

# Power, Structural and Technical Systems Careers Discussion Guide

Teachers: These discussion questions may be used at any point in exploring Power, Structural and Technical Systems careers with your students. If your students do not have significant prior knowledge of this career area, it may be best to use this guide after viewing some of the other links on our [Power, Structural and Technical Systems careers page](#). At the bottom of this guide, there are “Suggested Activities” to try with your class.

## Discussion questions

1. If you have taken the Student Interest Survey for the career areas on our site, do your results align with this career area? What interests and skills do you possess that may be a good fit for power, structural or technical systems?
2. We introduced you to several careers on the [Power, Structural and Technical Systems careers page](#). They included mechanical systems such as hydraulic and pneumatic equipment, electrical and other large-scale systems needed in agriculture. They also included transportation and logistics and precision agriculture (using GPS and other computer-based technology to improve farming practices). Which one of these careers do you think best fits your skills and interests? Which careers in power, structural and technical systems career appeal most to you and why?
3. **Scenario Practice:** Use the following scenario and questions to explore the field of power, structural and technical systems and how it might relate to you. (Teachers: At the end of this discussion guide, a Scenario Practice Solution is provided as guidance in solving the practice scenario. A helpful infographic is also referenced in the solution).

*Wellman Seeds wants to begin exporting soybeans to countries in Asia, such as Singapore, Indonesia and Japan. They plan to transport the soybeans using railways, highways, and container ships (by sea). You must help them plan the most efficient shipping methods and identify the systems needed to make transportation possible.\**

### Problem solving:

- What information will you need to begin planning best route for soybean transport? Brainstorm a list of information you will need to gather to find the most effective and cost-conscious shipping route.
  - What steps are involved in shipping the soybeans from the U.S. to Asia?
  - What careers will be involved in completing the steps for transportation? What power, technical, and structural systems can you identify that will be part of this shipping process? (For example: electrical systems for communication, hydraulic systems within the trains and trucks being used for transport, etc).
  - In which part of this development process would you enjoy participating? For example, would you enjoy mapping out the route from start to finish? Would you enjoy operating the trains or other shipping vehicles? Would you enjoy maintaining the transportation vehicles or coordinating pickup and delivery at a distribution center? Brainstorm the career options in this process that would most interest you.
4. There are many ways to get involved with the power, structural and technical systems career path even before you graduate. Some options include joining a related school club or starting one yourself. Taking a mechanics or machinery course would be an excellent way to explore this field. You may contact one of the GrowNextGen industry leaders and ask them to visit your school or share some resources with your class. You could also take a virtual field trip to an industry leader’s facility. What other ways can you brainstorm to involve yourself in power, structural and technical systems careers before you graduate or during your post-high school training?

\* From Cargill, 2016, <http://www.cargill.com/wcm/groups/public/@ccom/documents/document/na3074109.pdf>

## Curriculum connection question

- Please reflect on the material you have learned this year. Make one connection between the content you are learning and power, structural and technical systems careers. For example: Have you discussed electrical circuitry or mechanics in physics class or precision farming techniques in an agriculture course? What relevance might electronics, mechanics or precision farming have to this pathway?

## Suggested activities

- Have a round-table discussion about the various skills that students possess and how they could play a part in power, structural and technical systems careers. Use students' career inventory results as a jumping off point for discussion. Each student may keep a list of careers brought up during the discussion. Afterwards, students can create a concept map of the careers in this field that were discussed and how they may connect to one another.
- Have each student investigate an example of a system found in this career area. For example: a transportation route from start to finish, a mechanical diagram of a piece of agricultural machinery, an electrical system connected to agriculture, or a GPS system used in precision agriculture. Have students create an infographic explaining the parts of each system and their function.
- As an entrance or exit ticket, ask students to brainstorm 3 ways they could pursue a career in power, structural and technical systems before they graduate.

## Scenario practice solution

- The following infographic provided through Cargill may help students visualize the problem at hand: <http://www.cargill.com/wcm/groups/public/@ccom/documents/document/na3074109.pdf>
- Information like the most direct route to ports in the destination countries would be needed. Distribution centers or pickup and delivery sites should be identified. Shipping costs by truck, train and sea transport would be needed as well. Related expenses such as maintenance on vehicles and the cost of communication (by phone or internet) needed for transportation should be considered.
- Steps would include such things as route planning, locating distribution centers, pricing transportation, and identifying or setting up needed infrastructure (roads, railways or waterway transportation, for example). Shipping a "trial load" to the destination may be advisable. Having mechanical and power systems experts ready to service the vehicles may be necessary. Shipping in mass would be the final step.