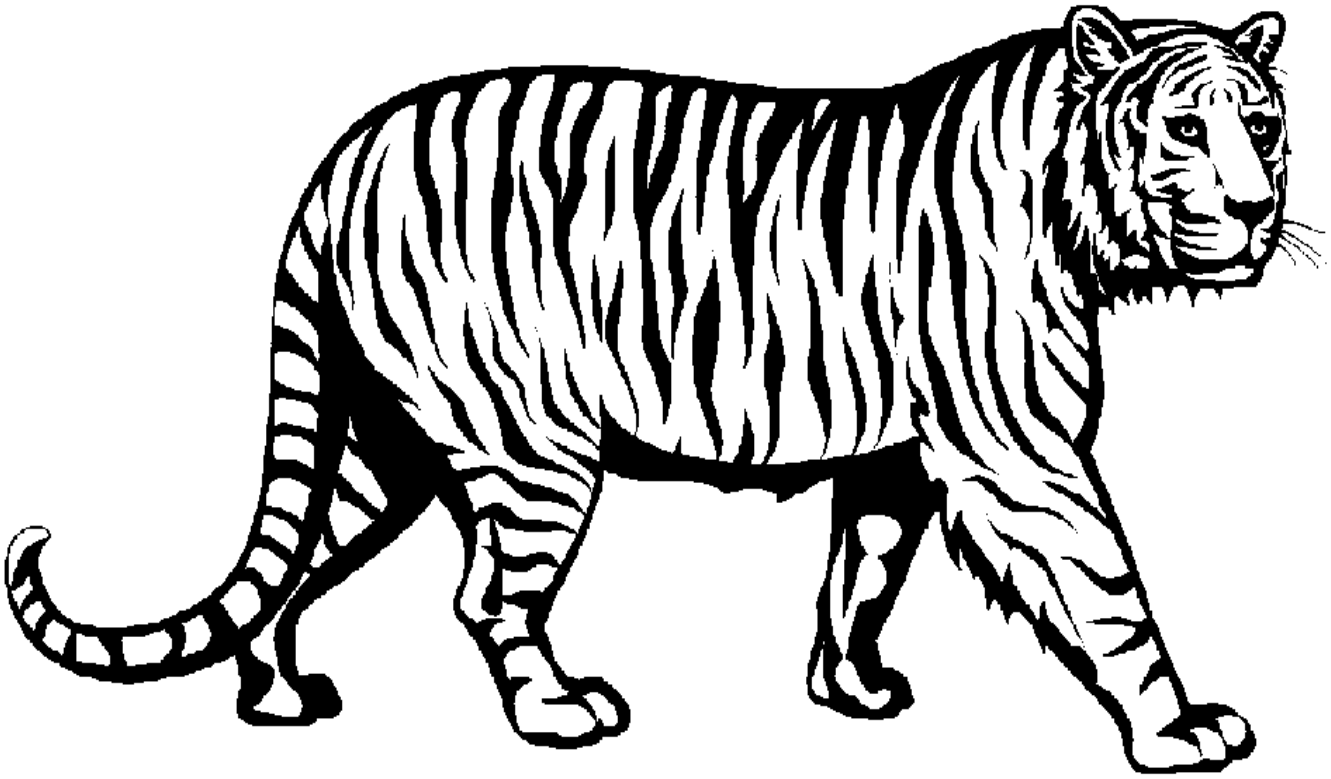
PLTW:
Forces and Interactions



Launch Log

Name _____

Activity 1: Introduction to Forces

1. ***Watch the "Introduction To Forces" Video with your partner. Take notes here.***

Forces:

Interactions:

Effort Force:

Resistance Force:

Forces Check: Label your sketches. Don't rush, draw these neatly.

Teeter Totter Sketches	*Push or Pull Sketch*

2. Go to http://www.sdzsafaripark.org/tiger-cam to watch tigers live. Take notes on what you see after watching for a few minutes.

3. Listen to *How Do You Lift a Lion?*
4. With your group, watch the Simple Machines presentation from step 5 in your procedures.
5. With your group, follow step # 6 in your procedures.

Model:

Wheel and Axle:

How could your simple machine make work seem easier?

Conclusion Questions

- Choose one task that was described in the book *How Do You Lift a Lion?* What are your ideas for completing that task? How would you use forces and simple machines?

- Describe an action or create a sketch that shows two forces you used as you got ready for school today.

a. Were you using a push or a pull in each interaction? _____
b. What was the effort force? _____
c. What was the resistance force? _____

- Name an item found on a playground that uses a simple machine to make it work. What kind of simple machine is used? How does the simple machine make work seem easier?

Activity 2: Simple Machines and Forces

1. Define the following terms from the introduction.

Energy: _____

Work: _____

Wedges: _____

Inclined Planes: _____

Levers: _____

Pulleys: _____

Screws: _____

Wheels and Axles: _____

As you follow the procedures for Part 1, Part 2, and Part 3, be sure your group is taking pictures to create a presentation in Popplet.

2. Your group will now go through the procedures for building an incline plane, lever, and pulley. You will use Autodesk for your procedures on constructing these simple machines.

Part 1: Inclined Plane

Inclined Plane Drawing & Measurement

- Which distance is greater, the length of the ramp or the height of the ramp?

- Did lifting the box or pushing the box up the inclined plane require more effort on your part?

Part 2: Lever

Lever Drawing

Step 17: Did this require more or less effort force than when the pivot point was in the center of the lever? Explain your answer.

Step 19: How did moving the fulcrum close to the tires change the amount effort force you needed to move the tires up and down? Why do you think there was a difference?

Part 3: Pulley

Pulley Drawing

Conclusion Questions

1. How do simple machines transfer energy?

2. Describe one common simple machine in your life and how it makes your work effort easier for each of the following:
   a) an inclined plane

   b) a lever

   c) pulley

Activity 3: Forces and Interactions: Compound Machines

Define and summarize what a compound machine is. (introduction activity 3)

My Compound Machine Sketch	*Group Members' Compound Machine Ideas*

Final group sketch:

Activity 3 Conclusion Questions

1. How do you think compound machines make work seem easier? **Use evidence from this activity to justify your answer.**

2. Name the simple machines you used in your complex machine design and indicate whether they make the task easier or more difficult.

Machine Type	Is the task easier or more difficult?

3. Put together a Popplet presentation using the photos from each part of this activity. Be sure to follow procedures and label parts.

Popplet Presentation Rubric

Score	*1*	*2*	*3*
Pictures and Labels	Only a couple images from the activity were included. There are no labels.	Images from most of the steps of the activity are included. Labels are not correct or clearly marked.	Images from each stage of the activity are included. Labels are clear and correct.
Text Boxes	Too much text is used, cannot be read by audience, and/or the speaker faces the screen and reads the text directly.	Text in the presentation is difficult to read by the audience. The speaker relies on reading the text.	Text used in the presentation is minimal and easy to read by the audience. Text is used to help the speaker, not read by the speaker.
Speaking	Does not appear that group has planned or organized their presentation. Speakers look at the screen instead of the audience, presentation is less than 1 minute or exceeds 3 minutes.	The group has attempted to organize the presentation, but each member is not confident in his/her role. Presentation seems disjointed or unplanned. Speakers make minimal eye contact with the audience, the presentation is less than 1.5 minutes or exceeds 2.5 minutes.	The group has organized the presentation and each member is prepared for their part. The presentation does not exceed 2 minutes. Speakers are clear and easy to understand and hear, and they make eye contact with the audience.

Presentation Total: _____

Problem

1. Read the introduction – Animal Rescue.
2. Follow procedures with your group.

Ask:

Explore:

Model:

Evaluate:

Explain:

Problem Conclusion Questions

1. Was your animal rescue model able to successfully move the animal to a safe area? Support your answer with the evidence you recorded in your Launch Log.

2. List two changes you would make to improve the design. Why do you think these changes would improve your animal rescue model?

3. In this problem, you designed an animal rescue device to lift an animal to safety. What forces and interactions occurred during the rescue?

4. Sketch or use the tablet to take an image of the device. Label the forces and interactions. Include opposing forces such as effort and resistance force.