

Team Member's Names: _____

“Race for the Gold”

Our class is participating in a simulated Yukon mail train. As you recall from the novel, *The Call in the Wild*, sleds were used as the primary transportation throughout the Yukon Territory. The sleds were also crucial in the 1925 Serum Run across Nome, Alaska.

Task:

To create a working sled that will be hooked to a Sphero and race against other teams. Your sled must hook or be attached to your Sphero without damaging it and must be removed at the end of each class period. Your sled must hold the designated amount of weight, must make it through the course, and complete it in the least amount of time. Cost will be a factor in the case of a tie. Lowest cost will be the tiebreaker.

Team Name: _____

All Team Members should be ACTIVELY engaged each day.

Teams must complete the required tasks and designate team members (in engineering plan) to take the lead on each one of the tasks listed below:

- In charge of plugging/unplugging Sphero's from docking area
- In charge of practicing using the controls of the Sphero via a smartphone or iPad
- In charge of keeping track of designs and revisions
- Work with team to create the sled
- Keep track of time each day so progress is being made
- Keep track of budget
- Only one member can ask questions to teacher

TIMELINE

| Day 1 in classroom |
|--|
| <ul style="list-style-type: none">● Load Sphero.edu app● Complete task description● Research models of sled on the smartphone● Consider list of supplies that will be available |

| |
|---|
| <ul style="list-style-type: none"> • Sketch design • Begin design plan • Keep track of your budget and time! |
| Day 2 Mission Ops Room |
| <ul style="list-style-type: none"> • Finish design plan • Purchase supplies in the store • Complete budget sheet and have initial by teacher • Build sled |
| Day 3 Mission Ops Room |
| <ul style="list-style-type: none"> • Sled trial • Revisions or changes to model • Practice running Sphero on course |
| Day 4 Mission Ops Room |
| <ul style="list-style-type: none"> • Make last minute adjustments • Race Day • Reflect on your model and your peers |

Materials:

The Race General Store is your point of which to get all materials. Remember supply and demand. Not all materials will be available at all times, and if they run out, no other supplies will be added to the Store inventory. Personal materials may not be used, and if used, your team will be disqualified from the race. Supply sheet must be filled out and initialed by teacher before the supplies leave the store. Every group will receive 12 inches of tape and 4 paperclips for free .

Sled Supplies

- | | |
|-------------------------------------|------------------------|
| • Index cards | \$10 each |
| • Foil* | \$100 per inch |
| • Cardboard | \$500 each |
| • Cardstock/File Folders | \$50 each |
| • Styrofoam plates/bowls | \$500 each |
| • Plastic bottles | \$1000 each |
| • Plastic Caps | \$25 each |
| • Pipe cleaners * | \$5 for 2 (must buy 2) |
| • Masking tape/duct tape/clear tape | extra tape \$25/ft |

- Wooden dowels \$500 (must buy 2)
- Craft sticks \$500 (must buy 2)
- Plastic wrap \$100 per inch
- Felt \$1000 per 5x5 square
- Straws \$25 each
- Paper clips \$5 each
- Plastic and paper cups in various sizes \$5-25 each depending
- String \$10 per foot
- Coffee filters \$5 each
- Pencils \$50 each
- Toothpicks \$1 each
- Fishing line \$25 per foot

BUDGET FORM

Team Name: _____

| MATERIAL | COST PER UNIT | NUMBER OF UNITS | TOTAL FOR EACH MATERIAL | |
|----------|---------------|-----------------|-------------------------|--|
| | | | | |
| | | | | |
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| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | Project Total | |

Team Member's Names _____

Engineering Design Process

Complete each step of the engineering process. You must use complete sentences where applicable. Remember **speed, durable, and expense are key to your design!**

Task: What is the task? Consider and write about the requirements.

Imagine: Brainstorm as a team. Explore all the possibilities for the design. Draw possible ideas and label the materials that you will use.

Plan: What are the steps involved in the process?

1. _____

2. _____

3. _____

4. _____

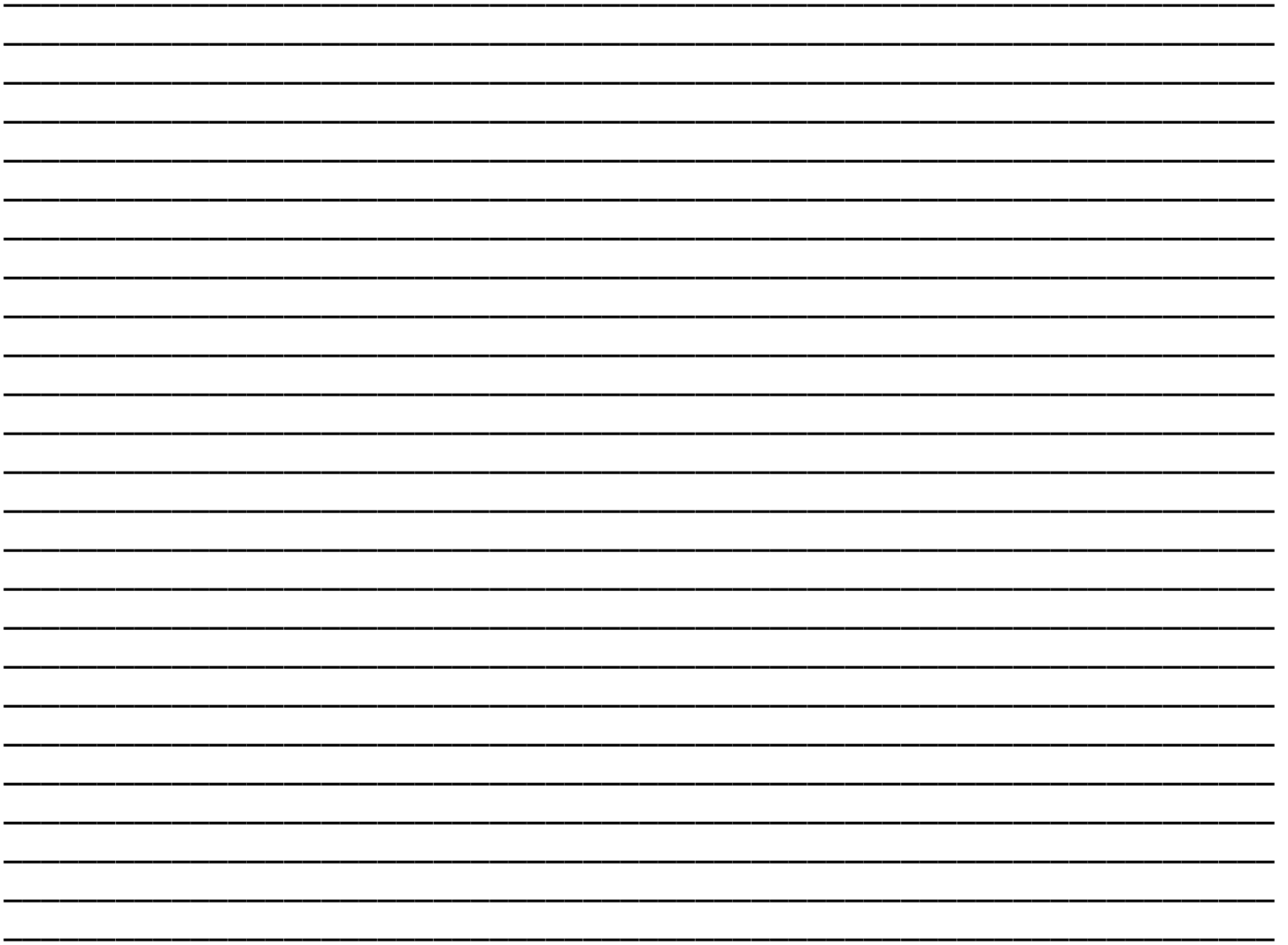
5. _____

Create: Make a model using your plan. **Draw your design here.**

Test your model. **Record and reflect:** What happened during the first test?

Improve design: How can you make your design better? Describe the needed improvement and explain why based on the project requirements. **Improve your model. Draw any changes in the space below.**

Final team reflection: Was your model successful? Why or why not? Describe how the most successful sled was engineered? What supplies were used? If given, the opportunity to rebuild, what would your team do differently?



Dog Sled Rubric- Engineering Design

| Rubric Components | Point Scale | | | | | Student's Score |
|--------------------|---|---|---|---|--|-----------------|
| | 4 | 3 | 2 | 1 | 0 | |
| Investigate | Team states problem/challenge clearly. Team shows evidence of researching topic to solve sled building design problems independently. | | Team states problem/challenge in general terms. Students have difficulty solving building problems. | | Team does not work to standard discussed in class | |
| Design | Team creates a successful sled design that is affordable and competitive in the race. Additionally they defend their choices well. | | Team creates a basic sled design, but it does not satisfy all requirements. | | Team does not work to standard discussed in class | |
| Plan | Team produces a solid sled plan that results in a successful sled race. Takes into account the scenario and conditions into building. | | Team struggles to define a plan, understand the building concepts that result in a successful sled. | | Team does not work to standard discussed in class | |
| Create | Team sled plan results in a successful sled that is competitive in the competition. Able to solve all problems independently | | Team has difficulty building the sled to requirements; is unable to solve all/most problems independently. | | Team does not work to standard discussed in class | |
| Evaluate | Team successfully evaluated problems in their sled design, adapts design to practical applications and does research to solve problems. | | Team sometimes evaluates problem resulting from their original plan and sometimes cannot solve problems without assistance. | | Team does not work to standard discussed in class | |
| Sphero | Team successfully navigated course using the Sphero as driving factor (dogs). Minimal reset times/times out of bounds. All members drove. | | Team utilized the Sphero to navigate course but design of sled often interfered with control of dogs. Multiple resets or out of bounds. Only 1 or 2 members drove | | Team does not work to standards discussed in class / Sphero did not control sled | |
| Group | Team works well as a group, differentiates for team members strengths, and works as experts in solving problems. | | Team has difficulty working as a group and remaining positive about problem solving. | | Team does not work to standard discussed in class | |

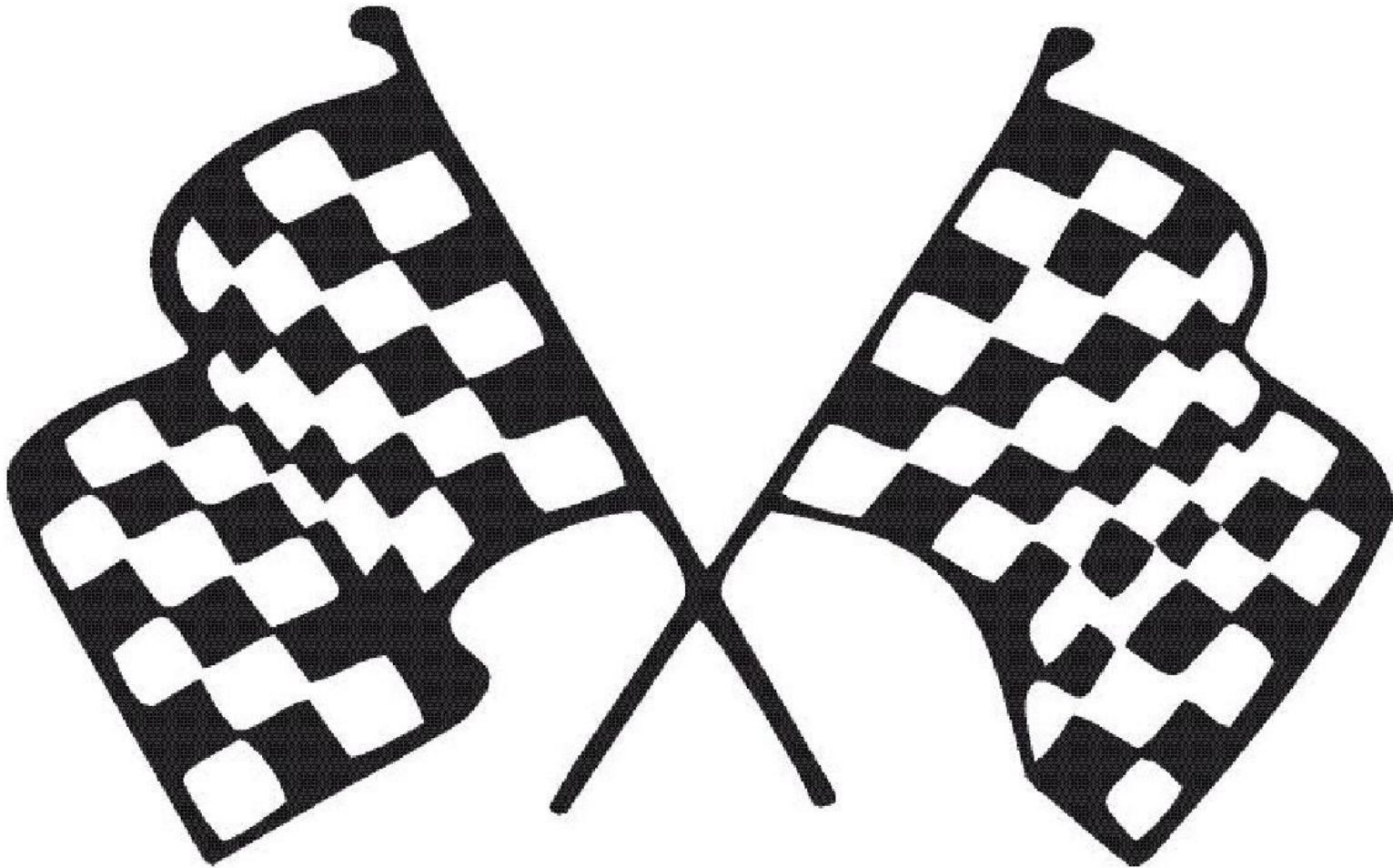
TOTAL SCORE _____/20

Race TIMESHEET.xlsx

| # | Group Name | Time | Sled Penalties | Course Penalties | Final Cost | Final Ranking |
|----|------------|------|----------------|------------------|------------|---------------|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

START

SKAGWAY



White Pass

**(Longer route but
wider trail)**

