Newton's Third Law (Action- Reaction) Worksheet

1. Identifying Action and Reaction
   1. An easy way to identify action and reactions forces is to simply say:
      1. Action: Object A exerts a force on Object B.
      2. **Reaction**: When the force Object A and Object B it makes the object go slow or far.
   2. Example: In the case of a falling boulder,
      1. Action: the Earth exerting a force on the boulder.
      2. **Reaction**: When the Earth exerts a force on a boulder it will not go very far but if it is down hill the boulder will go really fast.
   3. Example: In the case of hanging a lamp from ceiling,
      1. Action: the ceiling exerting a force on the lamp.
      2. **Reaction**: When the ceiling exerts a force on the lamp it will swing a little bit back and forth.
   4. Example: In the case of hammering a nail,
      1. Action: the hammer exerting a force on the nail.
      2. **Reaction**: When the hammer exerts a force on the nail since the hammer is very big and strong the nail goes right into the ground very fast.
   5. A diver dives off a raft. What happens to the diver? What happens to the raft?
      1. **Action:** The action force is the diver pushing off of the raft, and the reaction force is the raft pushing back on the diver.
      2. **Reaction:**  When the diver moves forward and dives into the water. The raft moves backwards in the water because of the reaction force.
   6. What action reactions forces are involved when a rocket engine fires? Why doesn't a rocket need air to push on?
      1. **Action:** The action force is the rocket pushing out the hot gasses produced by the engine.
      2. **Reaction:** The reaction force is the hot gas pushing back on the rocket propelling it into space.
   7. A tennis racquet hits a tennis ball. Why doesn't the racquet swing backwards when the ball hits it? (Shouldn't it swing back because of action- reaction forces? The racquet does not swing backwards because the force of your arm keeps it from going back. The action force is the ball hitting the racquet. The reaction force is the racquet pushing back on the ball causing it to go back across the net and by the other player.
   8. What forces are acting on a book sitting on a table? Are action- reaction forces involved in this situation? The force on the book is gravity pulling the book down and the table pushing the book back up. These two forces are equal and opposite so that means there are action forces and reaction forces.
   9. If two people each stand on a skateboard and push off of each other what happens (Newton's 3rd law)? When two people push off of each other they move away from each other and they would fall off the skateboard which would be equal and opposite.
   10. In question "i" how would the distance moved by the skateboard compare if one person had a lot more mass than the other person? The person with less mass would move away faster and would likely move a greater distance than the more mass person.