

# Tassel to Table

**Grade Level: 4-8**

## Lesson Overview

Students will learn about the path corn takes from the field into food products we use every day. This lesson explores careers throughout the process, as well supply issues that can affect the food supply chain.

## Student Objectives

1. Explain or model the processes involved in taking corn from the field and turning it into a food for our table and various other corn products.
2. Identify the four main phases of the process involved in taking corn from the field and turning it into food for our table.
3. Name at least 5 careers involved in turning corn into food.

## Materials

- ✓ Copies of “Tassel to Table” cards (one set per class)
- ✓ Script to prompt students (teacher only)
- ✓ Tassel to Table flowchart
- ✓ Tassel to Table worksheet
- ✓ Tassel to Table Power Point (optional)  
<https://docs.google.com/presentation/d/1Na8Pg6A4Jqo4row0WmdZNZDRJ1ZaHJ1PbDj9fn40qts/edit?usp=sharing>
- ✓ Tassel to Table student cards (one set per student – optional)

## Vocabulary

- **agronomy**- a science that deals with the methods used by farmers to raise crops and care for the soil.
- **barge** – a roomy, usually flat-bottomed boat used chiefly for the transportation of goods on inland waterways and usually propelled by a towboat.
- **elevator** – structure for unloading, storing and loading out grain.
- **inputs** – resources used in farm production. These may include chemicals, equipment, feed, seed and fuel.
- **processing** – changing grain into a variety of products such as livestock feed, cosmetics, fireworks, paints, detergents, and so much more.

## Background Information

Corn is used in products we eat and use every day. There are many people involved in several places that are necessary to turn a kernel of corn into one of the more than 3,000 products that are available for us to use or eat.

## Procedure

1. Show students a box of cereal or other food product made from corn.
2. Ask students to think about how many people (or careers) were involved in the production of the box of cereal. Brainstorm as a class, if desired.
3. Tell students that they are going to make a chain of some of the stops involved through the production, process, packaging, and distribution of corn food products. Using the following script, discuss the various steps the corn takes. As a student answers the next step correctly, ask them to be the next link in the chain by going to the front of the classroom and holding the appropriate card in front of them. The provided Power Point could be used in place of the physical student line, or the student cards could be hung on the board or a wall, creating the chain.

## Production Questions:

**Ask the students who they think is the first person, or link, that is important in this chain.**

*Farmer (card included)*

- **Ask the students to think about things that might have an effect on the farmer doing their job.**

*Weather – too much or too little rain, temperature; illness; equipment breakdown; plant disease; insect infestation...*

- **Do any of these things have alternatives?**

*The farmer is at the mercy of the weather, but family, friends or hired help could lend a hand due to illness. If the farmer is unable to fix the equipment him/herself, a mechanic will have to be paid to work on the machinery or borrow or rent the necessary equipment from a friend, neighbor, or dealership. Depending on the disease and insect, the farmer may be able to treat the crop at additional expense or could potentially lose the entire field.*

- **Ask the students what the farmer needs to be able to plant and care for the corn crop and what people are instrumental in this, again giving the appropriate card to the first student with the correct answer and instructing them to join the chain.**

*Implement dealership (card included) includes the sales representatives, mechanics, delivery driver, parts inventory, equipment set up and delivery, etc.*

*Seed sales (card included) includes sales representatives, geneticists, marketing coordinators,*

*Agronomy services (card included) includes chemical and fertilizer salespersons, soil technicians, crop scouts, custom applicators, etc.*

- **What are some things the farmer must consider when dealing with these different individuals?**

*Cost of purchasing and maintaining new versus used equipment or repairing equipment that is already owned; cost of the different varieties of seed and chemical choices available.*

**Assuming a successful planting and growing season, the corn crop is ready to harvest using a combine.**

- **Ask the students to now think of things that might delay the harvest.**
- **What happens if the combine or other equipment breaks down; weather – too much rain or it freezes or snows sooner than expected; illness; fire in a field where the crops are dry and ready to harvest?**
- **Are there any solutions for any of these problems?**

*Again, there is nothing the farmer can do to change the weather and the machinery has to be fixed or other arrangements made to replace the equipment on a temporary or permanent basis. Friends, family or neighbors can help out in the event of an illness. Fire could potentially destroy an entire field of grain and any buildings (machine sheds, barns, grain bins) or equipment that is nearby.*

- **What happens to the corn after it is harvested?**

*Truck or wagon transportation to the grain elevator (cards included)*

**Give the students with the correct answers the appropriate cards and instruct them to join the chain.**

**At the elevator, the corn is graded based on moisture content and foreign materials such as weed seeds and plant residue, and the quality of the grain to determine the price. The grain is stored and dried until it is sold.**

- **What are some of the jobs that could be found at the grain elevator?**

*Elevator manager, accountant, truck driver, grain merchandiser*

## Processing Questions:

- **When the grain is sold, where does it go and how does it get there?**

*Truck, train or barge transportation to the refinery (cards included)*

**The refinery is the beginning of the processing phase of the chain; there are several steps the corn goes through:**

1. **Inspection and cleaning** – the grain is cleaned twice to remove any foreign materials, dust or remaining cob.
2. **Steeping** – stainless steel tanks full of 50-degree water will hold about 3,000 bushels of corn to soak for 30 – 40 hours. During steeping, the corn will more than double in size and significantly increase moisture levels. As the corn swells and softens, the starch is released. After steeping, the corn is coarsely ground to separate the germ then a mixture of ground corn and water moves on to the next step with everything else being used a different way.
3. **Germ separation** – special machines called cyclone separators spin the corn and water mixture to separate the germ from the rest. After this separation, the germs are pumped onto screens and washed repeatedly. A combination of chemical and mechanical processes takes the oil from the germ. This oil is further filtered into corn oil. The leftover germ is used for animal feed.
4. **Fine grinding and screening** – after leaving the germ separator, the corn and water mixture is cleaned more thoroughly and then ground to release starch and gluten from the corn fiber. This mixture is poured through screens to capture fiber and allow starch and gluten to filter through. The fiber is put back into a water mixture and screened again before being used as a key ingredient in animal feeds. The starch and gluten is sent through pipes to the starch separator.
5. **Starch separation** – the gluten and starch are spun so the gluten can be used in animal feed. The starch is diluted and washed 8 – 14 times, then diluted and washed again to remove any last bits of protein. Some starch is dried and sold that way, but most is turned into corn syrups and dextrose.
6. **Syrup conversion** – starch is liquefied and using acids and enzymes, turned into dextrose. At different times during refining, the syrup can be made into different types of sugar for various uses. The syrup is filtered, spun, and evaporated. Syrups in these different forms can be sold as is or further processed.
7. **Fermentation** – using yeast or bacterial fermentation, dextrose is distilled to keep the alcohol or further separated to produce other by-products. Carbon dioxide from the fermentation process is sold and all remaining nutrients are used in animal feed.

- **What kinds of jobs could be found at a refinery?**

*Line workers, mechanics, electricians, scientists, managers*

- **How could equipment break down or a storm that caused the refinery to lose power affect the chain up to this point? What about from this point on?**

*Depending on the length of time, any problems that affect production could cause selling prices for farmers to fall due to decreased demand. On the other end of the chain, prices could increase due to lack of supplies to make the desired products.*

- **After leaving the refinery, what happens to the various corn products, and how do they get there?**

*Truck or train to the manufacturer (cards included)*

### **Packaging Questions:**

**The manufacturer is the beginning of the packaging phase of the final corn product.**

- **What types of jobs would be in a manufacturing plant that produces soda or cereal?**

*Plant manager, accountants, food scientists, line workers, mechanics, electricians, cleaning crews, quality assurance personnel, buyer*

- **Are there any jobs that would contribute to the packaging of the final product that would not be found at the manufacturing plant?**

*The people that design and produce the actual packaging materials (boxes, bags, cans, labels, ties, etc.), advertising agents*

- **What would happen if the workers decided they weren't being paid enough or that their benefits weren't good enough? How would a strike affect the chain up to this point? From this point on?**

*Again, depending on the length of time, any problems that affect production could cause selling prices for farmers and refiners to fall due to decreased demand. On the other end of the chain, prices could increase due to lack of products to meet the demand of consumers.*

### **Distribution Questions:**

**After leaving the manufacturing plant, where does the product go and how does it get there?**

*Truck transportation to the warehouse (cards included)*

- **What types of jobs are available at a warehouse?**

*Managers, accountants, order pickers, forklift operators, transportation routers, order takers.*

- **The final phase of the corn products is distribution. At the warehouse, small amounts of a variety of products are stored.**
- **When they leave the warehouse where do they go and how do they get there?**

*Truck transportation to the store for consumers to purchase (cards included)*

- **If every manufacturer had to deliver their product to each individual store that sold their products, how would this affect the price consumers pay?**

*It would significantly increase transportation cost that would be reflected in the price consumers pay at the store.*

- **Again, ask the students to think about what things could affect the prices of the products at the store.**

*Inclement weather could affect transportation. Equipment breakdown, fuel prices, supply and demand are other factors that could affect prices.*

- **What are some examples of corn products that you buy at the grocery store and take home to eat?**

*Cereal, soda, tortillas, syrup, candy, ice cream, and many more*

- **What are some examples of corn products that you buy at the store that you take home and cannot eat?**

*Glass cleaner, diapers, paint, packing peanuts, fireworks, makeup*

- **What other places can you buy corn products, besides the grocery store?**

*Gas station, pet store, feed store, pharmacy.*

## **Extension Activities**

1. To further explore the economics of the prices at the grocery store, check out the link to the Illinois Farm and Food Facts at: <https://www.ilfb.org/resources/consumer-resources/>, specifically looking at page 38, *Food Dollar Series*. Farmers are the only entity that does not set their own price, while others are setting prices to ensure profit. A farmer only receives 15¢ of every food dollar spent. Have students investigate where the other 85¢ goes.

2. As an alternative to the flow chart worksheet, have students use technology or art supplies to create their own flow chart.

## Additional Resources

- Illinois Agriculture in the Classroom Cooperative and Corn Readers:  
[http://www.agintheclassroom.org/TeacherResources/terra\\_nova.shtml](http://www.agintheclassroom.org/TeacherResources/terra_nova.shtml)
- Illinois Agriculture in the Classroom Interactive Corn and Career Ag Mags:  
<http://www.agintheclassroom.org/TeacherResources/AgMags.shtml>

## Standards

### ***Illinois Social Science Standard***

SS.EC. 2.4 Describe how goods and services are produced using human, natural, and capital resources (e.g. tools and machines).

### ***Illinois English Language Arts Standard***

W2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

The **M**ultidisciplinary **A**gricultural Integrated Curriculum (mAGic) was created in 2004 under the leadership of the Illinois State Board of Education (ISBE) and the Facilitating Coordination in Agricultural Education Project (FCAE). Funding was made available through the FCAE grant budget from the agricultural education line item of the ISBE budget. This revision, as printed, was developed in April 2021.



These mAGic lessons are designed to bring agriculture to life in your classroom. They address the Illinois Learning Standards in math, science, English language arts and social studies.

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Name \_\_\_\_\_

## **Tassel to Table**

1. List the four phases of the process involved in taking corn from the field and turning it into a usable product for consumers.
  - 1.
  - 2.
  - 3.
  - 4.
2. Name five of the possible careers that were discussed in the “Tassel to Table” chain.
3. Discuss how nature can affect the prices of products that consumers purchase.
4. Discuss a way that humans can affect the prices of products that consumers purchase.



## **Tassel to Table ANSWER KEY**

1. List the four phases of the process involved in taking corn from the field and turning it into a usable product for consumers.

- 1. Production**
- 2. Processing**
- 3. Packaging**
- 4. Distribution**

2. Name five of the possible careers that were discussed in the “Tassel to Table” chain.

**Answers may vary, refer to the teaching script.**

3. Discuss how nature can affect the prices of products that consumers purchase.

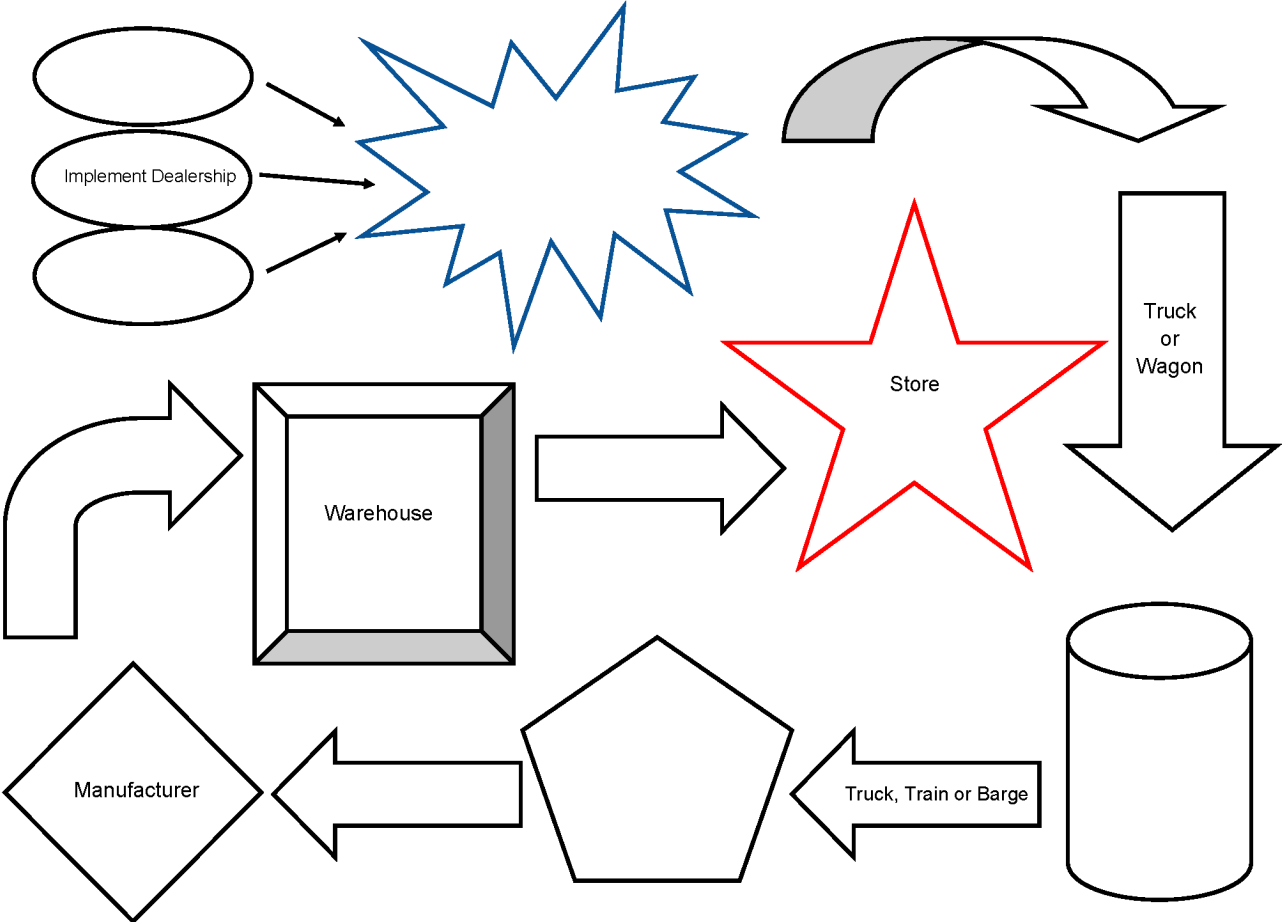
**Answers may vary. Inclement weather can affect whether the corn crop is planted and harvested in time; it can also affect growth and yields. A plant disease or insect infestation could also strike an area that could affect the amount of grain available at harvest.**

4. Discuss a way that humans can affect the prices of products that consumers purchase.

**Answers may vary. Illness can occur during the production phase. Workers at any point during processing, packaging and distribution could strike due to disagreements with management.**

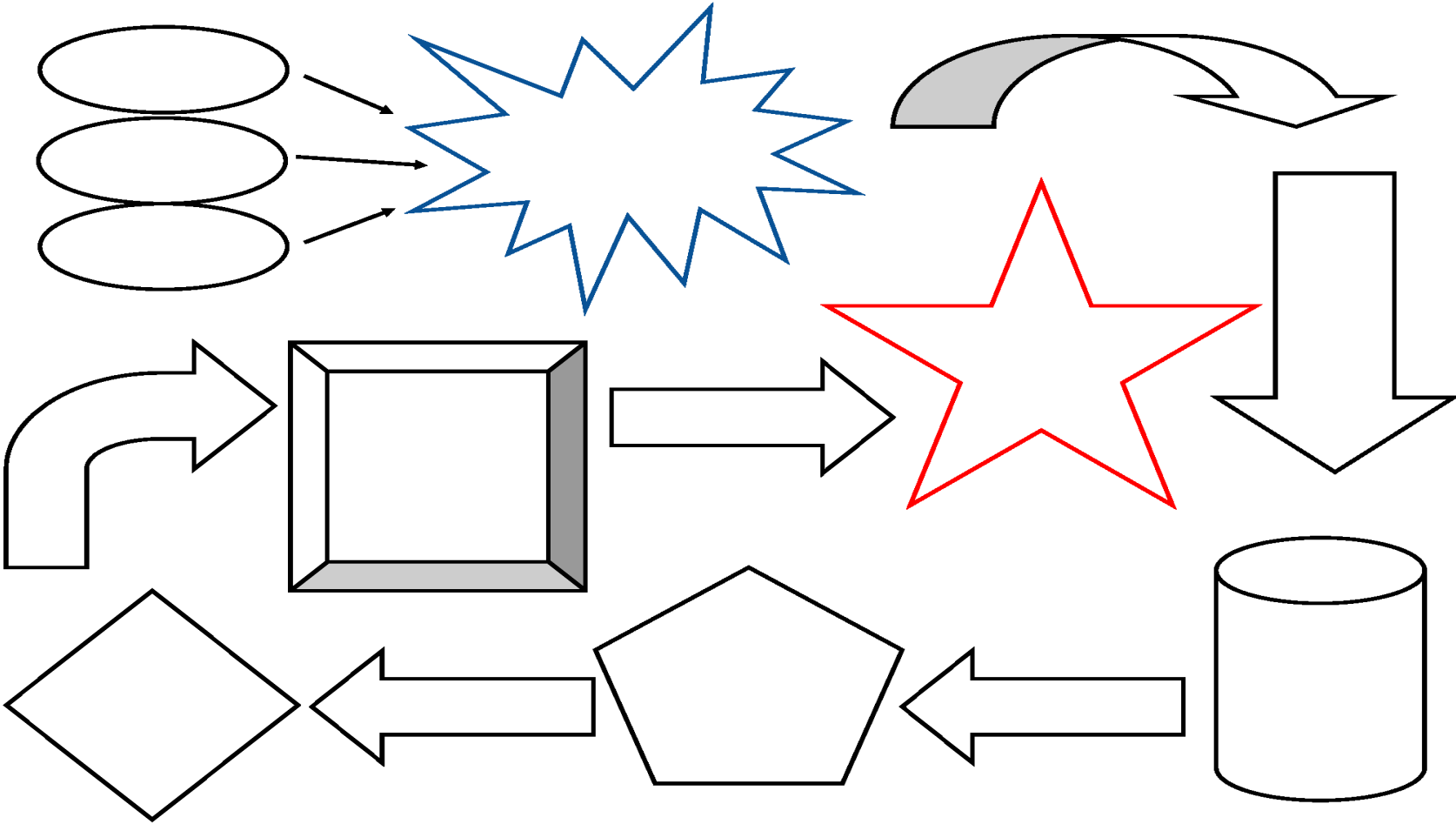
Name \_\_\_\_\_

### Tassel to Table Flowchart

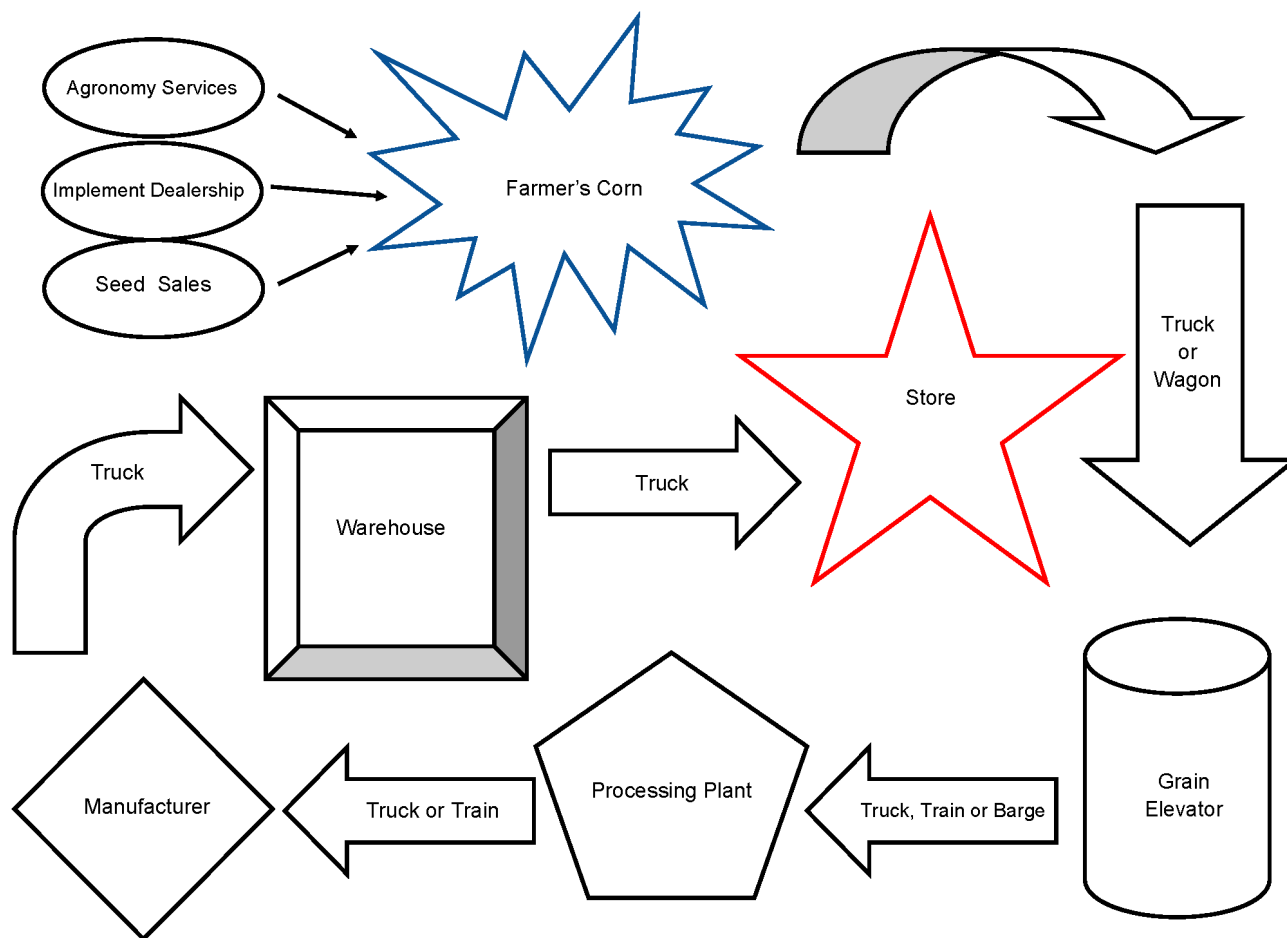


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### Tassel to Table Flowchart



## Tassel to Table Flowchart ANSWER KEY



# Agronomy Services



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# Farmer

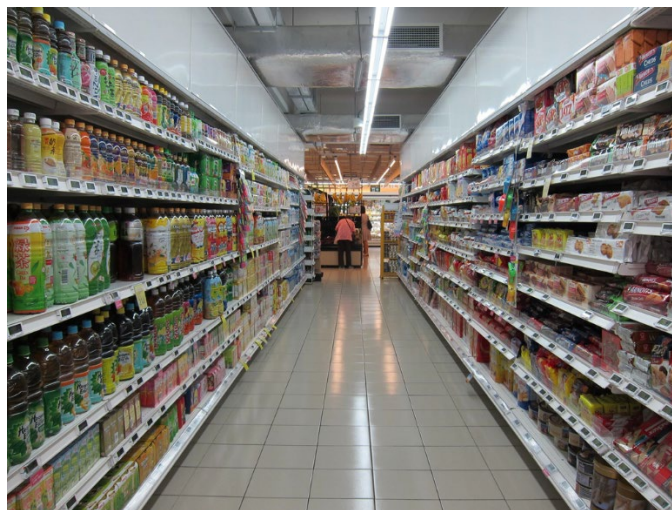


# Seed Sales



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# Grocery Store



# Implement Dealership



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# Manufacturer



# Rail, Truck or Barge Transportation



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## Refinery





# Elevator



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## Truck or Train Transportation



# Truck or Wagon Transportation



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# Warehouse



# Truck Transportation



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# Truck Transportation





**Truck  
Transportation**



**Truck  
Transportation**



**Warehouse**



**Truck or  
Wagon  
Transportation**



**Truck or Train  
Transportation**



**Grain Elevator**



**Refinery**



**Rail, Truck or  
Barge  
Transportation**



**Manufacturer**



**Implement Dealership**



**Grocery Store**



**Seed Sales**



**Farmer**



**Agronomy Services**