**11.17**

1. There is no dodecahedron with the property that there is something in back of it.
2. There is no dodecahedron with the property that there is something back of it.  
   ¬∃x (Dodec(x) ∧ (∃y BackOf(y,x)))  
     
   All dodecahedrons have the property that no objects are back of them.  
   ∀x (Dodec(x) → (∀y ¬BackOf(y,x)))
3. There is no tetrahedron with the property that it is the same size as any cube.  
   ¬∃x Tet(x) & there is a cube that is the same size as x  
   ¬∃x (Tet(x) & (∃y (Cube(y) & SameSize(x,y))))  
     
   All tetrahedrons have the property that there is no cube that is the same size.  
   ∀x (Tet(x) → (∀y (Cube(y) → ¬SameSize(x,y))))
4. Every dodecahedron has the property that it is the same size as some cube.  
   ∀x (Dodec(x) → ∃y (Cube(y) & SameSize(x,y)))
5. Every object that is between two dodecahedra is a cube  
   ∀x ∀y ∀z (Dodec(y) & Dodec(z) & Between(x,y,z) → Cube(x))
6. Every cube falls between two objects.  
     
   Every cube: ∀x Cube(x)  
     
   Between two objects: ∃y Ez Between(x,y,z)  
     
   ∀x (Cube(x) → ∃y ∃z Between(x,y,z))
7. Every cube with something in back of it is small.  
     
   ∀x ((Cube(x) & ∃y BackOf(y,x)) → Small(x))
8. Every dodec with nothing to its right is small.  
   ∀x ((Dodec(x) & ~∃y RightOf(y,x)) → Small(x))
9. Every Dodec with nothing to its right has something to its left.  
   ∀x ((Dodec(x) & ~∃y RightOf(y,x)) → ∃z LeftOf(z,x))
10. Any Dodec to the left of a cube is large.  
    ∀x ((Dodec(x) & ∃y LeftOf(x,y)) → Large(x))

**11.18**

1. There is no non-large object with the property that there is nothing in front of it.  
   ~∃x ~Large(x) & ~∃y FrontOf(y,x)
2. For every cube, if there is something in front of it then it’s small  
   ∀x (Cube(x) → (∃y FrontOf(y,x) → Small(x)))
3. Every dodec has the property that (every cube that is to the back of the dodec has the property that (the dodec is smaller than the cube))  
     
   ∀x (Dodec(x) → (∀y Cube(y) → (BackOf(y,x) → Smaller(y,x))))
4. If e is between two objects then they are both small.  
     
   The object e has the property that (if there are y and z and x is between y and z then y and z are small)  
     
   ∃y ∃z Between(e,y,z) → (Small(y) & Small(z))
5. For any z and y, if there is a tetrahedron that is between z and y, then z and y are small  
     
   ∀z ∀y ((∃x Tet(x) & Between(x,z,y)) → (Small(y) & Small(z))