**Modelling Photosynthesis**

“How does a chloroplast convert light energy into chemical energy stored as glucose?”

Light + 6CO2 + 6H2O  C6H12O6 + 6O2

**Task:**

In this activity your group will be working together to model the process of photosynthesis. Each group member will be a structure involved in photosynthesis. As a group your goal is to make a molecule of glucose from carbon dioxide and water.

**Materials:**

|  |  |
| --- | --- |
| Role Cards | Toothpicks (chemical bonds) |
| Marshmallow (carbon) x6 | Marshmallow (hydrogen) x12 |
| Marshmallow (oxygen) x18 | NADP Card x2 |
| ADP | Phosphates x 12 |

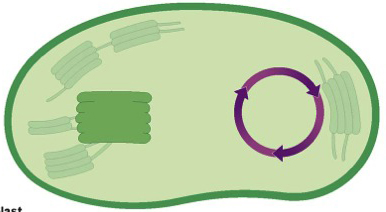
**Procedure:**

1. Build reactants. Water has single bonds. Carbon dioxide has double bonds
2. Stomata 1 collects water. Stomata 2 collects carbon dioxide
3. Shine a light on thylakoids.
4. Start the process of photosynthesis.
5. Call over Mr. Gingold when glucose is constructed (picture of glucose on projector)

|  |  |
| --- | --- |
| Structure (Member role) | Role |
| Stoma | 1. Deliver water 2. Take out oxygen |
| Thylakoid (light-dependent reaction) | 1. Transfer light energy to ATP **(add a P to ADP card)** 2. Transfer hydrogen from water to NADP **(Add a hydrogen marshmallow to NADP card)**   Synthesize oxygen gas |
| Stroma (light-independent reaction) | 1. Convert carbon dioxide into glucose **(recombine hydrogen, oxygen, and carbon marshmallows into glucose)** 2. Recycle NADP and ADP **(return NADP and ADP cards to thylakoid)** |
| Stoma | Deliver carbon dioxide |

**Conclusion**: Diagram the chloroplast below given your knowledge of photosynthesis.

1. Label reactants and products
2. Label two reactions
3. Label structure of photosynthesis



1. How is light converted into chemical energy in the thylakoid?
2. What happened to water in the thylakoids?
3. How is glucose made in the stroma?
4. What is the role of ADP and NADP in photosynthesis?
5. Was there anything wrong with your model? Did you have to break the rules? Why?