



# Formules et modèles moléculaires

## Jeu de Dominos

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Hervé ABBES (Académie d'Aix-Marseille)

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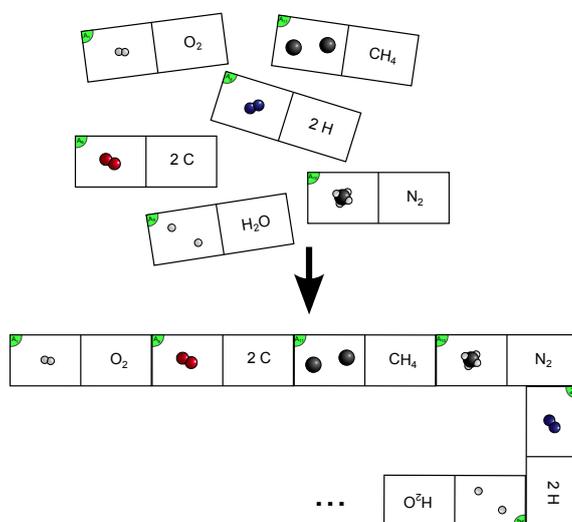
Voici quatre jeux de "Dominos" de difficulté croissante pour faire travailler les élèves sur le passage de la formule au modèle et du modèle à la formule. La notation qui servira dans les équations de réaction est abordée ainsi dans des exemples de plus en plus complexes.

Autant que possible, les diamètres relatifs des atomes et les angles des liaisons ont été respectés.

Il est recommandé d'imprimer les dominos sur du papier cartonné, ou mieux encore, d'imprimer sur papier normal mais de plastifier les tirages avant de massicoter entre les cartes.

Les jeux sont conçus à la base pour une utilisation linéaire (une seule carte convient à la suite d'une autre) et ils "bouclent", c'est à dire que la première carte est associée à la dernière et l'ensemble forme un rectangle qui tient sur une table.

Il y a un jeu avec seulement les modèles et les formules (jeu A) et un autre avec aussi des descriptions sous forme de phrases (jeu B).



### Correction des quatre jeux :

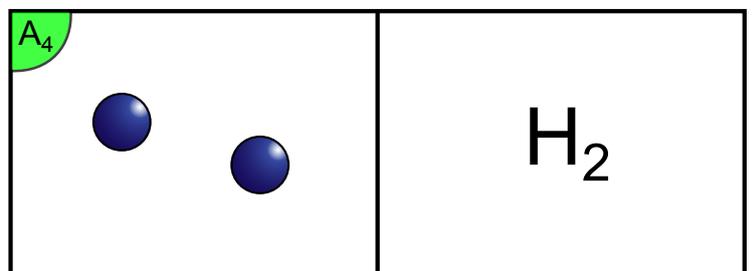
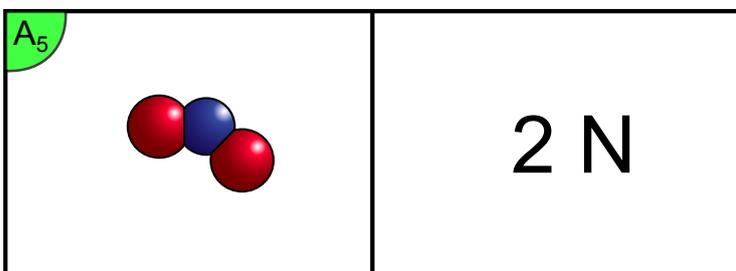
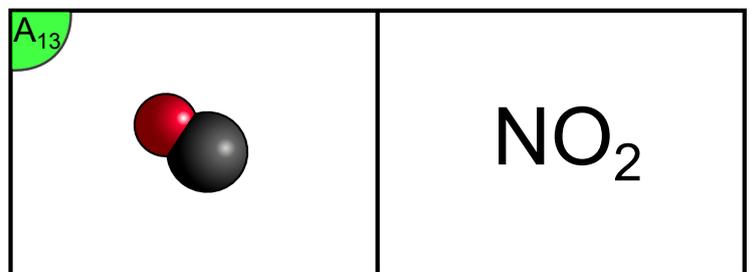
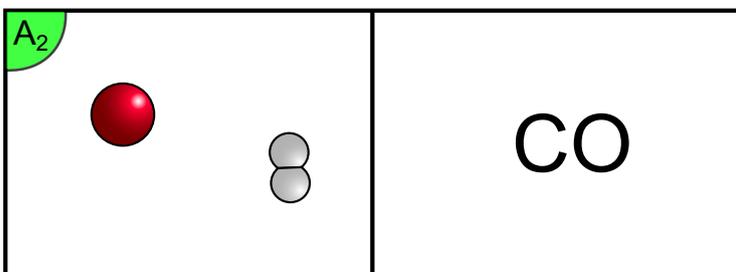
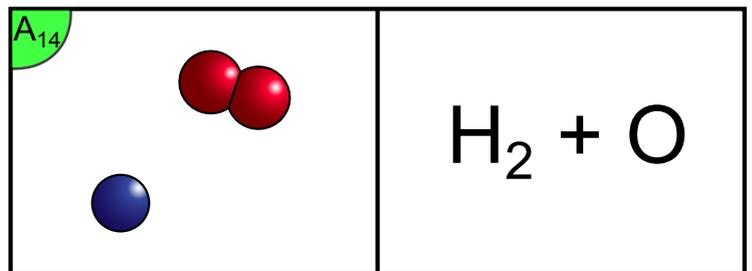
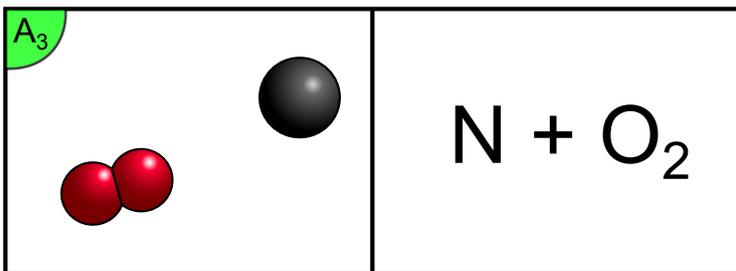
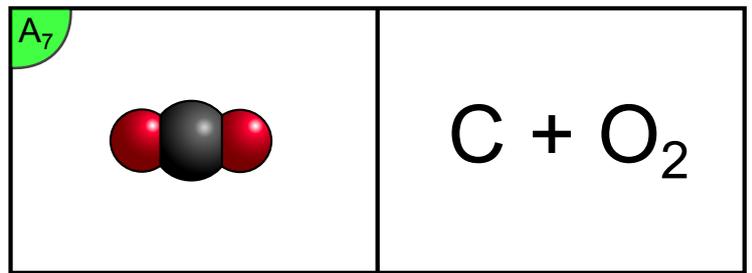
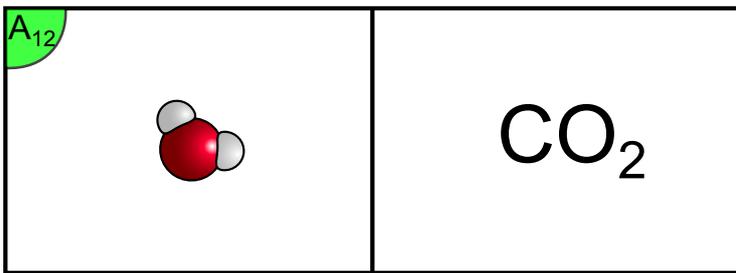
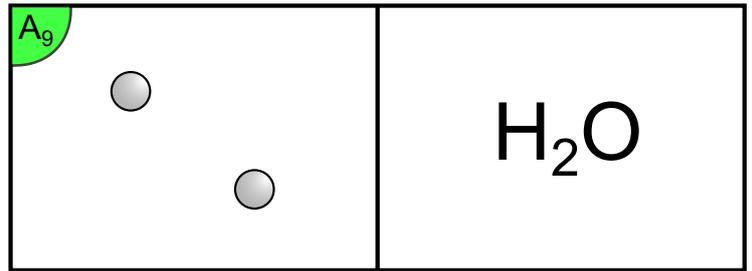
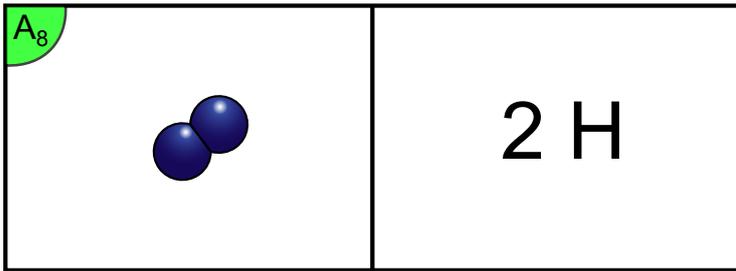
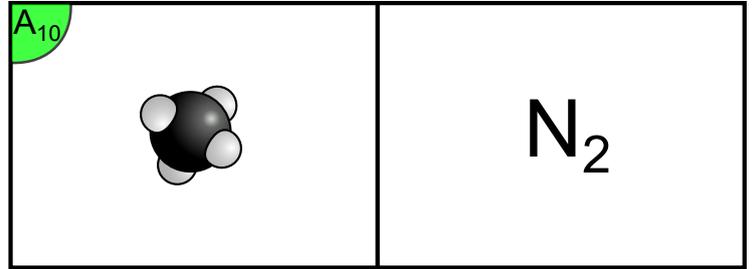
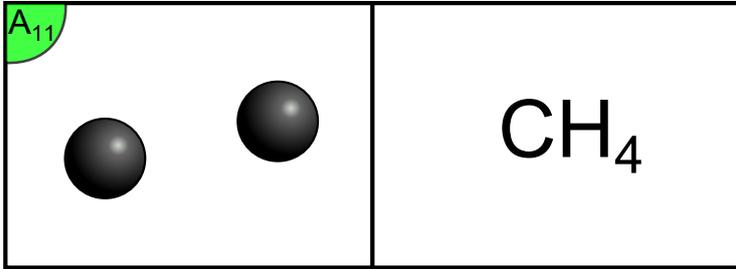
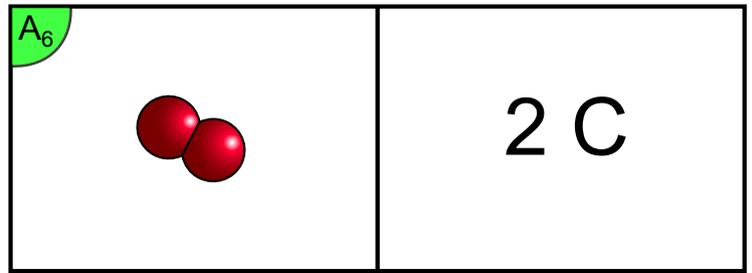
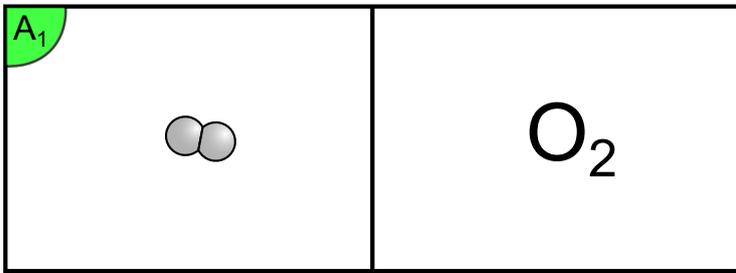
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B1 B6 B2 B14 B11 B10 B13 B8 B3 B4 B9 B12 B7 B5

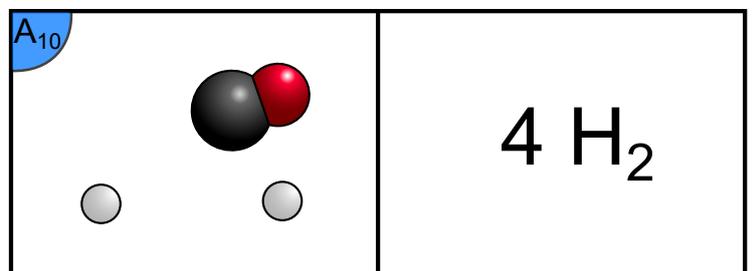
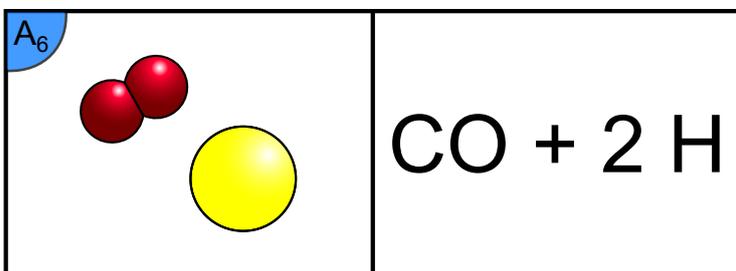
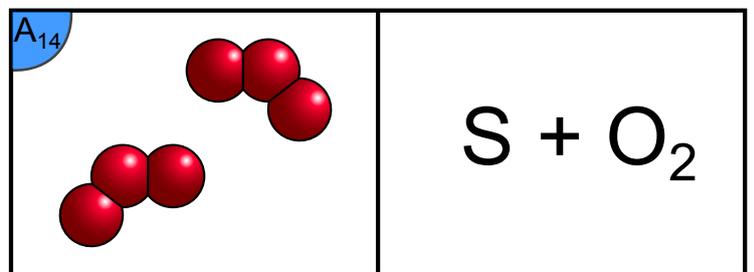
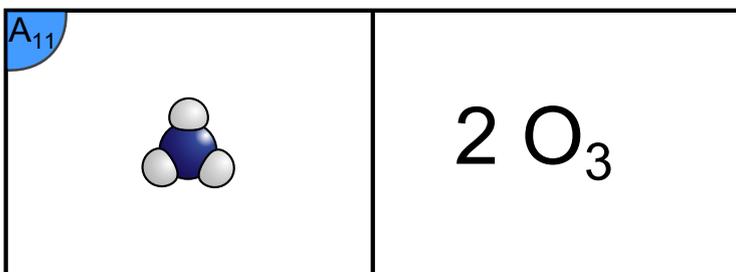
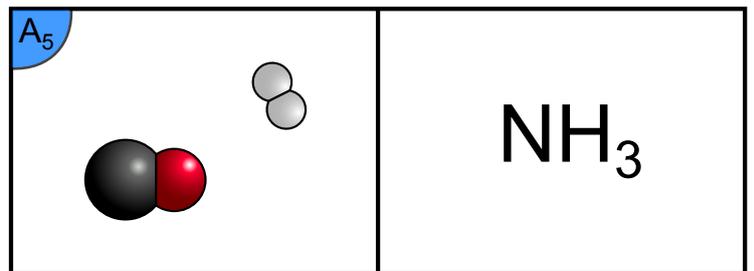
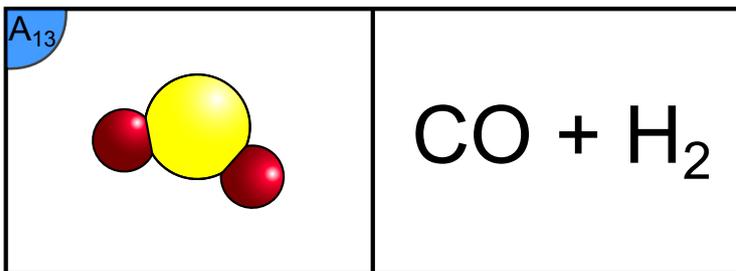
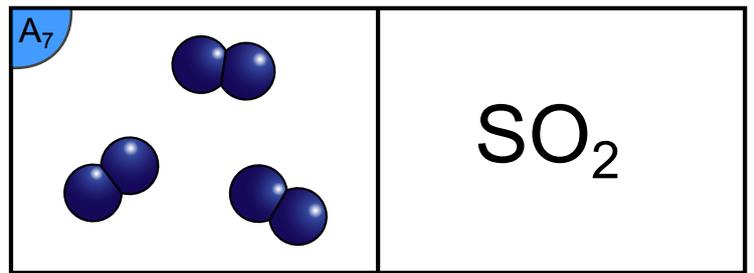
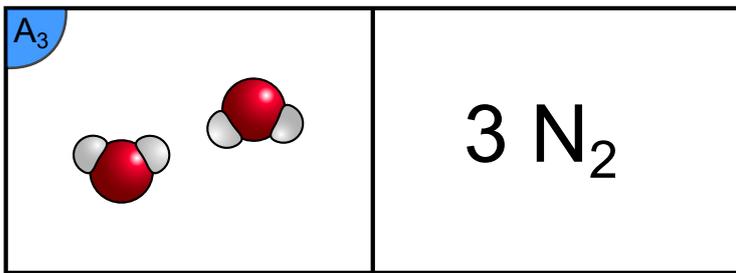
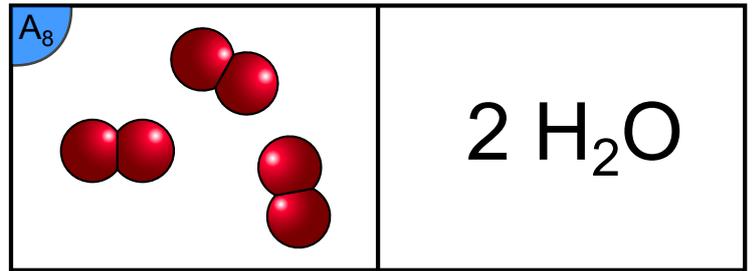
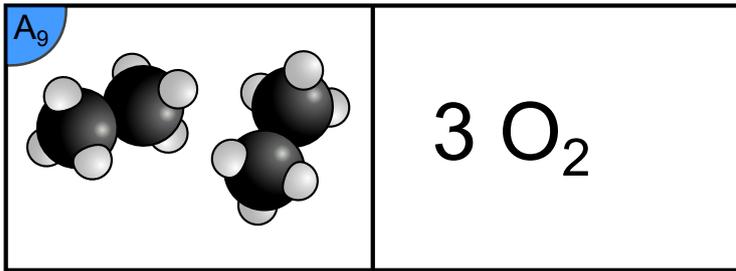
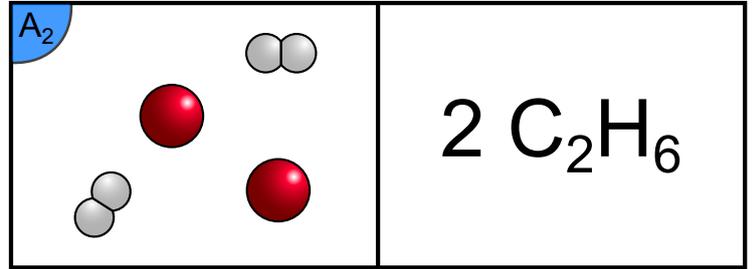
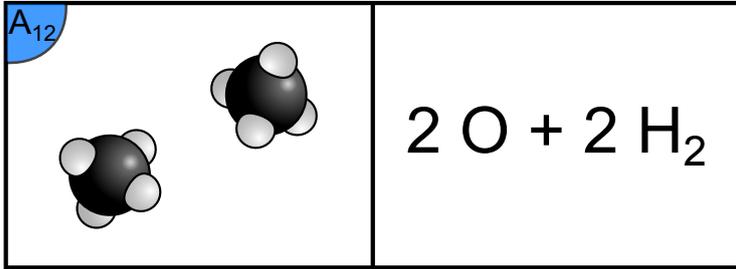
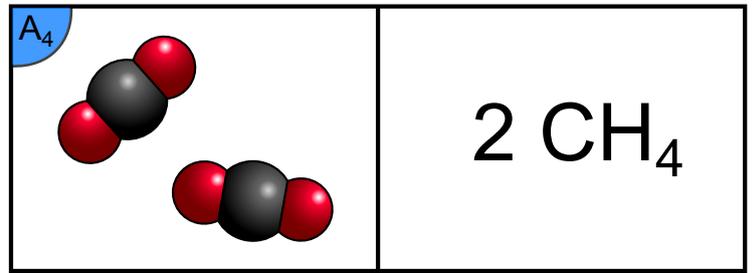
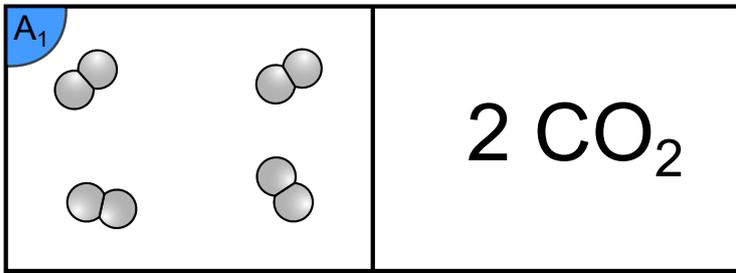
Moyen : A1 A4 A12 A2 A9 A8 A3 A7 A13 A5 A11 A14 A6 A10  
B1 B4 B13 B3 B7 B6 B2 B9 B12 B5 B11 B14 B8 B10

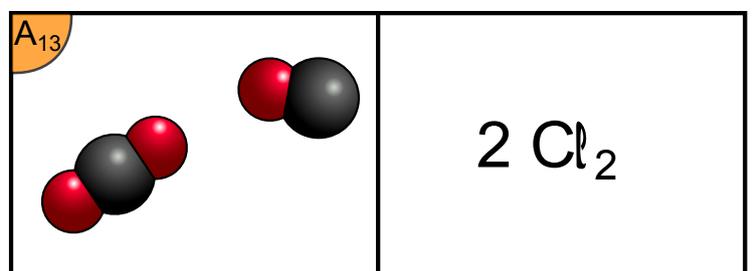
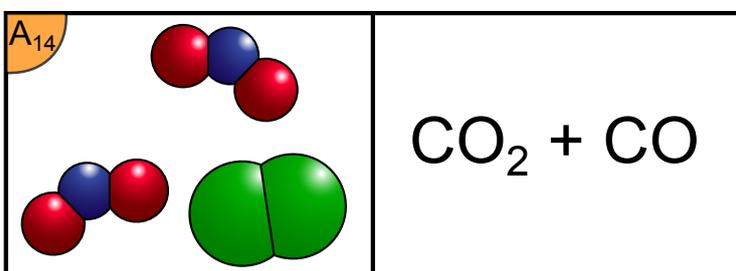
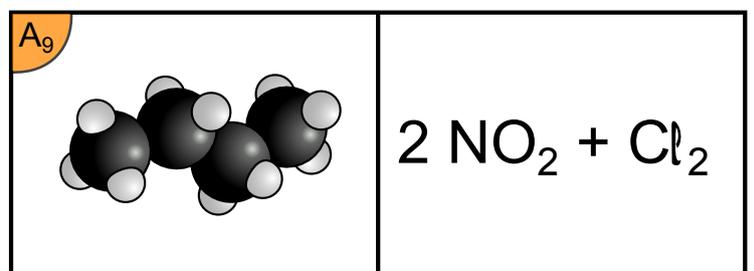
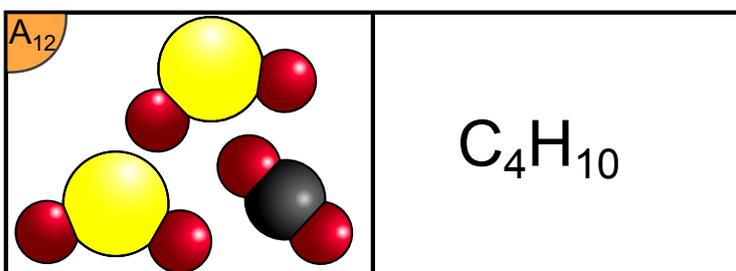
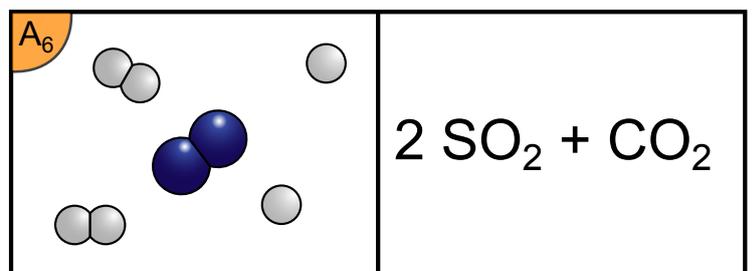
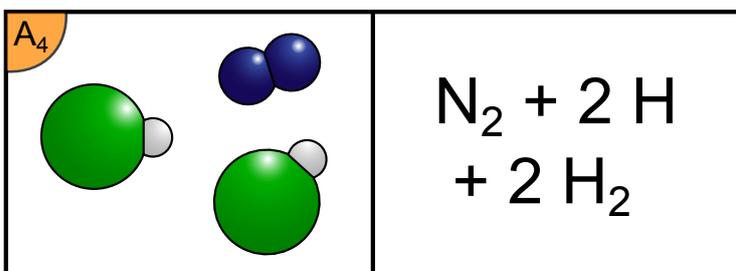
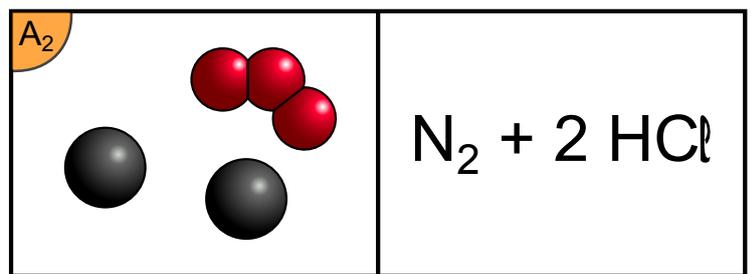
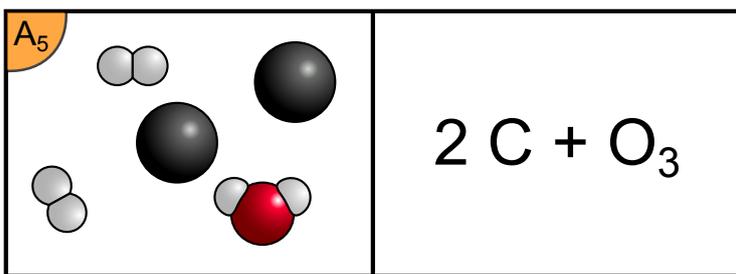
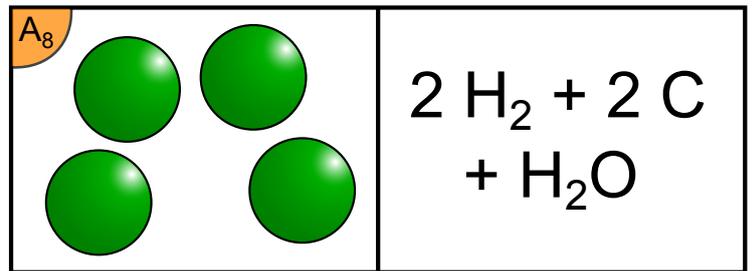
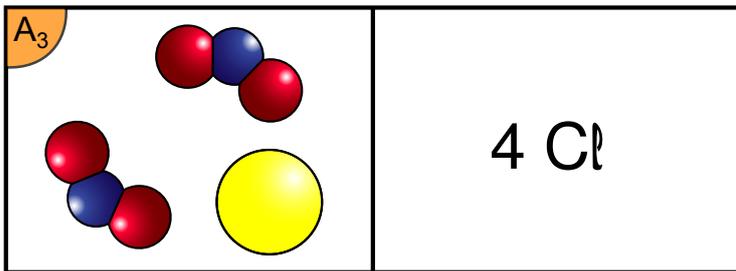
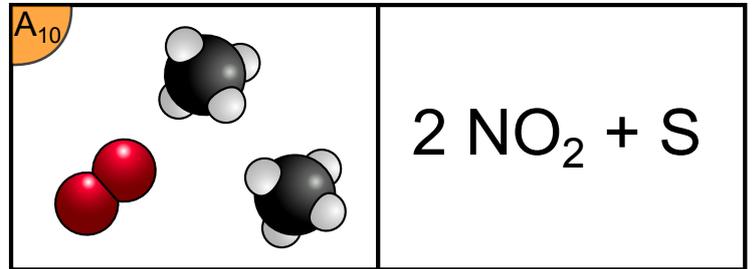
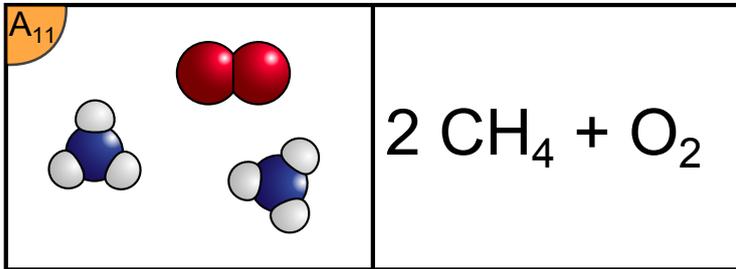
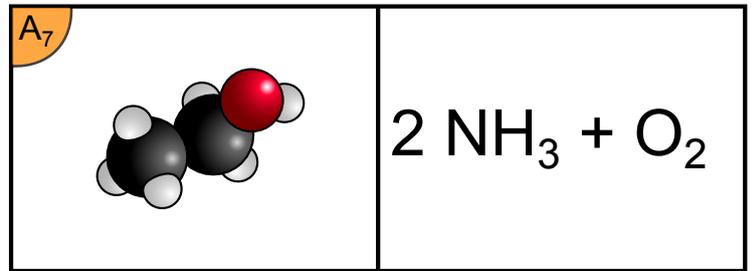
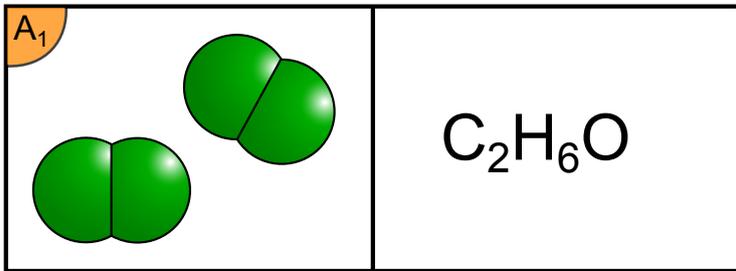
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B1 B2 B12 B10 B9 B8 B7 B5 B4 B6 B11 B3 B13 B14

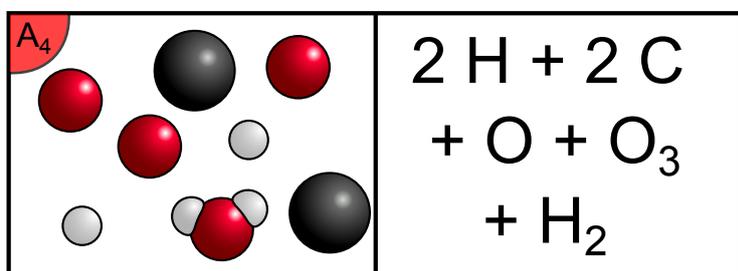
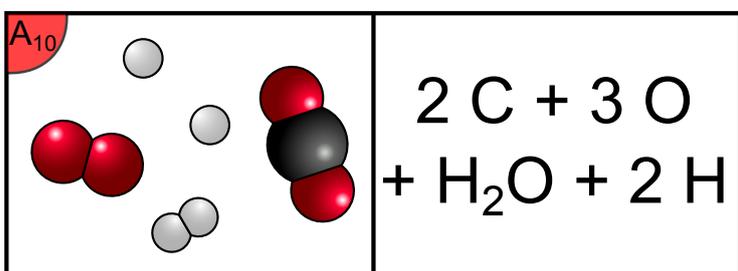
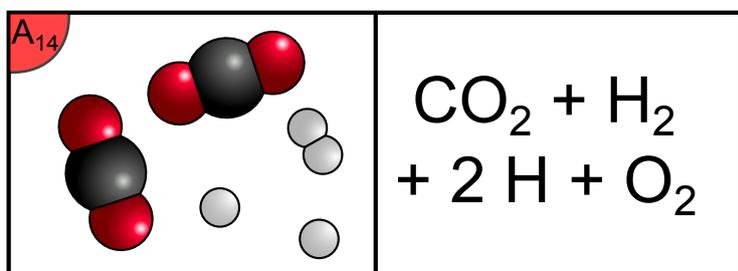
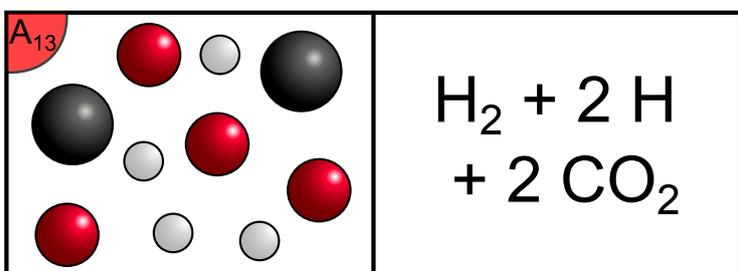
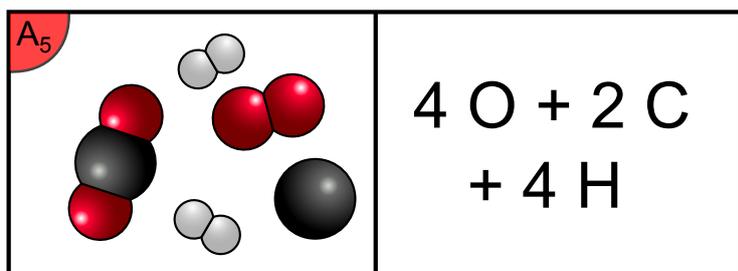
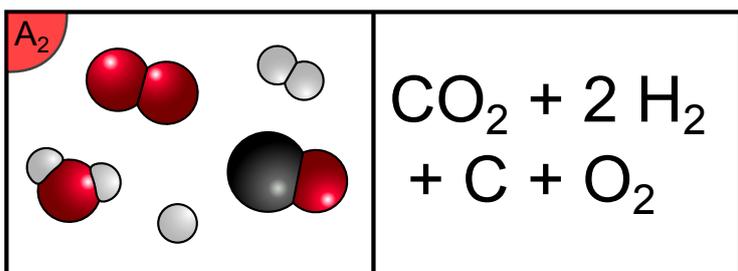
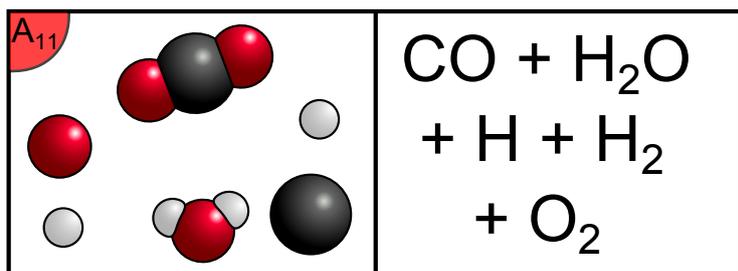
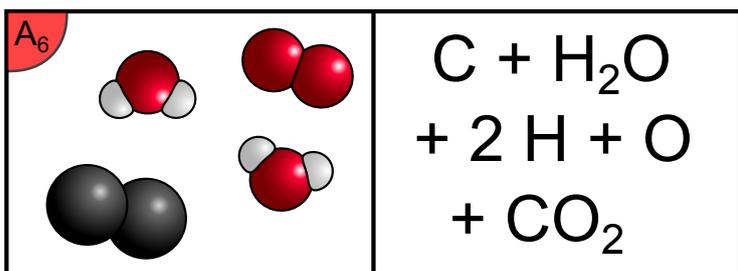
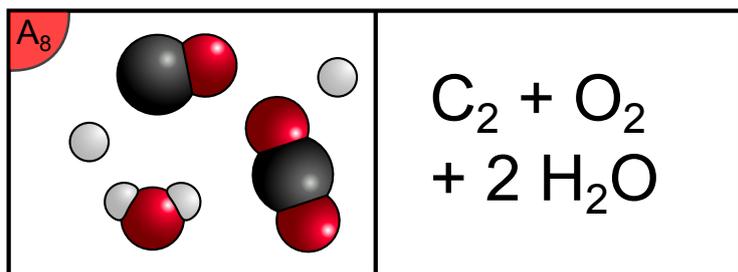
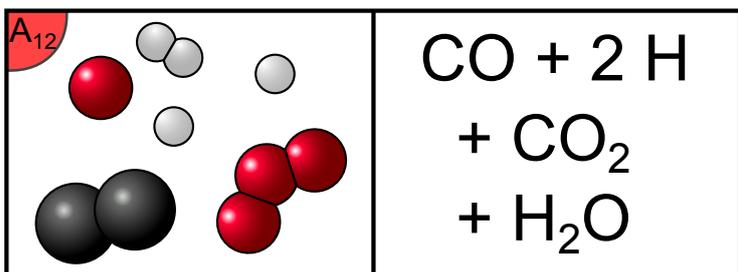
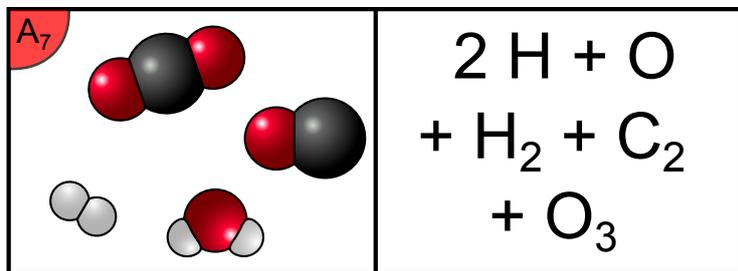
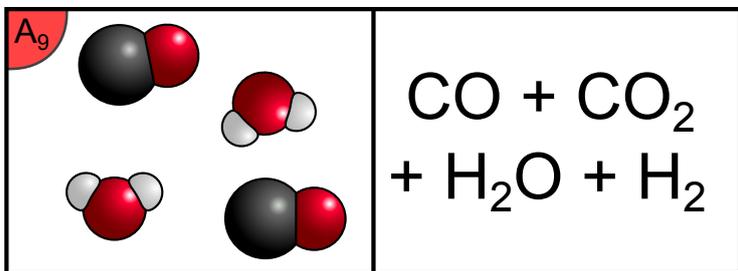
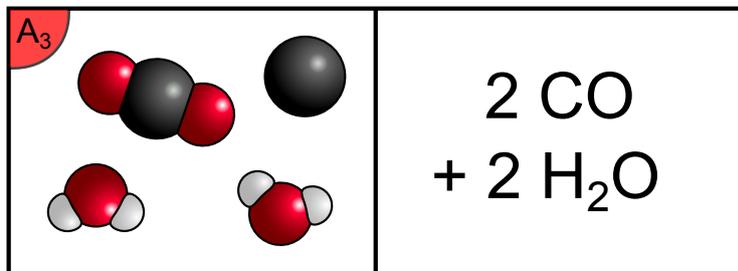
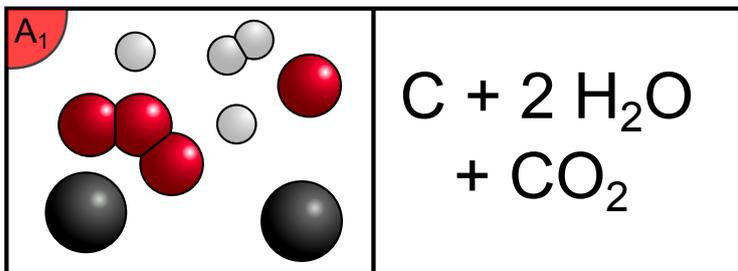
Très difficile : A1 A3 A9 A7 A12 A8 A6 A11 A2 A5 A13 A14 A10 A4  
B1 B9 B3 B7 B11 B8 B6 B12 B2 B5 B13 B10 B14 B4











B<sub>1</sub>



H<sub>2</sub>

B<sub>6</sub>

Une molécule de dihydrogène

CO<sub>2</sub>

B<sub>2</sub>

Une molécule de dioxyde de carbone

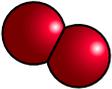
CH<sub>4</sub>

B<sub>14</sub>



O<sub>2</sub>

B<sub>11</sub>



2 N

B<sub>10</sub>

Deux atomes d'azote

H<sub>2</sub>O

B<sub>13</sub>

Une molécule d'eau

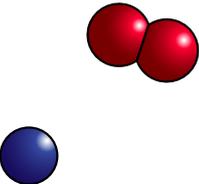
CO

B<sub>8</sub>



N + O<sub>2</sub>

B<sub>3</sub>



C + O<sub>2</sub>

B<sub>4</sub>

Un atome de carbone et une molécule de dioxygène

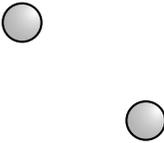
2 C

B<sub>9</sub>

Deux atomes de carbone

2 H

B<sub>12</sub>



H<sub>2</sub> + O

B<sub>7</sub>



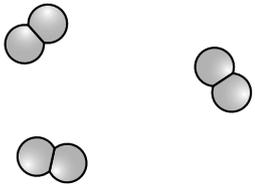
O<sub>3</sub>

B<sub>5</sub>

Une molécule d'ozone (trioxygène)

N<sub>2</sub>

B<sub>1</sub>



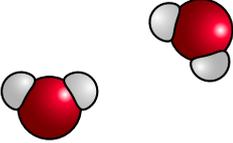
2 CO<sub>2</sub>

B<sub>4</sub>

Deux molécules de dioxyde de carbone

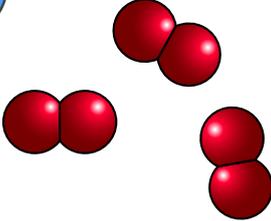
2 H<sub>2</sub>O

B<sub>13</sub>



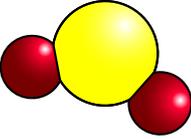
Trois molécules de dioxygène

B<sub>3</sub>



Une molécule de dioxyde de soufre

B<sub>7</sub>



2 O + 2 H<sub>2</sub>

B<sub>6</sub>

Deux atomes d'oxygène et deux molécules de dihydrogène

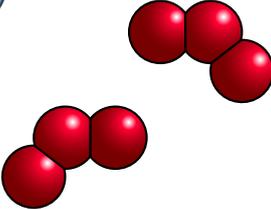
NH<sub>3</sub>

B<sub>2</sub>



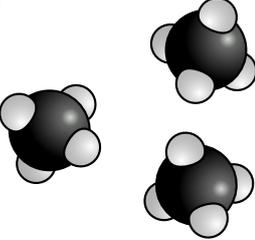
Deux molécules d'ozone (trioxygène)

B<sub>9</sub>



Trois molécules de méthane

B<sub>12</sub>



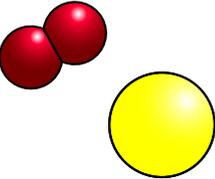
3 N<sub>2</sub>

B<sub>5</sub>

Trois molécules de diazote

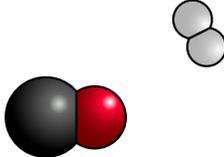
S + O<sub>2</sub>

B<sub>11</sub>



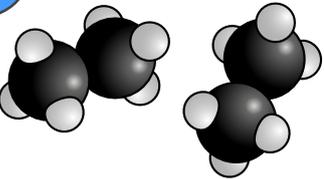
Une molécule de dihydrogène et une molécule de monoxyde de carbone

B<sub>14</sub>



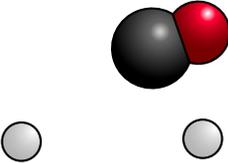
2 C<sub>2</sub>H<sub>6</sub>

B<sub>8</sub>



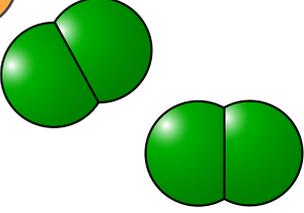
Une molécule de monoxyde de carbone et deux atomes d'hydrogène

B<sub>10</sub>



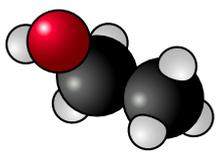
3 H<sub>2</sub>

B<sub>1</sub>



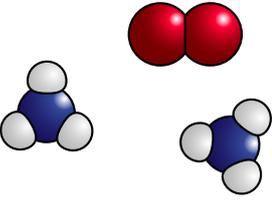
$C_2H_6O$

B<sub>2</sub>



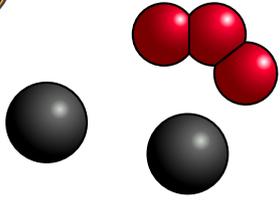
$2 NH_3 + O_2$

B<sub>12</sub>



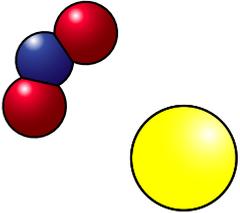
Deux atomes de carbone et une molécule d'ozone (trioxygène)

B<sub>10</sub>



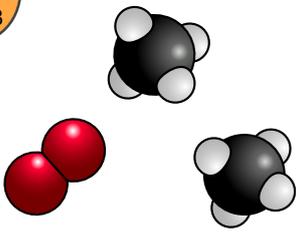
Un atome de soufre et une molécule de dioxyde d'azote

B<sub>9</sub>



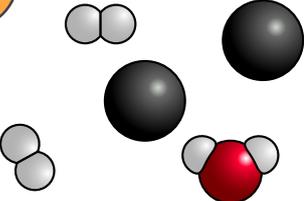
Deux molécules de méthane et une molécule de dioxygène

B<sub>8</sub>



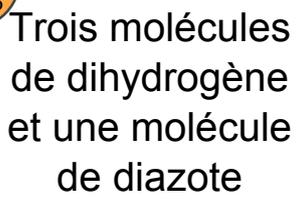
Deux atomes de carbone, une molécule d'eau et deux molécules de dihydrogène

B<sub>7</sub>



$N_2 + 3 H_2$

B<sub>5</sub>



Trois molécules de dihydrogène et une molécule de diazote

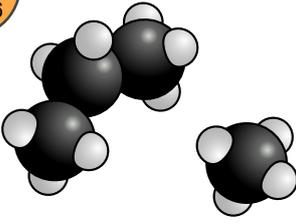
$N_2 + 2 HCl$

B<sub>4</sub>

Une molécule de diazote et deux molécules de chlorure d'hydrogène

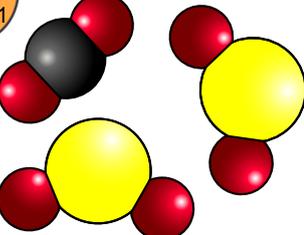
$C_3H_8 + CH_4$

B<sub>6</sub>



Deux molécules de dioxyde de soufre et une molécule de dioxyde de carbone

B<sub>11</sub>



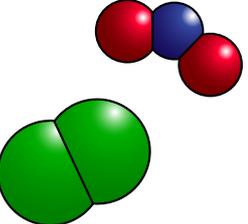
$4 Cl$

B<sub>3</sub>

Quatre atomes de chlore

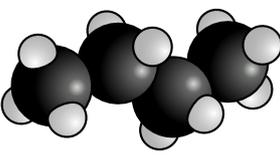
Une molécule de dichlore et une molécule de dioxyde d'azote

B<sub>13</sub>



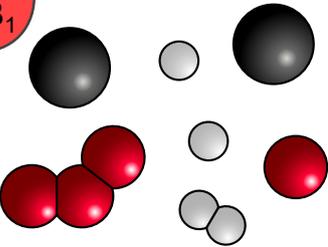
$C_4H_{10}$

B<sub>14</sub>



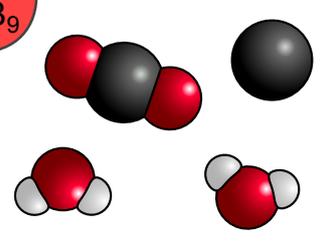
Deux molécules de dichlore

**B<sub>1</sub>**



Un atome de carbone,  
deux molécules d'eau,  
une molécule de  
dioxyde de carbone

**B<sub>9</sub>**



$2 \text{ CO}$   
 $+ 2 \text{ H}_2\text{O}$

**B<sub>3</sub>**

Deux molécules d'eau  
et deux molécules de  
monoxyde de carbone

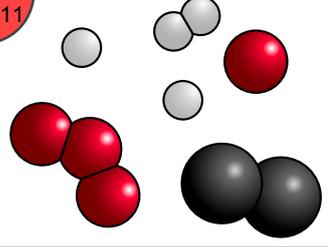
$\text{CO} + \text{CO}_2$   
 $+ \text{H}_2\text{O} + \text{H}_2$

**B<sub>7</sub>**

Une molécule de  
dihydrogène, une molécule  
d'eau, une molécule de  
dioxyde de carbone  
et une molécule de  
monoxyde de carbone

$2 \text{ H} + \text{O}$   
 $+ \text{H}_2 + \text{C}_2$   
 $+ \text{O}_3$

**B<sub>11</sub>**



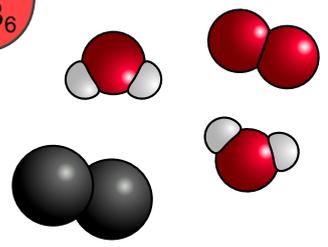
$\text{CO} + 2 \text{ H}$   
 $+ \text{CO}_2$   
 $+ \text{H}_2\text{O}$

**B<sub>8</sub>**

Deux atomes  
d'hydrogène, une molécule  
d'eau, une molécule de  
dioxyde de carbone  
et une molécule de  
monoxyde de carbone

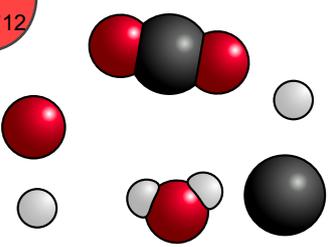
$\text{C}_2 + \text{O}_2$   
 $+ 2 \text{ H}_2\text{O}$

**B<sub>6</sub>**



Deux atomes d'hydrogène,  
une molécule d'eau,  
un atome d'oxygène,  
une molécule de  
dioxyde de carbone  
et un atome de carbone

**B<sub>12</sub>**



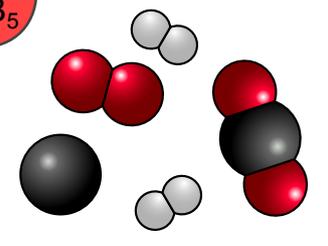
$\text{CO} + \text{H}_2\text{O}$   
 $+ \text{H} + \text{H}_2$   
 $+ \text{O}_2$

**B<sub>2</sub>**

Une molécule de  
dihydrogène, une molécule  
d'eau, une molécule de  
dioxygène, un atome  
d'hydrogène  
et une molécule de  
monoxyde de carbone

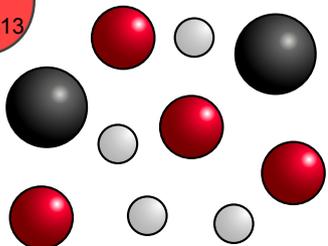
$\text{CO}_2 + 2 \text{ H}_2$   
 $+ \text{C} + \text{O}_2$

**B<sub>5</sub>**



Quatre atomes  
d'hydrogène,  
deux atomes de carbone  
et quatre atomes  
d'oxygène

**B<sub>13</sub>**



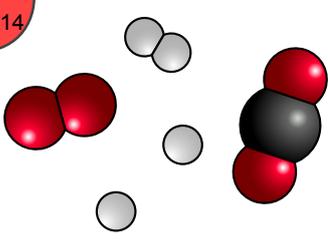
$\text{H}_2 + 2 \text{ H}$   
 $+ 2 \text{ CO}_2$

**B<sub>10</sub>**

Une molécule de  
dihydrogène, deux atomes  
d'hydrogène et  
deux molécules de  
dioxyde de carbone

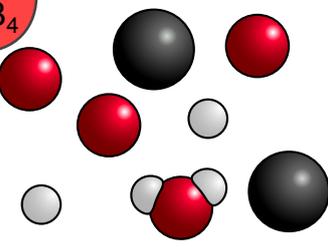
$\text{CO}_2 + \text{H}_2$   
 $+ 2 \text{ H} + \text{O}_2$

**B<sub>14</sub>**



Trois atomes d'oxygène,  
une molécule d'eau,  
deux atomes de carbone,  
et deux atomes  
d'hydrogène

**B<sub>4</sub>**



Deux atomes de carbone,  
deux atomes d'hydrogène,  
une molécule d'ozone,  
un atome d'oxygène  
et une molécule  
de dihydrogène