

## STUDENT VERSION

### ONE TANK SALT MODEL

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**Abstract:** We offer students a chance to model a one compartment salt mixing model.

#### SCENARIO DESCRIPTION

A large tank initially contains 60 pounds of salt dissolved into 90 gallons of water. Salt water flows in at a rate of 4 gallons per minute, with a salt density of 2 pounds per gallon. The incoming water is mixed in with the contents of the tank and flows out at the same rate.

1. Develop a differential equation model with an initial condition which predicts the amount of salt in the tank as a function of time.
2. Solve the differential equation which models this salt flow problem.
3. Plot your solution over the time interval  $[0, 100]$  min.
4. Determine the maximum amount of salt possible in the tank over time.
5. Determine if and when the amount of salt in the tank gets to 80% of the maximum amount of salt possible.