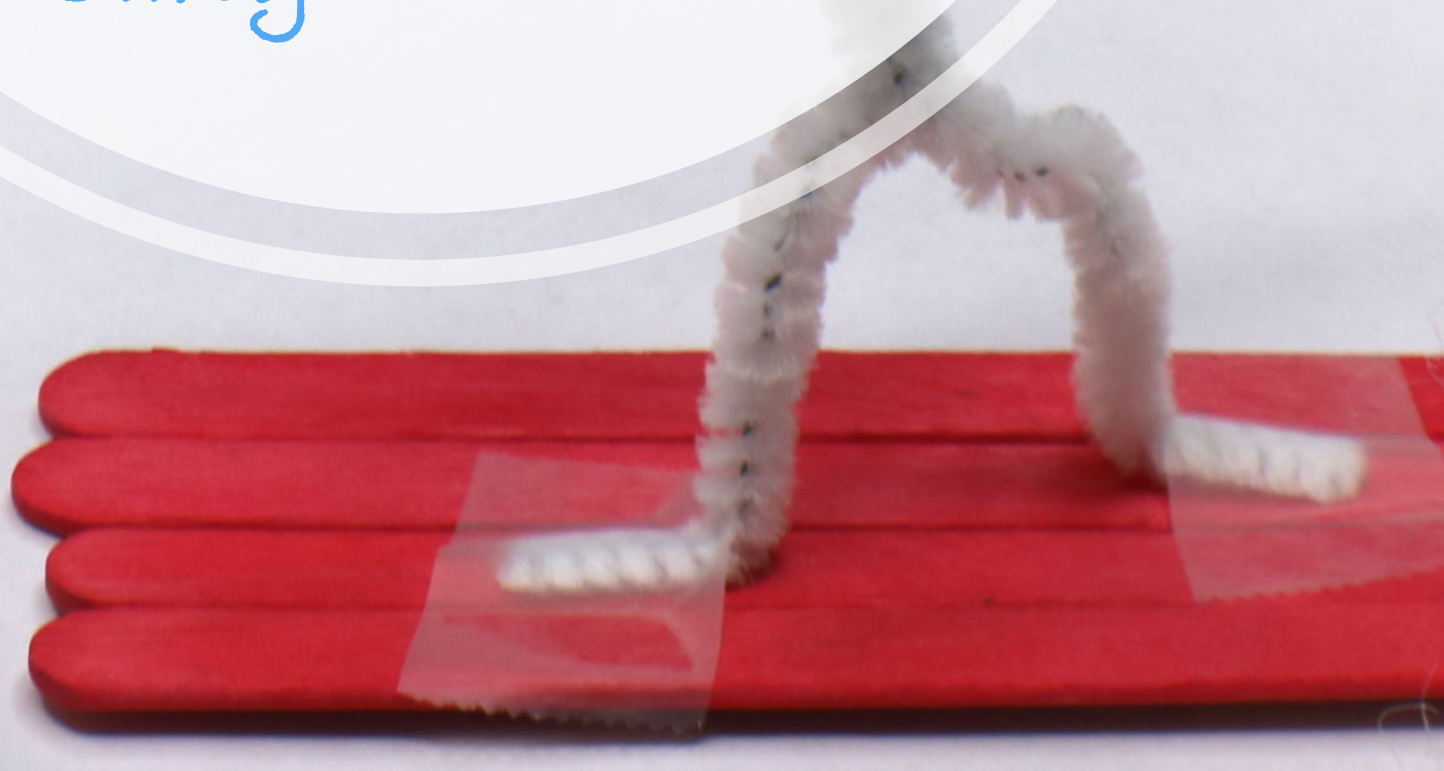
WINTER GAMES STEM

Snowboarding

Carly and Adam



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STEM Teachers Club

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Snowboarding

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.

3-PS2-1 Motion and Stability: Forces and Interactions

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Snowboarding

Teacher Instructions

Materials:

- 4 small popsicle sticks (or 2 large)
- washers, nuts, and/or pennies (approximately 4-6)
  *Students should decide the best weight for their snowboard.
- 4 straws
- 2 feet of tape
- 3 pipe cleaners
- scissors

Additional Materials:

- a wood plank or playground slide for testing

Instructions:

- Watch some of the included YouTube videos with your students to help build background knowledge about snowboarding.
- Students can also read the included article and complete the comprehension questions.
- After learning about snowboarding students will construct a snowboard and a snowboarder 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.
- Give students the materials listed above. Students will have 30 minutes to construct their snowboard and snowboarder.
- While constructing students should think about the weight of the snowboard and snowboarder and how it will impact the speed. The washers, nuts, and/or pennines should be used as weights. Students should also consider what materials should be on the bottom of the snowboard in order to create the least amount of friction.
- The snowboarder must be attached to the snowboard and standing on top of it.
- At the end of the 30 minute time limit students will test their snowboards.
- 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.

Snowboarding

Teacher Instructions (CONTINUED)

Resources:

Science of the Winter Olympics: Snowboarding (4:07 min)
https://www.youtube.com/watch?v=58YvhpxXaN0&t=118s

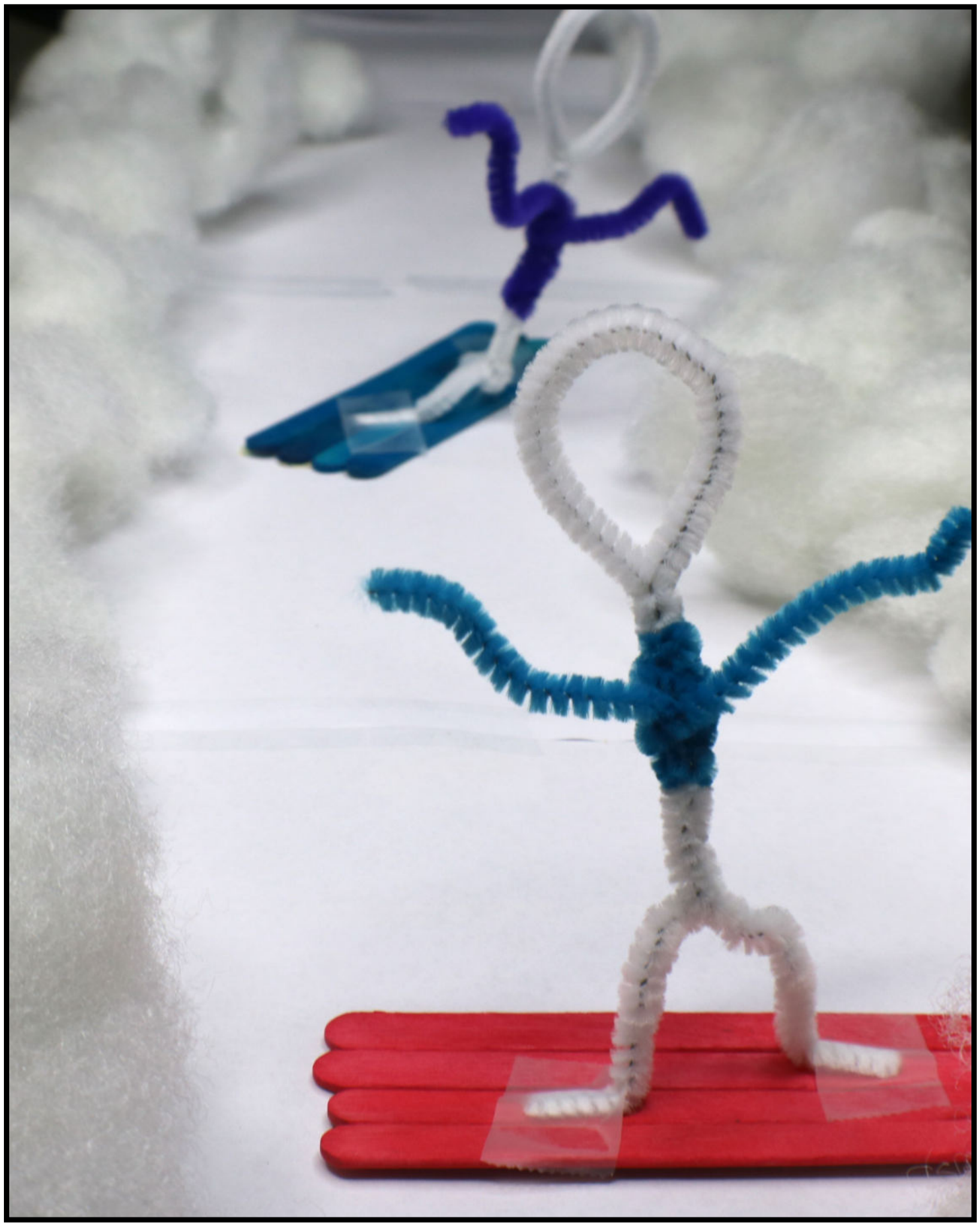
Science of the Winter Olympics:Engineering the Half Pipe (5:20 min)
https://www.youtube.com/watch?v=vjTMKVMFsyk

The Story of Snowboarder Lindsey Jacobellis (5:20)
https://www.youtube.com/watch?v=eEA-ieWtuIU

Snowboarding

Teacher Instructions

Example:

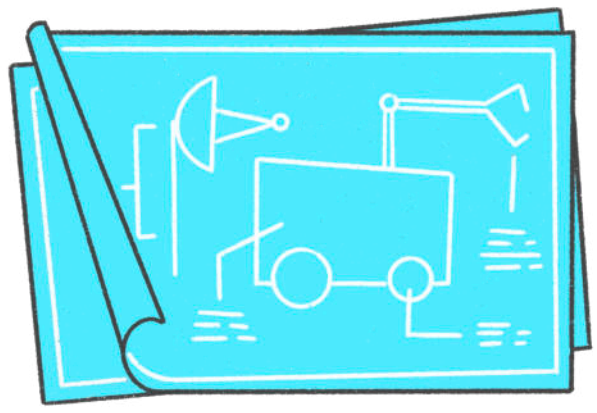


THE ENGINEERING DESIGN PROCESS

ASK

IMAGINE

PLAN



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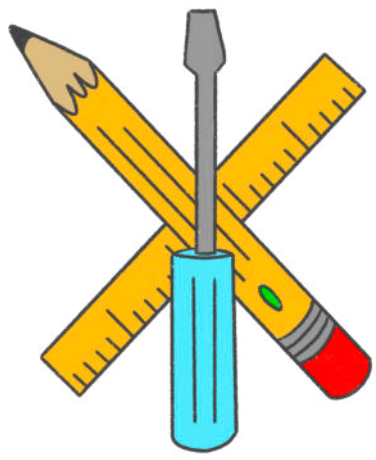
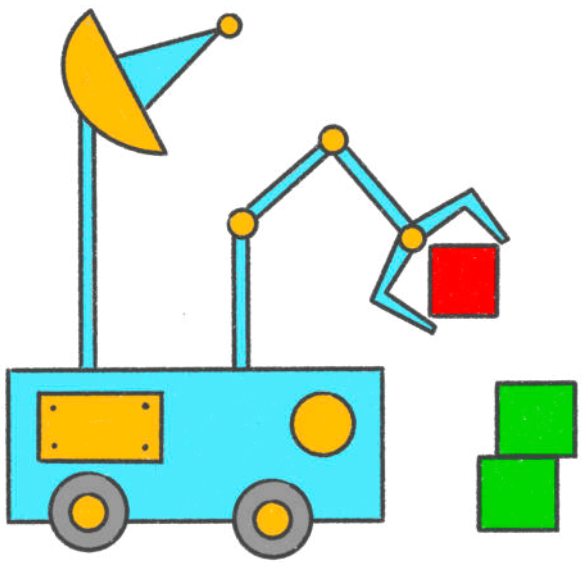


EXPERIMENT



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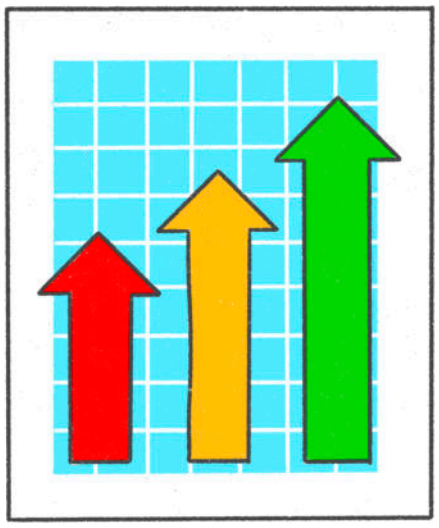
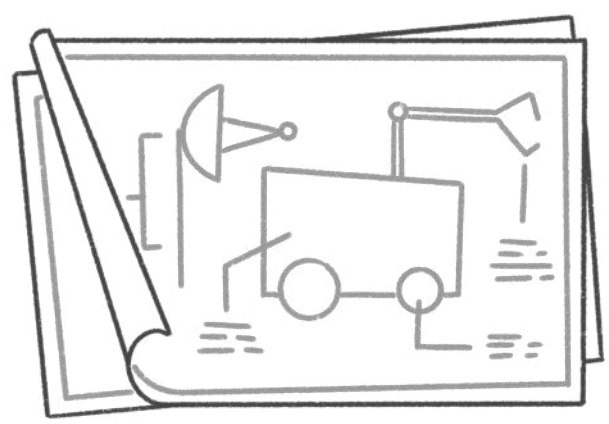


THE ENGINEERING DESIGN PROCESS

ASK

IMAGINE

PLAN



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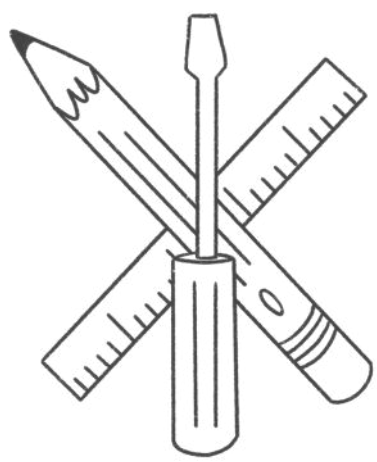

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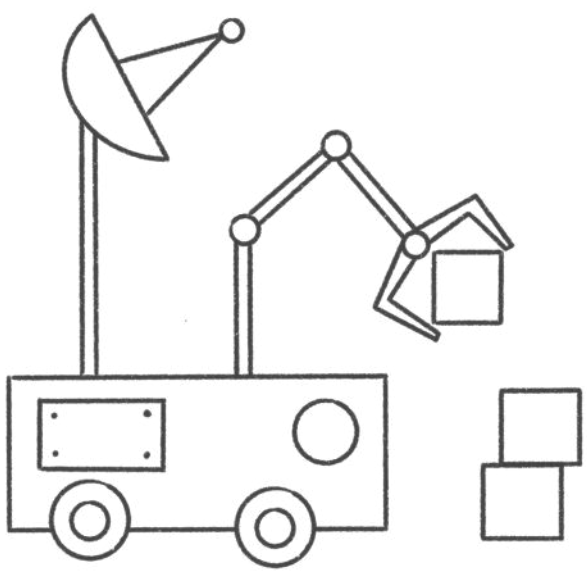

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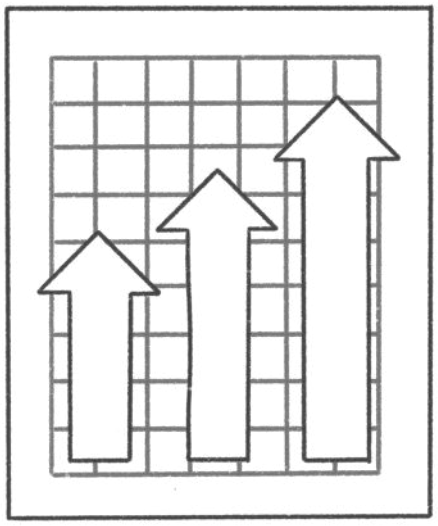

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WINTER GAMES

STEM

JOURNAL

Dear Students,

You are helping prepare for a winter competition. Part of your job involves designing a snowboard. In order to create your snowboard you may use any of the materials listed below. You will also need to create a snowboarder to ride on your snowboard. The snowboarder must stand on top and be attached to the snowboard. The washers, nuts, and pennies can be used as weights. Do you think your snowboard will go faster if it weighs more or less? You should also think about what materials should go on the bottom of the snowboard in order to create the least amount of friction.

You will have 10 minutes to plan your design individually and 10 minutes to plan as a team. Your team will have 30 minutes to construct your snowboard and snowboarder. At the end of the time limit you will test your snowboard by racing against the other teams. Good luck!

Materials:

3 pipe cleaners	scissors
4 small popsicle sticks	2 feet of tape
4 straws	washers, nuts, and/or 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

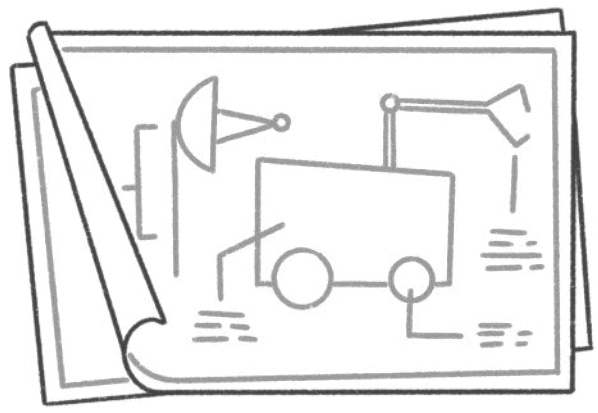
Name:_____

PLAN

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

Ideas

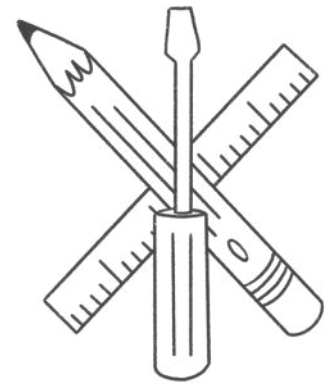
Sketch Space



Name:_____

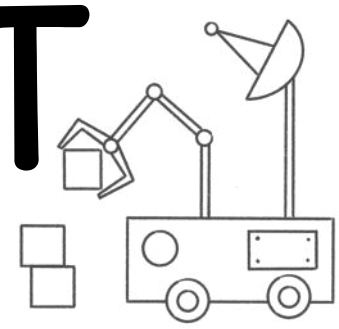
CREATE

Build your Prototype.



EXPERIMENT

Test your Design. Take Notes.

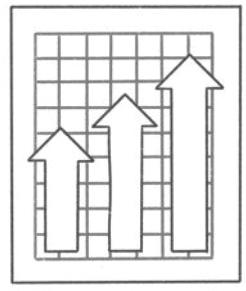


_____

_____

IMPROVE

What could you do to improve your design?



_____

_____

Sketch Space

What is **Snowboarding**?

Snowboarding was first included as a sport at the Winter Olympics in 1998. In 1998 there were four snowboarding events, two for men and two for women. These events included the giant slalom and the half pipe. The giant slalom is a downhill racing event. On the other hand, the halfpipe is an event in which competitors perform tricks while moving from side to side in a ramp that curves up at both ends.

Snowboard racing is one type of snowboarding. In these events competitors try to complete a course in the fastest amount of time. These races can be done by a single competitor racing against the clock or by two or more competitors racing against each other. The snowboard racing events that are currently part of the Winter Olympics are parallel giant slalom, parallel slalom, and snowboard cross.

The parallel giant slalom involves two snowboarders competing against each other at a time on separate identical courses that are side by side. Racers compete in a knock out style in which the player that comes in last during each round is eliminated while the winner of each round moves on. The event begins with 16 competitors and ends with the last two racers competing for first and second place. Parallel slalom is similar to parallel giant slalom however the course is smaller.

Snowboard cross is another Olympic snowboarding competition in which four to six snowboarders race through a course to see who can make it through the fastest. These courses are narrow and include multiple turns and jumps. Due to the difficulty of the course it can be hard for the competitors to move quickly while maintaining control.

One of the most famous snowboarders is Shaun White. He competed in the halfpipe snowboarding event in the 2006 and 2010 Winter Olympics and won the gold medal both times. He also holds the record for the most X Games gold medals.

Name:_____

When did snowboarding first become an Olympic sport?

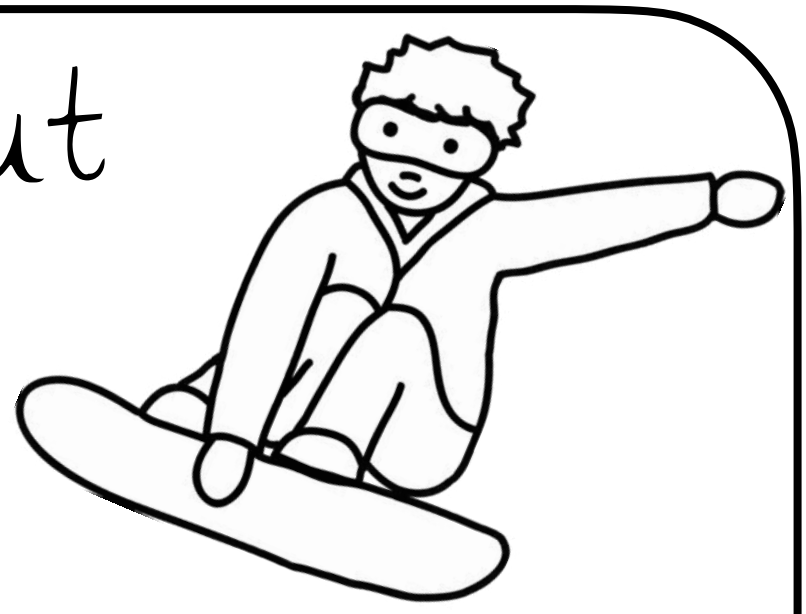
What snowboard racing events are currently part of the Winter Olympics?

What is the halfpipe snowboarding event?

Who is a famous American snowboarder?

What I Know About

Snowboarding



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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