

## Problem Solving

**Course**

Health Science

**Unit I**

Leadership

**Essential Question**

Can you solve the problem?

**TEKS**

130.204(c) 7A, 7B, 7C

**Prior Student Learning**

Teamwork concepts

**Estimated time**

1-3 hours

**Rationale**

Healthcare teams must rely on an evaluation of the factors involved in a decision, and the risks and consequences of their actions.

**Objectives**

Upon completion of this lesson, the student will be able to

- adapt and utilize problem-solving skills to resolve conflicts.

**Engage**

The team from the CDC in charge of investigating an outbreak of food-borne illnesses at a HOSA conference has requested your assistance. They would like you to develop a questionnaire for those who are ill, in order to determine the specific types of illnesses they have, how they got them, etc.

Where do you start? What do you do next? What help do you need?

**Key Points**

- I. Problem solving involves a four step process
  - A. Identify the problem.
  - B. List all alternatives.
  - C. Name the consequences of the alternatives.
  - D. Evaluate and choose the best course of action.
- II. Step 1 – The true problem must be clearly understood and identified.
  - A. Gather all the facts [assemble all the information].
  - B. Ask specific questions.
  - C. Stay as objective as possible.
- III. Step 2 – Once the problem is identified, brainstorm possible solutions.

Rules for brainstorming:

  - A. Limit the discussion to one issue or problem.
  - B. Set a time limit to encourage creativity and quick thinking.
  - C. No evaluating of any kind is allowed. The goal is quantity, not quality.
  - D. Encourage members to build on what has been said and modify the ideas.
  - E. Have a recorder write down every idea.
- IV. Step 3 – Identify all the possible consequences that might result from the possible alternatives. These may be good or bad outcomes. Depending on the problem, the group may want to divide and research possible

solutions before identifying consequences.

- V. Step 4 – Label each consequence as a positive (good) or negative (bad) factor. Rank ideas according to those that have the greatest potential for success. Finally, chose a solution to the problem.

### **Activity**

- I. Evaluate a healthcare issue, working in small groups (4 or 5).  
Formulate an effective solution to the healthcare problem and validate it using resource materials.
- II. Present potential solutions to be critiqued by your peers.

### **Assessment**

Problem-solving rubric

### **Materials**

Copy of a **problem** to lead groups in problem-solving discussion.

Problem #1 – Obesity Crisis

Problem #2 – Food-Borne Illness

Problem #3 – Post-Traumatic Stress Disorder

Problem #4 – Organ Transplants

Problem #5 – School fashion trends versus professional dress

Problem #6 – Preventing Teenage Depression

Problem #7 – Hospital staffing and retraining

### **Accommodations for Learning Differences**

For reinforcement, students will list the four steps in the problem-solving technique and summarize the meaning of each step.

For enrichment, students will participate in the HOSA Creative Problem Solving competitive event (<http://www.hosa.org>).

### **National and State Education Standards**

National Health Science Cluster Standards

HLC07.01 Leadership and Teamwork

Health care workers will understand the roles and responsibilities of individual members as part of the health care team: Apply corrective action to an acknowledged conflict situation.

HLC08.01 Ethics and Legal Responsibilities

Health care worker will understand the legal responsibilities, limitations, and implications of their actions within the health care delivery setting: Use problem-solving techniques when confronted with legal dilemmas or issues.

TEKS

130.204(c)(7)A analyze systematic procedures for problem solving;

130.204(c)(7)B evaluate the impact of decisions; and  
130.204(c)(7)C suggest modifications based on decision outcomes.

Texas College and Career Readiness Standards

English-Listening:

B.3. Listen actively and effectively in a group discussion

Cross-Disciplinary Standards

Reasoning:

B.1. Consider arguments and conclusions of self and others.

Key Cognitive Skills

Problem solving:

C.1. Analyze a situation to identify a problem to be solved.

C.2. Develop and apply multiple strategies to solving a problem.

C.3. Collect evidence and data systematically and directly related to solving a problem

# Problem Solving Rubric

Student: \_\_\_\_\_ Date: \_\_\_\_\_

<b>Scoring criteria</b>	<b>5 Excellent</b>	<b>4 Good</b>	<b>3 Needs Some Improvement</b>	<b>2 Needs Much Improvement</b>	<b>1 N/A</b>
Identifies, summarizes, and understands the problem/question/issue.					
Considers the situation and makes appropriate assumptions.					
Develops and communicates a point of view or hypothesis that is sound and workable.					
Presents, assesses, and analyzes appropriate supporting data/evidence.					
An imaginative and innovative approach used to solve the problem.					
Identifies and assesses conclusions, implications, and consequences.					
Communicates effectively.					
Total involvement and presentation of the solution.					

Scale:  
 35-40 A Excellent  
 29-34 B Good  
 22-28 C Needs Some Improvement  
 15-21 D Needs Much Improvement  
 8-14 F Not Appropriate

TOTAL=

Comments:

# Problem #1

It's a fat, fat world

## Prosperity blamed for health threat

BY BRENDAN I. KOERNER

Americans are used to being admonished for their self-destructive fondness for cheese-flavored snacks and La-Z-Boys. But citizens of developing countries are also falling prey to the perils of the First World's fat-rich diet and couch-potato ways. At last week's 8th International Congress on Obesity, held in Paris, researchers warned that the planet's expanding waistlines threaten "to become the curse of the next millennium."

"We used to consider obesity a problem of industrialized, rich countries," says Arnaud Basdevant, a member of the meeting's lead committee. "But now it has become a worldwide pandemic."

Researchers blame the trend—and the attendant rise in the incidence of heart disease and diabetes—on the Third World's increasing affluence, reduced physical activity, and more calorie-laden diets. As a result, the World Health Organization has estimated that 300 million people will be obese by 2025, an increase of 50 million from today. In Mauritius, for example, WHO estimates that 32 percent of the population will be obese by 2025, compared with 7 percent in 1987. One in five Brazilians are expected to be obese in 2025, more than double the number in 1989. Last year, WHO said that obesity's lethal impact could rival smoking.

There was much hopeful discussion about new drugs such as leptin, a hormone that has proved effective for severe weight problems. But leptin should be a last resort, says Basdevant: "First of all, we have to consider prevention." If America is any indication, however, educating the world about the perils of Big Macs and cable TV will be difficult: Despite heightened awareness of the need for proper diet and exercise, the number of obese Americans is expected to double over the next three decades.

**Your Problem:** Your Creative problem solving team has been asked to make recommendations for a community, state, national, and global action plan to address the obesity crisis. The time to act is now, before the crisis becomes a world pandemic.

Identify action steps, strategies, and financial considerations appropriate to meet the needs of this growing problem. Include cultural and socioeconomic factors, and be prepared to support your plan of action.

## Problem # 2

The team from the CDC in charge of investigating an outbreak of food-borne illnesses at a HOSA conference has requested your assistance. They would like you to develop a questionnaire for those who are ill in order to determine the specific types of illnesses they have, how they got them, etc.

You must decide what questions you will ask and defend your decisions. You may want to consider how you will word the questions, since 79% of the people answering the questions are high school Health Occupations students. You must also take into consideration the length of your questionnaire and how busy the conference delegates are.

You will present your findings and recommendations to a committee from the CDC.

Supportive documentation on Food Poisoning.

Web Resources:

<http://www.cdc.gov/>

## Problem # 3

In light of the tragic events of September 11, 2001, your school's principal/dean had been approached by twelve parents who believe their sons and daughters are suffering from events of that day. Guidance counselors report a 70% increase in students needing to see a counselor. Each counselor reports 10-15 students per day whose request to see a counselor is denied because there are not enough counselors to meet the demand. The school psychologist suggests that this may be some form of Post-Traumatic Stress Disorder.

Your Creative Problem Solving team has been approached to consider the information above and make a recommendation to the principal. As students, you have a unique insight into what is happening with you and your peers. Given the resources provided, and your firsthand knowledge of your school, what do you think is the problem, and what would you propose as a solution?

Attachment: Article - *After the Trauma* – see below

## After the Trauma

*Newsweek* By Geoffrey Cowley nbsp; Oct. 1 issue

**Of the tens of thousands who survived the Sept. 11 attacks, a third may experience post-traumatic stress disorder. What it is, and how to cope.**

Francesco Fiorello was nowhere near the Twin Towers on the morning of Sept. 11. The 30-year old high-school teacher was 40 miles away in Ossining, N.Y., talking to his wife, Rose, also 30, on her cell phone. Rose had just come out of the subway at Dey Street, in front of the World Trade Center, when United Flight 175 slammed into Tower 2.

AS ROSE DESCRIBED what she was seeing—smoke pouring from both buildings, people plunging 100 stories to the sidewalk—Francesco begged her to run for her life. “I thought I was going to lose my wife,” he recalls. “She was crying and telling me there was a fire and people were dying.” Rose managed to escape before the buildings collapsed. She returned to work last week, shaken but physically uninjured. Francesco still feels as scared as he did that morning. “I’m staying away from any type of place where I know a lot of people are going to be,” he says. “I won’t enter the train station unless I see the police or the National Guard.”

Who could blame him? Disasters cause psychic wounds as well as physical ones, and the consequences can be serious. By rough estimates, at least 40,000 people—survivors, witnesses, emergency workers—suffered serious psychological trauma during the attack on the Trade Center. Countless others will experience weeks of grief, shock, fear, and even despair as they replay the televised images in their minds. Eventually, most of us will put the experience behind us. Most, but not all. Past experience suggests that a third or more of the people touched directly by this event will develop post-traumatic stress disorder (PTSD). For those people, every day will be Sept. 11.

It’s no accident that we respond to life-threatening events the way we do. The stress response is a biological adaptation, as essential as hunger and as finely regulated as pain. When we perceive immediate danger, our bodies institute what Stanford neuroscientist Robert Sapolsky describes as a “triage economy.” Adrenaline and cortisol speed the heart and dilate the bronchial tubes while slowing nonessential functions such as digestion and tissue repair. “You want to secrete these hormones by the boatload if you’re at the foot of the World Trade Center and need to run like hell,” Sapolsky says. Unfortunately, an overwhelming trauma can distort the stress response, causing symptoms that may persist for months or even years.

PTSD is at least as old as war, but it didn’t become an official medical diagnosis until 1980. Its causes are still murky and its course is unpredictable, but the key

symptoms are unmistakable. A month or more after the original trauma, people with PTSD remain hyper alert and easily startled. They suffer recurring nightmares and an inability to recall the experience without physically reliving it. Any passing reminder—a sound, smell, a song—can trigger intense distress. Dr. Arthur Rousseau, a psychiatrist in Oklahoma City, recalls the case of an armored-car guard who was standing in an elevator when gunmen sprayed it with bullets, hitting him three times and killing the two people flanking him. The bullet wounds healed, but the guard developed an uncontrollable fear of elevators. He knew they weren't dangerous, yet he couldn't ride one without panicking.

These reactions are normal in the aftermath of a disaster, but when they persist, they can cause a cascade of other problems. To escape a terrifying memory, people with PTSD typically avoid activities that trigger it, and that response can turn them into prisoners. One of Rousseau's patients—a rescue worker who pulled a dead baby from the wreckage of the 1995 Oklahoma City bombing—withdrawed from his family during the months afterward. He was contemplating divorce when Rousseau met him. During therapy it emerged that the sight of his young daughter triggered memories of the corpse. By recognizing the pattern he had fallen into, the man was able to work consciously on breaking it.

PTSD is hard to predict, for people vary widely in resiliency. Most of those now pulling body parts from the Trade Center will quickly rebound—while some who watched the collapse from Greenwich Village rooftops will suffer for years. The risk of PTSD depends partly on past experience (previous trauma makes it more likely) and a person's psychological condition (a history of anxiety or depression raises the risk). Sex is a factor (women suffer at twice the rate of men), and so is the nature of the experience. PTSD rates hover around 5 percent among people who survive natural disasters but rise to 50 percent among rape victims and Holocaust survivors.

It's too early to assess the psychic toll of the attacks on New York and Washington, D.C., but experience suggests it will be substantial. Dr. Carol North, a professor of psychiatry at Washington University in St. Louis, has studied more than 2,000 survivors of a dozen different disasters. Of the tragedies she has analyzed, the highest rate of PTSD was in Oklahoma City, where 34 percent of the survivors went on to develop it. "That's not a surprise," she says. "The larger the disaster, the more cases you expect to see." People far beyond the East Coast may experience several weeks of insomnia, nightmares, irritability, and anxiety. But as Health and Human Services Secretary Tommy Thompson observes, "The biggest impact will be on the first responders, and on the children and families that lost loved ones."

At Manhattan's Saint Vincent Catholic Medical Centers, counselors and psychiatrists have seen thousands of them. "Nothing can prepare you for what we've experienced," says Dr. Spencer Eth, the hospital's medical director for

behavioral-health services. “It’s far more exhausting than anything else I’ve ever done.” As the closest major hospital to the blast site, Saint Vincent’s received several hundred injured victims—followed by successive waves of people desperate for information and emotional support. “There are fewer of them now,” Eth says, “but their emotions are far more intense.”

Can the fallout be contained? No one doubts that talking and sharing can help people cope with the grief of the moment. In the immediate aftermath of the Trade Center attack, Dr. Gail Saltz of the New York Psychoanalytic Institute walked into her local fire department with a cup of coffee and announced that she was available to talk. The station had just lost nine men, and the survivors were reluctant to engage with her at first. But once they got started, they had a lot to say. They described how helpless they felt, whether digging in vain for their buried brothers or trying to reassure their worried spouses. No one has proved that talking can ward off chronic distress, but common sense suggests it’s therapeutic. “I worry most about the ones who haven’t started processing the event,” says John Draper, the director of Lifenet, New York’s mental-health crisis hot line.

Images of Sept. 11 will haunt us all to one degree or another, but they can also give us new perspective. In the days since the disaster, San Francisco psychiatrist Fred Parris has seen a number of patients suddenly become more grounded. “When something like this comes along, their own problems seem less important,” Parris says. “They start to look outward instead of inward.” Could these awful attacks do the same for the whole society? New York has become a small town in recent days, and America has taken a hard look in the mirror. “The tragedy has [brought] relationships and generosity to the foreground,” says Harvard psychiatrist Michael Craig Miller. Both will be essential as we strive to put this experience behind us.

With Anne Underwood, Erika Check, and Julie Scelfo in New York and bureau reports

## Problem # 4

Your team has been asked to serve on a transplant recipient screening panel for your community. A kidney has just been harvested from a 20-year old traffic accident victim. Five potential recipients have been asked to report to the hospital. It was determined that two of them have tissue that is very compatible with the donor. One potential recipient is a 33-year old pediatric resident who has had to put her residency on “hold” due to the rigors of frequent dialysis. She is a recovered alcoholic and has not used alcohol for the past 5 years. Her liver function tests are normal. The second potential recipient is a 17-year old high school senior who has been on dialysis. Her blood work reveals that she has been using cocaine. When she was questioned about this, she said that she had used cocaine some—only occasionally at parties—but that crack really did give her a great rush. She obviously felt there was nothing wrong with occasional drug use. She is also very tired and having a hard time keeping up with her studies. Who should receive the transplant? Justify/support your answer.

<http://www.transweb.org/myths/index.shtml>

<http://www.kidney.org>

## **Problem # 5**

### Dress code

At a Health Occupations Advisory Committee meeting attended by representatives from your school and medical community, the topic of body piercing was raised. Medical professionals commented on an alarming increase in the number of students who had pierced eyebrows, navals, noses, lips, tongues, and other body parts. Without exception, they do not allow their employees to wear earrings in anything but their earlobes.

School representatives admitted that the school has not addressed the issue of body piercing, and agreed to investigate the situation. They also agreed to develop school policies related to body piercing, and strategies to discourage the practice among students.

Your Creative Problem Solving team has been approached by school administrators to analyze the problem and suggest solutions. Your suggestions should include:

- School policies
- Health Occupations policies
- A plan for discouraging the practice of body piercing

See attachment article *New Trends Can Damage Your Body* – below

The following is an excerpt from Augusta.com:

## **New trends can damage your body**

**By Jay Cermenaro**

*Xtreme Teen Board Member*

Rheinhard Gruebl is an 18-year old exchange student from Germany. He just got a tattoo.

"I called my mom and told her, and she just cussed me out for about five minutes. It was great," he said, smiling. "I'm not rebelling. I just thought a tattoo would be neat."

Getting tattoos and piercing bodies seems to be a trend among high school students. Ironically, teens try to express individuality by doing what everybody else is doing.

The downside to piercing your body includes infections, parental disapproval, discrimination, and the rate at which some of the holes grow closed. Although most infections caused by piercings are not serious, they can be painful. A small percentage may result in permanent disfigurement, or require cosmetic surgery to correct.

The Association of Professional Piercers says: "The jewelry used in these guns (ear-piercing guns) is usually steel, plated with gold, and frequently under-plated with nickel or copper. This can result in a metal reaction and infection for the piercee when the thin plating chips off. Furthermore, rather than being pierced with a surgically sharp needle, the tissue is brutally torn by the blunt backing of the ear stud. This is not an easier way to be pierced. The style of jewelry is less than ideal for even earlobes, but on other body parts, it can be dangerous, debilitating and permanently scarring. It is not unlikely that the body part pierced with an ear stud may lose all nerve sensitivity. For all these reasons, the APP is strictly opposed to the use of ear piercing guns."

Many parents disapprove of their children putting holes in their bodies. Teens often must conceal their piercings, which would seem to make the whole exercise pointless. In most cases, the holes grow closed very rapidly, which may not be a bad thing.

Tattoos are also rising in popularity. However, they are not nearly as popular as piercings for several reasons: Tattoos cost much more, they hurt more, most parents think they are disgusting, and they are "permanent." Nowadays, though, tattoos can be removed almost pain-free by lasers; for a small fee, of course!

The most compelling reason to get a tattoo is the complete customization. You decide the size, location, color, and image. Then you dish out the money and hope the tattoo artists know what they are doing!

One important factor that affects 20-somethings more than teens is employability. In the corporate world, many employers will not hire someone with visible piercings or tattoos. Call it absurd or call it discrimination, but many large corporation and businesses have very conservative policies, and feel that tattoos and piercings do not project the right image.

With modern technology and sterilization practices, tattoos and body piercings are relatively safe. But keep in mind, just because it was safe getting your tattoo or piercing your body, you are not necessarily safe from your parents' or other people's opinions.

## **Problem # 6**

### **Preventing Teenage Depression**

Recent statistics on adolescent depression are alarming. In the past 10 years, the teenage suicide rate has increased by 23%, teen violent crimes are up by 14%, and the prescription of antidepressant drugs for teens is up an alarming 46%.

A local mental health clinic has approached your creative problem solving team about this problem. They have reason to believe that exercising might be a part of the solution, but they are not sure if and how it would work.

A group from the mental health clinic is asking you to address this problem. They want you to read the attached article, and make recommendations to them about some possible next steps.

- Do you think teenage depression is a problem in your school?
- What do you think could be done about it?
- Is exercise part of the solution?
- What do you recommend the group from the clinic (judges) should do as their next steps in addressing your recommendations?

<http://my.webmd.com/>

## Problem #7

### Hospital Staffing

A large community hospital is having difficulty staffing and retraining staff. They have asked your Creative Problem Solving team to develop a plan to retain and attract healthcare staff for their hospital. They have also asked that you suggest ideas for retraining current staff members.

In your solution, take into account the following considerations

- Budgetary constraints
- Employer/employee needs
- Community involvement
- Community demographics

Resources for problem solving:

- Hospital budget
- Healthcare worker statistics

# Hospital Budget

The size of HOSA Community Hospital employee's paychecks will be going up next year, but patients' costs won't.

The hospital board approved a \$37.3 million operating budget Wednesday that includes a 3 percent wage increase effective Jan. 4 for all employees except chief executive William Smith, who is an employee of Quorum Health Resources, the hospital's management company.

Revenue generated by increased services covers the cost of employee's raises, said Jack Bly, the hospital's fiscal services director. He said the hospital has also been improving its operating efficiency.

The last time the hospital raised its rates was in 1993.

At \$37.3 million, the budget is an increase from this year's \$34.4 million total. However, the board on Wednesday increased the 2000 budget to \$36.4 million because of additional revenue and expenses from providing more services than expected this year.

Wages and benefits make up the largest expense (59 percent) for the hospital, which has 375 full- and 283 part-time employees. Next year, it will spend \$17.2 million in salaries and \$4.6 million in benefits. The facility's second-largest expense is supplies, including drugs, at \$6.1 million for the year.

On the revenue side, the hospital is seeing growth in outpatient services. While an estimated 4,400 patients will be admitted to the hospital next year, outpatient services are expected to be provided to 42,000 patients.

Bly said demand is up for physical, occupational, and speech therapy, the sleep lab, and laboratory and radiology services, all on an outpatient basis. And with two full-time cardiologists, he said, a lot more cardiology procedures are done at the hospital.

Home health has surpassed the emergency department in the number of patients served. Bly said the emergency department sees about 55 patients a day, and home health serves about 74 each day.

42 percent of the hospital's income comes from Medicare, another 42 percent from commercial insurance, and 6 percent from Medicaid. The rest comes from other sources, including self-payers.

Because the hospital's classification was changed from urban to rural on Oct. 1, the amount of reimbursement it will receive for Medicare patients will drop. Bly

estimated Medicare will pay the hospital \$1.1 million less next year than in 1999, "and we're projecting that we're still going to see the same amount of patients."

Nearly half of the 4,400 patients the hospital expects to admit next year will be Medicare patients, Bly said.

"Fortunately, the hospital is in good financial shape," Bly said, and can adjust without cutting staff or services.

Bly called the budget conservative. "I would expect 2000 also to be a good financial year for the hospital. I think we are fortunate," he said.

"Health care in general is still under siege by the federal government to cut costs," Bly said, explaining that the federal government is trying to reduce payments to healthcare providers.

Smaller hospitals will struggle to survive, said Bly, who considers Wooster to be an average-size hospital. He said the hospital is well-positioned for the future and "whatever comes down the road in the next four or five years, this hospital's going to do well."

From the \$2.7 million capital budget, which is used for items \$500 or more with a life expectancy of two years or more, the hospital will buy two radiographic fluoroscopic units for a total of about \$948,800. The hospital has three of the so-called "rooms," which are called that because the units fill a room, and one was replaced in 1999. The two being replaced were bought in 1982 and 1985.

Portable radiology equipment, which can be brought into the operating room to take X-rays, will be purchased for \$120,000, and a replacement mammography unit for the breast imaging center will cost \$94,300. Surgical instruments and equipment will be purchased for \$155,900.

Sixty computer terminals will be installed in second and third floor patient rooms so nurses can record information directly into the computer. The \$250,000 cost includes network wiring.

The hospital will also carry over money approved for its ambulatory surgery project. The board approved \$7 million for that project and \$2 million to expand the radiology department this year. Since only \$1.4 million has been spent, the board had to reauthorize the rest to be spent in 2000.

About \$1.1 million will be spent next year on heating, ventilation, air conditioning and electrical work. The upgrades were to be done gradually over the next few years, but will be done early because the ambulatory surgery project needs the upgrades sooner and the area where the work needs to be done will be open for

the construction anyway. Doing the work early is also expected to be less expensive.

The board authorized Smith to bid and award contracts related to the ambulatory surgery project, and upgrades to the temperature and electrical systems. An expanded architectural agreement with Moody/Nolan LTD, which was hired to design the ambulatory surgery project, was approved to include the upgrade work. The \$48,000 cost is both for the surgery project and the upgrade.

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## Health Careers

### GULF COAST PROJECTED EMPLOYMENT AND ANNUAL OPENINGS

<u>Occupations</u>	<u>Employment</u>		<u>Avg. Annual Openings</u>	<u>Occupations</u>	<u>Employment</u>		<u>Avg. Annual Openings</u>
	<u>1994</u>	<u>2005</u>			<u>1994</u>	<u>2005</u>	
Chiropractor* (Lic)	350	500	20	Optometrist (Lic)	750	950	35
Dental Assistant* (App) (Cert)	2,800	4,650	250	Pharmacist (Lic)	2,850	3,250	80
Dental Hygienist (Lic)	1,600	2,650	125	Pharmacy Technician* (Cert)	1,500	1,950	70
Dental Lab Technician*	800	1,000	35	Physical Therapist* (Lic)	1,600	3,050	160
Dentist* (Lic)	2,050	2,450	85	Physical Therapy Asst* (Lic)	1,250	2,650	160
Dietetic Technician*	500	550	20	Physician/Surgeon (Lic)	5,250	7,050	250
Dietician/Nutritionist* (Lic)	600	800	35	Podiatrist* (Lic)	150	200	10
Emer. Med. Tech* (App) (Lic)(Cert)	1,200	2,200	110	Psychiatric Aide	1,400	1,850	60
Health Service Manager* (Lic)	3,000	3,850	140	Psychiatric Technician	850	1,000	30
Home Health Aide (Cert)	6,100	14,000	815	Psychologist (Lic)	1,150	1,500	40
Lic Practical Nurse (Lic)(Cert)	13,100	16,700	580	Radiological Technologist*(Lic)	1,300	1,850	70
Medical Assistant* (Cert)	3,250	5,600	275	Recreational Therapist* (Lic)	200	250	10
Medical Lab Technician*	1,850	2,250	70	Registered Nurse* (Lic)	25,150	31,500	950
Medical Lab Technologist*	2,350	2,700	75	Respiratory Therapist* (Lic)	1,200	1,550	50
Medical Records Technician*	1,050	1,650	75	Social Worker, ex Med/Psych* (Lic)	5,150	8,600	415
Medical Secretary (Cert)	2,800	3,650	125	Social Worker, Med/Psych* (Lic)	2,050	3,300	155
Nurse Aide/Orderly*(App)(Lic)(Cert)	12,850	17,600	625	Speech Pathologist (Lic)	1,150	1,750	75
Occupational Therapist* (Lic)	650	1,300	70	Veterinarian* (Lic)	850	950	25
Occupational Therapy Asst*	500	900	45	Veterinary Assistant	500	600	85
Optician* (Lic)	950	1,400	60	Veterinary Technician* (Lic)	350	450	20

Health Careers encompass a variety of occupations in the specialized fields of Offices and Clinics of Dentists, Offices and Clinics of Doctors of Medicine and Osteopathy, Offices and Clinics of Other Health Practitioners, Nursing and Personal Care Facilities, Hospitals, Medical and Dental Laboratories, Home Health Care Services, Miscellaneous Health and Allied Services, and Veterinary Services. Since many of the occupations in this concentration area have multiple educational options, occupations may be listed more than once. The Texas Comptrollers' Office and the Texas Workforce Commission/Economic Research and Analysis Division jointly developed the projections data. Material in this report is not Copyrighted and may be reproduced with credit to TECHFORCE 2000 INC.(Aug 98)

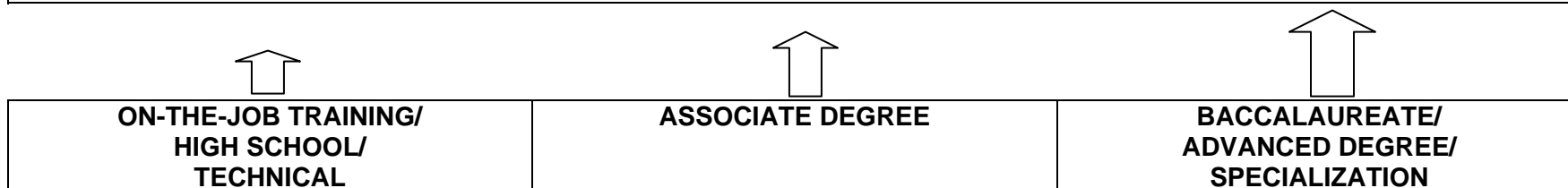
(App) Apprenticeship – A structured system of industry-based training designed to prepare individuals for occupations in skilled trades and crafts.

(Cert) Certificate Program – An occupational skills program that enables individuals to enter the workforce in a short period of time, usually requiring 15 to 47 credits.

(Lic) License – a licensing examination administered by the Texas State Board regulating that profession.

\* Professional Certification – State or national registry exam (either required or voluntary)

**HEALTH CAREERS  
THE WORLD OF WORK**



Dental Assistant* (App) (Cert)	\$9.05	Dental Hygienist (Lic)	\$14.77	Chiropractor* (Lic)	\$36.68
Dental Lab Technician*	\$9.56	Dental Lab Technician*	\$9.56	Dentist* (Lic)	\$27.77
Emergency Medical Tech* (Cert)	\$12.77	Dietician Technician*	\$8.99	Dental Hygienist (Lic)	\$14.77
Home Health Aide (Cert)	\$8.43	Emergency Medical Technician*	\$12.77	Dietician/Nutritionist* (Lic)	\$16.46
Lic. Practical Nurse (Lic)(Cert)	\$8.99	Medical Lab Technician*	\$11.82	Health Service Manager* (Lic)	\$12.98
Medical Assistant* (Cert)	\$12.38	Medical Records Technician*	\$11.68	Medical Lab Technologist*	\$13.10
Medical Records Technician*	\$11.68	Occupational Therapy Asst*	\$8.43	Occupational Therapist* (Lic)	\$14.63
Medical Secretary (Cert)	\$10.17	Optician*	\$14.06	Optometrist (Lic)	\$21.71
Nursing Aide/Orderly*(App)(Lic)(Cert)	\$8.12	Pharmacy Technician*	\$8.44	Pharmacist (Lic)	\$22.41
Optician* (Cert)	\$14.06	Physical Therapy Asst* (Lic)	\$10.69	Physical Therapist* (Lic)	\$12.38
Pharmacy Technician* (Cert)	\$8.44	Radiological Technologist* (Lic)	\$14.20	Physician/Surgeon (Lic)	\$27.45
Psychiatric Aide	\$8.43	Registered Nurse* (Lic)	\$14.63	Podiatrist* (Lic)	\$38.64
Psychiatric Technician	\$10.71	Respiratory Therapist* (Lic)	\$13.51	Psychologist (Lic)	\$18.13
Veterinary Assistant	\$6.00	Veterinary Technician* (Lic)	\$7.16	Radiologic Technologist* (Lic)	\$14.20
				Recreation Therapist* (Lic)	\$14.63
				Registered Nurse* (Lic)	\$14.63
				Respiratory Therapist* (Lic)	\$13.51
				Social Worker, ex Med/Psych* (Lic)	\$13.63
				Social Worker, Med/Psych* (Lic)	\$17.40
				Speech Pathologist* (Lic)	\$20.28
				Veterinarian* (Lic)	\$24.05

**TECHFORCE 2000 INC**

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(App) Apprenticeship  
(Cert) Certificate Program  
(Lic) License

\* Professional Certification – State or national registry examination (either required or voluntary)

Hourly Wages are based on Texas averages