ST-STE Lab 3.4 **Name_____**
Hand Drill **Handy Drilled Partner_____**

Procedure

1. Turn to p14 of the Wheels, Axles and Inclined Planes Booklet. Follow all six steps of the procedure to build the drill bit.

Analysis of Drill Bit and Entire Drill

1. Do the actual plastic parts of the model consist of removable links? Or nonremovable links?

2. a) Which is longer? The screw itself? Or the length of the screw's thread (represented by the green DNA-shaped plastic)?

   b) Is there an advantage to having threads?

   c) How does having threads and the length of the threads relate to $F_1d_1 = F_2d_2$, where F is the force applied and d is the distance, and how does this make a drill screw practical?
   relate to $F_1d_1 = F_2d_2$

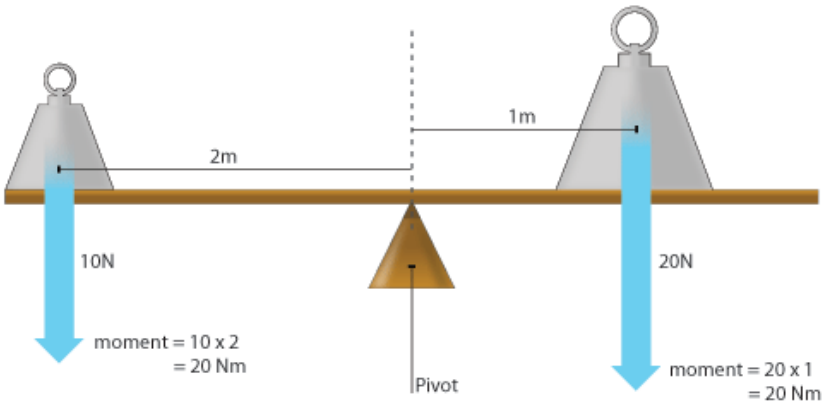
3. a) Does the small gear gain a speed advantage? Or a mechanical advantage?

b) Describe the transformation of motion involved when turning the handle.

c) At what angle are the gears connected?

Analysis of the See Saw

1. Why does sitting further away from the middle of the see saw allow a child to potentially balance a child who is not as heavy as he is? Recall $F_1d_1 = F_2d_2$.



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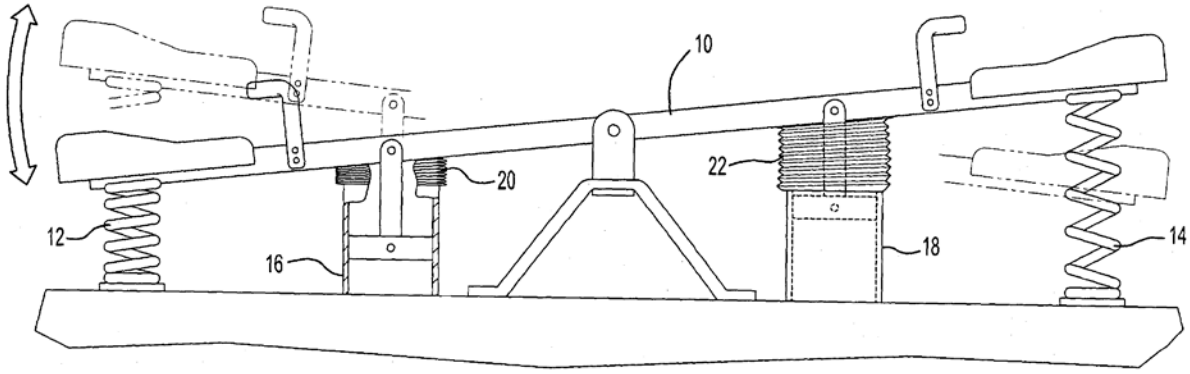


a) Is the link between the upside down V-stand and the top horizontal part of the see saw direct or indirect?

b) Why?

c) Is that same link partial or complete?

d) From the point of view of the child pushing down what kind of motion-transformation takes place?

e) What part of the see saw is directly responsible for this transformation?

Analysis of the Eggbeater

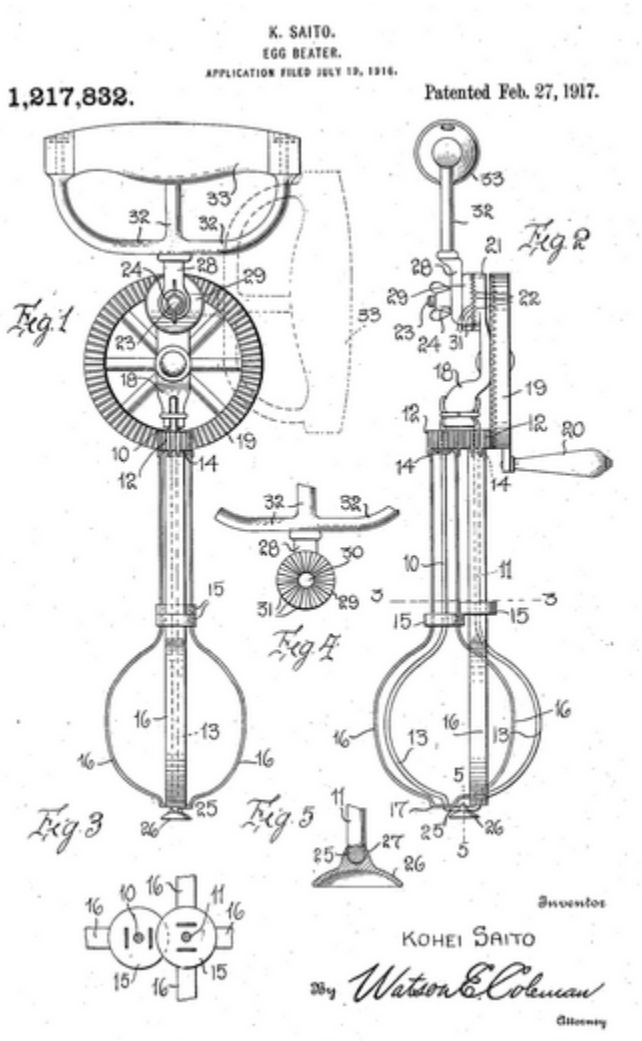
1. a) Does the small gear gain a speed advantage? Or a mechanical advantage?

b) Describe the transformation of motion involved when turning the handle.

c) At what angle are the gears connected?

2. a) Would a shorter handle be less practical?

b) Why? Relate to $F_1d_1 = F_2d_2$



ST-STE Lab 3.4 **Name**_____
See Saw **Seesawing Partner**_____

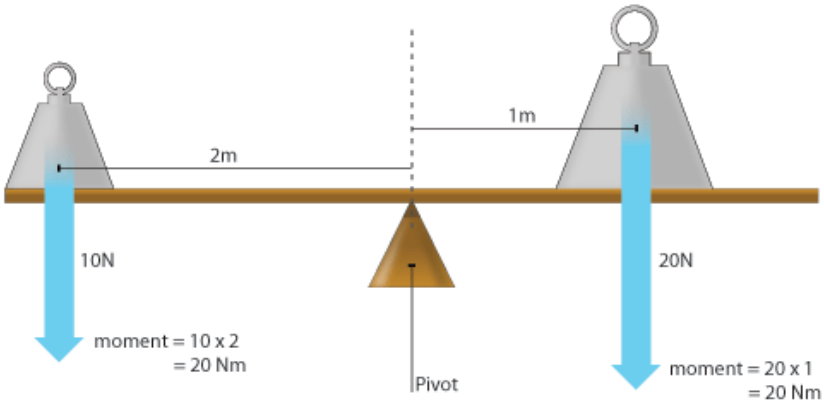
Procedure

1. Turn to p2-3 of the Levers and Pulleys Booklet. Follow all eight steps of the procedure to build the see saw.

Analysis of the See Saw

1. Do the actual plastic parts of the model consist of removable links? Or nonremovable links?

2. Why does sitting further away from the middle of the see saw allow a child to potentially balance a child who is not as heavy as he is? Recall $F_1d_1 = F_2d_2$.



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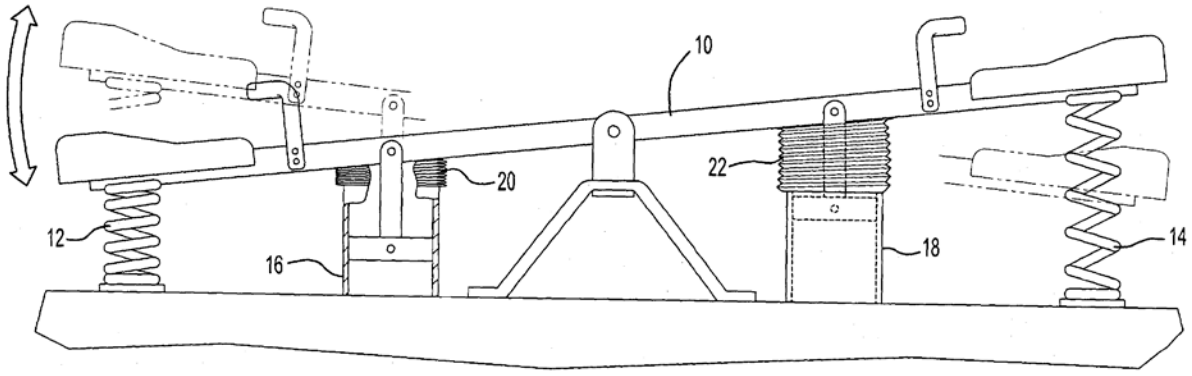


a) Is the link between the upside down V-stand and the top horizontal part of the see saw direct or indirect?

b) Why?

c) Is that same link partial or complete?

d) From the point of view of the child pushing down what kind of motion-transformation takes place?

e) What part of the see saw is directly responsible for this transformation?

Analysis of Drill Bit and Entire Drill

4. a) Which is longer? The screw itself? Or the length of the screw's thread (represented by the green DNA-shaped plastic)?

b) Is there an advantage to having threads?

c) How does having threads and the length of the threads relate to $F_1d_1 = F_2d_2$, where F is the force applied and d is the distance, and how does this make a drill screw practical?
relate to $F_1d_1 = F_2d_2$

5. a) Does the small gear gain a speed advantage? Or a mechanical advantage?

b) Describe the transformation of motion involved when turning the handle.

c) At what angle are the gears connected?

Analysis of the Eggbeater

6. Do the actual plastic parts of the model consist of removable links? Or nonremovable links?

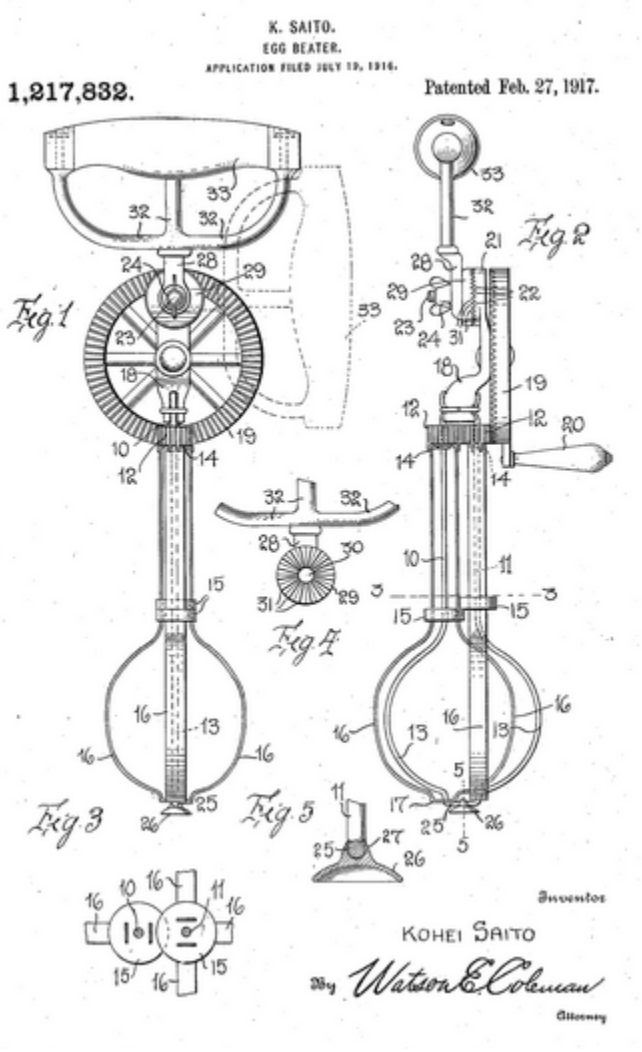
7. a) Does the small gear gain a speed advantage? Or a mechanical advantage?

b) Describe the transformation of motion involved when turning the handle.

c) At what angle are the gears connected?

8. a) Would a shorter handle be less practical?

b) Why? Relate to $F_1d_1 = F_2d_2$



ST-STE Lab 3.4 **Name_____**
Eggbeater **Eggbeating Partner_____**

Procedure

1. Turn to p2-3 of the Levers and Pulleys Booklet. Follow all five steps of the procedure to build the eggbeater.

Analysis of the Eggbeater

1. Do the actual plastic parts of the model consist of removable links? Or nonremovable links?

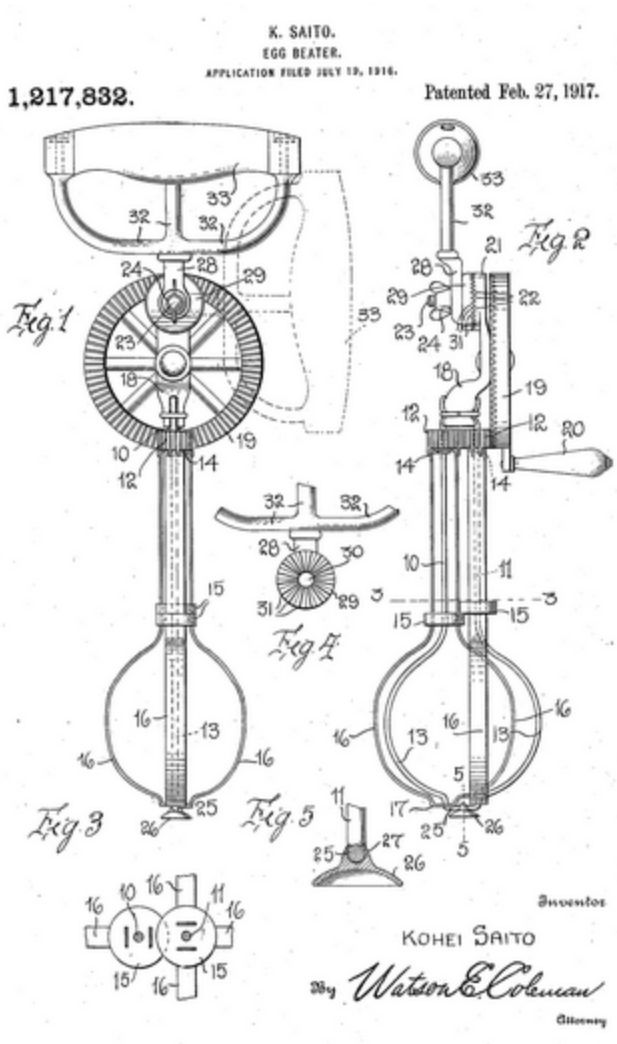
2. a) Does the small gear gain a speed advantage? Or a mechanical advantage?

b) Describe the transformation of motion involved when turning the handle.

c) At what angle are the gears connected?

3. a) Would a shorter handle be less practical?

b) Why? Relate to $F_1d_1 = F_2d_2$



Analysis of Drill Bit and Entire Drill

4. a) Which is longer? The screw itself? Or the length of the screw's thread (represented by the green DNA-shaped plastic)?

b) Is there an advantage to having threads?

c) How does having threads and the length of the threads relate to $F_1d_1 = F_2d_2$, where F is the force applied and d is the distance, and how does this make a drill screw practical? relate to $F_1d_1 = F_2d_2$

5. a) Does the small gear gain a speed advantage? Or a mechanical advantage?

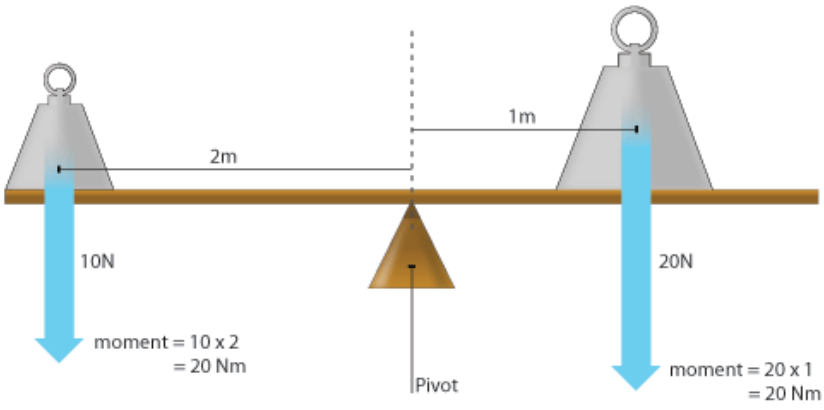
b) Describe the transformation of motion involved when turning the handle.

c) At what angle are the gears connected?

Analysis of the See Saw

1. Do the actual plastic parts of the model consist of removable links? Or nonremovable links?

2. Why does sitting further away from the middle of the see saw allow a child to potentially balance a child who is not as heavy as he is? Recall $F_1d_1 = F_2d_2$.



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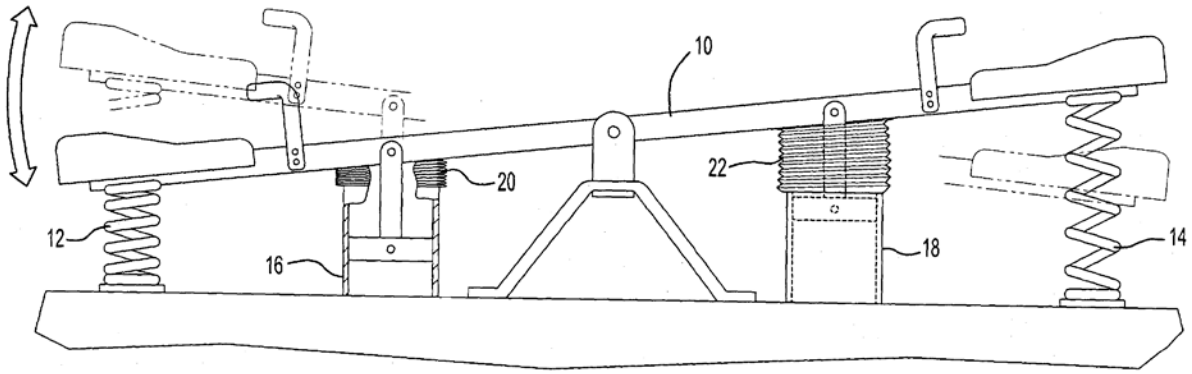

4. Is the link between the upside down V-stand and the top horizontal part of the see saw direct or indirect?

5. Why?

6. Is that same link partial or complete?

7. From the point of view of the child pushing down what kind of motion-transformation takes place?

8. What part of the see saw is directly responsible for this transformation?