1. Choose A, B, or C and complete all requirements.

A. Watch an episode or episodes (about an hour total) of a show about anything related to motion or machines. Then do the following
   i. Make a list of at least two questions or ideas from what you watched.
   ii. Discuss two of the questions or ideas with your Counselor

B. Read (about one hour total) about anything related to motion or machines. Then do the following:
   i. Make a list of at least two questions or ideas from what you read.
   ii. Discuss two of the questions or ideas with your Counselor

C. Do a combination of reading and watching (about one hour total) about anything related to motion or machines. Then do the following:
   i. Make a list of at least two questions or ideas from what you read and watched.
   ii. Discuss two of the questions or ideas with your Counselor.

☐ Requirement 1

I chose option: ☐ A  ☐ B  ☐ C

Name(s) of things I watched and/or read: ______________________________

☐ I made a list of at least two questions or ideas from what I read and watched.

☐ I discussed the ideas and questions with my Counselor.

__________________________________________________________________________  ________________
Counselor’s Okay Date

2. Complete ONE belt loop or pin from the following list. (Choose one that you have not already earned).

   Badminton   Golf   Table Tennis
   Baseball    Hockey   Tennis
   BB-Gun Shooting    Mathematics   Ultimate
   Fishing    Softball

☐ Requirement 2

I completed the: ☐ belt loop  ☐ pin in ______________________________

__________________________________________________________________________  ________________
Counselor’s Okay Date
3. **Levers**

   A. Make a list or drawing of three types of levers. (A lever is one kind of a simple machine.)
   
   B. Be able to tell your Counselor:
      
      i. the class of each lever
      ii. how each lever works
   
   C. With your Counselor, discuss:
      
      i. the type of lever that is involved with the motion for the belt loop or pin you chose for requirement 2.
      ii. what you learned about levers and motion from earning your belt loop or pin
      iii. why we use levers

☐ **Requirement 3**

☐ A. I made a list or drawing of three types of levers.

☐ B. I told my Counselor the class of each lever and how each lever works.

☐ C. I discussed my Counselor the type of lever involved in the motion of the _________________ belt loop/pin I earned for requirement 2, as well as what I learned about levers and motion and why we use levers.

Counselor’s Okay __________________________ Date __________________________

4. **Do the following:**

   A. Visit a place that uses levers, such as a playground, carpentry shop, construction site, restaurant kitchen, or any other location that uses levers.

   B. Discuss with your Counselor the equipment or tools that use levers in the place you visited.

☐ **Requirement 4**

☐ A. I visited: ____________________________ on date: ______________

☐ B. I discussed with my Counselor the equipment or tools that use levers in the place I visited.

Counselor’s Okay __________________________ Date __________________________
5. Do EACH of the following:

A. On your own, design, including a drawing, sketch or model, ONE of the following:
   i. a playground fixture that uses a lever
   ii. a game or sport that uses a lever
   iii. an invention that uses a lever

B. Discuss with your Counselor how the lever in your design will move something.

☐ Requirement 5
☐ A. I designed a/an: ________________________ that uses a class ___ lever and showed my Counselor a ☐ drawing ☐ sketch ☐ model of it.

☐ B. I discussed with my Counselor how the lever in my design will move something.

__________________________________________ _______________________
Counselor’s Okay Date

6. Discuss with your Counselor how levers affect your everyday life.

☐ Requirement 6

I discussed with my Counselor how levers affect my everyday life.

__________________________________________ _______________________
Counselor’s Okay Date
Swing! Nova Pi Pin

The below curriculum is designed for a 90-minute Pack meeting for ages Tigers to Webelos. We will break this into 3 sessions (20 min each) and Homework. Adult volunteers will lead sessions while Den Chiefs provide support and leadership. It is a good idea to pair Tigers with Webelos for support. Remember: DO YOUR BEST is the cub scout motto and above all else HAVE FUN!

**HOMEWORK**

1. Choose A or B or C and complete ALL the requirements.
   
   A. Watch an episode or episodes (about one hour total) of a show about anything related to motion or machines. Then do the following:
      i. Make a list of at least two questions or ideas from what you watched.
      ii. Discuss two of the questions or ideas with your counselor.
   
   B. Read (about one hour total) about anything related to motion or machines. Then do the following:
      i. Make a list of at least two questions or ideas from what you read.
      ii. Discuss two of the questions or ideas with your counselor.
   
   C. Do a combination of reading and watching (about one hour total) about anything related to motion or machines. Then do the following:
      i. Make a list of at least two questions or ideas from what you read and watched.
      ii. Discuss two of the questions or ideas with your counselor.

Sample videos:
https://www.youtube.com/watch?v=OuPyvTQBFwQ
https://www.youtube.com/watch?v=rKV8f69xIo
https://www.youtube.com/watch?v=HEsH1iA20GM
https://www.youtube.com/watch?v=OdM2jWg2uEE
https://www.youtube.com/watch?v=F8UGFU2M2gM
https://www.youtube.com/watch?v=ICYg_gz4fDo

Compiled by Leslie Dickson
based on materials from the BSA including worksheets found on the internet
September 2014
**HOMEWORK**
2. Complete ONE belt loop or pin from the following list. (Choose one that you have not already earned.)

<table>
<thead>
<tr>
<th>Badminton</th>
<th>Tennis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseball</td>
<td>Golf</td>
</tr>
<tr>
<td>Softball</td>
<td>Ultimate</td>
</tr>
<tr>
<td>Table Tennis</td>
<td>Hockey</td>
</tr>
<tr>
<td>Fishing</td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 1**

3. Levers
   A. Make a list or drawing of the three types of levers. (A lever is one kind of simple machine.)
      i. Be able to tell your counselor:
      ii. The class of each lever
      iii. How each lever works
   C. With your counselor, discuss:
      i. The type of lever that is involved with the motion for the belt loop or pin you chose for requirement 2
      ii. What you learned about levers and motion from earning your belt loop or pin
      iii. Why we use levers

**SESSION 2**

4. Do the following:
   A. Visit a place that uses levers, such as a playground, carpentry shop, construction site, restaurant kitchen, or any other location that uses levers.
   B. Discuss with your counselor the equipment or tools that use levers in the place you visited.
SESSION 3
5. Do EACH of the following:
   A. On your own, design, including a drawing, sketch, or model, ONE of the following:
      i. A playground fixture that uses a lever
      ii. A game or sport that uses a lever
      iii. An invention that uses a lever
   B. Discuss with your counselor how the lever in your design will move something.

6. Discuss with your counselor how levers affect your everyday life.
SESSION 1 Instructions (give to leader)

Supplies:
Worksheets
pencils
sports equipment: baseball bat, hockey stick, golf club, tennis racket, ping pong racket, etc

Learn about 3 classes of levers

Class 1 - The fulcrum is located between the effort and the load. The load always pushes down because of its weight. The force is pushed down and load is lifted up.

Class 2 - The fulcrum is located at one end, the effort is at the other end, and the load is in the middle. The effort and load move in the same direction.

Class 3 - The fulcrum is at one end, and the effort is applied between the fulcrum and the load. Force is applied in the direction you want the load to move.

The following belt loops require a class 3 lever; baseball, softball, tennis, golf, fishing, badminton, hockey. See images below. Use the supplied sports equipment to demonstrate the fulcrum, effort and load.

Compiled by Leslie Dickson
based on materials from the BSA including worksheets found on the internet
September 2014
Whole Group:
Discuss what was learned about levers and motion from earning your belt loop or pin

Discuss why we use levers.
- Levers can make things easier to move - a small force applied over a large distance results in a large force moving a small distance
- Change the direction of the applied force
- Increase the distance an object moves - a large force applied over a small distance moves the load a large distance.

Compiled by Leslie Dickson
based on materials from the BSA including worksheets found on the internet
September 2014
SESSION 2 Instructions (give to leader)

Supplies:
scissors
nutcracker
pliers
balance board
walnuts
hammer
shovel
spoons, forks
marshmallows
bottle opener
den provided consumable replies

Explore levers: Have scouts spend time using the levers, identifying the fulcrum, force and load. Each den will have its own set of consumable supplies (shopping list is provided prior to meeting).

Complete worksheet: “Benefits of Levers”
SESSION 3 Instructions (give to leader)

Supplies:
worksheet “Levers”
Pencils
Colored pencils

It's time to apply everything you have learned. Scouts will create their OWN lever! The lever can be something used in a game or sport, on a playground or an invention. A worksheet is provided to draw the new invention.

Scouts will tell the leader how the lever will move something.

On the back of the worksheet list all the levers you use in everyday life. Sample answers are below:

hammer, scissors, toilet, door pull handles, nutcracker, pliers, balance board, see saw, hammer, shovel, spoons, forks, fishing pole, wheelbarrow, crowbar, nail cutter, tweezers, stapler
Lever

A lever is a machine with a board over a fulcrum. By changing how much of the board is on each side of the fulcrum, it can be made more difficult or easier to lift a weight. If you push down on the long side, it will be easier to lift something on the short side.

Below are three different kinds of levers. Can you find the fulcrum in each one?
Label the Parts of the Levers

Below are 3 types of levers, can you label each type of lever? Label the load, fulcrums and effort.
Identify the lever and label the load, effort and fulcrum.

Name_____________________

Type of Lever ____________________________
1. 
2. 
3. 

Type of Lever ____________________________
1. 
2. 
3. 

Type of Lever ____________________________
1. 
2. 
3. 

Type of Lever ____________________________
1. 
2. 
3. 

Type of Lever ____________________________
1. 
2. 
3. 

Type of Lever ____________________________
1. 
2. 
3. 

Type of Lever ____________________________
1. 
2. 
3. 

http://worksheetplace.com©
**Benefits of Levers**

1. What kinds of tasks get done with the help of levers?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

2. What would it be like without the use of levers?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

3. How many levers can you think of that require push? pull?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

4. Why do levers work?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

5. How many levers can you list from playgrounds and sports?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
Levers

Design a See-saw (teeter-totter) and label the fulcrum, effort, load and type of lever:

Design a lever that makes a job easier and label the: fulcrum, effort, load and type of lever. (For example, something that opens a paint can lid, something that lifts a large rock, something that moves a large item.)