NEWS BREAK

Sunday's News Break selects an article from Sunday, November 27, 2016 of The Seattle Times e-Edition for an in-depth reading of the news. Read the selected article and answer the attached study questions. **Please remember to always preview the content of the article before sharing with your students.**

Article: Big jobs for Boeing robots (MAIN, A1)

Pre-Reading and Vocabulary

- What do you know about robotics in the aeronautical industry? What are they doing?
- How do you feel about robots taking jobs away from machinists?

Vocabulary: Match the words to the numbered definitions in the chart below.

A. autoclave	1. To fix or become fixed firmly and deeply in a surrounding solid mass.
B. autonomous	2. Immensely large; huge; enormous
C. embed	3. Navigated and maneuvered by a computer, without a need for human control or intervention.
D. mammoth	4. A business enterprise or speculation in which something is risked in the hope of profit; a commercial or other speculation.
E. supplant	5. A heavy vessel for conducting chemical reactions under high pressure.
F. venture	6. To take the place of (another), as through force, scheming, strategy, or the like.

Comprehension:

1. Until the automated system for moving these big wing parts is proved, “we do have four people watching it,” said Darrell Chic, acting director of 777X wing fabrication. “But the intent is to work our way to autonomous and allow the navigation system to do its thing.” What does autonomous mean for Boeing employees?
2. The 777X Composite Wing Center, Boeing’s latest venture in advanced manufacturing, marks a significant step toward a future in which much of an aircraft factory’s work is done by what?
3. Once the wing skin was inside the giant pressurized oven, the lone operator at a computer station pushed a button. Lights flashed, a klaxon sounded. Slowly, a 55-ton, 28-footwide circular door slid into place and locked to form an airtight seal for the seven

hour baking cycle. Eric Lindblad, the newly appointed head of the 777X program, said having machines load the wing parts autonomously is what?

4. The only necessary human will be working on what?
5. The trend toward automated manufacturing was evident already at Boeing's older local plants. Give examples at the Frederickson, Auburn & Renton factories.
6. Introducing new automation is a challenge: In another new building in Everett, Boeing is struggling to do what?
7. Still, a new generation of airplanes like the 787 and 777X built with carbon-fiber reinforced plastic composite structures has triggered a transformative shift taking automation to a new level. Fabricating complete fuselage barrels or huge wings out of this material is simply not possible by hand. Only robots can do what?
8. Mark Summers, head of technology at the U.K. government's Aerospace Technology Institute, said increasing automation will allow Boeing and Airbus to ratchet up what?
9. Boeing is spending $_____ billion to make the giant 777X carbon fiber wing in-house, rather than outsourcing the wing to Mitsubishi as it did on the 787.
10. After World War II, what did Boeing give Washington State?
11. As robots revolutionize the industry, the region has become a hotbed of leading aerospace-automation firms. Which ones are listed in the article?
12. To prepare the next generation of factory workers for such jobs, what type of education and training is our state pushing?
13. What education will probably be required of future machine operators?

Group Discussion Questions or Extension Essay Questions:

"Jobs will not be lost, but there will not be so many new jobs created," Summers said during a panel discussion at the Farnborough Air Show in July. "I don't see it as an impact on the current aerospace workforce. There's just fewer jobs in aerospace in the future."

He foresees blue-collar machinist jobs increasingly supplanted by "more technologically focused" positions operating the machines.

However wary machinists may be of what the new technology means for the future, Pete Goldsmith, who led automation-technology projects at local companies Electroimpact and Nova-Tech, and now works for a third, MTorres America, said he got "a universally positive reaction" from mechanics at both Airbus and Boeing when he installed equipment to do repetitive riveting.

"That's a job that beats you up all day every day," Goldsmith said. "We were replacing an operation that was physically very debilitating for the mechanics."

- Do you agree or disagree with the statement above? Why or why not?
- How do you think more automation will impact Boeing employees, especially machinists?

Gary Laws, a Boeing mechanic for more than two decades who operates computer-controlled machines assembling wings in Renton, said automation makes his job much easier.

And if this region wants new work in aerospace, he sees no choice but to embrace the shift.

"It's the way it has to be," said Laws. "Technology is obviously going to be the future."

Today, the current 777's metal wing parts are made largely by machinists in Auburn and Frederickson, then assembled into a wing by machinists in Everett.

- Do you think embracing this shift in technology is the best thing machinists can do at this point? Why or why not?

It's a mistake to think robots can do it all, said Ben Hempstead, chief of staff and lead mechanical engineer at aerospace-tooling designer Electroimpact.

After these 777X skin panels, spars and stringers are fabricated in the wing center, Boeing will deliver them to the main Everett factory building where mechanics will first assemble the pieces into a basic wing box, then add the folding wingtip and the leading- and trailing-edge control surfaces.

That assembly process is inherently more labor-intensive.

"With wing-box assembly, if in the future it's half-automated, that'll blow my mind," said Hempstead, whose company supplies Boeing and also provided much of the equipment Airbus to build the composite wing of the A350.

"Many of the steps require skill and judgment and are very hard to automate," he said.

Hempstead said Boeing asked Electroimpact to look at automating one specific 737 wing process in Renton that's done today by about a dozen mechanics.

"We couldn't figure out how to do it faster with machines," Hempstead said.

And don't even think about robots doing intricate jobs like installing hydraulic tubes and electrical wiring in the crowded space of an airplane wheel well.

"Oh, man, nobody has even talked about automating that," Hempstead said. "I can't even envision how you'd do it."

- Do you agree with Hempstead's thoughts? Is it a mistake to think robots can do it all? Why or why not?

In 2005, almost 3,500 machinists in Renton produced 21 single-aisle 737s per month, according to employment data filed with the state.

In 2014, just over 6,000 machinists there produced exactly twice as many.

While production rose 100 percent, employment of machinists rose 75 percent.

As robotic systems and the automated processing of carbon fiber proliferates, that gap is certain to widen.

While Boeing employed more than 100,000 in Washington State in the late 1990s, it seems unlikely those days are ever coming back. Its payroll here is down to about 73,000 today.

Yet that's still a big workforce, crucially important to the economy. And well-paid manual jobs remain a vital thread in the social fabric of the state.

- Is the golden age of manual labor ending with Boeing's automation drive? Why or why not?

And he points to a big upside for the Pacific Northwest in having the 777X wing center: After investing so heavily, Boeing needs to use it to the fullest.

"It's absolute state of the art. It's not going anywhere," said Janicki. "You have all that equipment and the personnel trained to use it. It'll build 777s, yes. But 50 years from now, they'll still be building something in that plant."

- Do you agree or disagree with Janicki? Why or why not?

Newsbreak Answer Key: November 27, 2016

Vocabulary

A. 5
B. 3
C. 1
D. 2
E. 6
F. 4

Comprehension Questions

1. Not needing any humans to guide it.
2. Automated machines and robots
3. Safer and more precise. There isn't room for error inside the oven: When the long stiffening rods called stringers are baked in the autoclave, they'll go in six at a time with just 3 inches of clearance between them.
4. The person at the computer.
5. In Frederickson, robots drill 80 percent of the holes in the 787 and 777 tails fabricated there.

   In Auburn, robots drill the engine heat shields for the 787 and 777 jets, and will do the same for the 737 MAX. Another robot uses lasers to clean the dies used to shape the heat shields.

   In its most productive factory, the 737 final-assembly plant in Renton, Boeing has replaced the traditional multistory fixtures used to hold wings in place during assembly with smaller, flexible, increasingly automated equipment as it ramps up toward an unprecedented output of 52 planes per month by 2018.

6. Smooth out the kinks in a robotic system for assembling the 777's metal fuselage.
7. Lay up the strips of carbon fiber with enough speed and precision.
8. Production rates without adding employees
9. $1 billion
10. A thriving middle class, allowing blue-collar workers — some with only a high-school education — to live the American dream.
11. Electroimpact, Nova-Tech and MTorres America as well as Janicki Industries in Sedro-Woolley — that are hiring young engineers as fast as they can.
12. STEM education (science, technology, engineering and mathematics) and providing community-college-level training for hands-on careers.
13. Probably require a two-year associate degree with course work on the basics of electro mechanics.