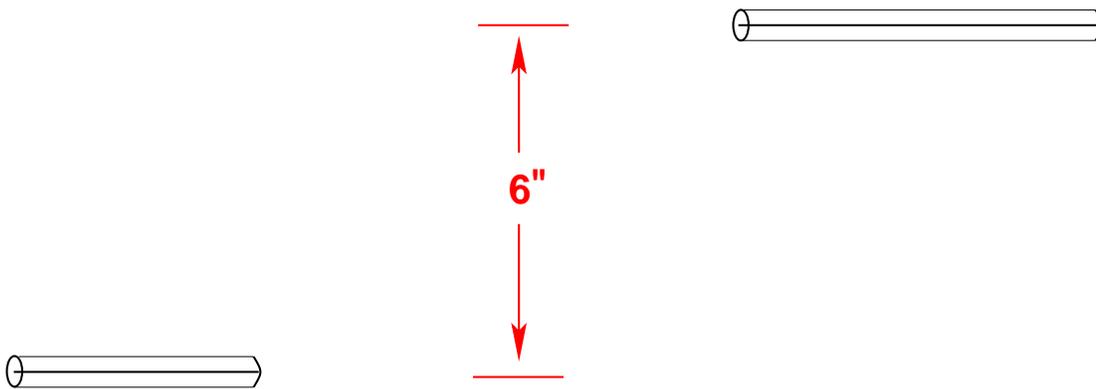


Day 2 Plumbing Challenges

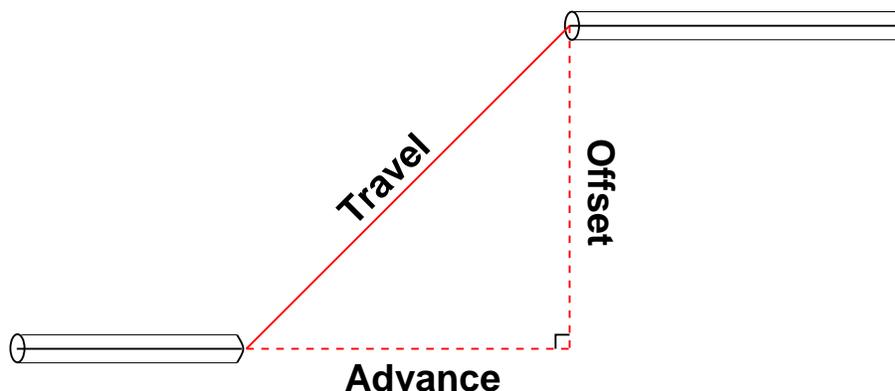
Fraction to Decimal Conversion Chart

- Make a chart that shows the decimal equivalents for $\frac{0}{8}$ up to $\frac{8}{8}$.
- Include simplified versions of fractions that are equivalent to fourths, halves, or units.

Offset, Advance, and Travel



- This diagram shows two parallel sections of pipe. You need to connect the two segments of pipe.
- Build a model that uses 90° fittings to connect the pipes. Make sure that the distance between the centers of the parallel pipes is 6". After you build the model, check to see whether the distance between the centers of the parallel pipes is actually 6".
- Now build a model that uses 45° fittings to shift the pipe 6". Check that your model has the correct distance between the centers of the parallel pipes.
- What are some advantages of using 45° fittings instead of 90° fittings in this situation?



- Plumbers use the terms *offset*, *advance*, and *travel* to describe the lengths involved when 45° fittings are used to connect two parallel pipes. How does the advance compare to the offset? How do you know?
- If you know that the offset is 6" how can you figure out the travel?
- Plumbers have a rule of thumb that they use to find the travel. If they multiply the offset by a certain number involving a decimal, they can find the travel. Use algebra to find this number. Make a diagram where the offset and advance are both labeled x . Use the Pythagorean theorem to find an expression for the travel. What is the plumber's rule of thumb for computing the travel?
- Now build two parallel pipes connected with 45° fittings using a travel of 10". Measure when you are done to make sure that the center to center measurement along the pipe is really 10".
- Calculate the offset and the advance for the model you built. Does your calculation match the actual measurement for these lengths?

Computing Travel

- Wait for pipe-holders and pipes to be mounted at your station.
- Compute the travel for the set-up at your station.
- Start by measuring the offset.
- Use straight and 45° fittings to connect the pipe ends.

Pipe-Running Challenge

Work with your team to run pipe so that it satisfies the following conditions:

- Your pipe must start in the starting clamp.
- Your pipe must go around the wooden frame obstacle close enough so that you can screw the metal pipe support into the outside of the frame and pass the pipe through the support.
- Your pipe must use a T junction by the styrofoam or cardboard box "furnace" so that you can send water up, over, and down into the coolant intake marked on the top of the box.
- Your pipe must continue along the table, go over the edge and hit the "drain" marked with tape on the floor.