The Problem Solvers

Problems—whether they are scientific, medical, creative, culinary, personal,

communal, or any other type—require solutions. The best way to find a solution

that fits is to first research the problem. Find out as much as you can about what

the difficulty is. Say, for instance, the issue is architectural in nature. A boutique

hotel was built several years ago on a beach, facing the sea, in Los Angeles,

California. Its owners have pointed out that the building is not handicap‐

accessible and would like for you to make it so. To begin, you will need to study

the hotel, look into what makes a physical space handicap‐accessible, and

understand what the owners’ needs are. Where exactly is the hotel? How big is it,

how is it laid out and how many floors? Is it important that only the lobby be

made wheelchair‐accessible, or will handicapped guests also need to get from the

hotel down to the sand? How much money do the hotel’s owners have to spend

on solving this problem?

Once you properly comprehend the problem and all of the details surrounding it,

it’s time to brainstorm. No matter what stage you find yourself in, it is usually

helpful to share proposed ideas with your peers. More heads are better than one,

and shared ideas can lead to improved projects and designs. Now imagine that just the hotel’s lobby and rooms need to be made wheelchair‐friendly. How might

this be accomplished? You will have discovered, from your research, that a

surface that is firm and level will allow for wheelchair traffic, and will also have

traction for walkers. The easiest way to make an entry accessible is to install a

ramp. According to the U.S. Department of Justice, a ramp should use the least

possible slope and be at least 36 inches wide to accommodate a person in a

wheelchair. To prevent slipping, you might consider handrails and curbs. What

about the front door leading to the lobby? Ensuring the outdoor entrance is

protected from elements like rain will make it safer.

Clearing paths of travel through doorways and hallways is also important. If there

are potted plants on the ground, one solution could be to replace them with

hanging plants. In the individual guestrooms, it could be helpful to install

adjustable rods in closets, and certify that light switches are low enough and

electrical outlets high enough. Throw rugs have the ability to move around, so it

would be wise to go with other flooring choices instead. Showers are easier to roll

into than baths for those with limited mobility. How about installing a seat or a

hand‐held showerhead? Grab‐bars and a taller toilet would work to make the

bathroom more accessible, too.

It is crucial to come up with more than one solution. Now that you’ve thought of

as many answers as possible to the problem at hand, test them and adjust them

according to your test results. There are countless ways to evaluate solutions with

respect to how well they meet the particular criteria and constraints of an issue.

Maybe the best way to test out a ramp would be to build one or more prototypes.

Then you can experiment with different materials and location. Tests are usually

designed to identify points of failure. In other words, you will want to submit your

ramp to tough conditions to see if it will be successful even under these

circumstances. Try out a particularly heavy wheelchair. Will your prototype

support it? Try out a manual chair, an electric mobility scooter and a walker. Will

a permanent access ramp work better, or is a fold‐up portable ramp more

suitable in this situation? How does wood hold up in comparison to aluminum or

concrete?

Sometimes, different solutions can be combined to create a result that is better

than any of the ones that have come before it. Perhaps during the brainstorming process, your peers suggested two equally good solutions to the problem at hand.

One proposed using a ramp to help handicapped guests bypass the stairs. The

other proposed using a stairlift, a mobilized chair with the ability to transport

people right to the top of the steps. It is possible that the best solution will be

some combination of these two suggestions. How might both of these ideas work

together? Maybe the least costly solution would be to eliminate the ramp and the

stairlift, and simply clear a path to an elevator. Test it out. Is the route leading to

the elevator wide enough for a wheelchair? Is the elevator itself wide enough?

When thinking up solutions and performing tests, you must take into

consideration a whole variety of variables—in this case, factors like cost,

efficiency and safety levels.

These same steps can be applied to any kind of problem, from simple science

experiments in the classroom to big, real‐world difficulties. For people who have

practiced problem solving, running through these stages comes as second‐nature.

Picture an experienced cook in a kitchen, readying herself to bake a chocolate

cake for a birthday party. The birthday party begins in an hour or two, so she will

need to work quickly! Suddenly, the cook realizes that she has run out of butter

and the recipe calls for some. What to do? She does not have time to run to the

grocery store. After rapidly examining the problem and brainstorming, she might

come up with a list of butter substitutes. Some common ones are canola oil, olive

oil, margarine and shortening. Sometimes butter can also be replaced with

pureed fruits, like apples, bananas or dates.

By performing various tests, the cook will be able to determine which butter

stand‐in will work best in her cake. From her research, she will understand that

the process of creaming butter together with granulated sugar helps achieve the

rich, fluffy, spongy texture that is so important to cakes, cupcakes and other

baked goods. In her tests, she will likely discover that because of this “creaming”

step, using oil on its own, instead of butter in this case, will not yield the results

she is looking for. It could be that combining two of the butter substitutes would

be best. Maybe the cook only has margarine with salt in it, when the recipe calls

for unsalted butter. The solution here could be to use the margarine, but to then

reduce the amount of salt added to the mixture. The cook will need to consider

several variables here, including taste and texture.

Next time you have a problem to solve, think back to these guidelines. What is the

quickest way to get to school when you’ve missed the bus? How to block the light

from coming through your windows when you don’t have any curtains or blinds?

How to make a plant grow in a room that’s too dark, or a space in which the sun

only shines in a single spot? What happens when you’d like to play a game with

six people, but only have enough parts for five? What to use instead, when you

have no face paints, but have promised your little cousin that you’d dress her up

like a clown for Halloween? The keys are these: research the issue, brainstorm

alone or with peers, list a variety of solutions, test those solutions, modify them

on the basis of your tests, and then select the best one. In most instances, this

should lead you to an answer that works well. Just follow our cook’s lead. She

must have landed on the right solution because the kitchen smells great!

1. What is the best way to start solving a problem?

A test possible solutions

B list a variety of solutions

C brainstorm with peers

D research the problem

2. The problem with the hotel described in the passage is that it is not accessible to

handicapped people. What is one possible solution?

A building a ramp

B putting a throw rug in every room

C placing potted plants in the hallways

D removing hand-held showerheads from the bathrooms

3. A problem can have more than one solution.

What evidence from the passage supports this statement?

A The best way to begin solving a problem is to research the problem.

B According to the U.S. Department of Justice, a wheelchair ramp should be at

least 36 inches wide.

C Throw rugs can move around on a floor, making a room less wheelchair-friendly.

D A cook who needs a butter substitute could use canola oil, olive oil, margarine,

or shortening.

4. Why is testing ideas for solving a problem important?

A Testing ideas shows people that their ideas are not as good as they thought.

B Tests can show whether an idea for a solving a problem will actually work.

C Tests show people that wood is always a better material for building than concrete.

D Tests make cooks feel foolish when they have run out of butter.

5. What is this passage mainly about?

A a cook who runs out of butter

B the U.S. Department of Justice

C canola oil, olive oil, margarine, and shortening

D the process of solving problems

6. Read the following sentence: “When thinking up solutions and performing tests, you

must take into consideration a whole variety of variables—in this case, factors like cost,

efficiency and safety levels.”

What does the word variables mean?

A problems

B solutions

C things that can change

D things that stay the same

7. Choose the answer that best completes the sentence below.

There are several steps in the process of problem solving, \_\_\_\_\_\_ research and

brainstorming.

A including

B last

C before

D meanwhile

8. As described in the passage, what is the first step in making a hotel handicap accessible?

9. What does the cook in the passage do when she realizes that she need butter but does not have time to get some?

10. How is making a hotel handicap accessible similar to finding a butter substitute? Support your answer with evidence from the passage.

Answers

1. d

2. a

3. d

4. b

5. d

6. c

8. According to the passage, the first step is research. That means studying the hotel,

looking into what makes a physical space handicap-accessible, and understanding what the owners’ needs

are.

9. At minimum, students should answer that the cook rapidly examines the problem.

They may add that she brainstorms a list of butter substitutes.

10. Answers may vary, as long as they are supported by the passage. After Questions 8

and 9, students should be capable of identifying the research or examination component as a similarity between making a hotel handicap-accessible and finding a butter substitute. Students may also identify other shared steps in each process, such as brainstorming and testing possible solutions. Ideally, they will identify both processes as examples of problem solving.