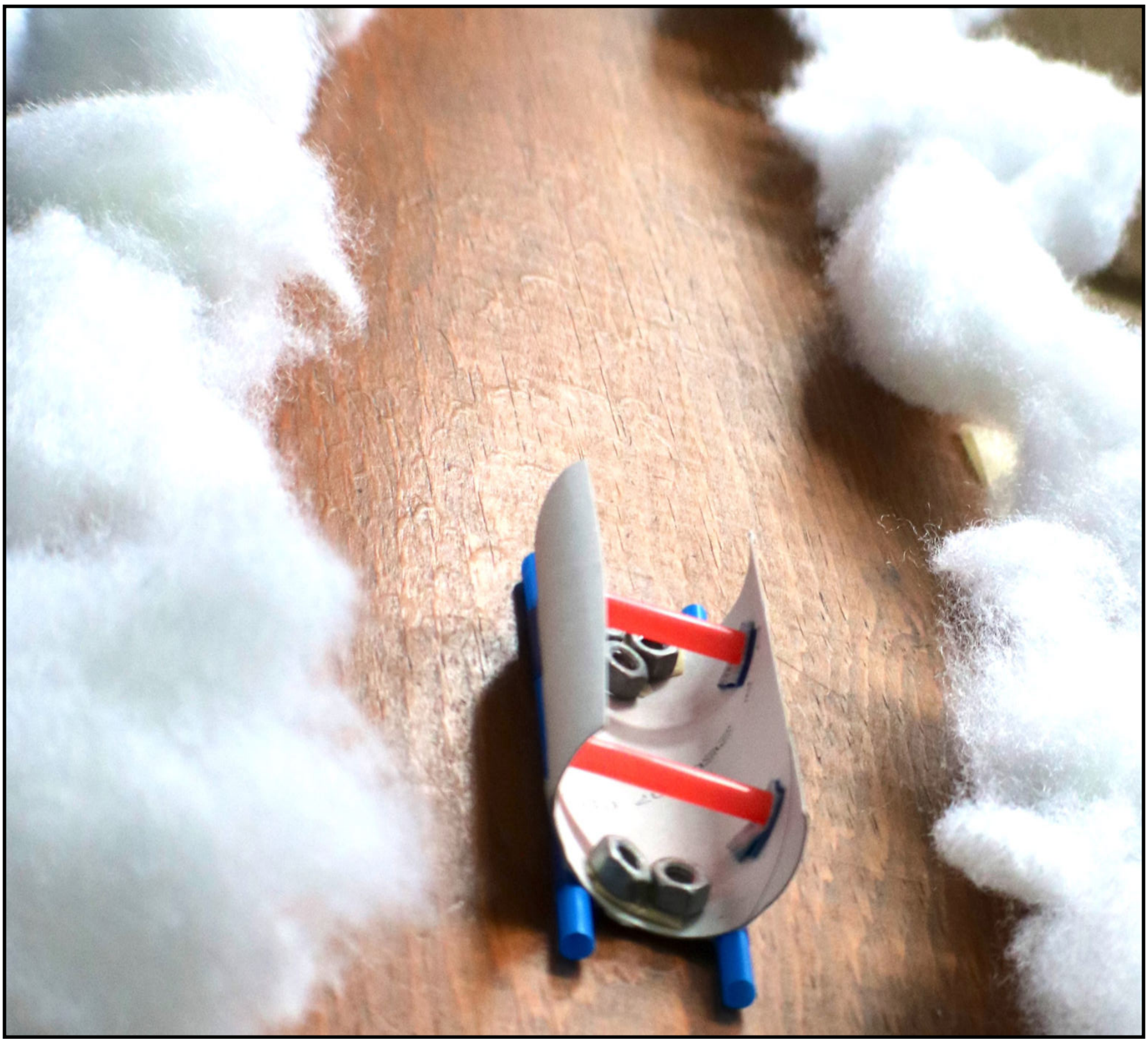
Olympic Coaching Tips: Bobsled Technique
https://www.youtube.com/watch?v=amlAqsxH9RQ

Science of the Winter Olympics: Bobsledding (5:05 min)
https://www.youtube.com/watch?v=UGbOP79EhT0

# Bobsledding

## Teacher Instructions

**Example:**

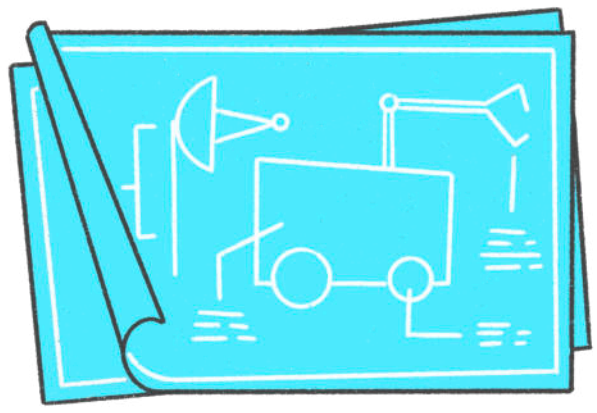


# THE ENGINEERING DESIGN PROCESS

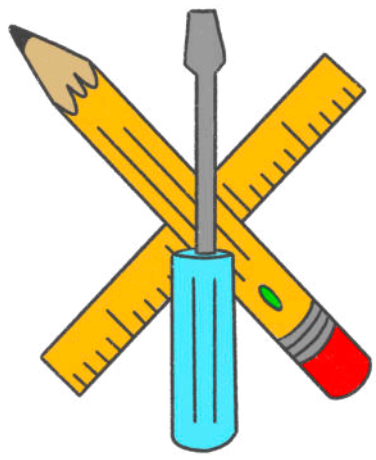
ASK

IMAGINE

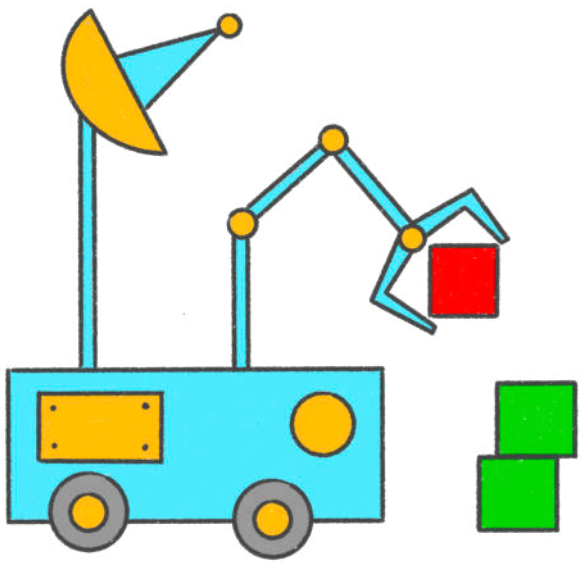
PLAN



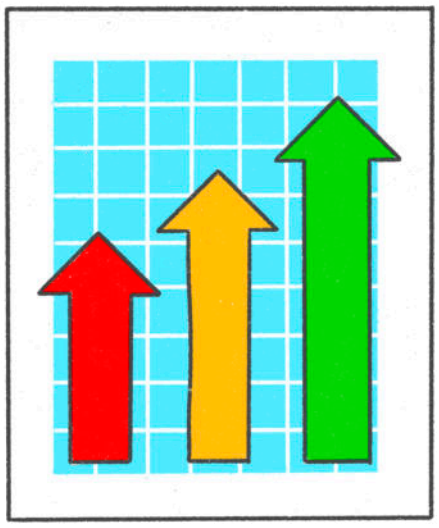
CREATE



EXPERIMENT



IMPROVE

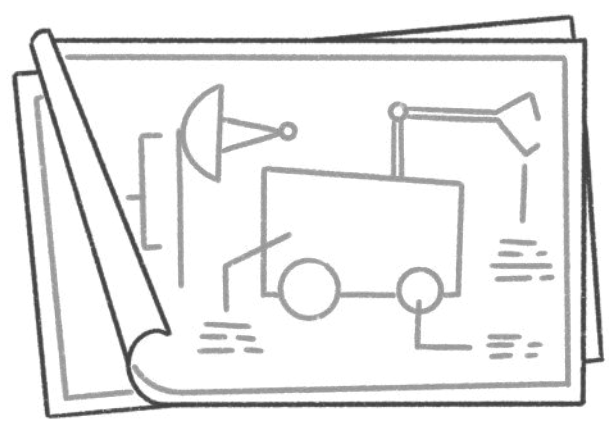


# THE ENGINEERING DESIGN PROCESS

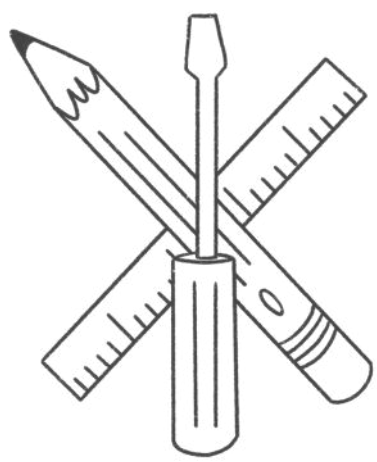
## ASK

## IMAGINE

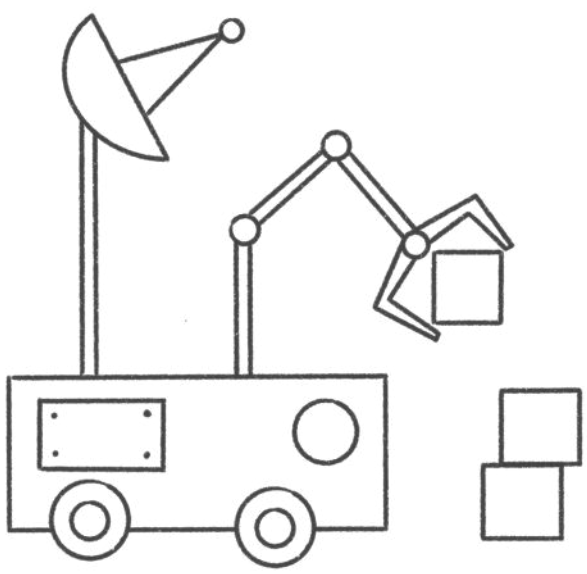
## PLAN



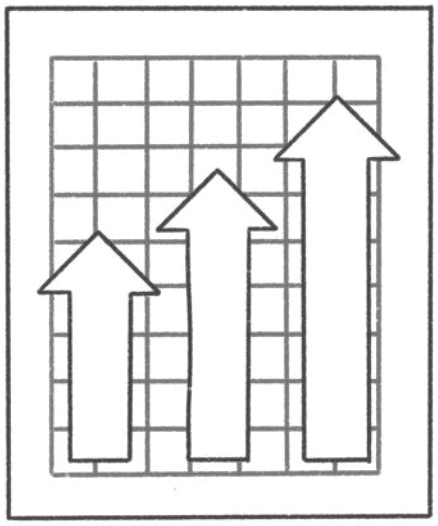
## CREATE

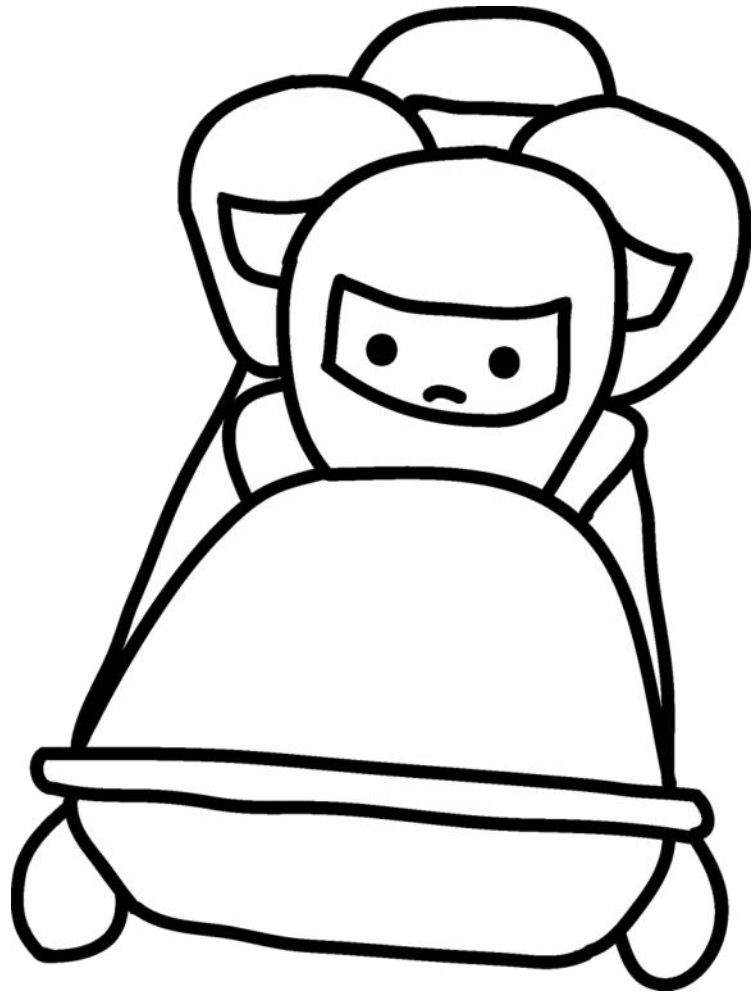


## EXPERIMENT



## IMPROVE





_____'S

# WINTER GAMES

# STEM

# JOURNAL

**Dear Students,**

You are helping prepare for a winter competition. Part of your job involves designing a bobsled. In order to create your bobsled you may use any of the materials listed below. Use the straws to create runners for your bobsled. The washers, nuts, and pennies can be used as weights. Do you think your bobsled will go faster if it weighs more or less?

You will have 10 minutes to plan your design individually and 10 minutes to plan as a team. Your team will have 20 minutes to construct your bobsled. At the end of the time limit you will test your bobsled by racing against the other teams. Good luck!

**Materials:**

| | |
|---|---|
| 1 toilet paper roll | 1 foot of tape |
| 3 straws | washers, nuts, and pennies |

**Name:**_____

# ASK

What is the problem you are trying to solve?

_____

# IMAGINE

Imagine the best way to solve the problem on your own.
Sketch out your design and brainstorm a list of ideas.

## Ideas

_____

_____

_____

## Sketch Space

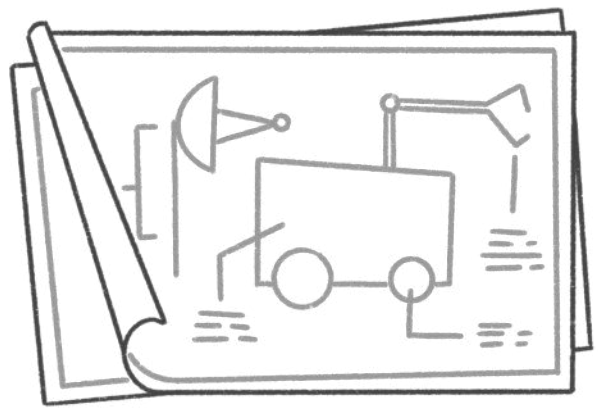
**Name:**_____

# PLAN

With your group, sketch out your plan to solve the problem.

Ideas

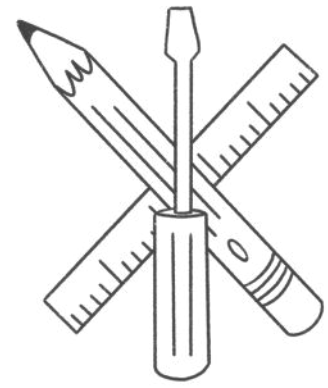
Sketch Space



**Name:**_____

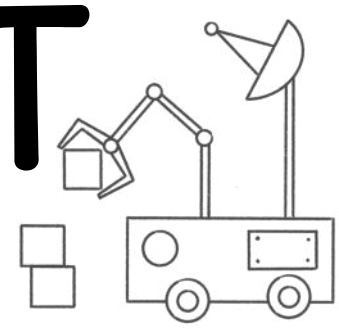
# CREATE

Build your Prototype.



# EXPERIMENT

Test your Design. Take Notes.



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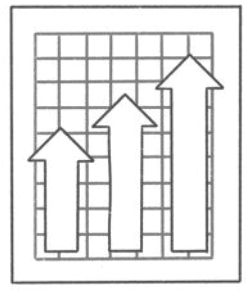
# IMPROVE

What could you do to improve your design?



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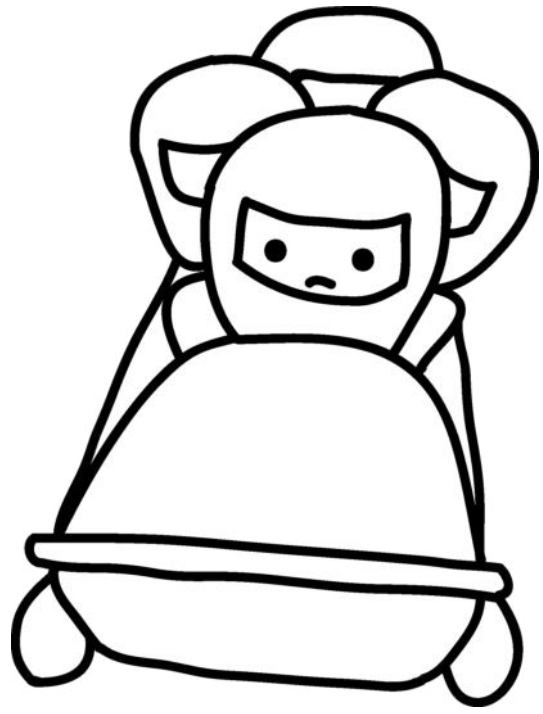
_____

Sketch Space

# What is a **Bobsled**?



Bobsled is a winter sport invented in the late 19th century by the Swiss.The four-man bobsled race debuted at the first Olympic Winter Games in 1924. In 1932 a two-man event was added, and the 2002 Olympics included a two-woman event.

The name bobsled came from the technique that the competitors use of bobbing back and forth inside the sled in order to increase speed. Bobsleds can reach speeds of 150 km/h (93mph). The fastest bobsled speed is recorded at 201 km/h (125mph). This is impressive considering that bobsleds are powered by the pushing force that occurs at the beginning of the race and gravity.

Teams competing in the bobsled event complete timed runs down a narrow, twisting, icy track. Teams compete for the fastest time, and the winner is awarded the gold metal.

Nowadays bobsled tracks are made out of concrete and coated with ice. The tracks must include a straight section as well as a section that includes three turns in a row. The length of a track can range from 1,200 to1,300 meters (3,900-4,300 ft) long. There must also include at least fifteen curves.

Bobsleds include a steel frame and two sets of runners. The back set of runners does not move while the front set moves to allow for steering. The crew rides in a fiberglass hull that is closed in the front and open in the back. Bobsleds are designed to be very light in order to easily maneuver through the twists and turns of the course. Before weight limit rules bobsled crews were typically very heavy in order to ensure maximum speed. Now the maximum weight for a 4-man crew is 630 kilograms (1,390 lbs).

A bobsled crew consists of a pilot and a brakeman. In 4-man races two pushers are also included. Crew members must be very athletic as it requires great strength and speed to push the sled at the beginning of the race.

Name:_____

**What is bobsledding?**

**When did the bobsled event for women begin?**

**How many curves must be included on a bobsled track?**

**What is the maximum weight for the 4-man bobsled race?**

What I Know About

# Bobsledding

What I Know About

# Bobsledding

# ABOUT US


Carly and Adam have been creating **STEM curriculum** for elementary students since 2015. In 2018, they created the **Elementary STEM Teachers Club Facebook Group** to bring like-minded educators together to collaborate around STEM topics.

As a result of the collaboration in the STEM Facebook group, they launched the **STEM Teacher Summit online conference** in June of 2020. Carly and Adam believe in the power of teacher collaboration. We Teach STEM Better Together! You can connect with Carly and Adam at **www.carlyandadam.com** as well as on **Facebook**, **Instagram**, and **Twitter**.

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